
PROGRAM GUIDE: THE CLEAN TECHNOLOGY DEVELOPMENT PROGRAM

Part of the Climate Change Innovation and Technology Framework

PROGRAM OVERVIEW

Background

In December 2017, the Government of Alberta (GOA) published the Climate Change Innovation and Technology Framework (CCITF) as the overarching guide for the government's investments in innovation and technology to reduce greenhouse gas (GHG) emissions, while preparing our province for the lower carbon economy of tomorrow. Alberta Innovates, on behalf of Economic Development & Trade, is offering five programs: Clean Technology Development, Clean Technology Networks & Emerging Partnerships, Clean Technology Commercialization, Clean Technology Business Innovation Vouchers, and Clean Technology Facilities Support.

The **Clean Technology Development (CTD)** program is intended to facilitate and support the development of novel clean technologies from bench scale to field pilots by:

- Advancing technologies with potential to broadly benefit Alberta industry or public sector;
- Funding novel technology projects based on the proponents' excellence and capacity to deliver, including universities, polytechnics, and colleges, industry consortia and partnerships - partnerships between the post-secondary institutions and industry are preferred;
- Recruiting and developing highly qualified skilled personnel (HQSP), through the technology development projects, to supply Alberta's industry with the right skills and competencies in emerging clean technology industries.

Program Details

The CTD program supports applied research and development work designed to develop technology for practical application in industry or the public sector. The program:

- Supports projects where commercialization or adoption of the results lead to identifiable benefits to Alberta in the form of GHG emissions reductions, economic growth, and other environmental and social benefits.
- Is not intended to support discovery research but supports research that targets an identified application aligned to the goals of the CCITF and may be part of a larger research effort that includes discovery research funded from other sources.
- Funds development or translational work designed to bring the research results to practice or resolve critical gaps in existing technology solutions.
- Must present a solution that is viewed as potentially having broad and significant impact on the industry environmental performance.
- Has 2 review and approval processes:
 - 1) Projects \$200,000 (\$200K) and UNDER** - a one stage application process is used for projects requesting \$200K or Under from Alberta Innovates
 - 2) Projects OVER \$200,000 (\$200K)** - a two stage application process is used for projects requesting OVER \$200K from Alberta Innovates

Eligible applicants are technology developing companies (with strong cases for the proposed technology development), post-secondary institution research teams, or other stakeholders (e.g. Innotech Alberta, C-FER, consortia, end-users, etc.) where an opportunity or critical need has been identified. Details on the application process are described later in this document.

The program supports projects in CCITF sectors and, in exceptional cases, emerging clean technology opportunities promising significant advances in GHG emissions reduction technologies. The program will, where appropriate, consider and utilize opportunities presented by larger projects for regional economic and social impacts.

The following sectors have been selected for the CCITF support in the CTD program:

- Cleaner oil and gas;
- Methane emissions reduction;
- Low carbon electricity;
- Waste to value-added;
- Green buildings;
- Energy efficiency.

HOW THE PROGRAM WORKS

Eligibility

(a) Applicant Eligibility Criteria – The Applicant is required to be one of the following:

- An Alberta-based technology developing company;
- A major greenhouse gas emitter in Alberta;
- A researcher or research team within an Alberta post-secondary institution; or
- A stakeholder (e.g. Innotech Alberta, C-FER, consortia, end-users, etc.) with an identified opportunity to develop technology for application to critical industry or public-sector needs (e.g. consortia, end-users).

Various partnerships may be eligible, including: companies, consortia, organizations working with InnoTech Alberta, and post-secondary institutions whose mandates include research and applied research.

(b) Partner Eligibility Criteria - the Partner(s) is(are) required to satisfy the following criteria:

- demonstrate a need or potential for use by Alberta industry;
- demonstrate the relationship between the Applicant and the Partner(s) does not create a conflict of interest; and
- have no outstanding balance or otherwise owe money and/or reports to Alberta Innovates or its subsidiaries.
- An industry partner is recommended but not required for post-secondary institution applicants
- Federal funding agencies (e.g. NSERC, NRCAN, etc.) are considered eligible project partners

(c) Project Eligibility Criteria - To qualify for funding all projects must:

- submit a completed application template with well-defined outputs and milestones in terms of technology advancement (Technology Readiness Level 2 – 6), quantified GHG emissions reduction potential, prototypes built, proof of concept, personnel trained, spin-off company creation, partnerships established, products brought to market, etc.;
- submit to other criteria that Alberta Innovates may develop from time to time.

Additional Information:

- Funded research initiatives may provide experiential learning opportunities for undergraduate and graduate students, aiming to develop HQSPs, supporting new technology development, and adoption of technologies in practice.
- For a list of examples of the types of projects that might be funded in the Clean Technology Development Program please see Appendix C.

Performance Management and Evaluation

Over the life of a project, Alberta Innovates employs an active project management philosophy, regularly monitoring performance and supporting the Applicant and Industry Partner to reach their outcomes. Funding is tied to outcomes and achievement of results and submission of progress and performance reports. For this reason, Alberta Innovates funds on a milestone completion basis. This means the Applicant and Industry Partner are expected to complete a task and submit a progress report before Alberta Innovates advances the next tranche of funds. Failure to complete annual performance reporting will also impact fund release.

All investment agreements outline the intended outcomes of the program and the corresponding performance indicators (measures) that will be tracked over the course of the project. Specific performance indicators will also be developed at the level of the individual project given the uniqueness of each project. The Applicant is responsible for reporting on all required indicators to Alberta Innovates on the agreed to schedule.

The performance reports are used to inform program planning and performance management. The Program level performance results will be communicated back to Applicants, key stakeholders and the public.

Once projects are completed, Alberta Innovates continues to monitor performance for an additional five-year period to accurately review the economic, environmental and social benefits realized for Albertans.

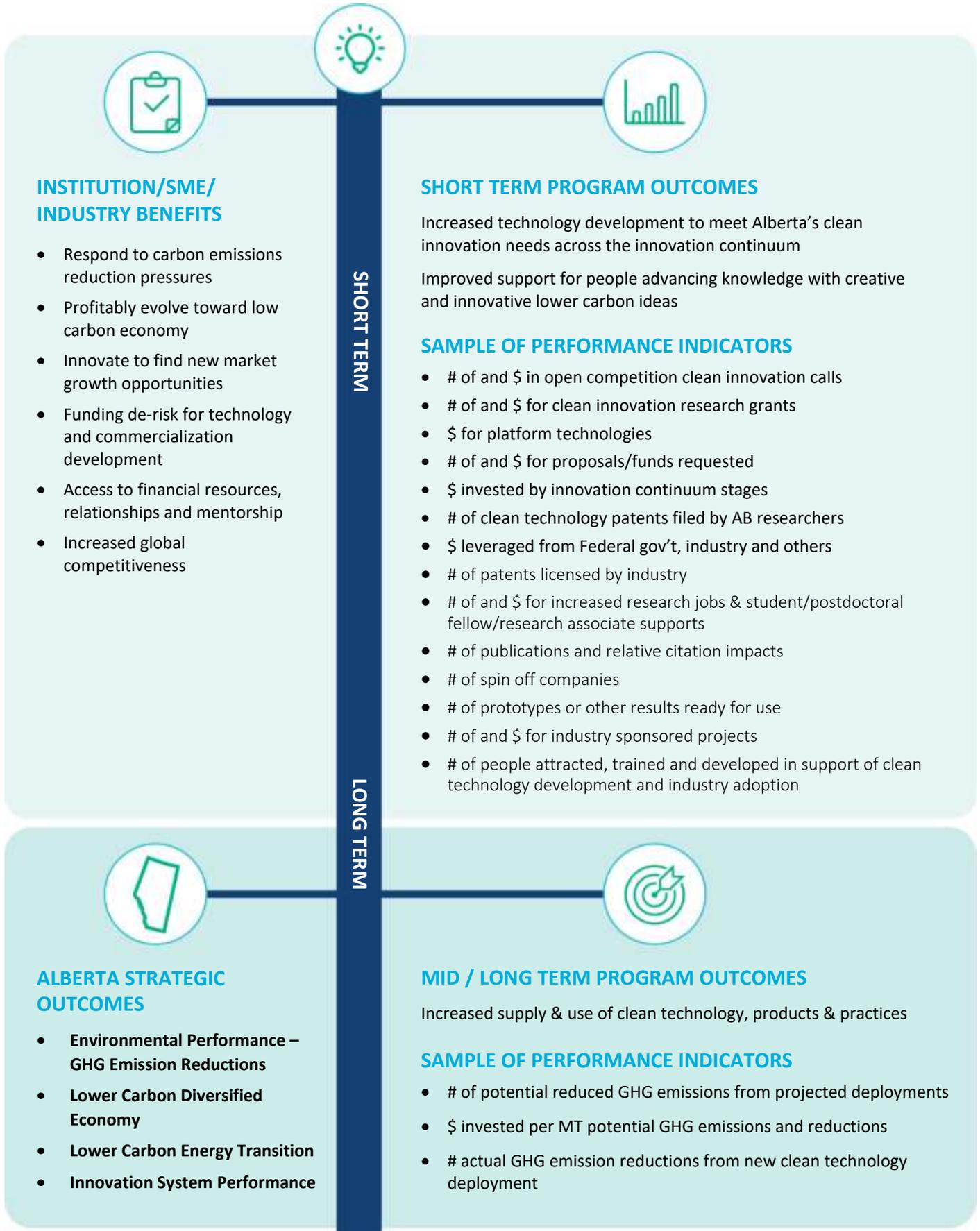
A results-focused organization, Alberta Innovates uses a performance management framework to monitor and evaluate the outcomes and impacts of its investments. The Applicant is responsible for annually reporting on all required indicators to Alberta Innovates.

The Clean Technology Development Program contributes to the strategic outcomes of the Climate Change Innovation and Technology Framework (CCITF).

CCITF Vision: *By year 2030, Alberta's use of innovation and clean technology ("Clean Innovation") will accelerate the shift to lower carbon economy, generating significant environmental and economic benefits.*

Short, mid and long-term program outcomes and a sample of key performance indicators are highlighted in the following diagram.

Pathway to Outcome



INSTITUTION/SME/ INDUSTRY BENEFITS

- Respond to carbon emissions reduction pressures
- Profitably evolve toward low carbon economy
- Innovate to find new market growth opportunities
- Funding de-risk for technology and commercialization development
- Access to financial resources, relationships and mentorship
- Increased global competitiveness

SHORT TERM

SHORT TERM PROGRAM OUTCOMES

Increased technology development to meet Alberta’s clean innovation needs across the innovation continuum

Improved support for people advancing knowledge with creative and innovative lower carbon ideas

SAMPLE OF PERFORMANCE INDICATORS

- # of and \$ in open competition clean innovation calls
- # of and \$ for clean innovation research grants
- \$ for platform technologies
- # of and \$ for proposals/funds requested
- \$ invested by innovation continuum stages
- # of clean technology patents filed by AB researchers
- \$ leveraged from Federal gov’t, industry and others
- # of patents licensed by industry
- # of and \$ for increased research jobs & student/postdoctoral fellow/research associate supports
- # of publications and relative citation impacts
- # of spin off companies
- # of prototypes or other results ready for use
- # of and \$ for industry sponsored projects
- # of people attracted, trained and developed in support of clean technology development and industry adoption

LONG TERM

ALBERTA STRATEGIC OUTCOMES

- **Environmental Performance – GHG Emission Reductions**
- **Lower Carbon Diversified Economy**
- **Lower Carbon Energy Transition**
- **Innovation System Performance**

MID / LONG TERM PROGRAM OUTCOMES

Increased supply & use of clean technology, products & practices

SAMPLE OF PERFORMANCE INDICATORS

- # of potential reduced GHG emissions from projected deployments
- \$ invested per MT potential GHG emissions and reductions
- # actual GHG emission reductions from new clean technology deployment

How Funding Works

(a) Project Funding

Project funding can be up to but not exceeding \$3 million from CCITF funding per project.

- **Projects \$200K and UNDER** will be reviewed using a one-stage application process
- **Projects OVER \$200K** will be reviewed using a two-stage application process which includes an expression of interest (EOI) phase and a full project proposal (FPP) phase.

The program normally supports 25 – 50% of total project costs, with remaining funding from other project partners (including cash and in-kind support). For projects involving post-secondary institution researchers, leverage from federal funding organizations (NSERC, etc.) is highly desirable.

Funding will be dispersed to successful Applicants at the end of each milestone, based on milestone proof, over the maximum three-year project. Normally, the projects will be 1 – 3 years in duration. All projects must be completed before March 31, 2022.

Alberta Innovates encourages co-funding of projects with other funding agencies and does not limit the amount of stacking towards the applicant's contribution.

(b) Eligible and ineligible expenses

Alberta Innovates funds expenses directly attributable to the performance of agreed upon projects. All costs incurred must be critical to the performance of the project, as outlined in the application.

Alberta Innovates only funds reasonable costs incurred as defined in the investment agreement after it has been executed.

A high-level summary of eligible and ineligible expenses is provided in Appendix A.

HOW TO APPLY

The Clean Technology Development Program is delivered in three phases. Project proposals will be reviewed on their merit and the potential for impacts aligned with the CCITF Clean Technology Development Program.



PHASE 1 Expression of Interest

There are two EOI application forms depending on the level of funding requested from AI.

1) EOI - Funding requests for Projects \$200K or UNDER.

Funding decision for these applications may be made based solely on the EOI submission; and

2) EOI - Funding requests for Projects OVER \$200K.

Successful applicants with funding ask greater than \$200K will be invited to submit a Full Project Proposal (Phase 2) for evaluation.

EOIs are accepted from applicants until the submission deadline. Applications received after the deadline will not be reviewed.

For current Competition timelines, please see the [CCITF CTD landing page](#).



PHASE 2 Full Project Proposal

The evaluation process at this phase is highly competitive and only the highest-quality projects will be considered for funding.



PHASE 3 Project Management

Successful applicants will execute an agreement with Alberta Innovates to proceed with the activities of the Project.

Agreement expectations will include:

- participation in project management activities;
- reporting on progress to milestones and budget on an agreed to timeline during the term of the Agreement; and
- reporting on progress to outcomes on an agreed to timeline during the term of the Agreement and annually for five years after that term.

Project payment is based on milestone, progress and performance reporting.

APPLICATION REVIEW PROCESS

During the distinct phases of the EOI and Full Proposal review process, Alberta Innovates leverages internal staff and external expert reviewers to evaluate applications submitted. Alberta Innovates retains the sole right to determine the evaluation process and does not disclose the names of its external reviewers to ensure their objectivity and impartiality. All external parties are subject to confidentiality, non-disclosure and conflict of interest policies set by Alberta Innovates. For a more detailed account of the evaluation process for this program, see Appendix B.

All decisions made by Alberta Innovates, acceptance or decline, are final, non-appealable and binding on the Applicant. Any failure to inform the Applicant of the determination regarding an application, within the timelines provided above will not result in any obligation or liability of Alberta Innovates to the Applicant. Alberta Innovates may also, in its sole and absolute discretion, forward feedback to the Applicant.

All investment decisions are at the sole discretion of Alberta Innovates.

TERMS AND CONDITIONS

This Program Guide is intended as a high-level overview of the CTD program. It provides interested parties with a roadmap of what to expect over the lifecycle of a project, from the application stage, during the project and post-completion. Should you have any questions about this guide or what is expected, please contact Alberta Innovates. Please be aware Alberta Innovates may modify this guide from time to time in keeping with any changes to the CTD program, or the CCITF.

Once we have reviewed and approved an application for funding, Alberta Innovates will require the participants to sign a standard form investment agreement. The investment agreement sets out in detail the roles, responsibilities and obligations of the various parties to ensure a successful project. Alberta Innovates will not provide any funding until the investment agreement has been signed by all parties.

DIVERSITY, EQUITY, AND INCLUSION

The Alberta research and innovation (R&I) ecosystem is stronger and more sustainable when it is broadly reflective of the overall diversity of our community. Alberta Innovates strives to ensure all interested and qualified parties have an equitable opportunity to participate and contribute. Historically, there have been a number of groups/populations that have been under-represented in the Alberta R&I landscape including:

- Women entrepreneurs/researchers;
- Indigenous entrepreneurs/researchers;
- Remote/small community entrepreneurs/researchers; and
- New immigrant entrepreneurs/researchers.

We are guided by the principles of:

- **Diversity** – both internal and external participants to our processes are comprised of a varied composition of demographics;
- **Equity** – our processes support equal access across all demographics; and
- **Inclusivity** – our processes proactively work to include underrepresented segments of the R&I landscape.

As part of its commitment to Diversity, Equity and Inclusion (DEI), Alberta Innovates will:

- Collect data in the grant application on a voluntary basis to better understand diversity;
- Provide grant application navigation support to applicants from under-represented groups; and
- Integrate a DEI focus into its due diligence processes including striving to have diverse review committees to foster unbiased decision making.

INFORMATION DISCLOSURE

Alberta Innovates is committed to protecting the confidentiality of application details. External experts who act as reviewers must sign a confidentiality agreement.

As a provincial corporation, Alberta Innovates is subject to the protection and disclosure provisions of the Freedom of Information and Protection of Privacy (FOIP) Act. Personal information is collected pursuant to Section 33(c) of the Freedom of Information and Protection of Privacy Act as it relates to and is necessary for the sub-program. Should you have any questions about the collection of this information, please contact us at cleantechdev@albertainnovates.ca.

CONTACT INFORMATION

To discuss eligibility for this program, to receive an application form, or for specific questions regarding this program and guide, please contact:

For projects within the Clean Energy sector

Bryan Helfenbaum, Executive Director, Advanced Hydrocarbons
(587) 779-2911

For projects within the Bio and BioIndustrial sector

Christine Murray, Director, Agriculture Technologies
(403) 382-7188

Program Manager

Paolo Bomben, Senior Manager, Clean Technology Development
(587) 779-2917

Or by email at: cleantechdev@albertainnovates.ca.

APPENDIX A

Summary of Eligible and Ineligible Expenses

Category	Eligible Expenses	Ineligible Expenses
Labour	<ul style="list-style-type: none"> ✓ Salary and benefits for individuals who are specifically working on the project 	<ul style="list-style-type: none"> ✗ Overhead ✗ Professional training & development ✗ Professional fees unless directly related to the project
Materials	<ul style="list-style-type: none"> ✓ Reasonable material costs 	
Capital Assets & Software	<ul style="list-style-type: none"> ✓ Capital improvements ✓ Capital equipment ✓ Software or information databases <p><i>Note: Eligible costs will be pro-rated to the project time frame based on the asset's expected economic life</i></p>	<ul style="list-style-type: none"> ✗ Acquisitions of land or buildings ✗ The undepreciated value of eligible capital costs which extends beyond the project timeframe
Travel	<ul style="list-style-type: none"> ✓ Travel, including mileage, low economy airfare, and accommodation for the purposes of executing the project 	<ul style="list-style-type: none"> ✗ Passport or immigration fees ✗ Costs relating to meals, entertainment, hospitality and gifts ✗ Reimbursement for airfare purchased with personal frequent flyer programs ✗ Commuting costs between place of residence and place of employment
Sub-contractors	<ul style="list-style-type: none"> ✓ Services or products of another entity 	<ul style="list-style-type: none"> ✗ Costs associated with applying for government grants and programs ✗ Provisions for contingencies, technical or professional journals ✗ Routine testing and maintenance
Other	<ul style="list-style-type: none"> ✓ Costs which Alberta Innovates pre-approves in writing as an eligible expense 	<ul style="list-style-type: none"> ✗ Collection charges, allowance for interest on debt, fines and penalties ✗ Federal and provincial income taxes, goods and services taxes ✗ Expenses for projects or activities outside the approved Project ✗ Overhead

APPENDIX B

Detailed Evaluation Criteria per phase

Process 1

EOI \$200K and UNDER

1. **Knowledge/Technology Opportunity** - Proposals will be reviewed on the strength of the technology, including the scientific basis for the innovation and novelty of the solution, and the extent to which the proposed project will achieve meaningful technological advancement.
2. **Intellectual Property (IP)** - Proposals will be reviewed based on the applicant's IP related to the proposal, freedom from IP conflict with existing IP, the potential generation of new IP from the proposed project, and the plan to translate and disseminate the outcomes and knowledge from the proposed project towards eventual commercialization.
3. **Work Plan, Deliverables, and Risk Analysis & Mitigation** - Proposals will be reviewed on the strength of the project plan, including how well developed the work structure is, whether the key elements are present to enable meeting project objectives, and the quality of task/category breakdown in the work plan and budget. The project deliverables will be reviewed on the ability of the applicant to measure and describe project success. Proposals will be reviewed on the identification of key project risks and the mitigation strategy and status to support the achievement of short and long-term goals of the project.
4. **Budget** - Proposals will be reviewed on the applicant's financial ability to carry out the proposed project, including the financial position of the applicant organization, the level of non-CCITF funding that is confirmed or in discussion, and the justification of the need for CCITF funding.
5. **Excellence of the Project Team** - Proposals will be reviewed on the expertise and capability of the project team to carry out the proposed project and advance toward commercialization, including the level of commitment from key team members and partners, as well as additional capacity provided by strategic partners to support commercialization and widespread adoption of the technology.
6. **Competitive Analysis** - Proposals will be reviewed on the competitiveness of the proposed solution, including advantages relative to existing and nascent technologies or research. Opportunities for synergies and collaboration must be described.
7. **Implementation Potential and Market** - Proposals will be reviewed on the strength of the implementation potential and pathway that will lead to application or use of the knowledge/technology in Alberta. Proponents must identify the market opportunity, including the size of addressable market(s) and alignment of the technology or research with market needs.

8. **Economic Diversification & Benefits to Alberta** - Proposals will be reviewed on the potential for economic benefits in Alberta, including increased employment, attraction of investment capital, increased resource revenues, economic diversification, and improved export potential.
9. **GHG Emissions Reductions and Climate Change Benefits** - Proposals will be reviewed on the potential to reduce GHG emissions in Alberta in the near term, by 2025, 2030, and beyond. This includes reductions directly resulting from implementation of the project, from future commercial implementations (e.g. retrofits at existing sites relative to historic operation, new builds), and from broader adoption across the relevant industry.
10. **Environmental and Social Benefits** - Proposals will be reviewed on the potential to provide additional benefits to Alberta, including reduced environmental impacts and societal benefits (e.g. environmental and/or societal benefits of the research / technology relative to current practice. Consider climate adaptation, water quantity and quality, land management, contaminant reduction, health improvements, safeguarding investments).
11. **Job Creation and Building Innovation Capacity** - Proposals will be reviewed based on their potential to contribute to the training and development of Highly Qualified Skilled Personnel (HQSP). The Full Project Proposal must provide details of the project's expected contribution to the training of HQSP, and their potential to be retained within or recruited to Alberta.

Process 2

EOI - OVER \$200K

At the **Expression of Interest** stage of application, your project will be reviewed on the basis of four broad criteria, with full details evident in the OVER \$200K EOI form. A brief summary of those criteria is below:

1. **The Opportunity:** This section includes non-confidential project abstract, project description and an opportunity to identify the project's alignment with the CCITF Clean Technology Development Program. The technology status and technology readiness level (if appropriate) can be indicated. A description of the market for the technology and market penetration should be included.
2. **Feasibility:** This section focuses on the work plan and the research team. A commentary on the he funding commitments from other partners should be included.
3. **GHG Emissions Reduction:** An estimate of the reduction in GHG emissions from the technology or knowledge generation in Alberta should be included.
4. **Outcomes:** This section focuses on how the project will derive economic, environmental and social benefits for Alberta. The training, attraction and retention of Highly Qualified People to Alberta should be included.

Signatures: Authorized representatives of the lead applicant's employing organization must sign the application form and may indicate if Alberta Innovates can share the application with trusted funding partners.

FPP – OVER \$200K

At the **Full Project Proposal** stage of application for applications over \$200K, your project will be reviewed on the basis of 11 broad criteria with full details evident in the FPP form. A brief summary of those criteria is below:

1. **Knowledge/Technology Opportunity** - Proposals will be reviewed on the strength of the technology, including the scientific basis for the innovation and novelty of the solution, and the extent to which the proposed project will achieve meaningful technological advancement.
2. **Intellectual Property (IP)** - Proposals will be reviewed based on the applicant's IP related to the proposal, freedom from IP conflict with existing IP, the potential generation of new IP from the proposed project, and the plan to translate and disseminate the outcomes and knowledge from the proposed project towards eventual commercialization.
3. **Work Plan, Deliverables and Risk Analysis & Mitigation** - Proposals will be reviewed on the strength of the project plan, including how well developed the work structure is, whether the key elements are present to enable meeting project objectives, and the quality of task/category breakdown in the work plan and budget. The project deliverables will be reviewed on the ability of the applicant to measure and describe project success. Proposals will be reviewed on the identification of key project risks and the mitigation strategy and status to support the achievement of short and long-term goals of the project.
4. **Budget** - Proposals will be reviewed on the appropriateness of the budget for the proposed project, the applicant's financial ability to carry out the proposed project, including the financial position of the applicant organization, the level of non-CCITF funding that is confirmed or in discussion, and the justification of the need for CCITF funding.
5. **Excellence of the Project Team** - Proposals will be reviewed on the expertise and capability of the project team to carry out the proposed project and advance toward commercialization, including the level of commitment from key team members and partners, as well as additional capacity provided by strategic partners to support commercialization and widespread adoption of the technology.
6. **Competitive Analysis** - Proposals will be reviewed on the competitiveness of the proposed solution, including advantages relative to existing and nascent technologies or research. Opportunities for synergies and collaboration must be described.
7. **Implementation Potential and Market** - Proposals will be reviewed on the strength of the implementation potential and pathway that will lead to application or use of the

knowledge/technology in Alberta. Proponents must identify the market opportunity, including the size of addressable market(s) and alignment of the technology or research with market needs.

8. **Economic Diversification & Benefits to Alberta** - Proposals will be reviewed on the potential for economic benefits in Alberta, including increased employment, attraction of investment capital, increased resource revenues, economic diversification, and improved export potential.
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11. **Job Creation and Building Innovation Capacity** - Proposals will be reviewed based on their potential to contribute to the training and development of Highly Qualified Skilled Personnel (HQSP). The Full Project Proposal must provide details of the project's expected contribution to the training of HQSP, and their potential to be retained within or recruited to Alberta.

APPENDIX C

Examples of projects that might be funded:

- **Cleaner oil and gas:** including but not limited to lower energy oil recovery, advanced combined heat and power with CO₂ reduction; advanced reservoir technologies including solvent recovery, electromagnetic systems, and non-aqueous/non-thermal processes; improved conventional and unconventional oil and gas process technologies; novel surface mining and bitumen ore processing technologies; improved bitumen upgrading and partial upgrading processes.
- **Methane emissions reduction:** including but not limited to minimizing flaring and venting methane emissions from oil and gas production or agricultural operations; monitoring, measuring and eliminating fugitive methane emissions from oil and gas facilities.
- **Low carbon electricity:** including but not limited to grid modernization technologies; emerging renewable or low-carbon electricity generation technologies; advanced renewable energy including systems-level technology integration (geothermal, advanced solar and wind, energy storage, bio-energy).
- **Waste to value-added:** including but not limited to waste to value-added technology and products including integration of agricultural, forestry, and municipal wastes; non-fuel uses of hydrocarbons; gas to liquid technologies, including biogas, syngas and methane to biofuels; non-combustion materials and new products from bitumen, etc.; bio-industrial products.
- **Green buildings:** including but not limited to development of green building products combined with a variety of social and technology advances; innovative building components; using bio-mass for green products and manufacturing.
- **Energy efficiency:** including but not limited to water processing and use efficiency; advanced biomaterials contributing to industrial energy efficiency; smart technologies and carbon neutral processes.
- **Cross-sectoral projects:** including but not limited to knowledge creation, modelling, quantification methodologies, economic analysis that can lead to GHG emission reduction in Alberta