

CLIMATE CHANGE ADAPTATION PROGRAM

Call for Project Proposals

Submission deadline: September 22, 2023 at midnight Eastern Daylight Time

Applicant Guide

This Guide provides an overview of the eligibility requirements, available funding, and process to submit an application for a cost-shared project under the Climate Change Adaptation Program (CCAP) (2022–2027).

Climate Change Impacts and Adaptation Division
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Natural Resources
Canada

Canada

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1.0 CLIMATE CHANGE ADAPTATION PROGRAM

1.1 Program Overview

Canada's climate is changing and there is a growing need to respond through adaptation to reduce current and future climate impacts and optimize opportunities. Most businesses and communities understand the risk that climate change poses, but many lack the supporting tools and specialized professional capacity to properly evaluate options and make informed decisions about investments in climate change adaptation. Decision-makers also face a persistent challenge with respect to their ability to translate expert knowledge into adaptation-informed decisions. Moreover, there are significant knowledge gaps and emerging issues that require further exploration, and a need for enhanced collaboration and coordination between different stakeholders and partners to enhance progress on adaptation in Canada.

Natural Resources Canada's Climate Change Adaptation Program (2022–2027) supports the goals of Canada's National Adaptation Strategy and helps position Canada's regions and sectors to undertake approaches and actions that will enable them to adapt to a changing climate. More specifically, the Program aims to 1) support communities, decision-makers and natural resource-sector businesses in identifying, developing, and implementing adaptation actions, 2) support the enhancement of adaptation knowledge and skills among Canada's professionals and workforce more broadly, and 3) increase access to climate change adaptation tools and resources.

This Call for Proposals is intended to identify cost-shared projects that will make important contributions to advancing adaptation progress in Canada and delivering impact, based on the topics identified in Section 2.2 and described in Annex 1.

2.0 OVERVIEW OF FUNDING

2.1 Eligible Projects

Up to \$15 million in contribution funding may be awarded through this process. Funds will be awarded based on the merits and feasibility of proposals received (see Section 4.1). Subsequent calls for proposals may be issued.

Eligible projects must facilitate the development, sharing, and application of knowledge, tools, and practices that will assist communities, decision-makers, and natural resource-sector businesses in taking adaptation-informed decisions and developing and implementing adaptation actions. Proposed project activities and deliverables should consider the needs of intended audiences and end-users and be designed in a way that helps to facilitate adaptation decision-making and action (e.g., case studies, concise reports, guidance documents).

Projects requesting less than \$150,000 of NRCan funding, as well as projects that include profit-making initiatives will not be considered through this Call for Proposals. See Section 2.2 and Annex 1 for more information about the different topics that will be considered under this Call for Proposals.

2.2 Topics

NRCan is soliciting proposals for cost-shared projects that address climate change adaptation on the following topics: adaptation skills, economics, emerging issues, and natural resource sectors. See Annex 1 for details on each topic.

2.3 Project Duration

Projects should have a start date no earlier than January 1st, 2024. The duration of the projects should be based on the scope of the work. Projects must be completed no later than December 31, 2026.

2.4 Eligible Recipients

Eligible recipients include individuals and legal entities validly incorporated or registered in Canada, including for-profit and not-for-profit organizations, such as:

- Academic institutions
- Non- governmental organizations
- Industry, research, and professional associations
- Companies and businesses
- Indigenous communities or governments
- Community, regional and national Indigenous organizations
- Provincial, territorial, regional and municipal governments and their departments and agencies

Applicants must demonstrate that their organization has the expertise and financial capacity necessary to deliver the project.

2.5 Intellectual Property

All intellectual property developed through the project will remain the property of the proponent. However, materials produced by the projects funded through this Call for Proposals must be made publicly available at no cost. The exception to this is for training programs, which may recover the costs required to deliver them. NRCan will also receive copies of, and will have free use of, any/all of the intellectual property created with NRCan funds in order to further enhance the availability of knowledge and tools for advancing adaptation in Canada.

3.0 HOW TO APPLY

3.1 Application Form and Required Documents

Applicants must use the **Application Form** (fillable PDF) available on the [Call for Proposal webpage](#) and complete all of the required fields. Within the form, applicants should clearly identify which topic the project relates to, based on the options described in Section 2.2 and Annex 1. Applicants are requested to consider the suggested word limits when preparing their responses to the questions.

Applicants are requested to complete and save an electronic version of the Application Form, as printed and scanned versions will not be accepted. Please save this form with the name “2023 CFP – lead organization name” and put “2023 CFP – lead organization name” in the subject line of your email when submitting your application.

In addition to the Application Form, applicants will need to provide the following attachments with their application:

- Attachment: Budget using the template provided (see Section 3.2).
- Attachment: Short (two page) CV for the project lead and for each team member involved in delivering the project. Please focus on providing information that demonstrates expertise in the topic and project management.
- Attachment: Work plan (to be completed either within the Application Form OR as an attachment).

- Attachment: Letter of support from each funding source (other than NRCan) that is making an in-kind or financial contribution to the project (see Section 3.4), as described in the budget.

Complete applications should be submitted by email to adaptation@nrcan-rncan.gc.ca by the submission deadline (see Section 3.5).

Applicants may submit more than one application to this call and are requested to submit a separate application for each proposed project.

3.2 Budget Template

Applicants are requested to use the **Budget Template** available on the [Call for Proposals webpage](#) and provide a project budget broken down by federal fiscal year (April 1 to March 31). The project start date and end date must be clearly indicated in the template (see section 2.3). Please see Section 3.3 for more information about eligible vs. non-eligible expenditures.

Federal funding must be complemented by other sources of funding as described in Section 3.4. The budget must include the amounts (cash and/or in-kind) and name the other sources of funding.

*It is important to note that NRCan funding is available according to the Government of Canada's fiscal year (April 1 to March 31) and is **NOT** transferable from one fiscal year to the other. **Unspent funds within a given fiscal year will be lost** and cannot be reprofiled to another fiscal year.*

3.3 Eligible and Non-eligible Expenditures

Eligible Expenditures must be directly related to the proposed project and include expenditures within the following cost categories:

- Salaries and benefits
 - "Salary" applies only for staff on the lead organization's payroll. NRCan funds cannot be used to augment the salary of an existing full-time employee.
 - Staff remunerated through a contract should be listed under the "Professional, scientific, and contracted services" cost category.
- Professional, scientific, and contracted services
 - Includes: staff remunerated through a contract, design and printing services; processing, analysis and management of data; computer support services; audio visual services; interpretation, teleconference and webinar services; and other services associated with the delivery of the project.
 - Applicants that are planning to undertake activities at the national level or in an officially bilingual region must include the cost of translation in the project budget.
- Honoraria and ceremonial costs where Indigenous recipients or Indigenous partners of recipients are involved
- Communication materials, publishing, and promotions
- Travel, including meals and accommodation
- Conference fees, approved on a case-by-case basis
- Materials, supplies, and equipment
 - Includes: laptop and desktop computers approved on a case-by-case basis; computer software; and library and bibliographic expenses.
- Facility rental
- License fees (e.g., access to datasets, IT applications)

- Overhead expenditures approved by NRCan to a maximum of 15% of NRCan’s contribution;
 - Includes: Administrative support provided directly to the project by the eligible recipients’ employee(s), valued on the same basis as professional staff time; heat, hydro and office operating costs (e.g., faxes, telephone).
- Reimbursement of the Goods and Services Tax, Harmonized Sales Tax, and Provincial Sales Tax, net of any tax rebate to which the Recipient is entitled

Non-Eligible Costs

Costs that **cannot** be covered with NRCan funding include:

- Costs related to capital items
- Hospitality (e.g., provision of food and beverages at meetings)
- Overhead costs in excess of 15% of NRCan’s contribution to the project budget

Projects cannot contribute to profit-making initiatives.

3.4 Requirements for Other Sources of Funding and Letters of Support

The Government of Canada may fund up to **60%** of the total cost of a project. Projects are expected to provide funding either in cash or through in-kind contributions from sources **other than** the Government of Canada. In-kind contributions must be specifically related to the project and can include documented time of presenters, staff time paid from non-federal sources, free use of meeting space, etc. Time of participants to attend conferences will **not** be considered towards in-kind contributions.

All other sources of funding except for that provided by NRCan should be documented in **letters of support** or emails from the supporting organizations. The letters of support must be included in the proposal and should clearly state:

- the source of the support,
- the nature of the support (e.g., cash or in-kind contribution),
- the amount (\$ or value of the in-kind contribution), and
- the period over which it will be supplied.

For in-kind salary contributions, the number of hours or days contributed per person, along with an average hourly or daily rate will need to be estimated.

The total amount of funding from other sources **over the entire course of the project** is what will be considered, not per fiscal year.

**** Note:** Indigenous organizations, governments, and communities, and Territorial governments applying through this competitive process may seek up to 100% of the total project costs from NRCan. Refer to the [Call for Proposal webpage](#) or contact the Program at adaptation@nrcan-rncan.gc.ca for information about the non-competitive process for Indigenous applicants.

3.5 Submission Deadline

Completed applications, including all attachments, must be submitted by email to adaptation@nrcan-rncan.gc.ca by **September 22, 2023** at midnight Eastern Daylight Time. Late submissions will not be considered. See section 3.1 for more information on what constitutes a complete application.

4.0 FUNDING DECISION

4.1 Review Criteria

This Call for Proposals is a competitive process. Proposed projects will be reviewed and evaluated by the Climate Change Impacts and Adaptation Division at NRCAN, supplemented by external review as necessary, based on the following review criteria:

Criteria #1: Project objective, intended audience(s), outputs and outcomes

- The proposed project addresses the goals and intended outcomes of at least **one topic** described in Section 2.2 and detailed in Annex 1 of this Applicant Guide.
- The **intended audience(s)** are clearly defined and are appropriate for the scope of the proposed project.
- The **products and outputs** of the proposed project are expected to enable the intended audience(s) to take adaptation action.
- The **intended outcomes** of the proposed project are appropriate and expected to deliver impact.

Criteria #2: Methodology and work plan

The **methodology and work plan** are appropriate and relevant for achieving the objectives of the proposed project and include a **sufficient level of detail** about the following:

- Appropriate **activities** for achieving the objectives of the proposed project.
- **Early and continued involvement** of intended audience(s), as appropriate.
- An approach to **knowledge mobilization** for reaching the identified intended audience(s).
- Relevant **equity, diversity, and inclusion considerations** related to the proposed project, as appropriate (e.g., engagement of marginalized groups, consideration of their needs in the development of adaptation actions, their inclusion in knowledge mobilization plans).
- The approach that will be used for **measuring** the proposed project's progress towards its proposed objectives, including the **indicators** that will be used, as appropriate.
- The approach that will be used to **incorporate Indigenous Knowledge** and/or engage with Indigenous communities, organizations, or groups, as appropriate.
- Use of **innovative approaches or methodologies, and/or generation of new knowledge** that helps to advance progress on adaptation, as appropriate.

Criteria #3: Capacity to deliver the project

- Relevant **technical and knowledge mobilization expertise**, and **capacity to manage funds** are clearly demonstrated and substantiated.

Criteria #4: Project budget

- Costs are **eligible and reasonable**, and **contributions from funding sources other than NRCAN** are supported with letters of support.
- The overall budget delivers good value for achieving the intended project objectives and outcomes.

Criteria #5: Collaboration and partnerships

- **Collaboration and partnerships** are leveraged to deliver meaningful results and ensure impact.
- **Appropriate project partners** are identified and involved in delivering the proposed project, and their roles in the project are clearly outlined.

Note: All applicants will be notified of the status of their application by email within 16 weeks of the closing date for this call.

4.2 Entering into a Contribution Agreement

Successful applicants will be required to enter into a Contribution Agreement with the Government of Canada. A Contribution Agreement is a written agreement between the Government of Canada and a recipient setting out the obligations or understandings of both with respect to the contribution. A template is available on request.

5.0 FOR MORE INFORMATION

5.1 Information Sessions

Information sessions using the Zoom platform will be held on July 18, 2023 at 1pm EDT (in English) and on July 19, 2023 at 1pm EDT (in French) to provide information about this Call for Proposals and to answer questions from potential applicants. Visit the [Call for Proposals webpage](#) to register. The information sessions will be recorded and made available on the Call for Proposals webpage.

5.2 Contact Information

Please contact us at adaptation@nrcan-rncan.gc.ca with any questions about this Call for Proposals.

ANNEX 1: CALL FOR PROPOSAL TOPICS

NRCan is soliciting proposals for cost-shared projects that address climate change adaptation on the following topics: adaptation skills, economics, emerging issues, and natural resource sectors. Further details are provided below.

ADAPTATION SKILLS

Up to **\$6.75M** available.

There is a need for a workforce in Canada that is equipped with the knowledge, skills, and behaviours (competencies) needed to assess vulnerability to climate change, understand climate risks, prioritize and evaluate adaptation options, and implement adaptation actions. A number of initiatives and investments have contributed to filling this need, including the *Building Regional Adaptation Capacity and Expertise (BRACE)* Program¹, however substantial gaps remain. These gaps are acknowledged in [Canada's National Adaptation Strategy](#) (NAS). For instance, a NAS objective under the Economy and Workers system is for Canada to “have a skilled, diverse, and adaptable workforce that is supported by education, training, knowledge, and skills development for responding to future climate change impacts.”

Funding under this topic is available for projects that help to equip 1) professionals that are well positioned to play a leading role in climate change adaptation, including professionals in engineering, planning, landscape architecture, accounting, and related professions, and/or 2) the workforce in natural resource sectors (i.e., mining, forestry, and energy) with the knowledge, skills, and behaviours (competencies) needed to include climate change considerations in their practice and to act on adaptation.

Priority will be given to projects of national scope that apply a systems approach, which involves implementing actions that take a holistic view, rather than focusing on siloed or isolated activities. In addition to the review criteria described in section 4.1, proposed projects under this topic must demonstrate that the work will be done in partnership with other relevant actors (e.g., professional associations, regulatory bodies, natural resource sectors, industry associations, academic institutions, and/or others as appropriate).

Subtopics:

Projects that focus on one or more of the following sub-topics will be considered:

- 1. Integrating climate change adaptation into professional requirements, policies, and standards**
Participation by professionals in climate change adaptation training programs, continuing education, and professional development opportunities is limited. This is in part because the acquisition of adaptation knowledge and skills is currently voluntary or optional, and also because such knowledge and skills are often not formally recognized. Furthermore, many professionals who already have the competencies needed to integrate climate change considerations in their work face challenges that limit their practical application, such as a non-supportive organizational culture, structure or governance model, and restrictive market demands and requirements (i.e.,

¹ [BRACE](#) (2017-2022) was an initiative under the [Pan-Canadian Framework on Clean Growth and Climate Change](#) that invested in training, knowledge-exchange activities, and practical action to increase the capacity of organizations, professionals, communities, and small-to-medium sized businesses to undertake climate change adaptation actions.

among employers and/or clients). Proposed projects under this sub-topic should support the integration of climate change adaptation into professional requirements, policies, and standards among professions and/or in natural resource sectors. Examples of possible activities include:

- Integrating and mainstreaming climate change adaptation knowledge and skills into post-secondary education and certification programs.
- Assessing what types of positions and roles within a given profession or sector should include adaptation competencies and identifying which ones, as well as identifying gaps or barriers to acquiring those competencies.
- Formalizing adaptation skills development as a licensing or continuing education requirement within a given profession or sector.
- Establishing standards for climate change adaptation qualifications or accreditations, as well as standards of practice at the national or regional level, within a given profession.

2. Enhancing access to relevant and appropriate training resources and tools for implementing adaptation actions

Several adaptation training resources and tools have been developed in recent years. However, many professionals and workers in natural resource sectors—especially among organizations that have low capacity and/or in remote communities—find it challenging to stay up to date on new developments, discern which resources best meet their needs and context, where to find them, and how to apply theoretical knowledge into practice and decision-making. Proposed projects under this sub-topic should expand the reach, availability and accessibility of adaptation training resources and tools among professionals and/or among the workforce in natural resources sectors (mining, forestry, energy). Examples of possible activities include:

- Adapting existing training resources and tools to ensure that the adaptation skills and needs within one or more professions and/or natural resources sectors are met.
- Developing case studies that present practical examples and guidance on adaptation skills development.
- Developing business cases for enhancing adaptation knowledge and skills within one or more professions and/or within one or more natural resource sectors.
- Improving access to adaptation training resources and tools among professions and/or natural resource sectors, including through improved coordination among partners and stakeholders and through enhanced knowledge mobilization.

Proposed projects under this subtopic should build from existing resources and tools, where possible, and demonstrate how the organization(s) involved in developing the original resources and tools will be engaged in the projects, as appropriate.

3. Innovative activities and initiatives for enhancing adaptation action

Proposed projects under this sub-topic should include innovative activities and initiatives that use a systems approach for addressing key gaps in enhancing adaptation competencies and action on climate change adaptation among professionals and/or the workforce in natural resource sectors (energy, forestry, mining).

ECONOMICS

Up to **\$2.5M** available.

This topic focuses on advancing knowledge of the economics of climate change impacts and adaptation measures in Canada; exploring the use of innovative economic tools and instruments; as well as building capacity to use economic information in adaptation decision-making.

Subtopics:

Proposed projects should address one or more of the following sub-topics:

1. Economic analysis of climate change impacts and adaptation

Economic analysis can provide a framework for assessing the cost-effectiveness of different adaptation options and informing the business case for adaptation. While much progress has been made in this area, there are a number of sectors and regions within Canada where such analysis is lacking. Proposed projects under this sub-topic should undertake economic analysis of climate change impacts, as well as examine the costs and benefits of adaptation actions for addressing those impacts in one or more of the following:

- Sectors where such economic analyses are limited or lacking, including energy, tourism, transportation, and water resources.
- Areas or regions where such economic analyses are lacking.
- Among First Nations, Inuit, and Métis Peoples.
- Local or regional scale economic analysis that integrates economic information from multiple sectors.
- Local or regional scale economic analysis that examines inter-sectoral climate change impacts and possible adaptation actions for addressing those impacts.

Note: The analytical tools used in the projects can include cost-effectiveness analysis, multi-criteria decision analysis, as well as tools designed to support adaptation decision-making in the presence of deep uncertainty (e.g., real options analysis, adaptation pathways, robust decision making, portfolio analysis). Analysis should include low-probability/high-consequence extreme events and/or slow-onset climate change impacts. Analysis should also include non-technical adaptation options, such as behavioural interventions to overcome barriers to change. Outputs may include business cases for action on adaptation.

2. Canadian case studies

Case studies should address one or more of the following and, where possible, be based on actual data:

- How costs and benefits of adaptation actions are distributed among different actors, to aid in the design and implementation of future adaptation actions.
- Which types of adaptation actions have the greatest economic merits and under what circumstances.
- Economic merits of sequencing adaptation decisions over time under multiple futures.
- Economic appraisals of previously adopted adaptation actions.

Note: If the project is being proposed by an organization other than the one whose data will be used in the study, a letter of support from that organization supplying the data will be required with the application, along with an explanation of how they will be engaged in the project. Please note that the final reports from these projects will be made public, but certain information can be anonymized, if necessary.

3. Economic instruments and tools for supporting adaptation decision-making

A range of economic instruments and tools are available to support decision-making related to different adaptation options and in understanding trade-offs. Proposed projects under this sub-topic should include one or more of the following:

- Designing innovative economic instruments and tools for supporting adaptation action and informing adaptation decision-making within the Canadian context.
- Developing case studies that draw on one or more economic instruments or tools to test assumptions and analyze public acceptance, barriers to implementation, and/or unintended consequences.
- Assessing economic instruments currently in use in Canada and/or in other countries and determining how they could be modified, if necessary, to incentivize and/or finance the implementation of adaptation measures in one or more sectors in Canada. Proposed projects may consider financial, behavioural, and/or informational economic instruments.

4. Non-market climate change considerations and co-benefits of adaptation

Climate change results in a wide range of non-market and/or intangible impacts (e.g., welfare losses, premature mortality, species loss, loss of cultural heritage, forced migration), which can be difficult to value in economic terms, but are important to capture in economic analysis. Similarly, adaptation actions can deliver benefits in other areas (e.g., climate change mitigation, economic development, health and wellbeing, social equity outcomes, ecosystem services), which can be difficult to define in economic terms. Proposed projects under this sub-topic should include one or more of the following:

- Undertaking economic assessments of non-market and/or intangible impacts of climate change, to be able to capture them in economic analysis and minimize underinvestments in adaptation.
- Documenting the range of co-benefits associated with different types of adaptation actions in one or more sectors and undertaking an economic assessment of their financial value to be able to capture them in economic analysis and adaptation decision-making.

5. Domestic and international climate risks for businesses

The impacts of climate change in Canada and around the world, as well as adaptation actions taken to address these impacts, will have implications for Canadian businesses, including related to physical assets, disruptions to supply chains and distribution networks, and changes in the availability and price of traded goods. There is a need for businesses to improve the consideration of climate risks and adaptation actions in their decision-making and risk management approaches. Proposed projects under this sub-topic should include one or more of the following:

- Conducting research to better understand how climate change impacts in other parts of the world (e.g., to primary production, global supply chains, damage to foreign assets,

health impacts to foreign workers) directly and/or indirectly affect Canadian businesses within specific sectors.

- Developing case studies on the application of foresight tools (e.g., scenario planning, horizon scanning), as well as holistic approaches that combine climate and non-climate drivers and outcomes (e.g., systems mapping, cumulative effects assessment) for assessing risks of international climate impacts for specific sectors in Canada.
- Conducting research to better understand how small and medium-sized businesses in Canada, particularly those that are highly exposed to climate risks, are assessing and responding to these risks.
- Conducting research to better understand incentives for different types and sizes of businesses in Canada to make investments in climate change adaptation.

6. Costs and benefits for enhancing the resilience of homes and residential buildings

Homes and residential buildings are exposed to a wide range of risks from climate change. Further economic information and analysis is needed on the costs and benefits of different adaptation actions that homeowners and residential building owners can consider for minimizing climate risks. Proposed projects under sub-topic should include one or more of the following:

- Conducting research into the return on investment for different types of residential adaptation measures (e.g., sump pumps, heat pumps) that homeowners and builders can consider for reducing climate risks for new or existing homes.
- Documenting the range of co-benefits associated with different types of current and emerging residential adaptation measures, as well as their financial value, to support decision-making.
- Conducting research into skills and/or supply chain issues related to different types of residential adaptation measures and technologies.

NRCan expectations from applicants for project funding under this topic: If the project is being proposed by an organization other than the one whose data will be used in the study, a letter of support from that organization supplying the data will be required with the application, along with an explanation of how they will be engaged in the project. Please note that the final reports from these projects will be made public. However, if desired, information identifying the company or site studied can be removed from the public report.

EMERGING ISSUES

Up to \$2M available.

Adaptation is a highly cross-disciplinary and rapidly evolving field. New adaptation knowledge, approaches, and actions are regularly being identified, developed, tested, and implemented in a wide range of sectors and at different levels (e.g., local, regional, national). A number of emerging adaptation issues are on the rise in Canada, where new research and work is needed to advance the available knowledge base and expand our understanding of how best to adapt to a changing climate.

Subtopics:

Proposed projects should use an innovative approach and/or have potential to make important contributions in advancing the knowledge base for one or more of the following sub-topics:

1. Lessons learned from the implementation of adaptation actions

While important progress has been made in terms of adaptation planning within many sectors and communities across Canada, implementation of adaptation actions is not yet keeping pace with the level needed to address current and projected climate change impacts. Enhancing our understanding of lessons learned from previously implemented adaptation actions can help to advance progress. Proposed projects should reference specific existing examples of adaptation (e.g., from case studies, reports) and address one or more of the following:

- Assessing the success of moving from planning to implementation of adaptation actions, including the barriers, drivers, and enablers.
- Assessing the effectiveness of implemented adaptation actions for addressing climate change impacts.
- Exploring intended and unintended outcomes, as well as co-benefits of implemented adaptation actions.
- Exploring factors that contribute to maladaptation (where adaptation actions have unintended consequences such as further increasing risks or vulnerability) and how these can be avoided.
- Exploring social equity, justice, gender, diversity, inclusion, and/or intersectionality considerations related to the implementation of adaptation actions (e.g., impacts of a given adaptation action on different population groups, successes following engagement with particular population groups, successes in Indigenous climate leadership).
- Comparing different types of adaptation approaches, including costs, benefits, and challenges.

2. Behavioural, social, and cultural barriers, drivers, and enablers of adaptation action

A wide range of factors can influence the extent to which adaptation action occurs, including economic, social, behavioural, and cultural considerations. For instance, adaptation action can be hindered by different types of barriers (e.g., lack of support from senior decision-makers, knowledge or data gaps) or propelled forward through diverse drivers (e.g., adaptation policies or strategies) and enablers (e.g., availability of adaptation training and resources)—factors that either directly or indirectly support adaptation action. While there is a growing knowledge base and understanding of economic barriers, drivers, and enablers for adaptation action, further work is needed to better understand non-economic considerations, such as behavioural, social or cultural biases and incentives. Proposed projects under this sub-topic should include one or more of the following:

- Expanding our understanding of behavioural, social, and cultural barriers to adaptation and possible approaches to overcome those barriers, including within specific sectors.
- Expanding our understanding of behavioural, social, and cultural drivers and enablers to adaptation, including within specific sectors, and how to increase their uptake.
- Exploring systemic barriers, drivers, and enablers of adaptation, and approaches for

catalyzing system-level or transformational adaptation.

- Exploring innovative approaches for communicating with intended audiences about climate change impacts and adaptation to enable action.

3. Intangible impacts of climate change and adaptation approaches for addressing them

Climate change is resulting in a wide range of economic, social, cultural, and environmental impacts in Canada, many of which are very visible and/or easily quantifiable (e.g., infrastructure damage following an extreme weather event, reduced agricultural yields due to changing precipitation patterns). Other types of impacts are more difficult to measure and/or value, such as damage to or loss of sites of cultural or social importance (e.g., loss of a traditional burial site due to sea-level rise) and disruptions in the transfer of Indigenous Knowledge within and between generations. Proposed projects under this sub-topic should include one or more of the following:

- Exploring the nature, breadth, and types of intangible climate change impacts within Canada.
- Exploring the social and cultural implications of intangible climate change impacts for different population groups.
- Exploring the role of Indigenous Knowledge and/or place-based knowledge for addressing intangible climate change impacts.
- Exploring innovative adaptation approaches for addressing intangible climate change impacts.
- Exploring approaches to account for intangible climate change impacts in adaptation planning and implementation.

4. Approaches for measuring adaptation progress and effectiveness

Measurement and evaluation is an important step in the adaptation continuum, allowing for adaptation actions to be assessed and to capture learning on what worked well, what didn't go as planned, and what changes can be made going forward. In practice, however, processes for measuring adaptation progress, as well as the effectiveness of different types of adaptation actions, are not regularly applied within sectors and organizations. Also, decisions around which types of indicators to use (including both qualitative and quantitative measures) to adequately measure progress and assess effectiveness can be challenging. This often results in the use of inappropriate indicators for the type(s) of adaptation actions being implemented or the use of very high-level indicators that don't allow for in-depth assessments. Proposed projects under this sub-topic should include one or more of the following:

- Developing sector-specific guidance for measuring the effectiveness of different types of adaptation actions, including the selection of appropriate indicators.
- Developing sector-specific guidance for measuring adaptation progress, including the selection of appropriate indicators.
- Comparative analysis of different types of approaches and indicators used for measuring adaptation progress and/or effectiveness within particular sectors or contexts, as well as their potential application in other sectors or contexts.
- Enhancing the application of robust adaptation measurement and evaluation processes and approaches in sectors and contexts where this is currently lacking.

NATURAL RESOURCE SECTORS (*mining, forestry, energy*)

Up to **\$3.5M** available.

Climate change is affecting the natural resource sectors in various ways, including growing risks to current and future operations, increasing pressure on value chains, as well as opening up new opportunities. Across these sectors, integrated and collaborative approaches that incorporate climate change considerations into all stages of decision-making, while avoiding unintended consequences for others, will be key to long-term resilience. Learning from recent successes, and mobilizing current and promising adaptation approaches are essential for mainstreaming climate change adaptation knowledge and approaches into natural resource management practices.

Subtopics:

Proposed projects should address one or more of the following sub-topics:

1. Applying climate data and projections in the mining sector through innovative approaches

Planning for climate change in the mining sector can be challenged by a lack of climate data (particularly in Northern Canada), including those related to extremes (e.g., heavy precipitation events) and compound events (e.g., wildfire, heavy rainfall). Proposed projects under this sub-topic should address one or more of the following:

- Identifying, documenting, and sharing good practices in using climate change data to inform adaptation planning and operations throughout the mine lifecycle (e.g., novel approaches to using existing data, decision-making in the face of data limitations, approaches to working with sparse data in remote areas, including Northern Canada).
- Identifying, documenting, and sharing good practices and approaches for working with Indigenous Peoples and communities to integrate the application of Indigenous Knowledge within the mining sector, in addition to western scientific climate change data.
- Developing Canadian and/or international case studies showcasing ways that practitioners have either successfully or unsuccessfully applied climate change data and/or integrated climate change considerations throughout the different stages of the mine lifecycle, and identifying lessons learned.

2. Reducing existing barriers to the implementation of adaptation actions for the forestry sector

Despite growing understanding of adaptation approaches and options for the forest sector and forest-based communities, barriers often limit their implementation. For instance, barriers may include regulatory limitations, economic considerations, issues related to social license and public awareness, policy disincentives, and/or limited access to data, information, and expertise.

Proposed projects under this sub-topic should include one or more of the following:

- Undertaking analysis of existing barriers and proposed approaches for addressing them.
- Developing detailed case studies about implemented actions in Canada's forestry sector for addressing climate change risks, including lessons learned.

3. Increasing the climate change resilience of low-carbon energy systems

Canada's energy sector is advancing in its transition towards low-carbon energy production, distribution, and practices, including through the growth of clean energy technologies and renewable energy sources like wind, solar, and biomass. With these advances comes the need to ensure that low-carbon energy systems and their related infrastructure are resilient to risks posed by current and future climate change. Enhancing the climate resilience of Canada's evolving energy sector is critical for Canadians and the economy. Proposed projects under this sub-topic should include one or more of the following:

- Conducting research on climate change considerations related to the transition to low-carbon energy systems in Canada, including how best to design and situate new infrastructure.
- Conducting research on climate change impacts and adaptation options for non-hydro renewable energy sources (wind, solar, biomass), including decentralized renewable energy technologies at the regional level.
- Developing case studies of implemented actions for addressing projected climate change impacts, including lessons learned, within Canada's evolving energy sector.
- Developing resources and guidance for promoting the use of climate change risk information and adaptation measures in the development and application of new and emerging clean energy technologies.

4. Integrating climate change resilience into site closure and reclamation

Further work is needed to address climate change risks and incorporate adaptation planning into energy and mining operations, particularly at the stage of site closure and reclamation. Proposed projects under this subtopic should address one or more of the following:

- Developing and sharing guidance on how to adapt land reclamation methods to better consider current and future climate change (e.g., thawing permafrost, changes to precipitation and temperature patterns, changing growing conditions and vegetation).
- Developing detailed case studies about implemented actions in Canada for integrating climate change resilience into site closure and remediation, including lessons learned.
- Conducting research on the implications of climate change for remediation design, and how adaptation can be incorporated into site closure and reclamation plans. This would involve considerations of the short-, medium-, and long-term impacts of changing climate conditions on ecosystems, natural environments, and landscapes.

5. Piloting integrated systems approaches across sectors and communities

Proposed projects under this sub-topic should use highly collaborative and integrated approaches, such as through Regional Integrated Assessments (RIAs). These projects should develop and pilot the application of adaptation approaches across multiple natural resource sectors within a defined geographic area. They should also include perspectives from other regionally important economic sectors and communities, as well as consider biodiversity, water, and socioeconomic challenges and opportunities. Projects that target areas exposed to significant climate risks are of particular interest.