

Department of Natural Resources
Office of Energy R&D

Green Infrastructure

Phase II Next Generation Clean Energy Infrastructure Program

Request for Letters of Expression of Interest (EOI) Applicants' Guide

July 2017

Ce document est aussi disponible en français. Veuillez envoyer un courriel à NRCan.innovation.RNCan@Canada.ca en indiquant à la ligne Objet «Guide de démonstration» (sans les guillemets).



**Natural Resources
Canada**

**Ressources naturelles
Canada**

Canada

Table of Contents

1	Program Objectives.....	3
1.1	Funding Streams	3
1.2	Disclaimer	3
1.3	Other NRCan Green Infrastructure Phase II programs.....	4
1.4	Expected Outcomes.....	4
2	Application Process.....	5
2.1	Register for an EOI Applicants' Package	6
2.2	Submitting a Letter of Expression of Interest.....	6
2.3	EOI Review, Selection, and Notification	6
2.4	Submitting a Project Proposal.....	7
2.5	Proposal Review, Selection, and Notification	7
2.6	Due Diligence Assessment	7
2.7	Contribution Agreement Negotiation	7
2.8	Service Standards.....	7
2.9	Program Inquiries.....	7
3	Program Features	8
3.1	Eligible Proponents.....	8
3.2	Eligible Activities	8
3.3	Regulatory Requirements	9
3.4	Funding.....	9
3.5	Reporting Requirements	11
3.6	Other Conditions.....	12
4	Confidentiality and Security of Information	13
5	Application Schedule and Process	14
5.1	Application Schedule	14
5.2	Submitting an EOI.....	14
5.3	Supporting Documents and Requests for Supplementary Information	15
6	Selection Criteria.....	16
6.1	Selection Criteria – EOIs.....	16
6.2	Selection Criteria – Project Proposals.....	16
7	Scope for Project Proposals	17
7.1	Energy Efficient Buildings	17
7.2	Electric Vehicle Infrastructure	20
	Appendix 1: EOI Template	23
	Appendix 2: Technology Readiness Levels	24
	Technology Readiness Level Descriptions:.....	24

1 Program Objectives

A clean environment and a strong economy go hand-in-hand. To advance Canada's efforts to build a clean economy, Budget 2017 proposed investments in green infrastructure, including initiatives that will support the implementation of the Pan-Canadian Framework on Clean Growth and Climate Change.

Modern energy infrastructure is essential to clean growth, but in key areas, uncertainty around the risks and costs of emerging technologies is stalling their development. The Green Infrastructure Phase II Next Generation Clean Energy Infrastructure Program (the Program), will accelerate the market entry of next generation clean energy infrastructure by investing a portion of its funding into commercial-scale technology demonstrations, and targeted R&D.

Projects under this Program (further described in Section 1.1 Funding Streams and in Section 7 Scope) will target two key areas:

- (1) Driving down the cost and create market confidence in net-zero energy construction to enable adoption of more stringent codes; and
- (2) Accelerating market entry of next-generation as well as innovative electric vehicle charging technologies to accelerate the adoption of electric vehicles.

1.1 Funding Streams

Subject to the availability of appropriated funds, the total amount of funding available to the program, the timeframe of the program, and project selection criteria, NRCan is proposing to allocate funding to the following two funding streams:

1.1.1 Energy Efficient Buildings Research, Development & Demonstration

Up to \$49.3M over eight years from April 1, 2018 to March 31, 2026 to support research, development and demonstration projects to accelerate the development and adoption of technologies, building design and construction practices, provide more cost effective building solutions, validate their applications locally with real-world demonstrations, and build confidence with industry and PTs to accelerate their adoption of revised building codes.

1.1.2 Electric Vehicle Infrastructure Demonstrations (Phase II)

Up to \$30M over four years from April 1, 2018 to March 31, 2022 to continue to support demonstrations of next-generation and innovative electric vehicle (EV) charging infrastructure projects that address technical and non-technical barriers to the installation, operation and management of EV charging technologies.

EV charging infrastructure **deployment projects** (projects that do not have an innovative component) may be considered in future funding programs.

1.2 Disclaimer

The Program objectives, funding amounts, and program features have not been finalized and are subject to change. The program features for Research, Development and

Demonstration (RD&D) components of the program are expected to be similar to prior RD&D programs, and features for those prior programs are described in this document.

NRCan reserves the right to alter or cancel the currently envisaged process, funding amounts, and deadlines, or to cancel the entire application process at its sole discretion. Any changes will be communicated to registered applicants via e-mail.

Any costs incurred for the submission of the EOI or of full project proposal are at the project applicant's own risk. In all cases, any funding under this entire submission, review and assessment process will be contingent upon the execution of a contribution agreement. **Until a written contribution agreement is signed by both parties, no commitment or obligation exists on the part of NRCan to make a financial contribution to any project, including any expenditure incurred or paid prior to the signing of such contribution agreement.**

Further information on the program features will be provided to applicants in the Proposal Applicants' Guide.

1.3 Other NRCan Green Infrastructure Phase II programs

EOIs submitted under this Program that are deemed to better suit other Green Infrastructure Phase II programs led by Natural Resources Canada may be shared with those programs, unless otherwise directed by Applicants in the Declarations Section of the EOI Template. Applicants will be notified if their EOI is shared with other programs.

Funding decisions made by any other program with which an EOI is shared, and not listed in Section 1.1 are at the sole discretion of the other program. Any communications or questions regarding any other program's application and selection process should be made directly to the other program. The notification letter will include information on how to contact the other program.

1.4 Expected Outcomes

The Program is expected to contribute to:

- An improved suite of clean energy technologies;
- New knowledge to inform improved regulations, codes and standards;
- Increased involvement and collaboration of the research community and key stakeholders;
- Increased competitiveness of Canada's clean tech industry and utility operations;
- Increased awareness and understanding of technologies and processes associated with reducing air emissions;
- Increased capability to develop new and improved energy systems; and
- Advancement of technologies that contribute to clean air objectives.

Specific outcomes for each of the three funding streams are listed below:

1.4.1 Energy Efficient Buildings Research, Development & Demonstration

- Supporting the energy efficient building strategy that aims at reducing GHG emissions by 5.6 megatonnes (Mt) annually relative to 2005 levels by 2030, with significant additional potential once technologies are replicated and codes are adopted nationally;
- Providing all jurisdictions in Canada with the foundational tools needed to ensure that all new buildings constructed beyond 2030 are net-zero energy ready;
- Providing financial support to RD&D projects across Canada to support GHG reductions in the built environment;
- Promoting greater market penetration of technologies resulting in improved affordability; and
- Leveraging Canada's investment by at least 1:1 through demonstrations.

1.4.2 Electric Vehicle Infrastructure Demonstrations (Phase II)

- Improving performance;
- Improving operational safety;
- Improving interoperability;
- Reducing the cost of charging stations;
- Improving cold climate related charging efficiency;
- Increasing knowledge of non-technical barriers that lead to an improved business case associated with the proposed project; and
- Leveraging Canada's investment by at least 1:1 through demonstrations.

2 Application Process

This Letter of Expressions of Interest Applicants' Guide (EOI Applicants' Guide) outlines the application process submissions of Letters of Expressions of Interest (EOIs) for projects to be funded under this Program. It explains how the Department of Natural Resources (NRCan) will review, in a consistent, fair, and transparent manner, EOIs submitted under these programs in order to identify a list of projects that best fit with the program's objectives. Applicants must register on the program website at <http://www.nrcan.gc.ca/energy/funding/current-funding-programs/12398> in order to receive the necessary documents and to be added to the electronic mailing list for program updates.

The application review and selection will be a seven-step process:

- (1) Register to receive an EOI Applicants' Package;
- (2) Submitting an EOI;
- (3) EOI review, selection, and applicant notification;
- (4) Submitting a full project proposal;
- (5) Proposal review, selection, and applicant notification;
- (6) Review of successful projects through a due diligence process; and
- (7) Entering into a contribution agreement acceptable to NRCan.

This guide describe in detail steps 1-3 of the application process. Further information on subsequent steps will be provided to successful applicants following the EOI review and selection phase.

NRCan will make the final decision as to which projects will receive funding, and the level of support that will be available to each project.

An applicant may withdraw its proposal without penalty at any stage of the evaluation process, by notification in writing.

2.1 Register for an EOI Applicants' Package

In order to receive a copy of the EOI Applicants' Package, applicants will be required to register via the program website, providing your name, phone number, and email address. If you have received this EOI Applicants' Package through another mechanism, please subsequently register yourself to avoid missing any important Program updates.

2.2 Submitting a Letter of Expression of Interest

Applicants may submit an EOI by completing the required information as described in the EOI Template provided in the EOI Applicants' Package. Further details are provided in Section 5 of this document.

2.3 EOI Review, Selection, and Notification

Following the EOI submission due date, EOI's will be grouped by the program into funding streams, evaluated and ranked according to the criteria outlined in Section 6 of this document. The Program may reallocate EOIs to another funding stream at its sole discretion, if an EOI is deemed to better suit that funding stream.

Both successful and unsuccessful applicants will be notified. Only successful applicants will be invited to proceed to the proposal phase of project selection and will receive a project identification code in their notification letter.

NOTE: Depending on Program demand and funding available, following the EOI review, a second phase of EOI submission may open for one or more funding streams. All registered applicants will be notified of any such change, and any such change would be advertised on the Program website.

2.4 Submitting a Project Proposal

Applicants who succeed at the EOI stage will be provided with a Proposal Package including a Project Proposal Applicants' Guide and full Project Proposal template with their EOI notification letter for the funding streams to which they have been selected. Only applicants that were provided a proposal identification code and the Proposal Package will be permitted to submit proposals. Any proposal received without an authorized project identification code will not be reviewed. Further details are provided in Section 5 of this document.

2.5 Proposal Review, Selection, and Notification

Project proposals will be evaluated and ranked according to the criteria provided in the Proposal Applicants' Guide. The minimum criteria that will be considered are outlined in Section 6 of this document.

Both successful and unsuccessful applicants will be notified, and unsuccessful applicants will be offered the opportunity to receive formal feedback on the review of their project proposal.

2.6 Due Diligence Assessment

All successful applicants passing the proposal stage will undergo a due diligence assessment, which will include an evaluation of the project's finances, technical risk, and team risk. NRCan may request that the applicant provide additional information to support the due diligence evaluation.

All applicants undergoing due diligence will be notified whether or not their project passes the due diligence assessment. Following due diligence assessment, applicants whose projects pass the due diligence assessment will be invited to begin negotiating a contribution agreement.

2.7 Contribution Agreement Negotiation

Any funding under this entire submission, review and assessment process will be contingent upon the execution of a contribution agreement. **Until a written contribution agreement is signed by both parties, no commitment or obligation exists on the part of NRCan to make a financial contribution to any project, including any expenditure incurred or paid prior to the signing of such contribution agreement.**

More information on NRCan contribution agreements will be made available to successful applicants following the proposal results notification.

2.8 Service Standards

NRCan maintains a suite of service standards on the expected timelines for each phase of program delivery. The service standards for NRCan's programs are available at the following link: [Service Standards](#).

2.9 Program Inquiries

In order to ensure that all EOI applicants have access to the same information and that there is a written response to every question, all questions and answers will be sent and received via the program email: NRCan.innovation.RNCan@Canada.ca. Recurring questions or those that may be useful to other applicants will be posted on the program's website in a "Frequently Asked

Questions” section. Confidential information and details revealing identity will first be removed. No meetings related to the program will be held between any proposed applicant and program staff involved with the project selection process.

3 Program Features

As described in Section 1.2 Disclaimer, the Program is developing the specific features of the program and as such, they are subject to change. These features will be incorporated in the contribution agreements entered into with selected applicants.

3.1 Eligible Proponents

Eligible Proponents may include:

- 1) Legal entities validly incorporated or registered in Canada, including:
 - For profit and not for profit organizations such as electricity and gas utilities, electricity system operators, transmissions owners and operators, companies, industry associations, research associations, and standards organizations;
 - Indigenous organizations and groups;
 - Community groups; and
 - Canadian academic institutions.
- 2) Provincial, territorial, regional and municipal governments and their departments and agencies where applicable.

It is expected that Proponents (the entity that will sign a contribution agreement with NRCan) will be the majority owner of any assets purchased in full or in part by funding provided under this program.

Further restrictions on the Eligible Proponents are listed per funding stream. Please see Section 7 Scope.

3.2 Eligible Activities

3.2.1 Demonstrations (Including FEED Studies)

Program funds may be directed to the following kinds of demonstration activities:

- The permanent (for the normal life of the equipment) installation of a pre-commercial technology with the intent that it continues to operate in its intended operational environment.
- Permanent modification of existing processes, equipment, or systems to accommodate an innovative technology or process;
- The permanent installation of equipment and/or infrastructure to support a demonstration, or multiple demonstrations.
- Associated costs for the engineering, design and permitting of a permanent installation as identified in the bullets above, including elements of a Front-End Engineering Design study (FEED) (see below) if required as part of a demonstration. Operation, performance testing, and analysis of pre-commercial equipment in its intended environment to assess performance of an innovation.

Front-end Engineering Design studies focus on the technical requirements as well as financial and regulatory requirements to complete a demonstration project. A FEED determines the demonstration project's specific requirements including technology, budget, and timelines to avoid significant changes in the execution phase of the demonstration project. Acceptable FEED studies could also incorporate a feasibility study, a design charrette, as well as completing any environmental assessments and addressing any other regulatory requirements.

FEED studies must have a demonstration project as the end goal of the effort.

3.2.2 Research and Development

For the purpose of this Program, R&D projects must have a starting Technology Readiness Level of four (TRL 4)¹. Program funds may be directed to the following kinds of R&D activities:

- Development, assessment, testing and integration of novel and innovative equipment, software and methodologies - for example:
 - proof of concept of technologies where there is a significant technical risk, including field trials, bench-scale testing, pilot plants and prototypes; and
 - analytical tools and modelling software
- Pre-demonstration field trials - limited duration tests designed to identify further R&D needs before a technology can proceed to a pre-commercialization demonstration with limited expectation of long term operation; and
- Assessments or characterization studies, including data compilations and syntheses, where there is a significant energy-related knowledge gap.

3.3 Regulatory Requirements

This program is subject to the *Canadian Environmental Assessment Act 2012*, and the duty to consult with Indigenous Groups as set out in Section 35 of the *Constitution Act, 1982*. Projects that are subject to these acts will be expected to complete all federal requirements related to these acts before funding is disbursed.

3.4 Funding

Subject to Section 1.2 Disclaimer, the Program provides the following guidance to potential applicants on the Program's funding conditions. Further clarity will be provided to applicants in the Proposal Applicants' Guide.

3.4.1 Timeframe for Funding

Projects will be eligible for Program funding from the latter of the time that an applicant is notified that their project has been selected to proceed to a contribution agreement and April 1, 2018, until the Funding stream end date as set out in Section 1, Program Objectives. Projects under this program are not anticipated to start earlier than April 1, 2018.

3.4.2 Program Funding Limits

The values in the table below are estimated limits for each project type and are subject to change. Further anticipated restrictions are set out per funding stream and identified in Section 7 Scope.

¹ See Appendix 2 for Technology Readiness Level definitions

Project Type	Maximum Funding Amount (estimated)	Maximum program contribution to Total Project Costs (estimated)	Total Canadian Government Funding ² (estimated)
Demonstrations	\$20M	50%	100%
R&D	\$1.5M	75%	100%

3.4.2.1 Stacking of Assistance

Collaboration and leveraging are strongly encouraged, and these will be included among the selection criteria.

3.4.3 Basis and Timing of Payment

Contribution agreements will set out the required terms for payment, made upon receipt of proper documentation as defined in the contribution agreement.

In all cases:

- Final payment will not be made until all project activities have been completed by a proponent and are deemed acceptable to NRCan. To ensure appropriate project oversight, a percentage of the contribution will be withheld until all conditions of the contribution agreement have been met. The percentage withheld will be determined based on the project type, nature of the project, and its risk level. Any conditions related to the withheld payments will be stated in the contribution agreement.
- Proponents may be audited one or several times either at project completion or at NRCan's discretion during the project. Auditors may call and potentially visit each proponent on site at the beginning of the project to explain the auditing process, and review project financial controls.

3.4.4 Eligible Expenditures and Non-permissible Costs

3.4.4.1 Research and Development and Demonstration Projects

The Program will provide for Eligible Expenditures as described below:

Eligible Expenditures for an approved project under the Program must be directly related to, and necessary for, the implementation and conduct of a project, and will include:

- salaries and benefits for employees on the recipient's payroll, for actual time spent by the employees on the project;
- professional, scientific, technical and contracting services;
- reasonable travel costs, including meals and accommodation;

² Total Canadian Government funding means: federal departments, crown corporations, agencies, and other entities such as the Sustainable Development Technology Canada (SDTC). The same would extend to provincial government entities such as municipal governments and crown corporations. An exception would apply to Crown Corporations whose principle function is of a banking nature.

- printing services;
- data collection services, including processing, analysis and management;
- licence fees and permits;
- field testing services;
- purchase, installation, testing and commissioning of qualifying equipment, materials and products, including diagnostic and testing tools and instruments;
- laboratory and field supplies and materials; and
- overhead expenses, provided they are directly related to the conduct of the project and can be attributed to it. Overhead costs will be negotiated and agreed to on an individual basis with project proponents before signing a contribution agreement. They will not exceed 15% of eligible expenditures.

Costs ineligible for reimbursement from the Program (but permitted as part of the proponent's contribution to the total project costs) will include:

- The reimbursable portion of Federal and Provincial Taxes
- In kind costs³

Costs not allowed to be counted toward total project costs (non-permissible costs) will include:

- Land Costs
- Legal Costs
- Proposal preparation costs
- All costs associated with the protection of IP
- Costs incurred before the proposal submission due date, or after the Project Completion Date.

3.4.5 Repayable Contributions

3.4.5.1 Demonstration Projects

Demonstration projects will be conditionally repayable within five years after Project Completion if the project generates profit.

3.4.5.2 R&D Projects

Contribution agreements for R&D projects will not be repayable because the R&D contributions are for activities whose primary aim is to further research and development.

3.5 Reporting Requirements

3.5.1 Research, Development and Demonstration Projects

Proponents are required to submit the following reports and updates:

³ In-kind contributions from the proponent and their partner(s) will be accepted on a case by case basis to count towards the proponent's portion of the project costs. In-kind support must be verifiable, directly support the project, and fall into the same cost categories as identified for Eligible Expenditures.

- Regular updates to NRCan summarizing the project progress and expenses incurred (at the same period as the payment of claims);
- Annual updates on project performance, for the period of the project and for five years after the project's completion;
- A final report documenting the project's results;
- A public final report to be made available to the public through the proponents website, or by other means; and
- For repayable agreements only, for five years following the completion of the project, a financial statement on the profitability of the project, to meet the repayment requirements.

Regular communication between NRCan and the proponents will be implemented to monitor progress.

3.6 Other Conditions

- All Intellectual Property (IP) that arises in the course of a project funded through a contribution agreement shall vest in the Proponent, or be licensed to the Proponent in the event that a Proponent's subcontractor retains title to such Intellectual Property. The Proponent shall supply documents as required by the Minister and set out in the contribution agreement, and the proponent will grant to Canada a non-exclusive, irrevocable, world-wide, free and royalty-free licence in perpetuity to use, modify, and, subject to the *Access to Information Act*, make publicly available such reports and documents for non-commercial governmental purposes.
- No Member of the House of Commons shall be admitted to any share or part of the contribution agreements, or any resulting benefit.
- The Proponent will comply with the *Conflict of Interest Act*, the *Conflict of Interest and Post-Employment Code for Public Office Holders*.
- Funding may be cancelled or reduced in the event that departmental funding levels are reduced by Parliament. Agreements will include provisions to this effect.
- Proponents will be required to acknowledge the financial support of Canada in all public information produced as part of the project.
- As part of project monitoring requirements, NRCan will have the right to visit and inspect all project sites, upon providing a reasonable notice to project proponents.

4 Confidentiality and Security of Information

Paragraph 20(1) of the *Access to Information Act* prohibits a government institution, including NRCan, from disclosing any information - financial, commercial, scientific or technical - supplied by a project applicant to NRCan so long as the project applicant treats the information as confidential in its own establishment.

Accordingly, NRCan will protect the applicant's confidential information in its possession to the same extent as the applicant protects said confidential information in its own establishment: if the applicant chooses to send the proposal or other confidential information to NRCan by e-mail, NRCan will respond to the Proposal by e-mail. Similarly, if the applicant's correspondence is through regular mail, NRCan's response will be in like manner. However, in all cases, NRCan will use e-mail correspondence to the applicants for all non-confidential matters.

NRCan recognizes that e-mail is not a secure means of communication, and NRCan cannot guarantee the security of confidential information sent via e-mail while it is in transit. Nonetheless, applicants who regularly use e-mail to communicate confidential information within their own organizations may choose to submit their documentation packages by e-mail to: NRCan.innovation.RNCan@Canada.ca.

For more information on this subject, a careful reading of the entire section 20 of the *Access to Information Act* is greatly encouraged.

5 Application Schedule and Process

5.1 Application Schedule

The following is the anticipated schedule for the application and review process:

Due date for submission of EOIs	September 25, 2017 23:59 EDT
EOI Selection Complete	October - November 2017
Due date for submission of Project Proposals	To be established individually by funding stream. Estimated (December 2017 - January 2018)
Project Selection Complete	February - March 2018
Due diligence process	February – June 2018
Negotiation and signing of contribution agreements	March – July 2018

The above schedule is subject to change. Any changes will be communicated to applicants via the e-mail addresses provided during the registration to receive an EOI Applicants' Package, as well as updated on the Program website.

5.2 Submitting an EOI

EOIs must be submitted by providing a complete set of documents including any signatures required as described in the EOI Template. Incomplete documents will not be considered. Printed and mailed versions of the materials will be accepted, but electronic versions are preferred.

An applicant may provide supporting material for any aspect of the EOI. Applicants are required to submit A SINGLE COPY of the required documents by the Due Date for submission of EOIs listed in Section 5.1. It is the applicant's responsibility to retain proof of the time that the documentation package was sent to NRCan. This may be required in the event that NRCan does not receive the documentation package by the deadline for reasons that are beyond the control of the sender.

As per Section 4 above, NRCan recognizes that e-mail is not a secure means of communication, and NRCan cannot guarantee the security of confidential information sent via e-mail while it is in transit. Nonetheless, applicants who regularly use e-mail to communicate confidential information within their own organizations may choose to submit their documentation packages by e-mail to: NRCan.innovation.RNCan@Canada.ca.

Applicants may also submit their documentation by courier or registered mail to:

Next Generation Clean Energy Infrastructure Program

Office of Energy Research and Development
Natural Resources Canada
580 Booth St., 14th floor
Ottawa, ON K1A 0E4

Where applicants submit A SINGLE COPY of the required files by courier or registered mail, we request that A SINGLE COPY of the required files in an electronic version on a memory stick be included in the package, clearly marked with the name of the organization and the title of the project. If you are submitting by courier, it is recommended that you inform us by e-mail that you are doing so.

5.3 Supporting Documents and Requests for Supplementary Information

If you are providing supporting material, we request that it be in electronic format, preferably PDF. However, please note that the maximum total size of e-mail attachments is 9 MB. If your electronic submission would exceed the maximum, we suggest you submit A SINGLE COPY of the material by courier or registered mail, on a memory stick, clearly marked with the name of the organization and the title of the project. We request that you restrict additional material to that which is directly relevant to, and in support of, your EOI.

The Program may request supplementary information at various points in the review process. Please note: During the proposal phase, up to three years of financial statements may be requested during the selection process from the applicant in order to assess project and applicant financial risk. Financial review will be done in confidence by financial analysts contracted by the program. These requests to the applicant will be made via e-mail, and responses should be by e-mail, courier or registered mail. Any additional material and documentation provided in response as attachments should be in electronic format, preferably PDF. The Program may also request presentations by the applicants, either in person or by teleconference, during the review process.

6 Selection Criteria

6.1 Selection Criteria – EOIs

The list of criteria for the EOI phase will include the following:

- How well the project addresses the Program Objective as listed in Section 1.1 Program Objective and the scope as listed in Section 7 Scope;
- How well the project addresses a technology, knowledge, market (regulatory or financial) gap as described in the EOI template;
- The proposed innovativeness of the project as defined in the EOI template;
- How well the project addresses the key results, including the results listed per funding stream in Section 1.4 Expected Outcomes, as well as the project's potential for uptake by stakeholders.

6.2 Selection Criteria – Project Proposals

The selection criteria for project proposals will be provided to successful applicants in the Proposal Applicants' Guide, but at minimum will include the following:

- How well the project addresses the Program objectives;
- The ability and capacity of the Proponent to deliver the project, based on the proposed project team and its individual and collective experience and expertise;
- Clearly articulated and achievable timelines and milestones;
- The capacity for take up and adoption of the results of the project;
- The project's technical, economic, and environmental merits; and
- Verifiable cost estimates for the project.

6.2.1 Other Criteria

In addition to the above criteria, project leverage and departmental priorities including regional balance may be considered in the final project selection.

7 Scope for Project Proposals

The Government of Canada has committed to reducing greenhouse gas (GHG) emissions, increasing investments in sustainable development and preparing for extreme climate events. The Pan-Canadian Framework on Clean Growth and Climate Change and Mission Innovation further emphasize the push to modernize energy systems.

Modern energy infrastructure is essential to clean growth, but in key areas uncertainty around the risks and costs of emerging technologies is stalling their development. The Green Infrastructure program will accelerate the market entry of next generation and proven clean energy infrastructure by investing a portion of its funding into commercial-scale technology demonstrations and targeted R&D. Projects under this program will target two key areas: (1) driving down the cost and create market confidence in net zero construction for housing and buildings to enable adoption of more stringent codes; and (2) supporting the demonstration of next-generation as well as innovative electric vehicle charging technologies to accelerate the adoption of electric vehicles.

EOIs are being requested in the following strategic priority areas:

7.1 Energy Efficient Buildings

7.1.1 Project Types and Funding Conditions

This funding stream accepts both demonstrations and R&D projects for funding from April 1, 2018 to March 31, 2022. Further details on the funding limits are set out in the table below:

Project Type	Program Funding Request	
	Minimum	Maximum
Net zero Energy Ready Solutions for High Density Housing - Demonstrations	\$250,000	\$5M
Highly Energy Efficient Commercial/institutional Building - Demonstrations	\$250,000	\$5M
Housing and Buildings Tools - Research, development & demonstrations	\$250,000	\$1.5M

7.1.2 Eligible Recipients

Legal entities validly incorporated or registered in Canada, including companies (including designers, builders and developers), electricity and gas utilities, industry associations, research associations, aboriginal and community groups, Canadian academic institutions, and provincial, territorial, regional and municipal governments and their departments and agencies.

7.1.3 Objective

Projects under this funding stream will accelerate the deployment of very high efficiency homes and buildings in Canada in order to support the development and adoption of the model national net-zero energy ready building codes by 2030 and the energy code requirements for existing buildings by 2022.

7.1.4 Description

The built environment, consisting of residential, commercial and institutional buildings, accounts for 17% of Canada's total GHG emissions as a percentage of total primary energy use. This includes 12% of direct emissions attributed to the buildings sector, and another 5% attributed to electricity use by buildings. Reducing GHG emissions in the buildings sector requires ongoing innovation in the design, construction and operation and increased availability of affordable, higher efficiency homes and buildings. Achieving affordable net-zero energy ready performance levels and cost-effective deep energy retrofits requires development and deployment of highly efficient technologies and equipment, as well as a concerted focus on building envelope.

The Program seeks innovative projects that can demonstrate multiple cost-effective solutions and to inform the development and adoption of model national net-zero energy ready and the energy code for existing homes and buildings.

7.1.4.1 Net-Zero Energy Ready Solutions for High-Density Housing

This component targets barriers to achieving net-zero energy ready high-density houses by funding **demonstration projects** (starting TRL: at least 6).

- Demonstration projects showcasing high efficiency technologies, tools and solutions, and how to use and integrate technologies to achieve affordable net-zero energy ready or net-zero energy buildings. The Program is targeting low-rise Multi-Unit Residential Buildings (3 storeys or less) and other high-density low-rise buildings only.
- Projects should include the integration of key technologies including one or more novel technologies such as: electric heat pumps, advanced windows, advanced high performance envelopes, gas-fired heat pumps, dual-fuel systems, geothermal, BIPV/BIPV-T, CHP, solutions to thermal bridging.

7.1.4.1.1 Exclusions

Suburban low-rise housing, such as detached, attached and row homes, are excluded from this call.

7.1.4.2 Highly Energy Efficient Commercial/institutional Buildings

This component targets barriers to achieving net-zero energy ready buildings by funding **demonstration projects** (starting TRL¹: at least 6).

- For new buildings: demonstration projects addressing both technical and non-technical barriers to achieving Net-Zero Energy ready, Net-Zero Energy or Passive House performance levels;
- For existing buildings: demonstration projects addressing both technical and non-technical barriers to deep energy retrofits (achieving over 40% reduction in energy consumption);

7.1.4.2.1 Notes

- Projects should include the integration of multiple key technologies including one or more novel technology such as: electric heat pump, advanced windows, advanced high performance envelopes, gas-fired heat pumps, dual-fuel systems, geothermal, geo-exchange, BIPV/BIPV-T, CHP, solutions to thermal bridging.
- Preference will be given to the following building types: office, schools, Multi-Unit Residential Buildings (MURBs) greater than 3 storeys, retail, mixed-use (Office, MURB).

7.1.4.3 Housing and Buildings Tools

This program component targets barriers to achieving high efficiency houses and buildings by funding **research, development & demonstration projects** (starting TRL: at least 4).

- Innovative tools for modelling, performing ongoing commissioning and/or re-commissioning of energy systems, and monitoring the energy performance of commercial buildings to produce actionable information for building owner and operators.
- Design, cost and performance optimization tools for builders, designers and utilities in support of meeting proposed net-zero energy ready code performance levels.

7.1.5 Notes

The submitted EOIs must address at least one of the following criteria:

- Share valuable technical or techno-economic data to inform local authorities;
- Provide a model that is replicable in their climate zone;
- Provide a comparative analysis to buildings meeting code requirements in their region;
- Provide solutions that are affordable:
 - For new buildings, less than 15% incremental costs and 10 year payback or less.
 - For existing buildings, less than 25% incremental costs or 20 year payback or less.

In addition, projects are expected to result in at least one of the following:

- Showcase significant differences over existing local high performance buildings;
- Improve construction techniques;
- Include post-project monitoring and reporting;
- Include a strong knowledge dissemination plan;
- Reduce cost of technology;

- Improve equipment efficiency in cold Canadian climate;
- Provide a business case for the proposed net-zero energy ready building step codes, or codes for existing buildings.

7.2 Electric Vehicle Infrastructure

7.2.1 Project Types and Funding Conditions

This funding stream accepts demonstration projects for funding from April 1, 2018 to March 31, 2022. Further details on the funding limits are set out in the table below:

Project Type	Funding Request
Demonstrations	Program funding for Electric Vehicle Charging Infrastructure Demonstration projects is expected to be in the range of \$1 million to \$5 million per project. The Program may pay up to 50% of Total Project Costs.

7.2.2 Eligible Recipients

Eligible proponents are legal entities validly incorporated or registered in Canada, including utilities, companies, industry associations, research associations, aboriginal and community groups, Canadian academic institutions, and provincial, territorial, regional and municipal governments and their departments and agencies.

7.2.3 Objective

Projects under this funding stream will address barriers to the deployment of electric vehicle (EV) charging infrastructure, which will lead to an increased uptake of EVs.

7.2.4 Description

The transportation sector represents approximately 32% of end-use related final energy demand⁴, and emissions from transportation represent 23% of the total GHG emissions⁵. This sector is thereby one of the largest sources of energy-related GHG emissions in Canada. Specifically, on-road vehicles remain the most significant contributors, producing 67% of Canada's overall transportation related GHG emissions. An increased adoption of low-carbon transportation technologies, such as electric vehicles (EVs), will lead to a reduction in transportation related GHG emissions.

The Electric Vehicle Infrastructure Demonstration (EVID) call for EOIs is seeking demonstration projects that address both technical and non-technical barriers to the installation, operation and management of charging infrastructure in real-world conditions.

⁴ Statistics Canada, CANSIM Tables, 2013

⁵ Environment and Climate Change Canada's (ECCC) National Inventory Report (NIR) (1990-2013)

The program is seeking projects that demonstrate the next-generation of existing EV charging technologies, new innovative EV charging technologies, or the innovative integration of existing or new EV charging technologies. The types of charging technologies proposed can include Level 2, Level 3, wireless (induction), or other types that would supply charging to on-road, highway capable EVs. These vehicles include, but are not limited to, light-duty passenger vehicles, medium to heavy-duty commercial vehicles, and buses.

Projects must have a technology readiness level⁶ (TRL) of at least **5** at the beginning of the project and must achieve a TRL of at least **8** at the end of the project.

Priorities

The submitted EOIs must address at least one of the following priorities:

- For the urban environment: enable innovative solutions for EV charging in multi-unit residential buildings or in high-density urban areas where most garage orphans are located;
- For workplaces and fleets: enable innovative solutions for fleet vehicle charging, including car-sharing applications, and EV owners to charge at work;
- For public transit: enable innovative charging solutions for the interoperability of electric buses across various types of routes and different jurisdictions (e.g. crossing municipalities);
- For freight transportation: enable innovative solutions to the electrified transportation of goods within urban environments and between urban centres;
- For charging networks:
 - Enable innovative solutions to improve functionality and interoperability of network communication and management systems for EV charging infrastructure, to enable seamless use of the EV charging infrastructure, such as charging and payment services when travelling beyond usual charging networks and across Canada;
 - Demonstrate innovative technologies for EV charging of on-road vehicles;
- For the electrical grid: enable innovative solutions to negative grid impacts, such as peak electricity demand from the localized high-density deployment of EV charging infrastructure. Applicants should seek collaboration with public utilities when addressing challenges on the grid integration of EV charging;
- For two-way energy transfer: enable innovative solutions to improve vehicle-to-grid (V2G) and vehicle-to-home (V2H) technologies.

Outcomes

In addition, projects are expected to result in at least one of the following outcomes:

- Improved performance of charging stations (e.g. efficiency and charging speed);
- Improved operational safety of charging stations;
- Improved interoperability;
- Reduced cost of charging stations (i.e. manufacturing, operational, retail);
- Improved cold climate related charging efficiency; and

- Increased knowledge of non-technical barriers, such as limitations of the current electricity billing structure in various jurisdictions, and innovative approaches leading to improved business cases.

7.2.4.1 Restrictions

Funding under the Electric Vehicle Charging Infrastructure Demonstration component is **not available** for the following:

- Projects **focusing** on the integration of renewable energy (e.g. solar) or energy storage;
- Projects **focusing** on the **deployment** of EV charging infrastructure that is already at the commercial stage.
- Projects **focusing** on a FEED study.

7.2.4.2 Notes

- Emphasis of projects must be on the **EV charging infrastructure**.
- Preference may be given to projects that include a local power utility, and a municipality or a province as confirmed partners;
- Preference may be given to projects able to disburse a majority of allocated funds in the first two years of the program.

Appendix 1: EOI Template

Please note the following when completing the EOI documentation.

1. The EOI template was sent to you by e-mail as a Microsoft Word file entitled “GI-Next Gen EOI”, along with this EOI Applicant’s Guide.
2. Unless otherwise specified, the “proposed project” or the “project” or the “EOI” in this template refers to the proposed project submitted in response to the EOI process undertaken by the program.
3. Completion and submission of the required documents does not imply that the proposed project will be approved for co-funding by the program.
4. Applicants, their partners and collaborators must submit all information required under this request.
5. The completed documents must be submitted by e-mail, courier or registered mail by **the Due Date for the submission of EOIs listed in Section 5.1**. Please refer to Section 5.2 Submitting an EOI for the submission procedure. **Submissions sent after that time will not be accepted**. It is the applicant’s responsibility to retain proof of time the documentation package was sent to NRCan. This may be required in the event that NRCan does not receive the documentation package by the deadline for reasons that are beyond the control of the sender.

Appendix 2: Technology Readiness Levels

Technology Readiness Level (TRL) is a measure used to assess the maturity of evolving technologies (devices, materials, components, software, work processes, etc.) during its development and in some cases during early operations. Generally speaking, when a new technology is first invented or conceptualized, it is not suitable for immediate application. Instead, new technologies are usually subjected to experimentation, refinement, and increasingly realistic testing. Once the technology is sufficiently proven, it can be incorporated into a system/subsystem.⁷

The lowest level, TRL 1, indicates that information already learned from basic scientific research is taking its first step from an idea to a practical application of a lesson learned. For example, after learning that hydrogen and oxygen can be combined to generate electricity, some would suggest an idea for building a machine to do just that.

A technology that has achieved TRL 9 is one that has been incorporated fully into a larger system. It has been proven to work smoothly and is considered operational. An example of an operational TRL 9 technology is the fuel cells which combine hydrogen and oxygen to generate electricity for NASA's space shuttle.⁸

Technology Readiness Level Descriptions:

- 0 R&D not specifically intended for technology development (but could be in support of technology adoption). Examples are knowledge generation to support codes, regulations and standards needed to support domestic adoption and to support Canada's position in opposing non-tariff export barriers. Also includes Basic Research conducted prior to Applied Research.
- 1 Early-stage scientific research begins the translation to applied R&D - lowest level of technology readiness. Basic scientific research begins to be translated into preparatory applied research and development. Examples include paper studies of a technology's basic properties, algorithms and mathematical formulations.
- 2 Technology development begins - once basic principles are observed, development of practical and specific applications can be initiated. Applications are speculative and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies, including concept development.
- 3 Active R&D is initiated - active research and development is initiated to establish proof of concept, including analytical and laboratory studies to physically validate analytical predictions of separate elements of the technology, i.e., individual components that are not yet integrated into the technology.

⁷ http://en.wikipedia.org/wiki/Technology_readiness_level

⁸ http://www.nasa.gov/topics/aeronautics/features/trl_demystified.html#.Us2Z_fvhH2Q

- 4 Basic technological components are integrated to establish that the pieces will work together, i.e. initial operational characterisation of technology. Standalone component prototypes implemented and tested.
- 5 System / subsystem prototypes are improved significantly - the basic technological components / prototypes are integrated within a reasonably realistic supporting environment so that the technology concept can be tested in a simulated environment. Examples include bench-scale laboratory integration of components and observation of operating characteristics.
- 6 Model/prototype is tested in relevant environment - representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant test environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype at the pilot scale, integrated with existing systems, if applicable, in a laboratory environment or in a simulated operational environment. Engineering feasibility demonstrated.
- 7 Prototype near or at planned operational system - represents a major step up from TRL 6, requiring demonstration of an actual system prototype in the intended operational environment. Examples include field testing or field trials over a period sufficient to provide meaningful data on the performance of the technology.
- 8 Technology is proven to work in a "real world" operating environment - actual technology completed and qualified through test and demonstration. This includes projects currently at the demonstration project stage.
- 9 System proven through successful demonstration. Actual application of technology is in its final form – commercialisation-ready technology proven through successful operations.