Call for collaborative research and innovation projects in quantum technologies – 7th call

Deadline for letter of intent: May 1st, 2023, before 4 p.m.
Deadline for submitting applications: May 30, 2023, before 4 p.m.

1. Introduction

A. Presentation

The ministère de l'Économie, de l'Innovation et de l'Énergie mission is to support business growth, entrepreneurship, science, innovation, export, and investment. It also advises the government on economic development across Québec, in the spirit of:

- Job creation
- Economic prosperity
- Sustainable development

The Ministry aims to support research and innovation players in becoming more competitive in establishing, building upon, and transferring their expertise into the economic sector, especially in priority disciplines that are strategic for Québec's future.

PRIMA Québec, le pôle de recherche et d'innovation en matériaux avancés, is a regroupement sectorial de recherche industriel (RSRI) which leads and supports the ecosystem of advanced materials, a driver of innovation and growth for Québec. Through its support and funding offered, it helps to stimulate the competitiveness of Québec businesses by allowing them to benefit from research expertise.

Prompt develops and finances research and innovation partnerships in all sectors of information and communication technologies (ICT), digital, artificial intelligence and microelectronics. It develops and finances projects that bring together companies, universities, technology transfer centres and public research centres to develop new products, solutions and cutting-edge services. It multiplies the capacities of researchers and entrepreneurs to make their dreams become a reality, while strengthening local expertise, notably by training the workforce and creating long-term wealth.

B. Background

The quantum technology sector is booming across the globe. Recent advances in our understanding of quantum phenomena and how to manipulate and control quantum states have opened the door to new applications based on quantum superposition and entanglement. Basic quantum research and the first quantum technology revolution—which included the development of lasers to investigate the quantum properties of matter—are giving way to a new era. The second quantum revolution is already having constructive, real-world impacts on our daily lives, including quantum metrology and quantum sensors. Future advances in areas such as quantum computing and cryptography promise to be even more disruptive.

Interest in disruptive quantum phenomena has been growing for some time, attracting investment that has spawned a rich research ecosystem within Québec in cryptography, high-performance computing, nanomaterials, and quantum photonics.

A number of innovation centres in Québec are collaborating with industry, research institutes, universities, and startups to mobilize expertise and grow the sector. The centres are hubs for expertise, know-how, and cutting-edge manufacturing infrastructure and act as vectors for quantum technology development.

Entrepreneurship is key to building an industry around digital and quantum technology. Small and medium-sized enterprises (SMEs) are the backbone of Québec's prosperity, especially when it comes to employment and economic contributions. Startups have high growth potential and a unique corporate culture based on flexibility, creativity, the development of disruptive technology, dynamic business models, and a global outlook, among other things.

Quantum technologies have the potential to produce far-reaching benefits and are often a source of innovations that help address global challenges and change our way of life. Developing these technologies means strengthening Québec's economy and making it more competitive.

2. Objectives

The objectives of the call for projects are to:

- Foster and consolidate innovation in the field of quantum technology
- Strengthen companies' capacity for technological innovation and create economic benefits by exploiting and transferring technology
- Help position Québec as a leader in quantum technology development

This call for projects is aimed at all Québec startups and SMEs seeking to undertake innovative projects that develop and commercialize quantum technology as defined in Appendix 1. This call for projects is divided into four parts, only for streams 3 and 4 are supported by PRIMA Québec and Prompt, for the other streams see the MEIE[1] website:

- **Stream 3 - Academic** aims to support collaborative business innovation projects in partnership with a public research centre. Optionally, in partnership with a public research centre and a company in Canada or abroad. For a Canadian or international partnership project, only the Québec portion of the financial plan must comply with the funding terms and conditions for this call for projects.
- **Stream 4 - Company** aims to support collaborative innovation projects involving two or more companies (including at least one SME or startup). This group of companies must share the costs, profits and intellectual property of the innovation project. Large companies carrying out in-house research and development or production activities in Quebec are eligible for this component. One or more public research centers in Quebec can also collaborate on the project. Optionally, in partnership with an SME (or startup) in Canada or internationally. For a Canadian or international

[1] https://www.economie.gouv.qc.ca/bibliotheques/appels-projets/appel-technologies-quantiques/

partnership project, only the Québec portion of the financial plan must comply with the funding terms and conditions for this call for projects.

Projects submitted must properly present the benefits of the projects for research, training and economic development.

It is strongly encouraged to contact PRIMA or Prompt advisor to review the application before submission.

3. Areas covered by the call for projects

The call for projects seeks to foster innovation in quantum technology derived from R&D in the following areas:

- **Quantum computing**, including, but not limited to, the development of quantum computers, quantum software, quantum computer programming languages, quantum algorithms, quantum simulations, and key supporting technologies for quantum computer development (e.g., microfabrication, refrigeration, and photon manipulation)
- **Quantum communications**, including quantum cryptography, quantum internet, and quantum networks, that use the principles of quantum photonics and have multiple applications, such as security, defense, and information storage and processing.
- **Quantum materials**, including the development or simulation of new materials with innovative quantum properties
- **Quantum metrology and quantum detection**, including the development of innovative devices based on quantum principles (especially quantum photonics) and applications for accurately probing, measuring, and manipulating quantum properties of matter or photons.

Projects must contribute to the development and commercialization of:

- Components for quantum computers and quantum communications
- Quantum technologies that fall within the following areas of application (non-exclusive):
    - **Life science**s, including quantum simulation tools for designing new drugs (in service of or collaboration with artificial intelligence), and the development of innovative materials for medical applications
    - **Sustainable development**, including the development and use of devices such as quantum sensors to detect mineral deposits
    - **Transportation and logistics**, including the design of new innovative materials for vehicles or aeronautics and quantum simulation tools for optimizing logistics and supply chains in service of or collaboration with artificial intelligence

Note: Companies that have received funding under Ministère de l'Économie, de l'Innovation et de l'Énergie Innovation Program must contact quantique@economie.gouv.qc.ca to confirm their projects are eligible.

In addition, projects must respect the domains of PRIMA Québec and Prompt.

For a submission to PRIMA Québec

The proposed research and development project must address the themes of the quantum call and be related to one or more of the PRIMA Québec axes.

In keeping with its strategic plan, PRIMA Québec recommends the submission of projects dealing with the development of advanced materials applied to key sectors in Québec like transportation and infrastructure, energy, environment, electronics, health, chemistry and critical and strategic minerals. Technologies targeted by this call for projects include primarily:

- **New materials:** Polymers, elastomers, biomaterials, metals, innovative fillers, cellulosic filaments, natural and synthetic fibres, nanomaterials, quantum material, etc.
- **Formulated materials or high-performance finished or semi-finished products:** Composites (TD or TP), rubbers, alloys, ceramics, smart textiles, flexible materials, membranes, thin layers, coatings, biocompatible materials, encapsulation, sensors, quantum technologies, etc.
- **Implementation processes, scaling and new characterization techniques:** Additive manufacturing and 3D printing, modification and surface treatment, micro/nanofabrication, tools, new characterization tools, modelling and simulation, shaping processes, quantum calculus, etc.
- **Use of artificial intelligence** with advanced materials for production, integration or implementation processes or characterization technique.

For a submission to Prompt

Prompt's core sector is information and communication technologies (ICT) and digital, from hardware to software, but also at the component, network and application level. This allows PROMPT to finance numerous projects within specific vertical markets such as health, security, transportation, etc. The impact of these projects is then considerable enough to change practices, research and applications.

4. Participants

Eligible Academics

For stream 3, applications must be submitted by Québec research establishments. Universities, CCTTs or public research centres[2] are eligible (If the research centre is not on the list, please contact PRIMA or Prompt advisor to check the status [public or private] with the MEIE). They must allow the training of highly qualified personnel (HQP).

Eligible Company

Quantum technology startups must meet the following criteria:

- They must be legally incorporated according to Canadian or Québec law and registered with the Registraire des entreprises du Québec.
- They must have their **headquartered in Québec** and their employees and subcontractors must be mainly based in Québec.
- **50% or more of the company cannot be owned by existing companies** or organizations.

[2] Link to Centres de recherche reconnus and Consortiums de recherches admissibles.

- They must have been incorporated for **five years or less.**
- They must own the rights to use the intellectual property in their product, process, or service.
- They must currently receive support from a business incubator or accelerator.
- They must allocate (or plan to allocate) a significant portion of their resources (50% or more) to business development, which extends from the design and development of the product, process, or service to the marketing stage.

Quantum technology SMEs must meet the following criteria:

- They must be legally incorporated according to federal or Québec law and registered with the Registraire des entreprises du Québec.
- They must have their **headquartered in Québec** and their employees and subcontractors must be mainly based in Québec.
- They must have been incorporated for **more than five years.**
- They have 249 employees or less.
- They have assets of less than $50 million.

Related companies will be considered as one and the same company in the project. Related meaning that "the relationship between the companies would be such that one has the ability to exercise, directly or indirectly, control or significant influence over decisions relating to the financing or operation of the other."

Foundations and NPOs may be eligible as a 2nd tier company. However, they must be a willing participant: it must have the capacity and bring their expertise to the project and benefit from the direct benefits of the project.

Ineligible organizations

The following organizations are ineligible (both individually and as part of partnerships):

- Companies that are directly or indirectly controlled by provincial or federal governments, municipal entities, or companies that are majority-owned by crown corporations.
- Companies under the protection of the Companies' Creditors Arrangement Act or the Bankruptcy and Insolvency Act.
- Companies listed on the Registre des entreprises non admissibles aux contrats publics
- Any company that failed to meet its obligations after being served formal notice regarding previous funding from Ministère de l'Économie, de l'Innovation et de l'Énergie in the two years preceding the funding application.

PRIMA Québec Membership

All industrial, academic organizations or public research centres participating in a project **must be members of PRIMA Québec at the time the project is submitted** and must remain so for the duration of the project. To become a member of PRIMA Québec: https://www.prima.ca/en/product/prima-quebec-membership/.

5. Financing Program Standards

Stream 3: Collaborative innovation projects, in partnership with a public research centre

Eligible projects are those that promote research in quantum technologies in partnership with an eligible public research center. They are divided into two categories depending on the size of the companies participating in the project:

Stream 3	SME Component An SME is a company with less than 250 employees.	Large Company Component (LC)
Minimum number of industrial partners	1 SME minimum one with a presence in Québec (R&D or production). Also, if partnership between SME and GE, the SME must also show a significant participation in the project. - Assessment of the company's position, its competition in the market and the ecosystem. - SME contribution: scientific and economic level. The SME might not have a strong scientific involvement. However, it is important to clearly demonstrate the SME contributions to the project. (SME role in the project? What % does it contribute? Contribution in cash vs. business income? Does it make an in-kind contribution?) - Benefits of the project for the SME -Benefits for the other companies involved - Benefits for the sector of activity and for Québec.	1 Large company minimum with a presence in Québec (R&D or production)
Eligibility of Canadian, foreign or industry association companies	Yes, as a 2nd company It cannot be related to the first company	
Minimum number of Québec academic partners (university or CCTT or public research centres)	1	
PRIMA Québec financing maximum, in %, of eligible R&D costs (MEIE management fees and IRC included)	40%	20%
	Max $1.0M ($500k/year)	
Minimum industrial financing	**Min 20% in cash** -If one or more SMEs with GEs, the total contribution of Québec SMEs must represent at least 20% of the minimum private contribution required.	**Min 40% in cash and in-kind** 50% of which may be in kind
	The contribution of a company that has been paid to it as part of a government grant will not be considered as an industrial contribution. Money from another government agency is not accepted. Only new industrial contributions for new projects will be recognized as counterparty, i.e., the MEIE aid will be granted in return for new industrial contributions (not already committed as co-financing in other programs or projects).	
Maximum cumulative public	80%	60%

Stream 3	SME Component An SME is a company with less than 250 employees.	Large Company Component (LC)
financing		
Complementary funding	NSERC [3], NRC-IRAP, MITACS, SDTC other municipal, provincial or federal funding sources. Any additional funding must be added to the PRIMA request (thematic and budget) once the additional funding has been deposited. Contact a PRIMA advisor to confirm acceptability. To use MITACS, NRC-IRAP or SDTC as complementary funding, please contact a PRIMA or Prompt advisor. Additional funding should be obtained within 9 months after the evaluation date to avoid any questioning of the scientific and economic evaluation. Therefore, it is strongly encouraged to submit the application surrounding the PRIMA or Prompt submission period to quickly obtain the PIRMA or Prompt funds or to have the necessary time to resubmit if the complementary funding body refuses. Ineligible additional funding: • MEIE grant cannot be combined with financial assistance from another program of the Ministère de l'Économie, de l'Innovation et de l'énergie, including those of the Fonds du développement économique (FDE), nor a contribution already matched by the MEIE • Cannot be funding already committed for research activities distinct from those that are the subject of the application to PRIMA or Prompt. It is necessary to specify in the request for additional funding that an application to PRIMA or Prompt has been submitted and the supplementary financing budget must include funding from PRIMA or Prompt[4]. Complementary funding already obtained that does not specify PRIMA Québec or Prompt and the current project cannot be used. If a request for additional funding is made to NSERC with co-applicants outside Québec, an advisor must be contacted, because the financial package will change. For PRIMA's contribution, only students from Québec institutions are considered in the financial calculation. MITACS funding cannot exceed 50% of the research budget and must be divided into its components. • The provincial part (MEIE) comes under PRIMA or Prompt funding, • The industrial part in industrial financing, • The federal part in complementary financing **The scientific evaluation of PRIMA serves as a scientific evaluation for MITACS internships.** **It is mandatory to quickly contact your PRIMA or Prompt and Mitacs advisor to ensure the coordination of the PRIMA or Prompt form and the Mitacs appendix.** Division of a MITACS internship unit MITACS MEIE (PRIMA) 4 000 $ / Entreprises 7 500 $ / Mitacs (fédéral) 3 500 $	
Maximum duration of projects	3 years The project can begin, at the earliest upon confirmation of the complete eligibility of the project following its submission, and at the latest 9 months after the approval of financing by the MEIE.	

[3] In alliance grant, please specify PRIMA as "Other funder (who does not participate in the research)" and specify Michel Lefèvre, michel.lefevre@prima.ca as PRIMA resource person or Jinny Plourde, jplourde@promptinnov.com as Prompt resource person.
[4] A copy of the request for additional funding must be sent to PRIMA.

Stream 3	SME Component An SME is a company with less than 250 employees.	Large Company Component (LC)
Indirect research costs (only for universities and CCTT)	27% of the MEIE contribution on eligible expenses	
PRIMA Québec management fees	5% of the R&D budget, with a maximum of $50,000 distributed in proportion to the contributions of the MEIE and the companies (40–60%, SME component) or (20–80%, LC Component)	

Stream 4: Collaborative innovation projects of two or more companies (including at least one SME or startup)

Eligible projects are those that highlight collaborative research in quantum technologies involving two or more companies (including at least one SME or startup). This group of companies must share the costs, profits and intellectual property of the innovation project. One or more public research centres in Quebec can also collaborate on the project. Projects must be submitted to PRIMA or Prompt.

Applications submitted will be part of the Innovation Program, Stream 1 – Support for Innovation Projects, and will be assessed in collaboration with Investissement Québec. **The management and terms of the grant agreement are the responsibility of the regional office of Investissement Québec corresponding to the territory of the applicant** in collaboration with PRIMA and PROMPT.

At the end of the project, **an external audit will be requested** to validate all project expenses.

Stream 4	
Minimum number of industrial partners	At least 2 companies (including at least one SME or a startup): • an SME or a startup with their head office in Québec and a company with a presence in Québec (R&D or production)
Eligibility of Canadian, foreign or industry association companies	YES as 3rd company. She participates in the project with their own fund, she is not eligible for reimbursement of expenses.
PRIMA Québec financing maximum, in %, of eligible R&D costs	50%
Minimum industrial financing	**Min 25% of eligible expenses** The contribution of a company that has been paid to it as part of a government grant will not be considered as an industrial contribution. Money from another government agency is not accepted.
Maximum cumulative public financing	75%
Complementary funding	Any public funding that does not come from the MEIE such as NRC-IRAP
Maximum duration of projects	3 years The project can begin, at the earliest upon confirmation of the complete eligibility of the project following its submission, and at the latest 9 months after the approval of financing by the MEIE.
Frais de gestion de PRIMA Québec ou Prompt	Management fee of 5% of the R&D cost of the project or $50,000 max
Maximum PRIMA Québec or Prompt funding in $ per project and MEIE management fees	1 M$

Technology Readiness Level (TRL)

To properly assess the project submitted to PRIMA or Prompt, the applicant must identify the TRL level of the technological solution at the start of the project and that targeted at the end of the latter. The TRL level is no longer used in the fund calculation. Projects can range from TRL 1 to 9. However, the PRIMA or Prompt program is a grant for the support of Research and Development projects, if we find that the share of R and D is low or that another program would be better suited such as Investissement Québec's Innovation Program, the project will be declared ineligible.

Collaborations outside Quebec

Projects can all be carried out in collaboration with one or more companies and/or one or more public research centres outside Québec, provided that the requirements of the component concerned are met on the Quebec side alone and that there are demonstrated benefits for Québec. Financial support will naturally be granted only to the Québec part of the project.

Eligible Expenses

Eligible expenses are the direct costs of projects (research mandate) incurred in public research institutions in Québec.

Indirect project costs refer to additional operating expenses arising from research projects, but which cannot be specifically attributed to them. They include costs related to the operation and maintenance of infrastructure, the management and administration of projects, as well as compliance with the various regulations and standards in force.

List of eligible expenses:

Stream 3
• Salaries, wages and benefits not subject to any other public financial support (students, postdoctoral fellows, research assistants and professionals, technicians, etc.); Salaries including benefits of professors newly recruited by an academic institution based on recognized expertise can be covered for a maximum period of three years, as long as they are part of a research chair dedicated to answering the needs of an emerging industry in Québec. These chairs also ensure the generation of highly qualified personnel to integrate into the workforce in these key industrial sectors. It is the actual cost and not selling price that must be indicated. • Scholarships; • Materials required and supplies specific to carrying out the project; • Purchase (less $ 25k per equipment before taxes) or equipment rental (maximum 25% of total eligible expenses); • Travel and subsistence expenses according to the Ministry guideline, these must be reasonable. In the context of projects carried out abroad, travel and living expenses abroad for Québec researchers and students are eligible but may not exceed 15% of the total eligible expenses. Travel and living expenses of foreign researchers are not considered eligible. • Intellectual property management fees (legal support, attorney fees);

- Fees for professionals and subcontractors;
- Dissemination fees;
- Animal and platform fees;
- Costs related to subcontracts.

Stream 4

- Salaries, wages and benefits related to the project;
- Materials required and supplies specific to carrying out the project;
- Purchase (only the portion amortized over the duration of the project is eligible) and rental of equipment, up to 25% of total eligible expenses;
- Travel and subsistence expenses according to the Ministry guideline;
- Intellectual property management fees (legal support);
- Fees for professionals (example: audit fees);
- Dissemination fees;
- Costs related to subcontracts;

List of ineligible expenses:

Expenditures made or incurred before the eligibility date of the application for financial assistance are not eligible, nor are expenditures made outside Quebec.

In addition to these, the following expenses are not eligible:

Stream 3

- Sums related to the release of university professors to carry out activities within the framework of the projects cannot be included in this item of expenditure.
- Salaries of university researchers who are currently being paid by their institution or by a government granting agency are not eligible expenses.
- Administrative costs are not eligible;
- Equipment maintenance costs;
- Expenses for filing and maintaining intellectual property;
- Recurring costs such as annual subscription fees and software upgrade fees.

Stream 4

- Expenses related to the rental of offices or laboratories for the expansion of the business (subsidiary or additional office);
- Debt service, repayment of future loans, capital loss or replacement of capital, payment or amount disbursed as capital;
- Capital expenditures and depreciation;
- Sales taxes;
- Expenses for filing and maintaining intellectual property;
- Recurring fees such as annual subscription fees and software update fees;
- Expenses not provided for in the financial package as presented when submitting the application for financial assistance;

- Expenses that have already received financial assistance from the Ministry;
- The cost of acquiring structuring equipment (for example, the acquisition of a machine that would require the disbursement of more than 60% of the subsidy paid).

The support requested may not be combined with financial assistance from another program of the ministère de l'Économie, de l'Innovation et de l'Énergie, including programs of the Economic Development Fund, which Investissement Québec manages as an agent.

In-kind contribution:

For collaborative projects in stream 3 with an SME, the partners in-kind contributions are not considered in the calculation of the grant. However, the jury will take it into account to assess the significant participation of the SME in the project.

For a Stream 3 – Large Company Component projects, in-kind contributions from partners are also accepted if:

- These are expenses subject to an audit by the MEIE (their value can be reasonably established and supported by supporting documents);
- They are essential to the realization of the selected project;
- They correspond to costs incurred specifically to carry out the project;
- They represent an element for which one would otherwise have to pay at equal or higher cost;
- Only 50% of the total industrial contribution (cash + in-kind) is considered, there may be more than 50% in the project.

Projects are cost-shared between industry, MEIE and complementary funding. MEIE support is for the entire project, not just a portion of the project's research activities. Any cost overrun in the project as initially presented to PRIMA must be borne by the promoter.

Indirect costs of research (universities, affiliated hospitals, colleges and CCTT)

For all funded projects, PRIMA Québec or Prompt will grant the university, affiliated hospital centres, colleges and CCTTs, in addition to the research grant, a grant for indirect costs for a maximum amount of 27% of the subsidy granted by PRIMA Québec or Prompt on the following expense items: salaries, student grants, small equipment, equipment rental, materials, consumables and supplies, as well as travel expenses.

Note: The other financial contributors to the project must pay a rate of ICR on their contribution at least equivalent to that of the MEIE for the project (27%). In other words, all funders must assume the full costs of the research, notably by paying the indirect costs of research.

PRIMA Québec Management Fees

PRIMA management fees are shared between the industrial partners and MEIE. It is the responsibility of the funding applicant to inform the industrial partners of the management fees of PRIMA Québec. The combined management fees of MEIE and the industrial partner are a maximum of $50,000.

For **Stream 3** projects

SME component:

- Companies involved in the project must contribute to PRIMA Québec's management fees for a total amount of **3%** of the amount of research mandate up to a maximum of $30,000.

- MEIE management fees are 2% up to a maximum of $20,000 max.

Large company component:

- Companies involved in the project must contribute to PRIMA Québec's management fees for a total amount of **2%** of the amount of research mandate up to a maximum of $40,000.
- MEIE management fees are 0.5% up to a maximum of $10,000 max.

For **Stream 4** projects

- Management fee of 5% of the R&D cost of the project or $50,000 max

Intellectual Property Management

An agreement governing conditions for the management of intellectual property must be concluded among all partners (companies, universities, research centres) before financing is awarded.

Application files will be accepted for evaluation even if an intellectual property agreement is not available at the time the proposal is submitted. **Nonetheless, the application file must present a broad outline of the sharing of intellectual property under consideration.**

Communications

Please note that the information given in the identification sheet section as well as the amount of the subsidy are public data and can be used by the MEIE and PRIMA Québec for promotional purposes.

If your project is approved for funding, the ministry may reserve the right to a first communication. Please communicate with PRIMA before any first communication about the project.

6. Procedure and Timetable for PRIMA Québec

1. A letter of intent is mandatory **on May 1st, 2023, before 4 p.m.**
2. Applicants must submit a COMPLETE APPLICATION **on May 30, 2023, before 4 p.m**. It is necessary to include the following items with the completed PRIMA form:
   - The CVs of the main researchers and academic and industrial collaborators (no format is imposed).
   - Signed letters of support from all industrial partners specifying:
     - The amount of cash and in-kind allocated to the project R&D as well as PRIMA's management fees.
     - Why is this project necessary for them?
     - What will be the benefits for them?
   - A PDF copy of the additional funding request must be sent to PRIMA Québec once it has been submitted.
   - If applicable, the Mitacs joint application form with an RSRI if the promoter does not use the NSERC/MITACS joint program
3. Verification of project eligibility
4. Projects will be evaluated by a scientific and economic evaluation committee selected by PRIMA Québec or Prompt and IRAP-NRC. (See point 7 for criteria.)

5. Results will be announced in September 2023.
6. Obtaining additional funding. This additional funding should be obtained within 9 months after the evaluation date to avoid any questioning of the scientific and economic evaluation. Therefore, it is strongly encouraged to submit the application surrounding the PRIMA or Prompt submission period to quickly obtain the PIRMA or Prompt funds or to have the necessary time to resubmit if the complementary funding body refuses.
7. Sending the file to the MEIE to obtain the authorization of financing. Please note that any other documents may be requested by the MEIE to validate the project component, the sources of funding (private or public), the company's ability to participate in the project, especially for Startups.
8. **Stream 3:** Once the authorization has been obtained, the grant agreement between the project promoter and PRIMA Québec or Prompt must be signed within 9 months. The project can begin, at the earliest upon confirmation of the complete eligibility of the project following its submission, and at the latest 9 months after the approval of financing by the MEIE.
   Stream 4: The agreement will be signed with Investissement Québec. The project can begin, at the earliest upon confirmation of the full eligibility of the project following its submission.
9. During the project, evidence of the contributions of the industrial partners as well as technical and financial reports must be provided according to the conditions indicated in the grant agreement.
   For stream 4, there is a first payment at the start of the project, then the following payments are made by reimbursement of expenses. Invoices, payslip, time sheets and proof of payments and instalments must be sent with the financial report.
10. At the end of the project, final reports (technical and financial) from the promoter and assessment report completed by the companies present in the project will be requested.
    For Stream 4, a report from an **external auditor** validating all eligible expenses incurred and paid and the sources of financing received for the project (both companies together with details of each or one report each). This expense is an eligible expense.

7. Evaluation Criteria

Projects will be assessed according to the following criteria:

- Project objectives, quality, and relevance
- Degree of innovation
- Commercialization potential
- The team and organization's ability to complete the project
- Intellectual property protection strategy
- Benefits for Québec (economic and social, expertise building)

For each component, files will be selected by an independent selection committee selected by PRIMA Québec, PROMPT and NRC-IRAP according to the following criteria and the weighting indicated:

Stream 3

Technical-Scientific Evaluation

- Scientific quality and feasibility of the project (30% for TRL 1-3 projects and 20% for TRL 4-9 projects).
- Training and knowledge transfer (30% for TRL 1-3 projects and 40% for TRL 4-9 projects).
- Innovation and project benefits (40% for TRL 1-3 projects and 40% for TRL 4-9 projects).

Economic Evaluation

- Relevance and fit between the project and industry as well as the quality of the team (50% of the economic evaluation).
- Intellectual property protection strategy and economic benefits for the industry and Québec (50% of the economic evaluation).

In order to be recommended for funding, a project must obtain a score above 70% in the technical-scientific evaluation and a score above 50% in the economic evaluation. The overall score must be above 70%.

- TRL 1-3 projects: the technical-scientific evaluation represents 70% of the overall score and the economic evaluation 30%.
- TRL 4-9 projects: the technical-scientific evaluation represents 60% of the overall score and the economic evaluation 40%.

Stream 4

Technical-Scientific Evaluation

- Level of innovation of the project (15%).
- Scientific and technological quality of the project: problem, objectives, quality of the preliminary or researched data, methodological approach, industrial feasibility and adequacy with the program's objectives (15%).
- Project implementation: stages of implementation, merits and justification of the request for financial assistance and management of intellectual property (protection and commercial development) (10%).
- Collaboration and expertise for the realization of the project: use of researchers or experts in quantum technologies, use of research and innovation organizations, level of commitment of partners and the stakeholder community, number and relevance of partners, expertise of the entrepreneurs, history of research and innovation, and ability of the team and the company to carry out the project (20%)
- Anticipated benefits: effect on the advancement of knowledge, improvement of the company's positioning, economic benefits, impact on the application sector, commercialization potential and contribution to the development of the next generation (40%).

Impact Assessment

- Relevance of the project in relation to the applicant's business model or added value of the financial assistance (25%).
- Ability of the company to carry out the project successfully in terms of financial and human resources (25%).
- Funding structure and, more specifically, partner support (25%).
- Business impacts (25%).

The project is recommended for funding if each of the scores (technical-scientific and economic evaluations) is above 70%.
The selection committee can approve the project, refuse it, or approve it conditionally to changes or clarifications required by the selection committee.

Following a positive evaluation, the project will be sent to the board of PRIMA Québec for recommendations for funding to the MEIE. However, the MEIE reserves the right not to award the funding. It could prioritize projects based on the research benefits, the training of skilled workers and the economic benefits. It could request additional documents or information from the promoter or companies participating in the project to finalize its decision.

The approval of the MEIE is also subject to obtaining additional funding and an intellectual property agreement between the participants. To avoid lengthening the time between the submission of the project and the funding agreement, please submit a request for additional funding and PRIMA request at the same time.

This program is dependent on funding from the MEIE. No guarantee of obtaining the grant can be provided. The grant criteria and other terms and conditions of this funding program are subject to change without notice.

Please note that the decisions of the PRIMA Québec evaluation committee and board of directors are **final and without appeal**.

8. Notes on the Project Submission Form

- Feel free to send the completed form for verification before submission to an advisor.
- We encourage you to submit your application for PRIMA or Prompt and additional funding in the same period to avoid extending the time before funding approval.
- If you are using Mitacs funding, please contact your PRIMA and Mitacs advisor to ensure funding rules are followed and forms completed correctly.
- Please note that the information (name of the promoter, name of the companies, as well as the summary) given in the section I-identification form as well as the amount of the subsidy are public data and can be used by the MEIE and PRIMA Québec or Prompt for promotional purposes.
- Make sure you have all the expertise needed to carry out the project.
- In the intellectual property section even if an agreement is not yet signed at the time of filing, please clearly state the outline on which the negotiation is taking place or will take place.
- This program aims, among other things, to train highly qualified personnel and to generate economic benefits for companies and for Québec. Please make sure that your application clearly presents these aspects.
- Along with the form comes an Excel file to help you calculate the correct budget values of Section VII.
- In the financial budget industrial contributions are direct contributions to R&D. This excludes amounts such as FIR that universities and CCTT may request and management fees from PRIMA.

- For the justification of the prototype line of the budget, please show that you have the necessary expertise and that the costs are realistic for the realization of the prototype and that if authorizations are necessary, these have been obtained or are in the process of being obtained.

9. Contacts

Form PRIMA Québec

For further information or assistance in the drafting of the application file, do not hesitate to contact an advisor:

- Michel Lefèvre: 514 284-0211, ext. 227, michel.lefevre@prima.ca
- Sébastien Garbarino: 514 284-0211, ext. 226, sebastien.garbarino@prima.ca
- Stéphane Ruggeri: 514 284-0211, ext. 231, stephane.ruggeri@prima.ca
- Cloé Bouchard-Aubin: 514 284-0211, ext. 225, cloe.bouchard-aubin@prima.ca

Applications must be sent as **a single file in PDF format** (Adobe Acrobat) by email to:
laura.salatian@prima.ca, 514 284-0211, ext. 223.

From PROMPT

For further information or assistance in the drafting of the application file, do not hesitate to contact Prompt.

Stream 3: https://promptinnov.com/programme/projets-techno-quantique-academique/
Stream 4: https://promptinnov.com/programme/projets-techno-quantiques-entreprise/

APPENDIX A - DEFINITIONS

Quantum

Branch of physics based on the principles of quantum mechanics that describes the behavior of matter at the microscopic scale, i.e., quantum particles (e.g., atoms, electrons, photons).

Quantum technologies

Technologies based on the basic principles of quantum: entanglement and superposition of quantum states. Quantum technologies are found in:
- the development of new quantum tools (quantum computer, quantum simulator);
- the use of quantum devices (sensors, detectors);
- the development of technologies in direct support of new quantum tools (new materials, microfabrication).

Categories of quantum technologies

Quantum communications

Quantum communication networks, cryptography (quantum key distribution), quantum internet.

Detection and metrology

Detector and sensors (acceleration, rotation, gravitational field), imaging, atomic clock.

Quantum calculator

• Hardware: different types of processors (photonics, solid state, adiabatic, superconductors, annealing, diamond spin qubits, nitrogen-vacancy centres);
• Software: quantum algorithms, development of programming languages, simulations;
• Enabling technology (enabler): microfabrication, refrigeration, measurement tools.

Quantum materials

New materials with quantum properties, new materials necessary for the fabrication of quantum devices, micro- and nanotechnology.

Quantum simulations

Classical or hybrid computer simulations of complex quantum systems (e.g., chemical reactions).

Areas of application and examples

• Mining: gravimeter;
• Environment: sensor, probe;
• Life sciences: imaging, simulations for the development of new drugs (pharmaceutical);
• Finance: optimization, high-precision atomic clock for the stock market;
• Defence and security: sensor, gravimeter, cryptography, new materials;
• Energy: new materials (batteries), optimization;
• Chemistry: simulations of new molecules and chemical reactions;
• Agriculture: simulations of the catalysis process in fertilizers;
• Machine learning, big data: optimization, processing of large data sets;
• Aerospace: simulations (quantum computers), quantum communications and navigation systems (quantum sensing);
• Land transport: new materials, optimization of logistics.

Photonics

Branch of physics that deals with the study of phenomena and the manufacture of tools related to the generation, transmission, manipulation, control and detection of photons. A photon is a quantum of energy, often described as a type of elementary particle, associated with light (or other sources of electromagnetic radiation). Photons possess energy whose associated frequency can range from terahertz to X-rays in the electromagnetic spectrum. Photonics can be approached in a classical or quantum way.

Quantum photonics

Using photonics to probe quantum phenomena and develop quantum technologies.

Categories of photonic technologies

Sources of light (photons)

Lasers (solid laser, fiber laser, semiconductor laser/laser diodes, free electron laser, etc.).

Photon manipulation

Fibre optics, photonic crystals, lenses, prisms, gratings, optical materials, semiconductors, interferometers, diodes.

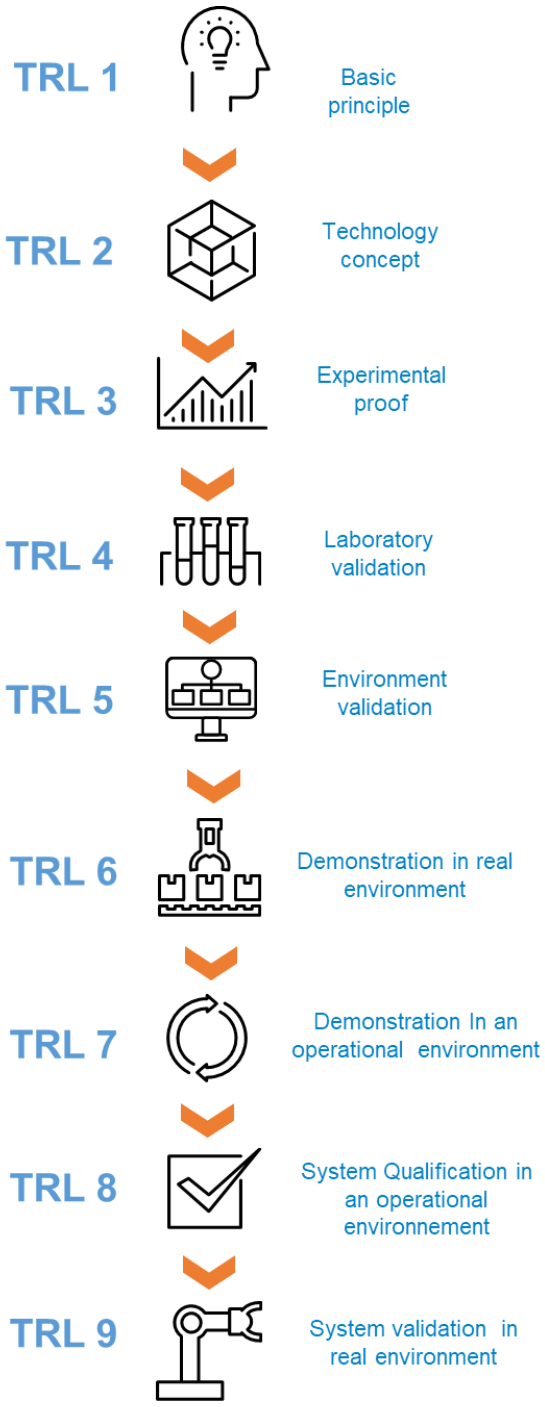
Use of photons

Spectroscopy, lidars, detectors, sensors, imaging, biophotonics, microscopy.

Areas of application and examples

- Aerospace: navigation systems, quantum detection, lidar;
- Agriculture: distance sensor;
- Biomedicine: surgery;
- Construction: topography;
- Engineering, micro- and nanotechnology: semiconductor chip, circuit, photolithography, microelectromechanical system;
- Renewable energies: photovoltaic cells;
- Environment: spectroscopy, detection;
- GPS: imagery and image processing;
- Information technology: storage and transmission of data on optical fibres;
- Chemistry: fluorescence spectroscopy, plasma, materials;
- Land transport: imagery, navigation;
- Defence and security: detection;
- Manufacturing: laser welding;
- Biotechnology: spectroscopy;
- Solid State: Light Emitting Diode (LED).

APPENDIX B: Definition of different technology readiness levels (TRL)



Graphic inspired by the document: Space Systems - Definition of Technology Readiness Levels (TRL) and their criteria of assessment, ISO 16,290. (https://www.iso.org/fr/standard/56064.html)
The ISO16290 standard is available for consultation at the offices of PRIMA Québec.