INNOV-R

COLLABORATIVE RESEARCH FUNDING PROGRAM

APPLICANT'S GUIDE

Plan pour une économie verte

Partenaire financier

Québec

October 2021

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1. CONTEXT OF THE INNOV-R PROGRAM CALL FOR PROJECTS

In November 2020, the Quebec government announced its Plan for a Green Economy2030 (PEV2030). With its electrification and climate change policy framework, the government wants to make the fight against climate change a major lever for economic development and international outreach. To that end, it will be relying on the electrification of the economy, the development of other renewable energy resources, and the emergence of new cutting-edge economic sectors creating quality jobs. INNOV-R program is part of this broad initiative and aims to foster the emergence of innovative collaborative projects that will enable Quebec to achieve its greenhouse gas (GHG) emission reduction objectives.

2. REDUCING GHG EMISSIONS IN QUEBEC: ALL ECONOMIC SECTORS IN QUEBEC

INNOV-R program is managed by the ministère de l'Économie et de l'Innovation (MEI) and is funded by the Electrification and Climate Change Fund. The purpose of the program is to enable collaborative industrial research projects with a significant potential to reduce GHG emissions in Quebec, and therefore help the province to achieve its GHG reduction target which is set at 37.5% below 1990 levels for 2030.

The grant award was approved by Executive Orders 301-2018 of March 21, 2018, 318-2019 and 317-2019 of March 27, 2019, under Action 4.4 of the 2013-2020 Climate Change Action Plan, the budget for which for this call was transferred to the 2030 Green Economy Plan Implementation Plan in Actions 2.3.1.2 and 2.1.1.3.

INNOV-R program is deployed by the Industrial Research Sectoral Groups (RSRI), which have been designated by the Quebec government to act as intermediation and funding organizations for collaborative R&D projects. Through their mandate, they promote the transfer of knowledge and the appropriation of innovation by businesses in various key sectors of the economy. The seven RSRIs designated to deploy the program are identified in Appendix A.

3. ELIGIBLE COLLABORATIVE RESEARCH PROJECTS

Projects eligible for the INNOV-R program must demonstrate a significant potential to reduce GHG emissions **in Quebec.**

Projects must involve at least one Quebec-based company with in-house production or research and development activities and at least one Quebec public research institutes (QPRI) such as: university, College Centers for the Transfer of Technologies (CCTT) or a Quebec-based public research center. Other partners such as NPOs, Crown corporations, public agencies, municipalities, Businesses outside Quebec and others may also be involved in the project. The main applicant must be affiliated with an QPRI. Businesses listed in the Register of Businesses Not Eligible for Public Contracts (RENA) and those that have defaulted on their obligations to the Government of Quebec are not eligible.

Projects will be eligible in either of two categories, as a function of the technological readiness level (TRL)[1-2] according to the current definitions: projects starting at TRL 1–3 and projects starting at TRL levels 4–6. To know the TRL of your project, you can get in touch with the concerned RSRI using the contacts written in the Appendix A.

[1] Technology readiness levels : https://www.ic.gc.ca/eic/site/080.nsf/eng/00002.html
[2] ISO 16290 :213 Space systems — Definition of the Technology Readiness Levels (TRLs) and their criteria of assessment https://www.iso.org/standard/56064.html

4. ELIGIBILITY OF EXPENSES

4.1 Eligible Expenses

Eligible expenses include direct research costs and in-kind contributions related to the project. Direct costs related to the research project must be incurred by the academic partner (university, CCTT or public research center established in Quebec).

The eligible direct costs are as follows

- Salaries, wages and benefits [3]
- Student scholarships;
- Supplies, consumables[4] and lab-ware;
- Equipment purchase or rental (maximum 25% of total eligible expenses)[5];
- Intellectual property management fees;
- Professional fees;
- Travel and lodging expenses;
- Management fees;
- Knowledge dissemination costs;
- Platform fees;
- Subcontracting costs.

In-kind contributions from the businesses and partners are considered eligible project expenses. These in-kind contributions are eligible if:

- These expenses are auditable (their value can be reasonably established and supported by documentary evidence);
- They are essential for the achievement of the selected project;
- They correspond to costs incurred specifically to carry out the project;
- They represent something that would otherwise have to be paid for at equal or greater cost.

4.2 Non-eligible expenses

- Expenses that have already received financial support from the ministère (MEI);
- Transactions between businesses or related partners;
- Recurring costs such as annual subscription fees and software upgrade fees.

[3] Amounts related to the release of university teachers to carry out project activities cannot be included under this item.
[4] Please provide details of consumable purchases over $1000.
[5] In the case of purchase, the value of the equipment must be equal to or less than $15,000 before taxes. Example: Software licenses are included in the purchase and rental of equipment. Not to be confused with the purchase of computers which are considered as consumables since their life span is estimated at 3 years (maximum duration of the project)

4.3 Indirect research costs (only for universities)

Indirect costs (university overhead costs) shall be reimbursed at the flat rate of 27 % of the project direct costs in the following categories:

- Salaries, wages and benefits;
- Student scholarships;
- Supplies and consumables;
- Equipment purchase or rental;
- Travel and lodging expenses.

4.4 Management fees

A management fee of a maximum of 5% of the eligible project expenses will be charged. These fees will be divided between the industrial partner(s) and the ministère de l'Économie et de l'Innovation (MEI) for the management of the program[6].

[6] Percentage to be confirmed with the RSRI where your application is filed

5. FUNDING PARAMETERS

The funding parameters for projects submitted to the INNOV-R program (Table 1) are based on **2 funding tracks**. At the time of submission, the applicant indicates which funding track they apply in:

A) **Regular Track**: designed for projects with multiple public funding programs, this track is designed to maximize public funding.

B) **Fast Track:** designed for projects where the only source of public funding is the INNOV-R program, this track is designed to optimize project approval and starting time.

Table 1. Details of INNOV-R funding

<table>
<tr><th></th><th>Regular Track</th><th>Fast Track</th></tr>
<tr><td>Business in Quebec (required) min</td><td colspan="2">1</td></tr>
<tr><td>Business outside Quebec, optional</td><td colspan="2">Yes, as a 2nd business</td></tr>
<tr><td>Minimal number of Quebec public research institute (university, CTTC or public research centre)</td><td colspan="2">1</td></tr>
<tr><td>Maximal funding by INNOV-R, % of eligible expenses</td><td>40 %</td><td>50 %</td></tr>
<tr><td rowspan="2">Minimal funding input from business</td><td>Project starting in TRL 1-3
20 %
(50% of which may be in kind)</td><td rowspan="2">50 %
(50% of which may be in kind)</td></tr>
<tr><td>Project starting in TRL 4-6
40%
(50% of which may be in kind)</td></tr>
<tr><td>Additional public funding</td><td>Other federal, provincial (other than MEI) or municipal funding sources can be added [7]</td><td rowspan="2">No public co-funding is possible</td></tr>
<tr><td>Maximal cumulative public contribution</td><td>80 %</td></tr>
<tr><td>Maximal project duration</td><td colspan="2">3 years</td></tr>
<tr><td>Maximal INNOV-R funding [8]</td><td colspan="2">$500,000/year</td></tr>
</table>

Note: *A single budget presenting all the activities is to be approved. Thus, the matching of a project already funded by the addition of new activities funded by the RSRI does not meet program standards. In addition, the sources of co-funding identified must be free from existing commitments.*

[7] Other sources of public funding may include NSERC, NRC-IRAP, MITACS (non-MIE portion). Please contact the RSRI to which you are applying for more information.

[8] The maximum INNOV-R funding includes all MEI contributions, i.e. direct research costs, IRFs and management fees

6. FILING AN APPLICATION

Depending on the sector targeted by your project, the request must be filed with one of the following seven RSRI :

- Consortium de recherche et innovations en bioprocédés industriels au Québec (CRIBIQ)
- Consortium de recherche et innovation en transformation métallique (CRITM)
- Pôle de recherche et innovation en matériaux avancés du Québec (PRIMA Québec)
- Consortium de recherche et innovation en aéronautique du Québec (CRIAQ)
- Centre québécois de recherche et de développement de l'aluminium (CQRDA)
- Innovation en énergie électrique (INNOVÉÉ)
- Consortium de recherche industrielle du domaine du numérique et des TIC au Québec (PROMPT)

The names and contact details of the persons responsible, as well as the detailed description of the business sectors are presented in Appendix A.

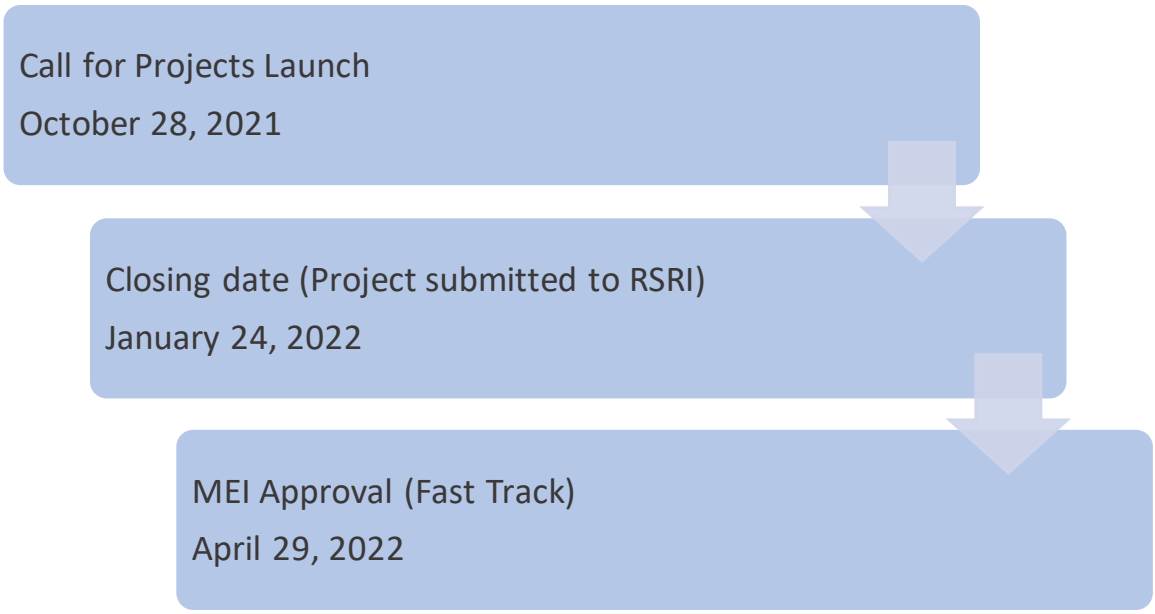
Two (2) forms must be filled out:

a) **General application form from the Industrial Research Sectoral Groups (RSRI) to which the project is submitted** – contains information about the R&D project to be funded. To obtain this form, you must contact the person responsible at the RSRI with whom you are submitting your request.

b) **GHG INNOV-R form** - contains an estimation of the potential for GHG emissions reduction during the first 10 years of commercial use of the innovation to be developed during the research project. This can be downloaded directly from the INNOV-R website by clicking **HERE**. Guidelines for filling out the GHG: INNOV-R form are available on page 8 of this guide.

7. CALL FOR PROJECTS CALENDAR

Please note that the application process and dates may vary depending on the RSRI to which the application for funding is submitted. The contact information for each RSRI can be found in Appendix A of this Guide.



8. PROJECT EVALUATION CRITERIA

Projects submitted under the INNOV-R program will be evaluated in two (2) parts: the scientific evaluation, which accounts for 50% of the final score, and the evaluation of the potential to reduce GHG emissions in Quebec, which accounts for the other 50%.

a) Scientific evaluation of projects

A technical-economic committee representing the industrial sector to which the project is submitted will be constituted for the purpose of this evaluation. The evaluation criteria for the scientific component of the projects are as follows and are worth 50 points:

- Scientific quality
- Quality of the research team
- Degree of innovation
- Ability to complete the project
- Benefits for the industrial partner(s) of the project
- Quality of the public-private partnership
- Expected scientific and technological advancement
- Expected benefits to the training of highly qualified personnel (HQP)
- Expected social, economical and other benefits for Quebec

b) Evaluation of the potential to reduce GHG emissions in Quebec

This evaluation is done by a committee of experts in GHG quantification. This committee will specifically evaluate the GHG reduction potential section (GHG INNOV-R form) of all projects submitted to all RSRIs. The evaluation criteria for the GHG component are as follows and are worth 50 points:

- Demonstration of the solution's ability to reduce GHG emissions in Quebec during the first ten years of its commercial use:
  - *Estimated quantity of GHG emissions that could be reduced or avoided, in tons of CO_2e/year in Quebec (10 pts)*
  - *Estimated cost per ton of CO_2e reduced or avoided in Quebec (10 pts)*
- Risks related to the deployment of the solution:
  - *Development time remaining before commercialization (5 pts)*
  - *Scale of investments required to commercialize the solution (5 pts)*
- Quality of the methodology used to demonstrate the GHG reduction potential in accordance with part 2 of ISO 14064-2:
  - *Realism of hypotheses (10 pts)*
    Example:
    Is the market penetration forecast for the solution realistic?
    Is sales growth at the marketing and transfer level plausible?
    Etc.
  - *Rigor of estimates (10 pts)*
    Example:
    Has the precautionary principle in the ISO standard been applied?
    Were the correct conversion factors used?
    Etc.

9. MENTION OF FINANCIAL ASSISTANCE RECEIVED

All communication activities related to the grant obtained must mention the financial support of the Government of Quebec under the INNOV-R program and comply with the terms and conditions of the *Guide sur les communications publiques à l'intention des bénéficiaires d'une aide financière découlant du Plan pour une économie verte 2030*.

10. GUIDELINES FOR COMPLETING THE INNOV-R SCHEDULE

This section presents the information to be provided in the form "Potential to Reduce GHG Emissions in Quebec" **(Form – Appendix INNOV-R)**. For terms relating to GHGs, please use the definitions in the Guide de quantification des émissions de gaz à effet de serre (in French only).

Section 1: Identification of the project, the applicant and the RSRI

As this form is an appendix to the application form, it is important to complete this section must be filled out.

Section 2. Demonstration of the solution's ability to reduce GHG emissions in Quebec during the first ten years of the commercialization phase

This section should demonstrate how the proposed solution will result in GHG emission reductions in Quebec if commercialized or implemented. To do this, the applicant must refer to the principles of ISO-14064-2 standard. The applicant must provide the assumptions, methodologies, criteria and calculations used in estimating the GHG emission reductions in Quebec for the proposed project.

The GHG quantities estimated under the INNOV-R program should be expressed in tons of carbon dioxide equivalent (CO_2e).

2.1 Context of the research project and identification of the problem related to GHG emissions

Present the context of the research project and the current GHG emissions problem that the proposed solution addresses. Identify the current conditions, including regulations, the market, and any other relevant elements prior to the start of the project as well as the reasons for quantifying GHG emission reductions in Quebec. If the project is part of a larger initiative, summarize the overall initiative.

2.2 Description of the solution chosen for the project

Describe the solution, i.e., the new or improved technology or practice, the use of which will result in reduced GHG emissions compared to existing solutions. Explain how the research project solution could reduce emissions, for example, compared to current standard practices.

2.2.1 Average annual acquisition (CAPEX) and operation (OPEX) cost of the technology or process of the selected solution

Present and justify the average cost of acquisition (CAPEX) and operation (OPEX) of the technology or process of the selected solution. Amortize the acquisition cost over the life of the technology or process to present an average cost per year.

2.3 Description of the baseline scenario

Present and justify the baseline scenario, i.e. the technology or process that would likely be used in the absence of the proposed solution. The baseline scenario should describe the expected market for the solution. This begins in the first year of commercialization, after the remaining development time. The reference case should present an annual picture of GHG emissions in Quebec over 10 years.

The baseline scenario shall be chosen based on the already known information and shall respect the precautionary principle. In the case of lack of data, conservative assumptions, values and procedures can be used to ensure that the GHG emission reduction calculation is not overestimated.

2.3.1. Average annual acquisition (CAPEX) and operation (OPEX) cost of the solution's technology or process under the baseline scenario

Present and justify the average cost of acquisition (CAPEX) and operation (OPEX) of the technology or process selected in the baseline scenario. Present the amortization of the acquisition cost over the life of the technology or process to present an average cost per year.

2.4 Estimate of the quantity of GHG emissions that could be reduced or avoided in Quebec by implementing the solution (in tons of CO_2e/year)

Based on the elements presented in the previous sections, estimate the amount of GHG emissions that can be reduced or avoided during the first 10 years of the commercialization phase of the solution. The estimated amount of GHG emissions that can be reduced or avoided is the ratio of the GHG emissions from the commercialization and transfer project to the emissions from the baseline scenario. This estimate necessarily includes a high level of risk and uncertainty.

First, present the methodology, assumptions and calculation leading to the estimation of the amount of GHG emissions from the solution and the baseline scenario (in tons of CO_2e/year). Referring to ISO 14064-2, identify and quantify the GHG emissions for all sources, sinks and reservoirs (SSRs) associated with the solution. Refer to Appendix B for more details on quantifying SSRs. The precautionary principle should be applied to avoid overestimating reductions or removal enhancements.

Secondly, present the calculation leading to the estimated amount of GHG emissions that could be reduced or avoided in Quebec by implementing the solution (in tons of CO_2e/year). This calculation is the ratio between the quantities of emissions estimated for the baseline scenario and those estimated for the solution.

Note that the assessment focuses on the magnitude of the estimated reductions (the evaluators will determine if the estimated quantity is high or not).

2.5 Estimated cost per ton of CO_2e reduced or avoided in Quebec

Using the elements presented in the previous sections, estimate the cost per ton of CO_2e reduced or avoided in Quebec during the first 10 years of the solution's commercialization phase. This estimate represents the ratio between the cost of the solution and the tons of CO_2e reduced or avoided in Quebec over the life of the solution.

To do this, estimate and present the following costs of the solution under two scenarios (optimistic and pessimistic):

- the acquisition cost (CAPEX) - amortized over the life of the technology, and
- the annual operating cost (OPEX)

Then, for each scenario, optimistic and pessimistic, present the calculation and assumptions leading to the ratio between the average cost per year of the solution and the tons of CO_2e reduced or avoided in Quebec during the first ten years of commercialization.

This estimate necessarily includes a high degree of risk and uncertainty (see Section 4).

Note that the evaluation focuses on the significance of the costs associated with commercializing the solution (evaluators will determine whether the cost per ton is high or low).

In cases where acquisition or operating costs of the baseline scenario are avoided, these can be subtracted from the project costs.

Section 3. Risks related to the deployment of the solution

The following two (2) criteria are intended to assess the uncertainties and risks surrounding the commercialization and transfer project. It is strongly suggested that you include solutions to overcome the uncertainties identified. In this section, indicate how, once the research project is completed, the development of the solution will continue: duration of the remaining development (3.1) and scale of the investments required (3.2).

3.1 Describe the time and development remaining before commercialization

This is the time between the end of the research project and the start of sales and reflects the point at which the commercialization scenario begins. Describe how the solution will be progressively transferred to the identified market. Outline the steps remaining before commercialization and transfer and the estimated duration of these steps.

Note that the longer this period is, the higher the risk is, and this could be reflected in the evaluation of this section. It is strongly suggested that solutions be included to mitigate the identified risks.

3.2 Describe the scale of investment required to bring the solution to market

Describe the investments required to commercialize the solution, including market penetration and annualized sales forecasts. Describe how the solution will progressively enter the market, for example by replacing existing technologies or practices, thereby reducing GHG emissions. Commercialization of the solution begins after the remaining development time (section 3.1).

It should be noted that the evaluation will consider the realism of the assumptions made regarding the forecasted market penetration rate or sales growth, etc. Thus, the higher the investment required after the research project is completed, the higher the risk of the commercialization and transfer project is. It is strongly suggested to include solutions to mitigate the identified risks.

APPENDICES

APPENDIX A - Industrial Research Sectoral Groups (RSRI)

RSRIs, which are innovation catalysts, have been designated by the Quebec government to act as intermediation and funding organizations for collaborative R&D. Through their mandate, they promote knowledge transfer and technological appropriation by businesses in various strategic sectors of the economy by encouraging the emergence of links between the industrial and research communities. The RSRIs involved in implementing the program are:

INNOVATION EN ÉNERGIE ÉLECTRIQUE (INNOVÉÉ)

InnovÉÉ
Innovation en énergie électrique

Contact person:
Yann Vuillermoz, Innovation Advisor
514 416-6777 ext. 205
yvuillermoz@innov-ee.ca

InnovÉÉ's mission is to stimulate, support and finance collaborative research projects related to the electrical industry, smart grids, transportation electrification, and intelligent vehicles and transportation systems, by pooling the expertise and resources of industrial partners and research institutions.
They provide access to grants for R&D projects involving the development of new technologies associated with:

- Electrification of transport;
- Autonomous vehicles and intelligent transport systems;
- Processes for vehicle lightening;
- Electricity production (hydraulic, solar, wind, etc.).
- Transmission, distribution, storage and optimized use of electrical energy.

CONSORTIUM DE RECHERCHE ET INNOVATIONS EN BIOPROCÉDÉS INDUSTRIELS AU QUÉBEC (CRIBIQ)

CRIBIQ
Consortium de recherche et innovations en bioprocédés industriels au Québec

Contact person:
Tarek Rouissi, Director of Innovation
418 914-1608 ext. 208

CRIBIQ's mission is to bring together Businesses and public research institutions to create value through the promotion of innovation and the funding of collaborative research projects in the fields of biobased products and bioprocesses.
The action levers are based on 3 industrial sectors:

- industrial bioproducts (bioenergy, biosourced chemistry, biosourced materials);
- environment;
- agribusiness.

CONSORTIUM DE RECHERCHE INDUSTRIELLE DU DOMAINE DU NUMÉRIQUE ET DES TIC AU QUÉBEC (PROMPT)

Contact person:
Jinny Plourde, Program Director PSO, Quantum & INNOV-R
514 875-0032 ext. 14
jplourde@promptinnov.com

Prompt is Quebec's industrial research consortium in the digital and ICT field. It supports the creation of partnerships, project development and R&D funding between Businesses and the institutional research community. The projects funded cover all sub-sectors of this vast field, from software and hardware development to components, networks and applications. As an innovation broker, Prompt aims to breathe new vitality into the ecosystem of innovation and collaborative research in ICT. With the financial support of the Quebec government and the private sector, Prompt stimulates the creation of new alliances that enhance the R&D capabilities of Quebec Businesses, stimulate private research investments, and foster the development of highly qualified personnel for Quebec's future.

PÔLE DE RECHERCHE ET INNOVATION EN MATÉRIAUX AVANCÉS DU QUÉBEC (PRIMA QUÉBEC)

Contact person:
Michel Lefèvre, B.Eng., Ph.D., Director of Programs and International Collaboration
514 284-0211 ext. 227
michel.lefevre@prima.ca

PRIMA Quebec animates and supports the advanced materials ecosystem, an engine of innovation and growth for Quebec. Through its support and financing, it helps stimulate the competitiveness of Quebec Businesses by enabling them to benefit from research expertise. The targeted application sectors include transportation, infrastructure, energy, the environment, microelectronics, telecommunications, health, chemicals and textiles.
The technologies targeted by this call for projects mainly include:

- **New materials**: Polymers, elastomers, biomaterials, metals, innovative fillers, cellulose filaments, natural and synthetic fibres, nanomaterials, etc.
- **Formulated materials or finished or semi-finished high performance products**: Composites (TD or TP), rubbers, alloys, ceramics, intelligent textiles, flexible materials, membranes, thin layers, coatings, biocompatible materials, encapsulation, sensors, etc.
- Implementation **and scaling processes and new characterization techniques**: Additive manufacturing and 3D printing, surface modification and treatment, micro/nanofabrication, tooling, new characterization instruments, modeling and simulation, shaping processes, etc.

CONSORTIUM DE RECHERCHE ET INNOVATION EN AÉRONAUTIQUE DU QUÉBEC (CRIAQ)

Contact person:
Mohammed Boutouba, Project Portfolio Manager
514 244-8443
mohammed.boutouba@criaq.aero

CRIAQ is a unique model of collaborative research conducted by Businesses of all sizes involving universities and research centres. It promotes collaboration between industry and research to identify and develop projects that meet industrial requirements.

Through CRIAQ, Businesses have access to the expertise of renowned researchers and to financial resources that will allow them to significantly increase their initial R&D budget.

CONSORTIUM DE RECHERCHE EN TRANSFORMATION MÉTALLIQUE (CRITM)

Contact person:
Jean-François St-Cyr, Program Manager
418-446-7187
jfstcyr@critm.ca

The Consortium for Research and Innovation in Metal Processing (CRITM) is a non-profit organization. It is the ninth sector industrial research grouping accredited and financed by the Government of Quebec.
The CRITM's mission is to increase the wealth of metal processing Businesses by supporting innovation. It contributes to the realization of applied research projects between Businesses and research institutions in the following four areas

- Development of transformation process;
- Design of advanced metal products;
- Reduction of the ecological footprint.
- Reduction of energy consumption.

CENTRE QUÉBÉCOIS DE RECHERCHE ET DE DÉVELOPPEMENT DE L'ALUMINIUM (CQRDA)

Contact person:
France Tremblay, Director of Liaison and Support
418 545-5520
france.tremblay@cqrda.ca

The Centre québécois de recherche et de développement de l'aluminium (CQRDA), created in 1993, actively supports links between SMEs, educational institutions and public and private research centres in Quebec.
The CQRDA promotes the use of aluminium in the R&D projects that are proposed to it, and provides technical and financial support to various promoters with a creative and innovative spirit who want to create and develop in this sector of activity.
Through its liaison, monitoring and research and development (R&D) activities, the Centre has been effectively transferring the knowledge, know-how and new technologies that make up Quebec's wealth for 25 years.
The CQRDA, a key intermediary in the aluminium ecosystem.

APPENDIX B - Estimated GHG Emission Reduction Potential in Quebec

The estimation of GHG emission reduction potential should consider the primary effect, i.e., all emissions and/or removals from sources, sinks and reservoirs [SSRs] associated with the solution.

If project related SSRs are not selected for quantification, explain why [e.g. marginal amount of GHG emissions, difficulty in obtaining relevant and reliable information, SSRs whose emissions will not be affected by the project, etc.].

Methodology for identifying SPRs

It is suggested that a systematic approach be used to identify the RPDs related to the solution.

The following steps can help identify the energy and material flows associated with the project, as well as all activities performed before, during, and after the upstream and downstream periods of the solution implementation:

1. Identify the project model based on the activities included in the project.
2. Identify the main activities of the project that help define its function [e.g. production of innovative materials by the project sponsor].
3. Identify the inputs and outputs [materials, energy] associated with the main activities.
4. Identification of other project activities by tracking material and energy flows in and out of the life cycle.
5. Review of all activities and energy flows to ensure that all relevant activities have been identified.

Once RPDs have been identified, they can be categorized according to whether they are:

- **Controlled**: GHG PRSs that are operated under the direction or influence of the GHG project authority through financial instruments, management policies or other means.
- **Associated**: GHG SSRs with material or energy flows into, out of or within the project. A SSR that is not directly controlled by the project but is associated with project GHG emissions.
- **Affected**: GHG SSRs affected by a project activity through changes in market supply or demand for the associated products or services or through physical displacement.

To demonstrate the rigor of the estimates, it is recommended that the rationale for the selection of the SSRs [included or excluded] in the quantification of GHG emissions be provided. To do so, it is suggested that a table of the SSRs and their description, category and inclusion or exclusion from quantification be presented.

Quantitative estimation

The quantitative estimate of GHG emission reduction potential is done on an incremental basis. This involves deducting the GHG emissions estimated for the baseline scenario from those estimated for the alternative. Thus, only the processes and activities that have changed with respect to the baseline scenario are quantified.

In general, a common metric or unit of measurement [such as area covered or volume of products produced] is used for the comparison between the emissions of the alternative and the baseline scenario.

Regarding the choice of emission factors, they must be from a recognized source and be appropriate for the type of activity at the time of quantification. The list of references [Annex D] includes reliable sources for emission factors.

Global Warming Potentials [GWP].

The concept of "global warming potential" [GWP] was developed to allow scientists and policy makers to compare the ability of each GHG to trap [retain] heat in the atmosphere relative to another gas. GWP is the change in radiative forcing due to the instantaneous emission of 1 kg of a gas expressed relative to the radiative forcing of the release of 1 kg of CO_2. In other words, a GWP is a relative measure of the warming effect that the emission of a radiative gas [a greenhouse gas] could have on the surface troposphere. The GWP of a GHG considers both the instantaneous radiative forcing due to a gradual concentration increase and the lifetime of the gas.

The program uses the 2012 IPCC GWPs [Table 1].

Table 1: Global Warming Potential [GWP]. [9]

GHG	CHEMICAL FORMULA	100 YEAR PRP
Carbon dioxide	CO2	1
Methane	CH4	25
Nitrous oxide	N2O	298
Sulfur hexafluoride	SF6	22 800
Nitrogen trifluoride	NF3	17 200
C-23	CHF3	14 800
HFC-32	CH2F2	675
HFC-41	CH3F	92
HFC-43-10mee	CF3CHFCHFCF2CF3	1 640
HFC-125	CHF2CF3	3 500
HFC-134	CHF2CHF2	1 100
HFC-134a	CH2FCF3	1 430
HFC-143	CH2FCHF2	353
HFC-143a	CH3CF3	4 470
HFC-152	CH2FCH2F	53
HFC-152a	CH3CHF2	124

GHG	CHEMICAL FORMULA	100 YEAR PRP
HFC-161	CH3CH2F	12
HFC-227ea	CF3CHFCF3	3 220
HFC-236cb	CH2FCF2CF3	1 340
HFC-236ea	CHF2CHFCF3	1 370
HFC-236fa	CF3CH2CF3	9 810
HFC-245ca	CH2FCF2CHF2	693
HFC-245fa	CHF2CH2CF3	1 030
HFC-265mfc	CH3CF2CH2CF3	794
Perfluoromethane	CF4	7 390
Perfluoroethane	C2F6	12 200
Perfluoropropane	C3F8	8 830
Perfluorobutane	C4F10	8 860
Perfluorocyclobutane	c-C4F8	10 300
Perfluoropentane	C5F12	9 160
Perfluorohexane	C6F14	9 300
Perfluorodecalin	C10F18	7 500
Perfluorocyclopropane	c-C3F6	17 340

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