



# CHOOSING QUÉBEC'S MINING SECTOR

October 2014

## Note to the reader

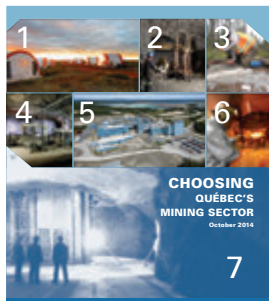
This report provides a portrait of mining activities for metals (iron and titanium; gold; nickel, platinum group elements and cobalt; copper; zinc; niobium and tantalum; lithium; rare earths). The report also examines graphite, phosphate and diamonds. Mining activities related to the industrial minerals feldspar, mica, salt and silica **are not** addressed in this report.

For each metal or mineral substance presented in this report, the authors have described the mining context, recent production data, and notable mining and exploration projects. Information on the mineral reserves and mineral resources for mining projects that have, at minimum, passed the preliminary economic assessment phase is presented as tables.

For each metal or mineral substance presented, a location map shows the active mines, mining projects and exploration projects for which NI 43 101 resources have been published within the last five years.

Finally, to underscore the most promising areas for exploration, the report presents mineral deposits with established tonnages and showings recorded in the *Système d'information géominière du Québec* (SIGÉOM) database, but these are not identified individually. Deposits and showings are only presented for mineral substances that are considered to be new and under-exploited commodities.

The information in this document is current as of July 2014.



## Photos credits

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## **A WORD FROM THE MINISTER FOR MINES, MR. LUC BLANCHETTE**

### **MINE DEVELOPMENT: A PRIORITY FOR QUÉBEC**

Over the past few years, the Québec mining sector, like the rest of the world, experienced many setbacks which brought about some uncertainty. This period culminated in 2013 with a revision of the mining tax regime and the adoption of a new Mining Act.

**Today, Québec is moving forward and making natural resource development one of its top priorities.**

The government has set up various measures to promote sustainable mining in the province, development that is based on a relationship of trust between players in the mining industry, investors and citizens. By doing so, the government ensures that the mining regime remains competitive and encourages investment. It is relaunching the ambitious Plan Nord to open up the vast northern reaches of the province and develop its wealth. Sustainable mining is one of the spearheads of this great project and thus plays a vital role. The government is also investing in improvements in infrastructure, to sustain economic growth, and is implementing a maritime strategy that aims to position Québec as the hub of transatlantic shipping traffic. This will become a key asset for the rapidly expanding mining industry in Québec.

**Vision, stability, competitiveness: this sums up the current investment environment in the Québec mining sector.**

This document provides a portrait of the mining sector as well as the exploration and mining contexts currently in place in Québec. You will discover the province's mineral potential and the advantages Québec offers to investors looking to help build the province's future.

**You will discover that to invest in Québec today is to make a choice about the future!**

A handwritten signature in black ink, appearing to read 'Luc B.', with a stylized flourish at the end.

Luc Blanchette  
Minister for Mines







Photo: MERN

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## INVESTING IN QUÉBEC'S MINING SECTOR

### The province of Québec and its mining sector

Québec is the largest federated State in Canada (1,667,441 km<sup>2</sup>), and has a population of 8.2 million inhabitants. Québec is strategically positioned, just northeast of the United States, near major population centres and industrial hubs. Europe and Asia are also easily accessible from Québec thanks to its deep-sea ports.

Québec accounts for a fifth of Canada's mineral production. It is the most diversified producer in Canada given its production and beneficiation of 17 metallic and 13 non-metallic minerals. This diversification will increase with the arrival of new mining projects for lithium, rare earths, phosphate and graphite, and the start-up of production at a diamond mine, slated for 2016.

Québec has tremendous mineral potential, such that mineral resources for commodities already being mined may be replenished and new resources may be discovered for metals and mineral commodities that will be in demand in the years to come.

The tax regime for companies in Québec is competitive, and its policies are stable and adapted. Investors can take advantage of a number of incentives when they come to Québec to do business.<sup>1</sup>

### Infrastructure

Québec is a major producer of electricity, as well as the fourth-largest hydropower generator in the world. Ninety-eight percent of this production comes from renewable sources.

Québec offers investors green and renewable power, accessible over much of its territory through a reliable distribution network.<sup>2</sup> Companies can also take advantage, based on their consumption, of highly competitive power rates.

Québec has many deep-sea ports, including the port of Sept-Îles, the most important ore-shipping port in North America, which also offers a rail link to the New Québec Orogen.

Québec's landmass is accessible via an extensive network of road, rail, maritime and air transportation infrastructure.<sup>3</sup> Map 1 provides an overview of the latter.

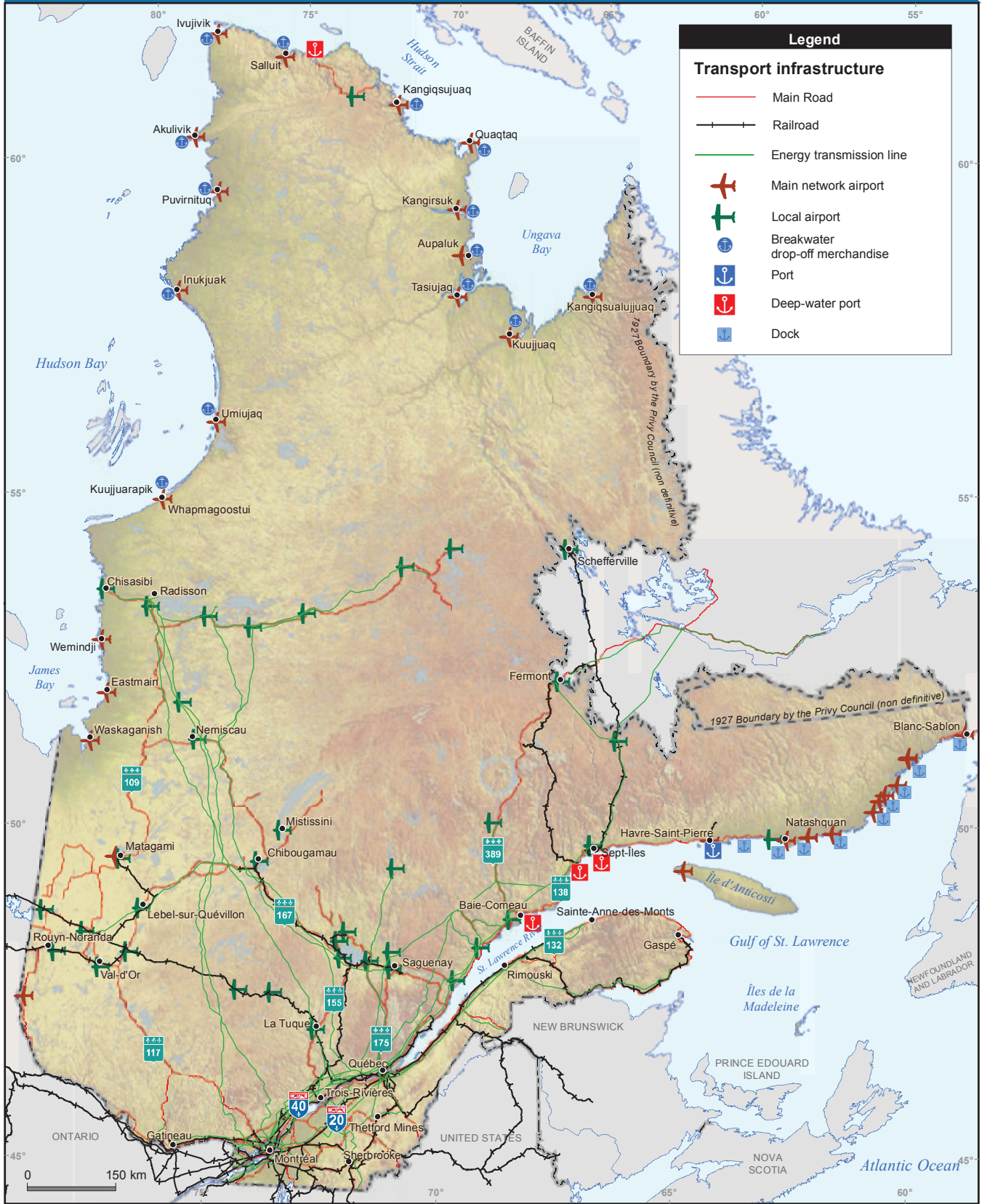
The Government of Québec has made it a priority to develop access to the vast expanse of land targeted under the *Plan Nord*, both in terms of transportation infrastructure (road, rail, maritime or air) and power supply infrastructure (hydroelectric power or natural gas). On July 21, 2014, the *Secrétariat au Plan Nord* launched a call to identify mining companies interested in participating in a feasibility study on a new rail line from the port of Sept-Îles to the Labrador Trough.

<sup>1</sup> [www.investquebec.com/international/en/why-quebec/tax-incentives.html](http://www.investquebec.com/international/en/why-quebec/tax-incentives.html)

<sup>2</sup> [www.hydroquebec.com/majorcustomers](http://www.hydroquebec.com/majorcustomers)

<sup>3</sup> [www.investquebec.com/international/en/why-quebec-transportation-infrastructure.html](http://www.investquebec.com/international/en/why-quebec-transportation-infrastructure.html)

# Map 1 - Transport infrastructure in Québec



Source: Ministère de l'Énergie et des Ressources naturelles  
 Date: october 2014.



## Knowledge management

The acquisition of new geoscience knowledge across Québec's territory is vital for the development of its mining sector.<sup>4</sup> In 2009, the government agreed to provide the Mining Heritage Fund with CA\$200 million over a period of ten years. Of this amount, CA\$120 million will be earmarked for geoscience knowledge acquisition.

Québec also created the SIGÉOM<sup>5</sup> database, which contains all the geoscience information collected over more than a century by the industry and the *Ministère de l'Énergie et des Ressources naturelles*. This database, accessible online through an interactive map, is widely acknowledged as one of the most comprehensive in the world.

In Québec, mining titles are managed electronically and are accessible online through the GESTIM Plus<sup>6</sup> application. This system provides real-time access to up-to-date data from the province's public register of real and immovable mining rights. It can be used to map-designate new claims or renew existing claims, as well as pay the prescribed fees in a secure online environment.

The Government of Québec encourages investments in research and development,<sup>7</sup> as well as mineral processing activities within its borders.<sup>8</sup>

## Workforce

The quality of Québec's workforce is recognized worldwide. As a long-time mineral producer, Québec has skilled workers in every administrative region, as well as a wide range of suppliers specializing in the mining sector, whether for mineral exploration, mining or mine site rehabilitation. More than 45,000 people in Québec work for the mining sector, either directly or indirectly<sup>9</sup>.

There are a number of quality learning establishments in Québec that provide workforce training for the mining sector.<sup>10</sup> In fact, Québec can count on an institution entirely dedicated to providing training for the mining sector: the *Institut national des mines*.<sup>11</sup>

## Community relations

Québec encourages the establishment of a collaborative approach between members of the mining industry and local communities where mining activities take place. Some amendments were made to the Mining Act in December 2013 to this effect. In addition, Québec has already signed treaties with three First Nations (Cree, Inuit and Naskapi).

## Mining tax regime

The corporate tax rate (combined federal/provincial rate) has been 26.9% since 2012, and the capital tax was abolished in January 2011. Québec's tax regime also offers incentives for investments, processing activities within Québec, and for research and development<sup>12</sup>, including:

- A credit on duties refundable for losses, which allows mine operators to recover the tax value of certain exploration, deposit appraisal and mine development investments prior to production. The tax credit has been 16% since January 1<sup>st</sup>, 2012.<sup>13</sup>
- A refundable tax credit for resources, which entitles companies to a refund of up to 31% of eligible exploration expenditures incurred in Québec.
- Québec's flow-through share regime, through which individual investors may claim deductions of up to 120% of their investment cost.<sup>14</sup>

4 [www.mern.gouv.qc.ca/english/publications/mines/strategy/mineral\\_strategy.pdf](http://www.mern.gouv.qc.ca/english/publications/mines/strategy/mineral_strategy.pdf) page 14

5 [sigeom.mrn.gouv.qc.ca/signet/classes/l1102\\_indexAccueil?l=a](http://sigeom.mrn.gouv.qc.ca/signet/classes/l1102_indexAccueil?l=a)

6 [gestim.mines.gouv.qc.ca/MRN\\_GestimP\\_Presentation/ODM02101\\_login.aspx](http://gestim.mines.gouv.qc.ca/MRN_GestimP_Presentation/ODM02101_login.aspx)

7 [www.investquebec.com/fr/index.aspx?page=336](http://www.investquebec.com/fr/index.aspx?page=336)

8 [www.budget.finances.gouv.qc.ca/budget/2014-2015a/fr/documents/Planbudgetaire.pdf](http://www.budget.finances.gouv.qc.ca/budget/2014-2015a/fr/documents/Planbudgetaire.pdf)

9 This includes mineral extraction activities, activities in support of mining operations, manufacturing of non-metallic mineral products, and primary processing of metals.

10 [www.mern.gouv.qc.ca/english/publications/mines/strategy/mineral\\_strategy.pdf](http://www.mern.gouv.qc.ca/english/publications/mines/strategy/mineral_strategy.pdf) page 22

11 [www.inmq.qc.ca](http://www.inmq.qc.ca)

12 [www.invest-quebec.com/international/en/why-quebec/tax-incentives.html](http://www.invest-quebec.com/international/en/why-quebec/tax-incentives.html)

13 [www.mern.gouv.qc.ca/english/mines/fiscal/fiscal-regime-losses.jsp](http://www.mern.gouv.qc.ca/english/mines/fiscal/fiscal-regime-losses.jsp)

14 [www.mern.gouv.qc.ca/english/mines/fiscal/fiscal-incentives-shares.jsp](http://www.mern.gouv.qc.ca/english/mines/fiscal/fiscal-incentives-shares.jsp)

The mining tax regime was modified in 2014.<sup>15</sup> The main new measures in effect since January 1<sup>st</sup>, 2014, are as follows:

- Establishment of a minimum mining tax at a rate of 1% to 4% of the gross output value at the mine shaft head;
- Introduction of progressive rates, ranging from 16% to 28%, used to determine the mining tax on annual profit, based on the company's profit margin;
- Balance between the minimum mining tax and the mining tax based on profit – the higher of the two shall be paid by mining companies;
- Enhanced processing allowance, making it possible to exempt from tax the share of profits made by a mining company that is attributable to mineral processing. Mining companies can take advantage of higher deduction rates for their processing assets, and may exempt from tax up to 75% of their profits.

## Mining Act

Québec has modern mining legislation that assures good tenure of mining titles.

The Mining Act was amended in December 2013 to foster dialogue with communities, to encourage mineral processing in Québec, to promote environmental protection and to increase transparency. Among the key elements:

- Regional consultations held by the BAPE (*Bureau d'audiences publiques sur l'environnement*)<sup>16</sup> are required for all metal mining projects or metallic ore processing plants of more than 2,000 metric tonnes per day, and for all rare earth projects. For all other projects, regional consultations must be held by the mining company.
- A new chapter is devoted to consultations with Native communities. A Native Community Consultation Policy for the mining sector will also be published in the summer of 2015.
- Mine operators must set up a monitoring committee to foster the involvement of local communities in all aspects of their project.
- The preparation of a scoping and market study for mineral processing in Québec is required before a mining lease is granted.
- Mine operators must submit their rehabilitation plan, which must be approved before a mining lease is granted.
- Since August 2013, mine operators must submit to the MERN a financial guarantee covering 100% of the anticipated rehabilitation costs for the entire mine site.
- To promote greater transparency, the quantity and value of extracted ores and the amount of royalties paid to the State by mining companies will be made public for each mine.

The laws and regulations of Québec may be consulted free of charge online.<sup>17</sup>

## Increasing investments and creating value

The Government of Québec is intent on making its corporate tax regime compare favourably with that of competitive jurisdictions. Québec wants to create a climate for companies that fosters investment and innovation.

The government grants a ten-year tax holiday for large investment projects.<sup>18</sup> This tax holiday applies to corporate income tax and contributions to the Health Services Fund.

The government wants to quickly spur development north of the 49<sup>th</sup> parallel. Major investments will be made to support previous efforts undertaken under the *Plan Nord*, the most important being the creation of the fund *Capital Mines Hydrocarbures*. This fund will enable the government to acquire equity interests in companies mining mineral substances in the domain of the State. It will have a budget allowance of CA\$1 billion, half of which will be invested in the territory targeted by the *Plan Nord*. This budget does not include the CA\$250 million

<sup>15</sup> [www.finances.gouv.qc.ca/documents/autres/en/AUTEN\\_NewMiningTaxRegime.pdf](http://www.finances.gouv.qc.ca/documents/autres/en/AUTEN_NewMiningTaxRegime.pdf)

<sup>16</sup> [www.bape.gouv.qc.ca/sections/mandats](http://www.bape.gouv.qc.ca/sections/mandats)

<sup>17</sup> [www2.publicationsduquebec.gouv.qc.ca](http://www2.publicationsduquebec.gouv.qc.ca)

[www.mern.gouv.qc.ca/lois/lois-mines.jsp](http://www.mern.gouv.qc.ca/lois/lois-mines.jsp)

<sup>18</sup> [www.revenuquebec.ca/en/salle-de-presse/nouvelles-fiscales/2013/2013-01-25.aspx](http://www.revenuquebec.ca/en/salle-de-presse/nouvelles-fiscales/2013/2013-01-25.aspx)

allocated for the capitalization of *Ressources Québec*, the subsidiary of *Investissement Québec* dedicated to the mining and hydrocarbon sectors.<sup>19</sup>

Other initiatives are planned to foster northern development: training of Native populations, preparation of a study on a potential new rail link to improve access to the Labrador Trough, and research on northern development. To help attain this goal, the government announced the creation of the Institut nordique du Québec. Situated on the campus of Université Laval, in the city of Québec, this institute supports research and knowledge development in the province's northern territory.

### **Québec Mines convention**

Québec Mines<sup>20</sup> is a major mining convention that takes place annually in the city of Québec. The convention covers all aspects of the mining industry: exploration, mining, processing, and mine site rehabilitation. It is the largest mining convention in the French-speaking world.

<sup>19</sup> [www.investquebec.com/quebec/fr/a-propos-de-nous/nos-filiales/ressources-quebec.html](http://www.investquebec.com/quebec/fr/a-propos-de-nous/nos-filiales/ressources-quebec.html)

<sup>20</sup> [quebecmines.gouv.qc.ca/english](http://quebecmines.gouv.qc.ca/english)



## OVERVIEW OF MINING ACTIVITIES IN QUÉBEC<sup>21</sup>

Québec is growing as a mine producer, particularly in terms of metal mines. With output accounting for one fifth of the total Canadian value, Québec is the most diversified mining producer in the country given its production and beneficiation of 17 metals and 13 non-metallic minerals.

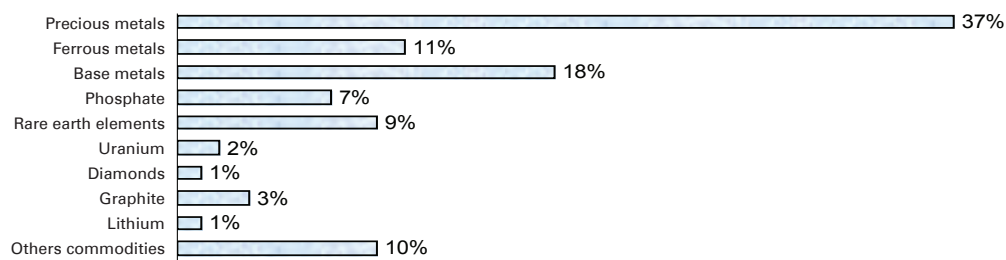
Among other commodities, Québec produces iron, precious metals, copper, nickel, zinc, feldspar, mica, salt, silica, architectural stone, peat and lime.

Québec is one of the world's few producers of niobium, titanium dioxide, cobalt and platinum. The province's bedrock also harbours great potential for commodities such as graphite, lithium, diamonds, rare earths and tantalum.

As of December 31, 2013, there were 190,071 active mining titles in Québec, representing a total surface area of 8.9 million hectares or 5% of the province.

Mineral exploration and deposit appraisal expenditures surpassed CA\$300 million in 2013, making up 650 different projects spread throughout the province. Exploration and deposit appraisal commitments for 2014 amount to nearly CA\$375 million.

Figure 1: Distribution of exploration and deposit appraisal expenditures by commodity, 2013



Source: Data from the *Institut de la statistique du Québec*

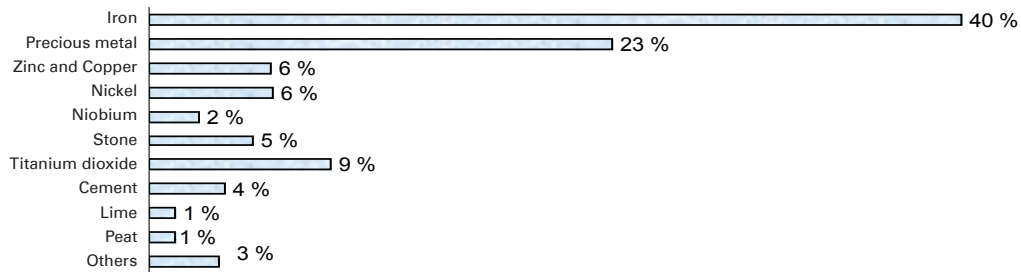
<sup>21</sup> For more information, particularly for details on the mining regime and access in the province, consult [www.mern.gouv.qc.ca/english/mines/rights/index.jsp](http://www.mern.gouv.qc.ca/english/mines/rights/index.jsp). The following yearly publication provides a summary of mining activities in Québec and information on topical issues: [www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp)  
Many statistics on the mining sector are also available at the following address: [www.mern.gouv.qc.ca/mines/statistiques/index.jsp](http://www.mern.gouv.qc.ca/mines/statistiques/index.jsp)



Total mining investments in Québec (exploration, deposit appraisal and mine complex development) reached a peak of \$5.1 billion in 2012, reflecting significant growth since the early 2000s. In 2013, investments slowed but remained at relatively high levels. These investments are distributed throughout the province but are mainly concentrated in three large administrative regions: Abitibi-Témiscamingue, Côte-Nord and Nord-du-Québec.

The value of Québec's mineral shipments reached CA\$8.3 billion in 2013. The principal commodities mined were iron, gold and silver, ilmenite (titanium), zinc, nickel and all types of stone.

Figure 2: Distribution of mineral shipments by commodity, 2013



Source: Preliminary data from the Institut de la statistique du Québec

In July 2014, there were 25 active mines in Québec and more than 350 establishments exploiting surface mineral substances (sand, gravel, peat, stone) (see map 2).

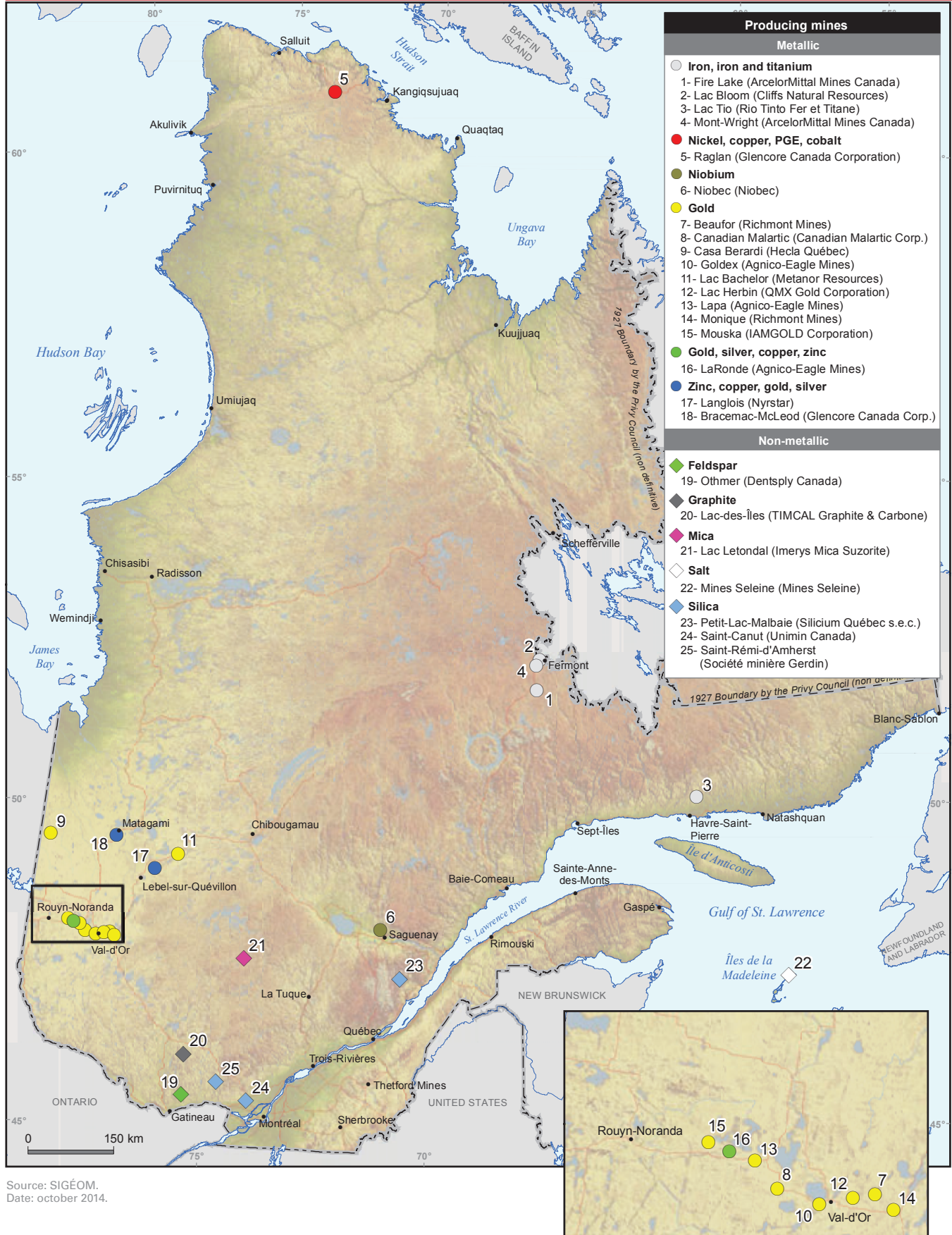
Québec also has 13 primary processing plants for mining products and minerals (not including aluminum): two smelters (copper and titanium dioxide), two refineries (copper and zinc) and nine plants for cement, lime and aluminous clay.

In addition, there are currently 22 mining projects at the deposit appraisal stage and seven projects at the development stage (construction, start-up, ramp-up) across the province. Many of these projects could contribute to Québec's mining diversity. These projects are for iron, gold and nickel, as well as for diamonds, lithium, phosphate, graphite and the rare earth elements (see map 3).<sup>22</sup>

Added to this are many exploration projects at various stages of advancement that will contribute to the province's stream of new mining projects, mining operations and processing activities. In 2013, more than 650 exploration and deposit appraisal projects were being carried out by nearly 200 mining and mineral exploration companies.

<sup>22</sup> These maps and many others are periodically updated: [www.mern.gouv.qc.ca/english/mines/publications/publications-maps.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-maps.jsp)

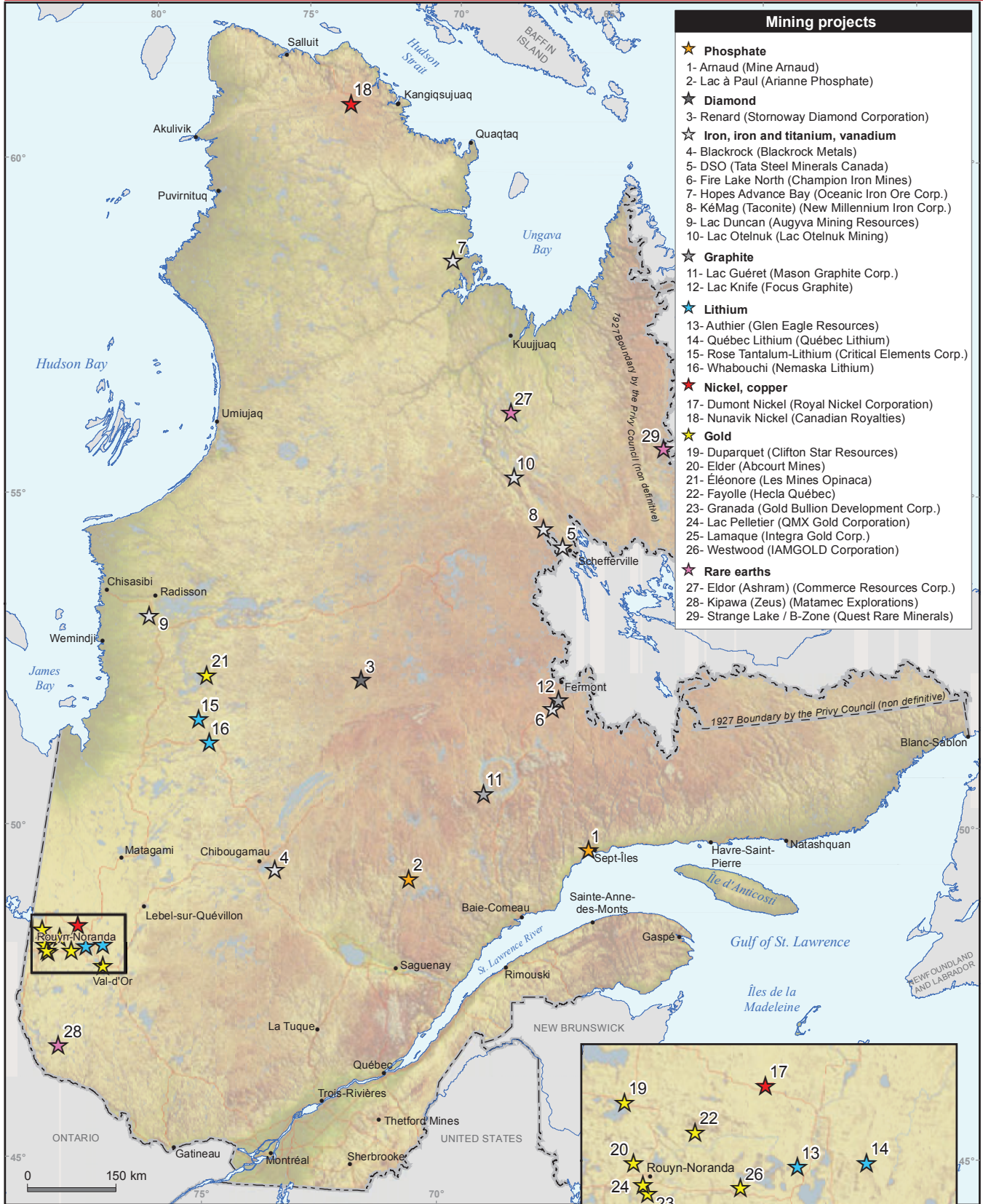
## Map 2 - Producing mines



Source: SIGÉOM.  
Date: october 2014.



# Map 3 - Major projects in advanced phase



Source: SIGÉOM.  
Date: october 2014.



Photo: Stornoway Diamond Corporation

## GEOLOGICAL POTENTIAL OF QUÉBEC

Almost 90% of Québec's bedrock is composed of Precambrian rocks belonging to the Canadian Shield (north of the Saint Lawrence River). The remainder consists essentially of Paleozoic rocks: the St. Lawrence Platform surrounding the Saint Lawrence River and the Appalachians to the south of the river. These geological environments offer significant discovery potential for mineral deposits.

Québec is divided into seven main geological provinces: Superior, Nain, Churchill, Grenville, Appalachian, St. Lawrence Platform and Hudson Bay Platform. These are illustrated on map 4.

**The Superior Province** (4.3 to 2.5 billion years [Ga]) occupies a large part of the North American continent and also covers half of Québec, for a total surface area of 750,000 km<sup>2</sup>. It is known around the world for its numerous gold, copper, zinc, nickel and silver deposits. The Superior Province is subdivided into a dozen subprovinces, half of them in Québec. The most well known is the Abitibi Subprovince, which is also the most extensive Archean volcano-sedimentary belt in the world, and famous for its gold, copper, zinc and silver deposits.

**The Nain Province** (3.8 to 1.3 Ga) is found mostly in Labrador, with only a small portion (about 60 km<sup>2</sup>) extending into the Torngat Mountains of Québec. It is composed of Archean metamorphic rocks.

**The Churchill Province** (2.9 to 1.1 Ga) covers an area of about 200,000 km<sup>2</sup> in the northern part of Québec, to the north and northeast of the Superior Province. It is characterized by four distinct geological zones:

- the Ungava Orogen (Ungava Trough), known for its nickel-copper deposits;
- the New Québec Orogen (Labrador Trough), which hosts massive iron deposits as well as many copper, nickel and platinum group element (PGE) deposits;
- the Core Zone (formerly known as the Rae Province), located between the Labrador Trough and the Torngat Orogen, is composed of Archean and Paleoproterozoic rocks (2.9 to 1.75 Ga) as well as Mesoproterozoic plutonic rocks (1.7 to 1.1 Ga);
- the Torngat Orogen (2.1 to 1.75 Ga), located east of the Core Zone, where rocks are injected by kimberlites with diamond potential.

**The Grenville Province** (2.7 Ga to 600 million years [Ma]) covers an area of 600,000 km<sup>2</sup>. It forms the south-east limit of the Superior Province and is divided into two parts: the parautochthonous and allochthonous belts. The Grenville Province is known for its iron and ilmenite mines and for its industrial mineral potential.

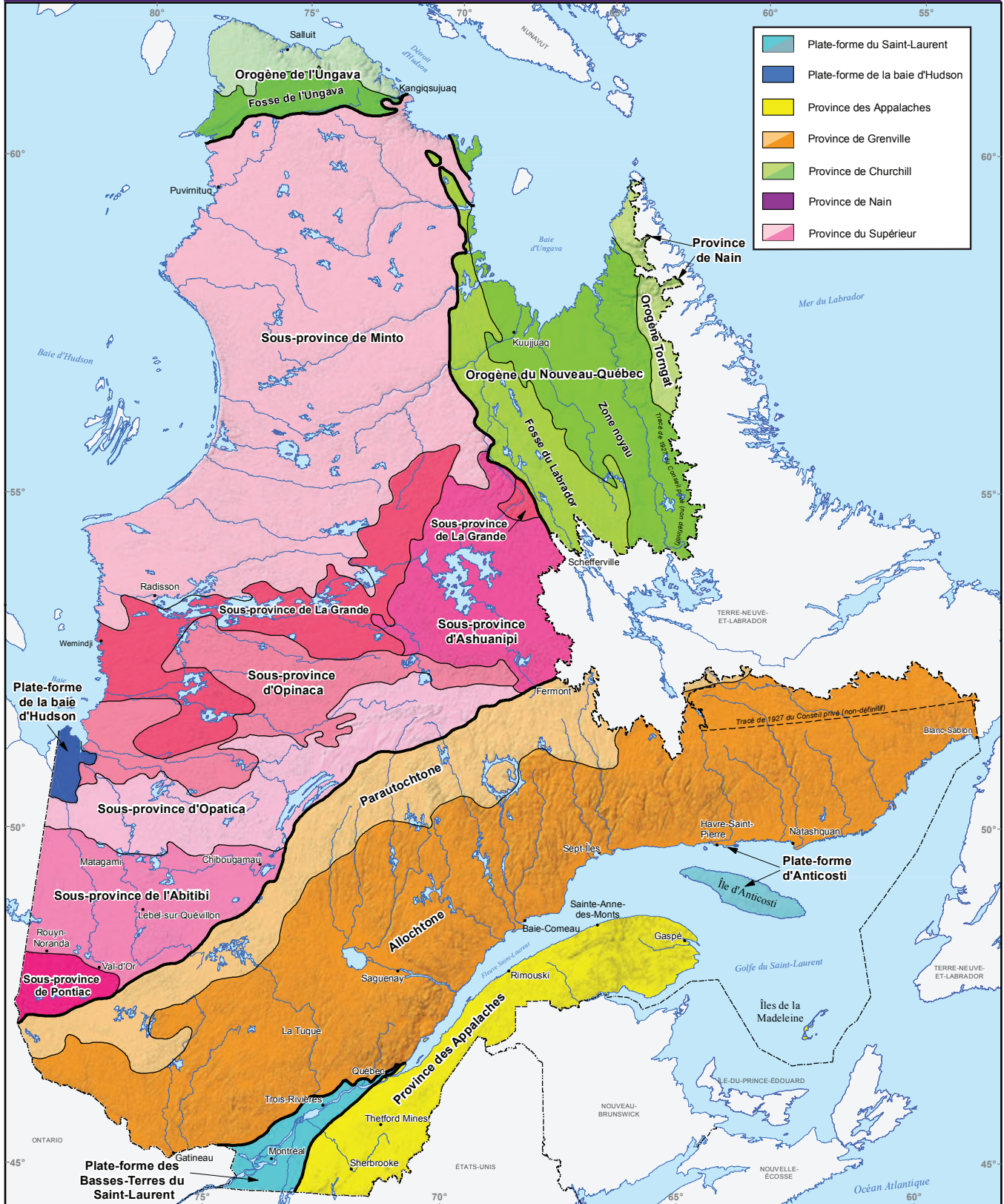


**The Appalachian Province** (600 to 300 Ma) developed along the edge of the Canadian Shield during the Paleozoic, and covers an area of roughly 80,000 km<sup>2</sup>. It is divided into three distinct zones: 1) the Humber Zone, 2) the Dunnage Zone, and 3) the Gaspé Belt. It is bounded to the east by the Permo-carboniferous Magdalen Basin. In Québec, the Appalachians were affected by two main tectonic events: the Taconian and Acadian orogenies. The Mines Gaspé copper deposits are found in this geological province.

**The St. Lawrence Platform** (570 to 430 Ma) developed at the end of the Proterozoic and during the Paleozoic, with the formation of the Saint Lawrence rift. It covers an area of more than 30,000 km<sup>2</sup> and overlies rocks of the Grenville Province. It is divided into two distinct platforms: the St. Lawrence Lowlands Platform and the Anticosti Platform. The main resource is limestone. Two carbonatite intrusions, Saint-Honoré (Grenville Province) and Oka (St. Lawrence Platform), host niobium deposits. Québec is the world's second-largest producer of this rare metal.

**The Hudson Bay Platform** (450 to 410 Ma) covers an area of roughly 5,500 km<sup>2</sup> in Québec just south of James Bay. It is composed of Paleozoic sedimentary rocks with a similar composition to those found in the St. Lawrence Platform.

## Map 4 - The Main Geological Subdivisions of Quebec



Source: Ministère de l'Énergie et des Ressources naturelles.  
Date: october 2014.



Photo: Agnico Eagle Mines

## DETAILS OF MINING ACTIVITIES



Photo: MERN



# Iron

## PRODUCTION AND MINING PROJECTS

### Current situation

Québec is the largest producer of iron concentrate in Canada. The province's entire production comes from three active mines in the Côte-Nord region. Production reached 23 million tonnes of concentrate in 2013, more than half the Canadian total. The grade of the iron ore mined in Québec hovers around 30%. It is typically concentrated to a grade of about 65% before being used at steel plants. Geologically, most of the deposits are located in the Labrador Trough.

Québec's production of iron concentrate is expected to grow over the next few years thanks to several mining projects that are undergoing expansion or are in development. According to forecasts, Québec's production of iron concentrate will double, compared to 2009–2010, to reach 30 million tonnes in 2014.

Québec is the only ilmenite producer in North America. Ilmenite ore is mined at the LacTio mine belonging to Rio Tinto Fer et Titane (RTFT). The ore is transformed in Québec into titanium scoria, remelt iron and steel. RTFT is working on extending the life of its mine beyond 2050.

Production of iron and ilmenite concentrate in Québec, 2013					
	Shipments			Reserves	Number of workers
	Quantities (t)	Value (CA M\$)	Canadian shipments (in %)		
Iron	22,900,000	c	60%	n.d.	3,800
Ilmenite	c	c	100%	n.d.	>300

c: confidential information  
Source: Preliminary data from the *Institut de la statistique du Québec* and Natural Resources Canada

### Notable mining projects

Several iron projects are in development or undergoing expansion. They will significantly increase the province's iron production over the course of the next few years. These projects will be supplemented by major improvements to the rail and port infrastructures of Sept-Îles and Port-Cartier.

ArcelorMittal Mines Canada invested CA\$1.5 billion to increase annual production at its Mont-Wright mine from 15 to 24 million tonnes of iron concentrate. At the DSO project, the company Tata Steel Minerals Canada will bring into operation, in 2014, its new processing plant with a nameplate capacity of 4 million tonnes per year of iron concentrate. The Lac Bloom Phase 2 project of Cliffs Natural Resources, which is currently suspended, should start up again eventually.

Near Chibougamau, the Blackrock project (iron-vanadium-titanium) of Blackrock Metals passed the feasibility stage. The company is still seeking financing for this project, estimated at CA\$950 million. The Taconite-KéMag project, located northwest of Schefferville, was also the subject of a feasibility study. New Millennium Iron is seeking financing for this \$CA8-billion project.



Photo: Francis Fontaine for the MERN



Three iron projects, all located in the New Québec Orogen, will be filing feasibility studies in 2014. The projects are Fire Lake North (Champion Iron Mines), Lac Otelnuik (Exploitation Minière Lac Otelnuik, a joint venture between Adriana Resources and Wisco) and Hopes Advance Bay (Oceanic Iron Ore).

The Duncan Lake project (Augyva Mining Resources – Century Iron Mines) and the Iron Hills project (Barlow Mine), both in the James Bay region, are at a less-advanced stage.

## Exploration and potential

In addition to exploration projects that focus exclusively on iron, Québec also has exploration projects for iron, titanium, vanadium and chromium.

The province's iron potential remains very high, as shown by several projects at the exploration or appraisal stage that would benefit if the iron market improves.

CHOOSE QUÉBEC'S MINING SECTOR – IRON PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Fire Lake</b> ArcelorMittal Mines Canada <a href="http://www.arcelormittal.com/minescanada">www.arcelormittal.com/minescanada</a>	Active mine	Iron					OP	Fire Lake Mineral reserves and mineral resources are combined with those from Mont-Wright.
<b>Bloom Lake</b> Cliffs Natural Resources WISCO <a href="http://www.cliffsnaturalresources.com">www.cliffsnaturalresources.com</a>	Active mine	Iron	1,034.5	Fe: 28.6%			OP	Production: 7 Mt/yr of iron concentrate at 65-67% Fe.
<b>Lac Tio</b> Rio Tinto Fer et Titane <a href="http://www.rfti.com">www.rfti.com</a>	Active mine	Ilmenite	143	TiO <sub>2</sub> : 83.1%	11.1	TiO <sub>2</sub> : 84.9%	OP	Production: 3 Mt/yr of ilmenite ore. Work to extend mine life to at least 2050.
<b>Mont-Wright</b> ArcelorMittal Mines Canada <a href="http://www.arcelormittal.com/minescanada">www.arcelormittal.com/minescanada</a>	Active mine	Iron	2,197	Fe: 30.2%	3,663	Fe: 29.6%	OP	Mineral reserves and mineral resources include those of Fire Lake. Resources are exclusive of reserves. Production: 24 Mt/yr of iron concentrate at 65-67% Fe.
<b>DSO</b> Tata Steel Minerals Canada <a href="http://www.tatasteelcanada.com">www.tatasteelcanada.com</a>	Development	Iron	64.1	Fe: 58.9%	67.1	Fe: 58.9%	OP	2013-2014 production: 0.5 Mt/yr of iron concentrate at 62% Fe. Production forecast: 4 Mt/yr of iron concentrate over the next few years.
<b>Blackrock</b> Blackrock Metals <a href="http://www.blackrockmetals.com">www.blackrockmetals.com</a>	Appraisal	Iron	291.7	Fe: 27.2%			OP	Production forecast: 3 Mt/yr of iron concentrate containing vanadium and 0.7 Mt/yr of ilmenite concentrate.
		Vanadium		V <sub>2</sub> O <sub>5</sub> : 0.42%				
		Ilmenite		TiO <sub>2</sub> : 7.5%				
<b>Fire Lake North</b> Champion Iron Mines <a href="http://www.championiron.com/fr/">www.championiron.com/fr/</a>	Appraisal	Iron	464.6	Fe: 32.4%	693.5	Fe: 31.6%	OP	Feasibility study underway. Resources are inclusive of reserves. Production forecast: 10 Mt/yr of iron concentrate
<b>Hopes Advance Bay</b> Oceanic Iron Ore Corp. <a href="http://www.oceanicironore.com">www.oceanicironore.com</a>	Appraisal	Iron	1,359.3	Fe: 32.2%	1,388.0	Fe: 32.1%	OP	Feasibility study underway. Resources are inclusive of reserves. Production forecast: 10 Mt/yr of iron concentrate
<b>KéMag (Taconite)</b> New Millennium Iron Tata Steel Minerals Canada <a href="http://www.nmliron.com">www.nmliron.com</a>	Appraisal	Iron	2,384	Fe: 30.6%	2,383	Fe: 31.6%	OP	Feasibility study completed. Resources are inclusive of reserves. Production forecast: 22 Mt/yr of iron concentrate
<b>Duncan Lake</b> Augyva Mining Resources Century Iron Ore <a href="http://www.augyvamining.com">www.augyvamining.com</a> <a href="http://www.centuryiron.com">www.centuryiron.com</a>	Appraisal	Iron			1,051.0	Fe: 24.4%		Preliminary economic assessment completed. Production forecast: 12 Mt/yr of iron concentrate
<b>Lac Otelnuik</b> Exploitation Minière Lac Otelnuik <a href="http://www.adrianaresources.com">www.adrianaresources.com</a>	Appraisal	Iron			20,640.0	Fe: 29.8%	OP	Feasibility study underway. Production forecast: 30 Mt/yr of iron concentrate

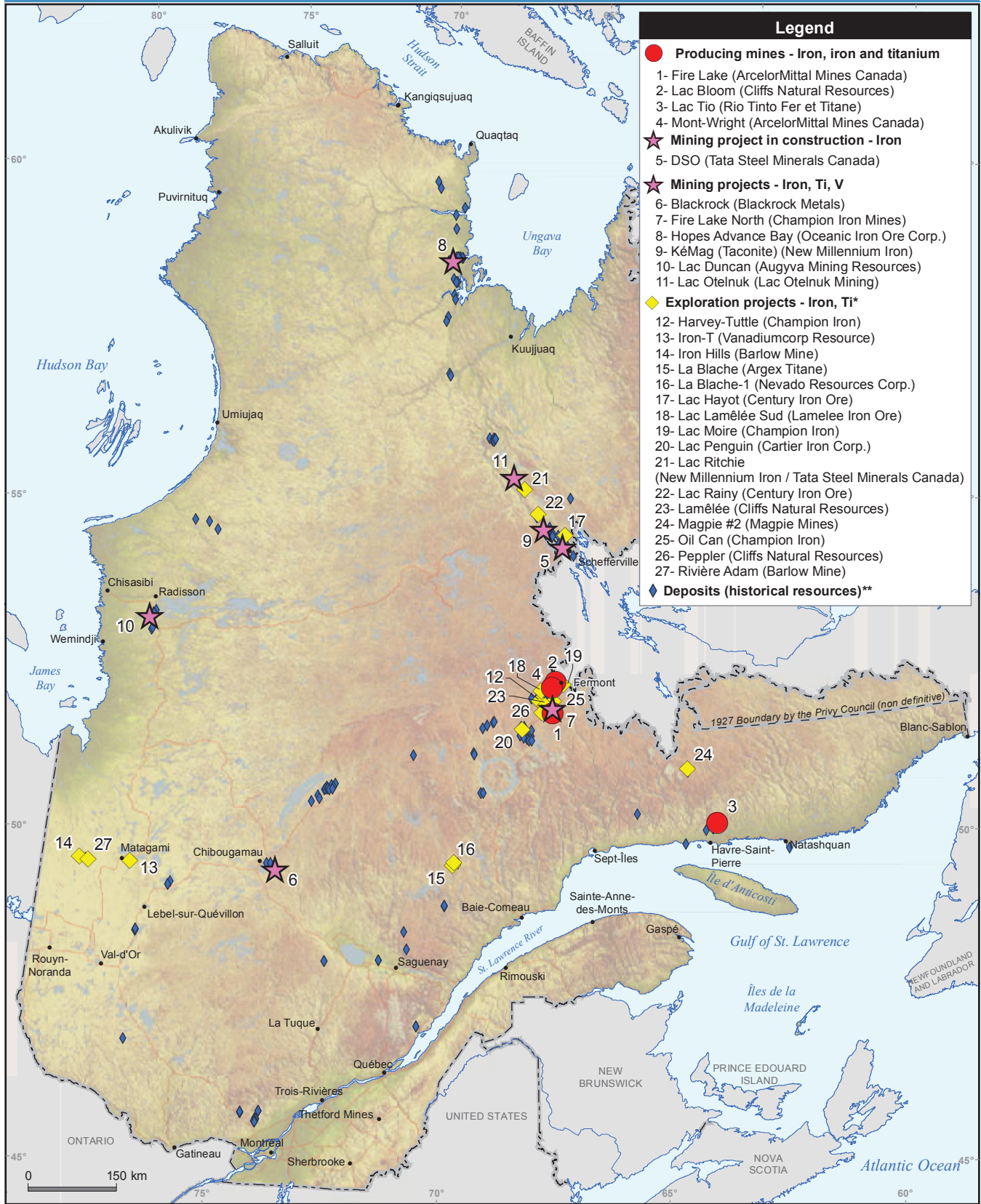
(1) Includes Ti, V and P projects; non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

(3) Mt: million metric tons, Mt/yr: million metric tons per year, %: percentage.

(4) OP: open pit, UG: underground.

# Iron - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.  
 \*\* Source: SIGÉOM.

# Gold

## PRODUCTION AND MINING PROJECTS

### Current situation

The value of Québec's gold shipments reached CA\$1.7 billion in 2013, accounting for more than one quarter of the Canadian total. Québec is the second-largest gold producer in Canada. Gold is produced at ten mines in the province, eight of which are in the Abitibi-Témiscamingue region in western Québec where gold has been mined since the beginning of the 20th century. The two other mines are located in the Nord-du-Québec region.

Québec has extensive expertise in the field of underground gold mining thanks to a qualified workforce, highly competent teaching establishments, experienced subcontractors and numerous suppliers. This background led to the creation of an internationally renowned centre of mining expertise in the Val-d'Or region, in addition to the province's expertise in developing open pit gold mine operations.

Among the most famous mines in Québec is the Canadian Malartic open pit mine (Canadian Malartic GP) with the ability to produce 600,000 ounces per year, as well as the La Ronde polymetallic underground mine (Agnico Eagle Mines), one of the deepest mines in the Western world, which is currently undergoing a progressive expansion to eventually produce 300,000 ounces per year. Yamana Gold and Agnico Eagle Mines acquired the Canadian Malartic mine in June 2014, and created the company Canadian Malartic GP.

Gold and silver production in Québec, 2013					
	Shipments			Reserves	Number of workers
	Quantities (t)	Value (CA M\$)	Canadian shipments (in %)		
Or	36	1,697	30%	600	3,900
Silver	119	96	17%		-

Source: Preliminary data from the *Institut de la statistique du Québec* and Natural Resources Canada

### Notable mining projects

Of the three gold mining projects at the development phase (construction and start-up), one is located in the Nord-du-Québec region and two others in Abitibi-Témiscamingue. Among them is the world-class Éléonore gold deposit belonging to Les Mines Opinaca, a subsidiary of Goldcorp, with pre-production scheduled to start in 2015. It is expected that the Éléonore mine will produce 600,000 ounces per year for more than ten years. The project required investments of CA\$1.9 billion and its operation should create 600 jobs. The Westwood project of IAMGOLD Corporation and the Elder project of Abcourt Mines should attain commercial production before the end of the current year. IAMGOLD Corporation expects to produce 186,000 ounces per year over 19 years, and Abcourt Mines 23,000 ounces per year over 11 years.

Added to this are five projects at the deposit appraisal stage, which could contribute, in the near future, to the province's gold production: Lac Pelletier (QMX Gold Corporation), Duparquet (Clifton Star Resources), Granada (Gold Bullion Development Corporation), Fayolle (Hecla Mining) and Lamaque (Integra Gold Corp.).



Photo: Francis Fontaine for the MERN

Québec is a major gold producer and has been for many years. In several years, the projects currently in expansion or development will double Québec's production compared to 2012 production. The renewal of mineral resources and the emergence of new gold projects will allow the province to produce gold for a long time to come.

## Exploration and potential

Several dozen gold exploration projects are underway in the province. Some of these projects are in the Abitibi region along the Québec (eastern) extension of Ontario's Lac Detour mine and in the vicinity of the Éléonore mine project in the James Bay area. These projects may lead to new discoveries.

CHOOSE QUÉBEC'S MINING SECTOR - GOLD PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Beaufor</b> Richmont Mines <a href="http://www.richmont-mines.com">www.richmont-mines.com</a>	Active mine	Gold	0.1	Au: 6.8 g/t	0.8	Au: 6.44 g/t	UG	Resources are exclusive of reserves. 2014 production forecast: 700 kg of gold.
<b>Canadian Malartic</b> Canadian Malartic GP <a href="http://www.canadianmalartic.com">www.canadianmalartic.com</a>	Active mine	Gold	281.2	Au: 1.04 g/t	327.0	Au: 1.06 g/t	OP	Resources are inclusive of reserves. 2014 production forecast: 16,300 to 17,900 kg of gold.
<b>Casa Berardi</b> Hecla Québec <a href="http://www.hecla-mining.com">www.hecla-mining.com</a>	Active mine	Gold	8.2	Au: 5.3 g/t	10.8	Au: 4.1 g/t	OP/UG	Resources are exclusive of reserves. 2014 production forecast: 3,900 kg of gold.
<b>Goldex</b> Agnico Eagle Mines <a href="http://www.agnicoeagle.com">www.agnicoeagle.com</a>	Active mine	Gold	7.6	Au: 1.52 g/t	30.1	Au: 1.96 g/t	UG	Resources are exclusive of reserves. 2014 production forecast: 2,500 kg of gold.
<b>Bachelor Lake</b> Metanor Resources <a href="http://www.metanor.ca">www.metanor.ca</a>	Active mine	Gold	0.6	Au: 7.54 g/t	n/a	n/a	UG	2014 production forecast: 1,500 kg of gold.
<b>Lac Herbin</b> QMX Gold Corporation <a href="http://www.alexisminerals.com">www.alexisminerals.com</a>	Active mine	Gold	0.03	Au: 6.76 g/t	0.05	Au: 8.18 g/t	UG	Resources are inclusive of reserves. 2014 production forecast: 500 kg of gold. Closure scheduled for 2014.
<b>Lapa</b> Agnico Eagle Mines <a href="http://www.agnicoeagle.com">www.agnicoeagle.com</a>	Active mine	Gold	1.5	Au: 5.97 g/t	1.6	Au: 4.28 g/t	UG	Resources are exclusive of reserves. 2014 production forecast: 2,500 kg of gold.
<b>LaRonde</b> Agnico Eagle Mines <a href="http://www.agnicoeagle.com">www.agnicoeagle.com</a>	Active mine	Gold	24.1	Au: 5.00 g/t	4.2	Au: 2.12 g/t	UG	Resources are exclusive of reserves. 2014 production forecast: 6,700 kg of gold, 69,800 kg of silver, 38,600 tonnes of zinc as concentrate, 4,000 tonnes of copper as another concentrate.
		Zinc		Zn: 0.67%		Zn: 1.61%		
		Silver		Ag: 19.6 g/t		Ag: 32.5 g/t		
		Copper		Cu: 0.25%		Cu: 0.16%		
<b>Monique</b> Richmont Mines <a href="http://www.richmont-mines.com">www.richmont-mines.com</a>	Active mine	Gold	0.4	Au: 2.29 g/t	0.1	Au: 4.88 g/t	OP	Resources are exclusive of reserves. 2014 production forecast: 450 kg of gold, closure scheduled for the fall of 2014.
<b>Mouska</b> IAMGOLD Corporation <a href="http://www.iamgold.com">www.iamgold.com</a>	Active mine	Gold	0.02	Au: 15.6 g/t	0.03	Au: 14.7 g/t	UG	Resources are inclusive of reserves. Closure scheduled for 2014
<b>Elder</b> Abcourt Mines <a href="http://www.abcourt.com">www.abcourt.com</a>	Development	Gold			1.2	Au: 6.58 g/t	UG	Production start-up phase. Production forecast: 780 kg of gold per year.
<b>Éléonore</b> Les Mines Opimaca <a href="http://www.goldcorp.com">www.goldcorp.com</a>	Development	Gold	19.3	Au: 6.49 g/t			UG	Production forecast: 18,700 kg of gold per year.
<b>Westwood</b> IAMGOLD Corporation <a href="http://www.iamgold.com">www.iamgold.com</a>	Development	Gold	1.6	Au: 9.98 g/t	1.3	Au: 12.9 g/t	UG	Resources are inclusive of reserves. Commercial production scheduled for Q3 2014. Production forecast: 5,800 kg of gold per year.
<b>Duparquet</b> Clifton Star Resources <a href="http://www.cfo-star.com">www.cfo-star.com</a>	Appraisal	Gold	39.4	Au: 1.50 g/t	20.2	Au: 1.26 g/t	OP	Prefeasibility study completed. Resources are exclusive of reserves. Production forecast: 4,900 kg of gold per year.



CHOOSE QUÉBEC'S MINING SECTOR - GOLD PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Fayolle</b> Hecla Québec Typhoon Exploration <a href="http://www.hecla-mining.com">www.hecla-mining.com</a>	Appraisal	Gold			0.6	Au: 5.75 g/t	OP/UG	Preliminary economic assessment completed. Possibility of open pit or underground mining. Production forecast: 1,000 kg of gold per year.
<b>Granada</b> Gold Bullion Development Corporation <a href="http://www.goldbulliondevelopmentcorp.com">www.goldbulliondevelopmentcorp.com</a>	Appraisal	Gold	0.6	Au: 4.24 g/t	1.4	Au: 4.14 g/t	OP	Prefeasibility study completed for the open pit component. Underground resources not reported here. Resources are inclusive of reserves. Production forecast: 760 kg of gold per year.
<b>Lac Pelletier</b> QMX Gold Corporation <a href="http://www.alexisminerals.com">www.alexisminerals.com</a>	Appraisal	Gold	0.2	Au: 6.46 g/t	0.3	Au: 8.61 g/t	UG	Feasibility study completed. Resources are inclusive of reserves. Production forecast: 1,050 kg of gold per year, mine life of approximately 1 year.
<b>Lamaque</b> Integra Gold Corporation <a href="http://www.integragold.com">www.integragold.com</a>	Appraisal	Gold			3.3	Au: 7.1 g/t	UG	Preliminary economic assessment completed. Underground mining. Production forecast: 4,000 kg of gold per year.

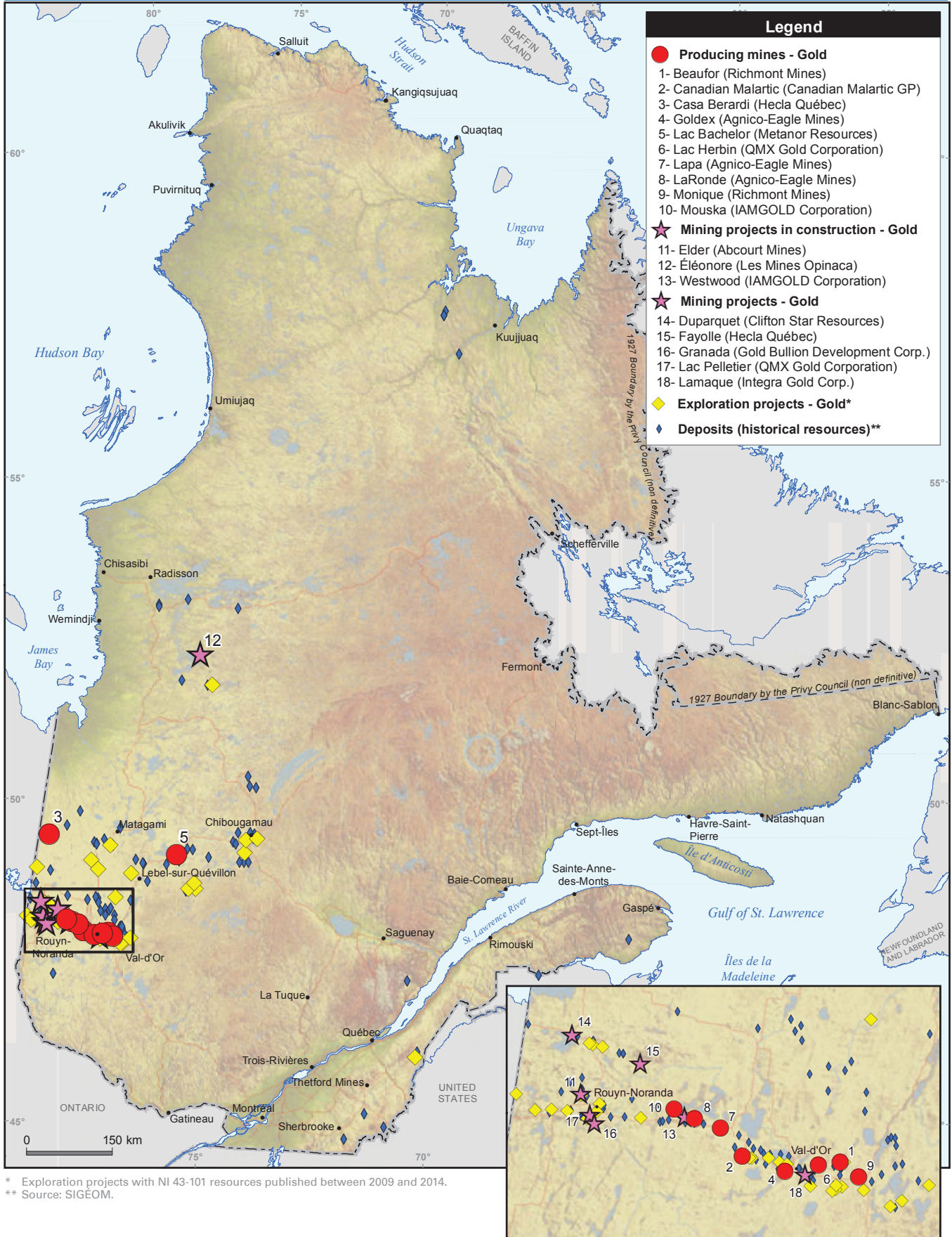
(1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

(3) Mt: million metric tons, g/t: gram per metric ton.

(4) OP: open pit, UG: underground.

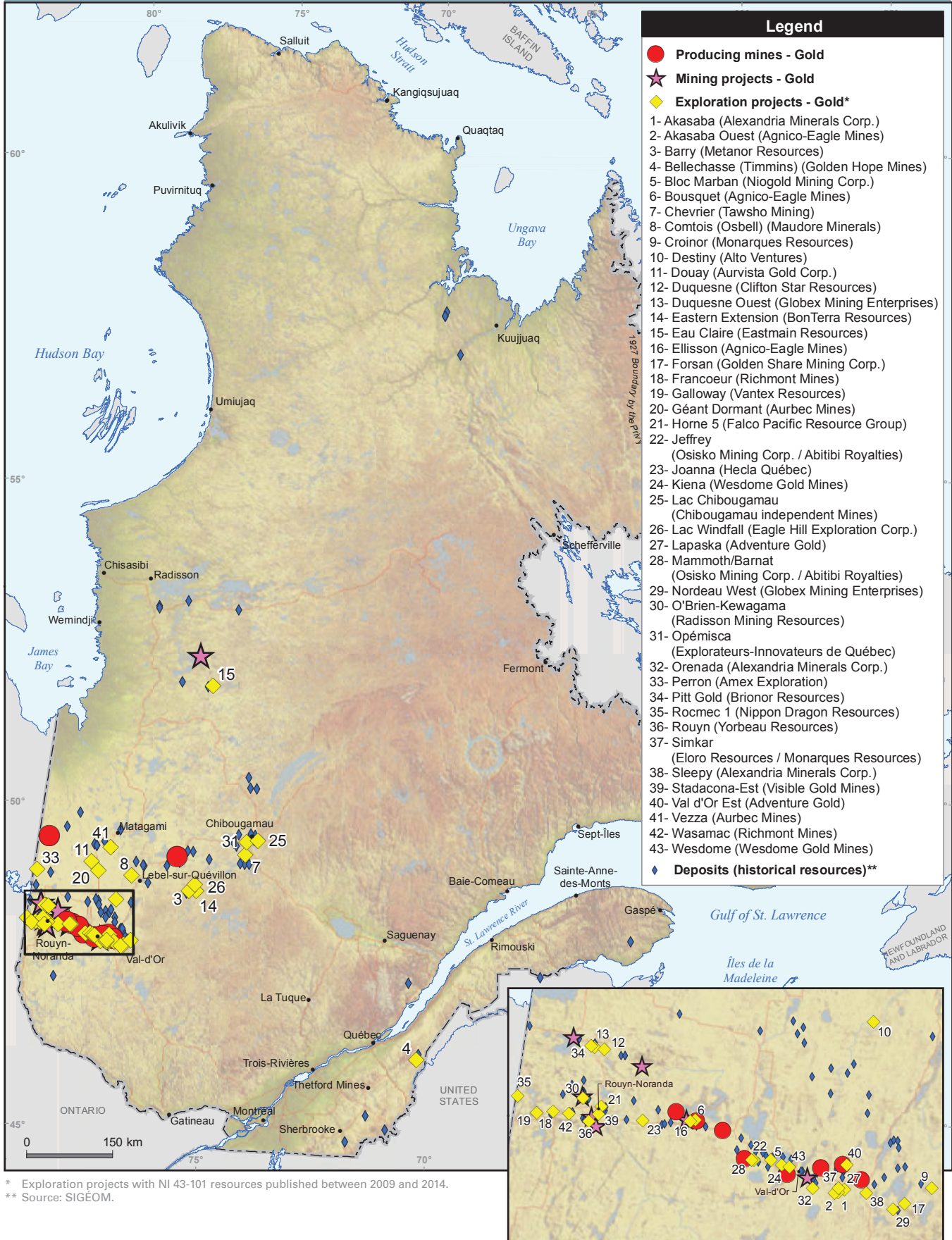
# Gold - Mines and mining projects



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.  
 \*\* Source: SIGÉOM.



# Gold - Exploration projects



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.  
 \*\* Source: SIGÉOM.

# Nickel, platinum group elements and cobalt

## PRODUCTION AND MINING PROJECTS

### Current situation

Québec's shipments of nickel, cobalt and platinum group elements (PGE), in the form of concentrates, come from the Raglan and Nunavik Nickel mine site in the far north region of the province. Geologically, they are found in the Ungava Orogen.

Glencore Canada Corporation (Raglan mine site) is studying an investment project of CA\$1 billion that will allow production to continue beyond 2035. The Nunavik Nickel mine of Canadian Royalties entered into production in 2013.

Nickel, cobalt and PGE production in Québec, 2013					
	Shipments			Reserves	Number of workers
	Quantities (t)	Value (CA M\$)	Canadian shipments (in %)		
Nickel	32,140	502	14%	290,000	>1000
Cobalt	630	18	8%	n.d.	-
PGE	>2	c	c	n.d.	-

c: confidential information

Source: Preliminary data from the *Institut de la statistique du Québec* and Natural Resources Canada

### Notable mining projects

In the Abitibi region, Royal Nickel Corporation completed the process to obtain environmental permits, and continues to seek financing to begin constructing its future Dumont mine site. The project requires an initial investment of CA\$1.27 billion. The concentrator feed will amount to 52,500 tonnes per day, which will increase to 105,000 tonnes per day during the second phase. More than 30 years of operation are envisioned, at a rate of 33,000 tonnes of nickel per year as a concentrate also containing cobalt, platinum and palladium.

Therefore, Québec is in a good position to significantly increase its nickel, copper, cobalt and platinum group element production in the years to come.

### Exploration and potential

The province's potential for nickel, cobalt and PGE deposits is promising. Mining of mineral resources in the Ungava Orogen (formerly known as the Cape Smith Belt) has only just begun. In the northern extension of the Labrador Trough, work by Nickel North Exploration<sup>23</sup> (Hawk Ridge project: copper, nickel, cobalt, PGE) underscores the nickel potential of this entire sector. This is also true for the greenstone belts of the Superior Province (Nisk project of Critical Elements Corporation<sup>24</sup>) and the Grenville Province (former producer and numerous nickel showings).

<sup>23</sup> [www.nickelnorthexploration.com](http://www.nickelnorthexploration.com)

<sup>24</sup> [www.cecorp.ca](http://www.cecorp.ca)



Photo: Francis Fontaine for the MERN



CHOOSE QUÉBEC'S MINING SECTOR - NICKEL PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Raglan</b> Glencore Canada Corporation <a href="http://www.glencore.com">www.glencore.com</a>	Active mine	Nickel	6.59	Ni: 3.36%	14.1	Ni: 3.36%	OP/UG	Resources are inclusive of reserves. Production: 30 kt of nickel as concentrate. Work to extend mining to at least 2035.
		Cobalt		Co: 0.07%		Co: 0.07%		
		Palladium		Pd: 2.05 g/t		Pd: 2.27 g/t		
		Platinum		Pt: 0.87 g/t		Pt: 0.93 g/t		
		Copper		Cu: 0.81%		Cu: 0.94%		
<b>Nunavik Nickel</b> Canadian Royalties <a href="http://www.canadianroyalties.com">www.canadianroyalties.com</a>	Development	Nickel			c <sup>(5)</sup>	c	OP	Start of mining operations Production forecast: nickel concentrate and copper concentrate.
		Copper						
		Palladium						
		Platinum						
		Cobalt						
<b>Dumont Nickel</b> Royal Nickel Corporation <a href="http://www.royalnickel.com">www.royalnickel.com</a>	Appraisal	Nickel	1 178.6	Ni: 0.27%	1,665.6	Ni: 0.27%	OP	Feasibility study completed. Resources are inclusive of reserves. Production forecast: 33 kt of nickel as concentrate around 2016 to increase to 51 kt after 2021. Revenue from cobalt, platinum, palladium.
				Co: 107 g/t		Co: 107 g/t		
				Pt: 0.009 g/t		Pt: 0.009 g/t		
				Pd: 0.019 g/t		Pd: 0.02 g/t		

- (1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))
- (2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.
- (3) Mt: million metric tons, %: percentage, g/t: gram per metric ton.
- (4) OP: open pit, UG: underground.
- (5) c: confidential information.

## Nickel - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.

\*\* Source: SIGÉOM.

# Copper

## PRODUCTION AND MINING PROJECTS

### Current situation

Québec has proven expertise in the mining and processing of copper. Not long ago, several copper mines were active in the province, giving rise to a major copper-processing industry. Today, there is one smelter (the Horne smelter) and one copper refinery (Affinerie CCR), both belonging to Glencore Canada Corporation.<sup>25</sup> These large cutting-edge industrial facilities process concentrate from the province and elsewhere in Canada, and from abroad.

The copper currently produced in Québec is a by-product of gold, nickel and zinc mines. As such, four mines are copper producers, the most important being the La Ronde mine (Agnico Eagle Mines) and the Raglan mine (Glencore Canada Corp.).

In the Matagami mining camp,<sup>26</sup> the Bracemac-McLeod zinc mine (Glencore Canada Corp.) took over from the depleted Perseverance mine, producing copper as a by-product during zinc ore processing. It is the same situation at the Langlois zinc mine (Nyrstar), near Label-sur-Quévillon, with a secondary production of copper concentrate.

Copper production in Québec, 2013				
Shipments			Reserves	Number of workers
Quantities (t)	Value (CA M\$)	Canadian shipments (in %)		
31,300	236	5%	258,000	-

Source: Preliminary data from the *Institut de la statistique du Québec* and Natural Resources Canada

### Notable mining projects

The Nunavik Nickel mine of Canadian Royalties, which started pre-commercial production in 2013, produces a copper concentrate in addition to its main nickel concentrate. At present, there are no projects in the province at the deposit appraisal stage.

### Exploration and potential

Exploring for copper in Québec is often carried out alongside the search for nickel, zinc and gold. Geoscientific data relevant to copper exploration were compiled while carrying out an action plan (2004 to 2009), and this information is available from SIGÉOM.

<sup>25</sup> www.glencore.com  
<sup>26</sup> www.glencore.com



Photo: Francis Fontaine for the MERN

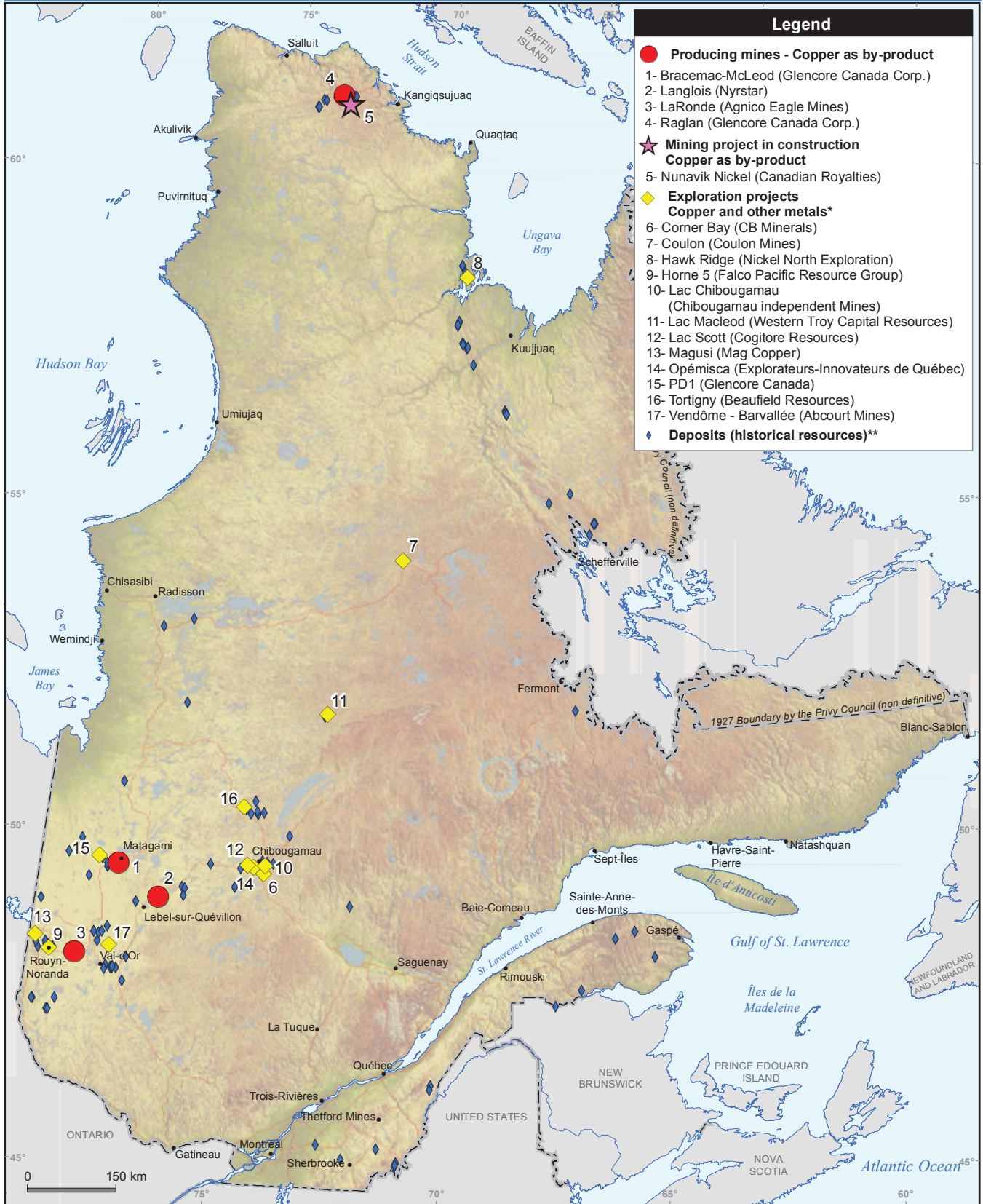
CHOOSE QUÉBEC'S MINING SECTOR – COPPER AND ZINC PROJECTS<sup>(1)</sup>

Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Bracemac-McLeod</b> Glencore Canada Corporation <a href="http://www.glencore.com">www.glencore.com</a>	Active mine	Zinc	3.8	Zn: 6.5%			UG	Production: 70 kt/yr of zinc as concentrate and 9 kt/yr of copper, 100 kg/yr of gold and 11,500 kg/yr of silver as another concentrate.
		Silver		Ag: 25 g/t				
		Copper		Cu: 0.9%				
		Gold		Au: 0.4 g/t				
<b>Langlois</b> Nyrstar <a href="http://www.nyrstar.com">www.nyrstar.com</a>	Active mine	Zinc	4.5	Zn: 8.72%	5.4	Zn: 9.92%	UG	Resources are inclusive of reserves. Production: 40 kt/yr of zinc as concentrate and 2 kt/yr of copper, 60 kg/yr of gold and 16,000 kg/yr of silver as another concentrate.
		Silver		Ag: 41.7 g/t		Ag: 49.6 g/t		
		Gold		Au: 0.06 g/t		Au: 0.07 g/t		
		Copper		Cu: 0.6%		Cu: 0.7%		
<b>LaRonde</b> Agnico Eagle Mines <a href="http://www.agnicoeagle.com">www.agnicoeagle.com</a>	Active mine	Gold	24.1	Au: 5.00 g/t	4.2	Au: 2.12 g/t	UG	Resources are exclusive of reserves. 2014 production forecast: 6,700 kg of gold, 69,800 kg of silver, 38,600 tonnes of zinc as concentrate, 4,000 tonnes of copper as another concentrate.
		Zinc		Zn: 0.67%		Zn: 1.61%		
		Silver		Ag: 19.6 g/t		Ag: 32.5 g/t		
		Copper		Cu: 0.25%		Cu: 0.16%		
<b>Raglan</b> Glencore Canada Corporation <a href="http://www.glencore.com">www.glencore.com</a>	Active mine	Nickel	6.59	Ni: 3.36%	14.1	Ni: 3.36%	OP/UG	Resources are inclusive of reserves. Production: 30 kt of nickel as concentrate. Work to extend mining until 2035.
		Cobalt		Co: 0.07%		Co: 0.07%		
		Palladium		Pd: 2.05 g/t		Pd: 2.27 g/t		
		Platinum		Pt: 0.87 g/t		Pt: 0.93 g/t		
<b>Nunavik Nickel</b> Canadian Royalties <a href="http://www.canadianroyalties.com">www.canadianroyalties.com</a>	Development	Nickel			c <sup>(5)</sup>	c	OP	Start of mining operations. Production forecast: nickel concentrate and copper concentrate.
		Copper						
		Palladium						
		Platinum						
		Cobalt						

- (1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))
- (2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.
- (3) Mt: million metric tons, %: percentage, g/t: gram per metric ton, c/t: carat/tonne.
- (4) OP: open pit, UG: underground.
- (5) c: confidential information.



# Copper - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.  
 \*\* Source: SIGÉOM.

# Zinc

## PRODUCTION AND MINING PROJECTS

### Current situation

Québec is the largest zinc producer in Canada. The value of its shipments reached CA\$250 million in 2013, accounting for one quarter of all Canadian shipments.

The province's current zinc production comes from three mines: Bracemac-MacLeod (Glencore Canada Corp.), LaRonde (Agnico Eagle Mines) and Langlois (Nyrstar). These polymetallic mines also produce silver, gold and copper.

Moreover, Québec has one zinc refinery, the CEZ<sup>27</sup> refinery, at which production has grown steadily since it opened in 1963. This refinery, renowned as one of the most productive in the world, is located in Salaberry-de-Valleyfield, in the Montérégie region near Montréal. The refinery processes concentrate from Québec, other regions in Canada and abroad.

Zinc production in Québec, 2013				
Quantities (t)	Shipments		Reserves	Number of workers
	Value (CA M\$)	Canadian shipments (in %)		
129,900	253	24%	1,300,000	>500

Source: Preliminary data from the *Institut de la statistique du Québec* and Natural Resources Canada

### Notable mining projects

At present, there are no zinc projects at the development or deposit appraisal phase.

### Exploration and potential

A few active zinc exploration projects are being carried out in the province. There are at least six exploration projects with mineral resources, mainly in the Abitibi-Témiscamingue region and in the James Bay area of the Nord-du-Québec region.

There is potential in the Grenville Province for zinc deposits of sedimentary origin although this region has seen little exploration for deposits of this type. Québec should be able to consolidate its position as Canada's leading zinc producer.

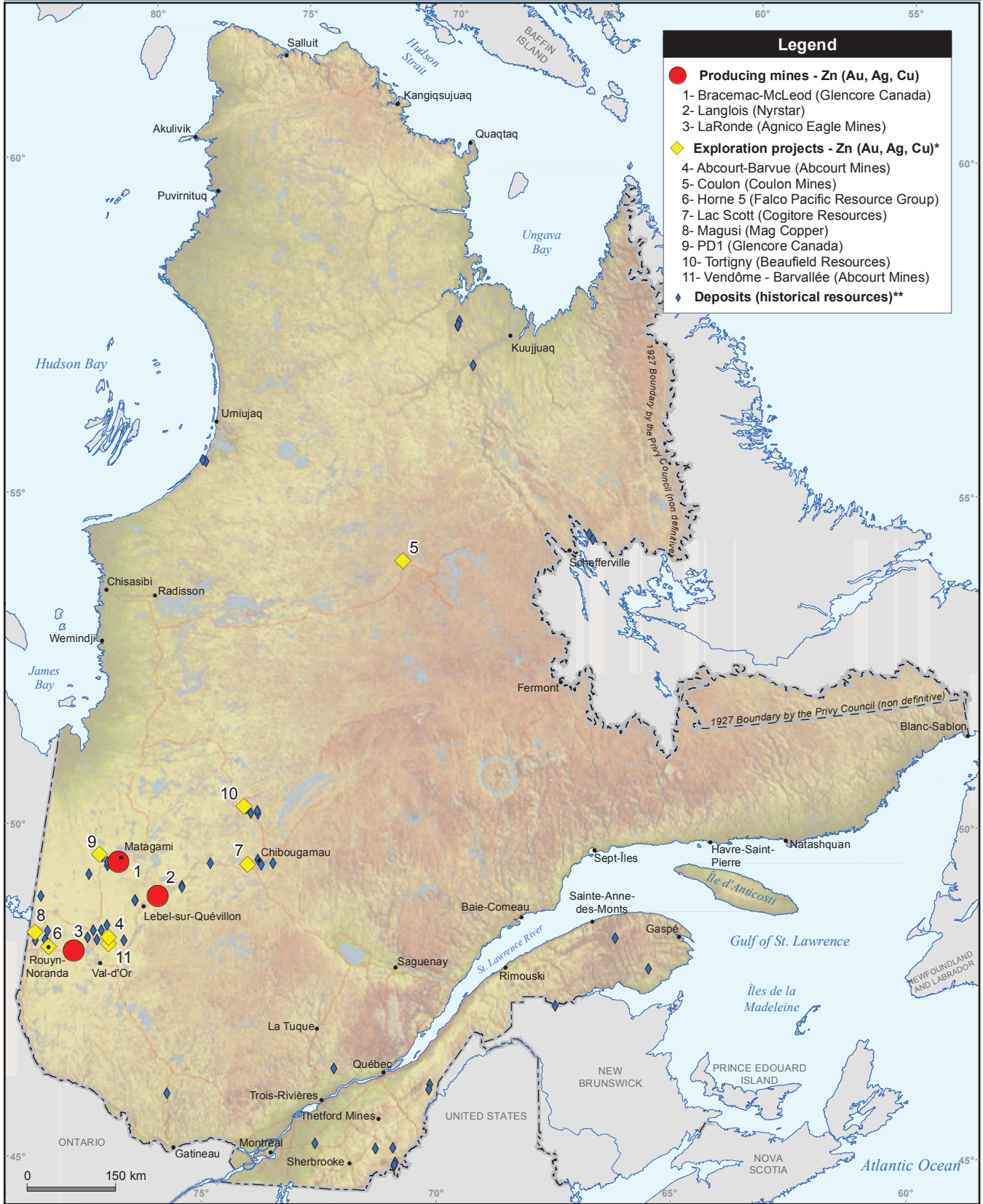
27 [www.fondsderevenunoranda.com](http://www.fondsderevenunoranda.com)



Photo: Francis Fontaine for the MERN



# Zinc - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.

\*\* Source: SIGEOM.

# Niobium and tantalum

## PRODUCTION AND MINING PROJECTS

### Current situation

Niobium and tantalum are metals that often occur together in a wide range of deposit types but have very different uses and are destined for different markets. Both metals are generally used in high-tech applications or in the manufacture of certain types of alloys.

Québec is the only niobium producer in North America and one of only three producers in the world. The production comes from the Niobec mine, owned by Niobec, a subsidiary of IAMGOLD Corporation. The pyrochlore concentrate undergoes primary processing to produce ferroniobium, which is exported to customers all around the world.

Niobium mining in Québec is evidence of the province's diversified mineral base. There is also good potential for other niobium-producing operations, particularly in association with rare earths. Add to this the province's strong potential to extract tantalum from niobium or lithium mineral deposits. Tantalum is not currently mined in Québec.

Niobium production in Québec, 2013				
Shipments			Reserves	Number of workers
Quantities (t)	Value (CA M\$)	Canadian shipments (in %)		
4,900	c	100%	200,000	475

c: confidential information

Source: Preliminary data from the *Institut de la statistique du Québec* and Natural Resources Canada

### Notable mining projects

Niobec announced a major expansion project to increase its annual production at the mine to 15,000 tonnes of niobium. The project, evaluated at roughly CA\$1.2 billion, will extend the life of the mine by 40 years. A feasibility study is underway. Niobec also discovered rare earth mineralization near the current niobium mine site, and work is ongoing.

As with the rare earth elements, niobium and tantalum are often associated with carbonatites and various types of pegmatites. Projects focused primarily on lithium or rare earths may also involve the recovery of niobium or tantalum. The Rose Tantalum-Lithium project of Critical Elements Corporation, at the deposit appraisal stage, is one such example.

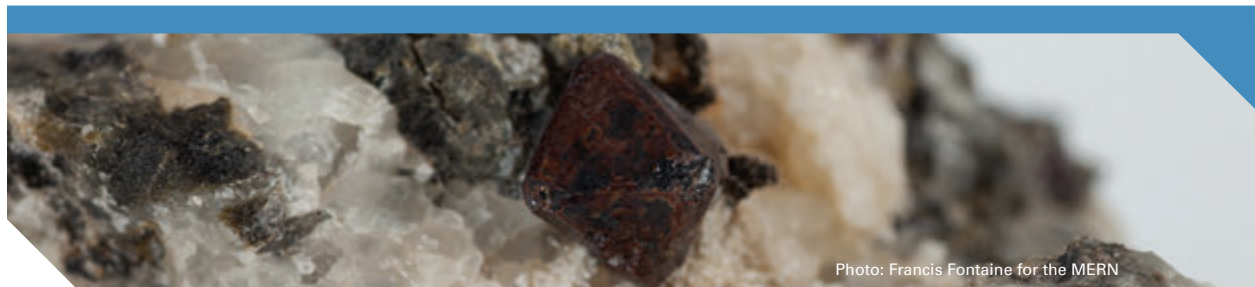


Photo: Francis Fontaine for the MERN



## Exploration and potential

North of Saint-Jean Lake, Minéraux Crevier<sup>28</sup> is continuing to work on its Crevier niobium and tantalum project on the nearby Samaqua property.

In the Lebel-sur-Quévillon area, GéoMéga Resources<sup>29</sup> continues its evaluation of the Montviel carbonatite (Montviel project). The goal of the ongoing work is to provide a resource update and preliminary economic assessment of this rare earth and niobium project.

Québec has several favourable geological settings for niobium and tantalum, particularly carbonatite environments.

CHOOSE QUÉBEC'S MINING SECTOR - NIOBIUM AND TANTALUM <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Niobec</b> Niobec <a href="http://www.niobec.com">www.niobec.com</a>	Active mine	Niobium	416.4	Nb <sub>2</sub> O <sub>5</sub> : 0.41%	288.7	Nb <sub>2</sub> O <sub>5</sub> : 0.43%	UG	Resources are inclusive of reserves. 2014 production forecast: 7 Mkg of ferroniobium equivalent to 4.9 Mkg of niobium. A major production expansion project is under study.
<b>Rose Tantalum-Lithium</b> Critical Elements Corporation <a href="http://www.cecorp.ca">www.cecorp.ca</a>	Appraisal	Lithium			26.5	Li <sub>2</sub> O: 0.98%	OP	Feasibility study underway. Production forecast: 26.6 kt/yr of lithium carbonate and 94 t/yr tantalum concentrate.
		Tantalum				Ta <sub>2</sub> O <sub>5</sub> : 163 g/t		

(1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

(3) Mt: million metric tons, Mkg: million kilograms, %: percentage, g/t: gram per metric ton.

(4) TREO: sum of all rare earth oxides plus yttrium oxide; LREO: sum of light rare earth oxides (La-Sm), HREO: some of heavy rare earth oxides (Eu-Lu).

(5) OP: open pit, UG: underground.

28 [www.mdn-mines.com/en/](http://www.mdn-mines.com/en/)  
29 [www.ressourcesgeomega.ca](http://www.ressourcesgeomega.ca)

## Niobium and tantalum - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.

\*\* Source SIGEOM.

# Rare Earth Elements

## MINING PROJECTS

### Current situation

Rare earth elements constitute a global-scale strategic resource. Forecasts call for rising demand due to their use in high-tech domains and green technologies, particularly hybrid and electric vehicles. New sources for producing these elements are being developed at several locations around the world. China is the main producer and consumer.

Québec has never been a rare earth producer, but may become one in the near future thanks to its promising potential, particularly for heavy rare earths. Three projects have reached the deposit appraisal stage and may someday supply rare earth oxide concentrates. In addition, geoscientific studies and exploration work currently underway will likely reveal new rare earth mineralization.

In addition to its rare earth resources, Québec offers several other strategic advantages for industrial activities related to the mining and production of rare earth concentrates, as well as the separation and processing of rare earths into value-added products. Moreover, Québec is also located near major markets.

### Notable mining projects

In Témiscamingue, Matamec Explorations has just completed a feasibility study for the Kipawa rare earth deposit. The project is a partnership with Toyotsu Rare Earth Canada, and its main focus is on heavy rare earths. The project will produce rare earth oxides destined, in part, for the Asian market. Matamec Explorations also discovered new rare earth showings nearby.

In Nunavik, Quest Rare Minerals intends to mine ore at its B-Zone project (Strange Lake), and transform the ore into concentrate that will be shipped to facilities in southern Québec. Quest Rare Minerals also announced that it intends to build a processing plant at Bécancour to obtain mixed heavy and light rare earth oxides. Construction for this CA\$1.6-billion project should begin in 2016, and the plant will start production in 2019.

In Nunavik, 130 kilometres south of Kuujuaq, the Eldor project (Ashram Zone) of Commerce Resources Corporation is focused on mining rare earths from a carbonatite. The project involves mining and on-site concentration of the ore followed by off-site processing. Work in preparation for a prefeasibility study is already underway.

### Exploration and potential

Two advanced exploration projects are worth noting. In Saguenay, Niobec (IAMGOLD Corporation<sup>30</sup>) discovered one of the largest rare earth resources in the world (indicated resources of 531 Mt at 1.64% TREO, inferred resources of 527 Mt at 1.83% TREO) near its niobium mine. Resource evaluation work is underway.

In the Lebel-sur-Quévillon area, Ressources GéoMéga<sup>31</sup> is continuing its evaluation of the Montviel carbonatite (Montviel project). The goal of the ongoing work is a resource update and preliminary economic assessment of

30 [www.iamgold.com](http://www.iamgold.com)

31 [www.ressourcesgeomega.ca](http://www.ressourcesgeomega.ca)

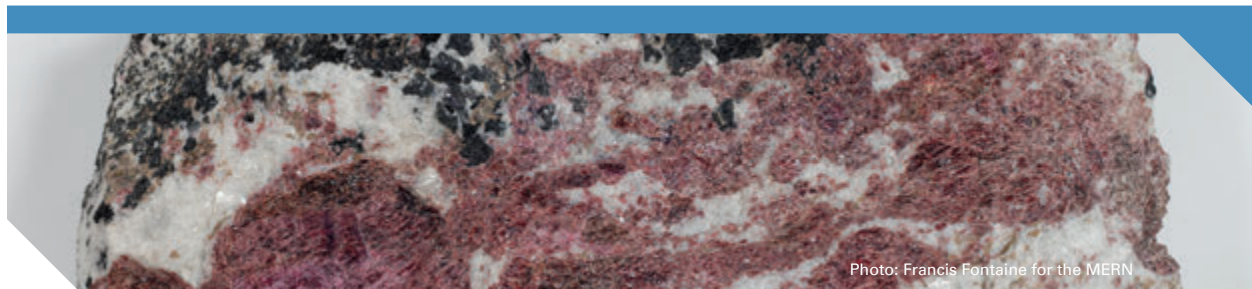


Photo: Francis Fontaine for the MERN



this rare earth and niobium project. GéoMéga envisions the production of rare earth oxide concentrates, as well as the separation of rare earth elements by electrophoresis (a process at the research and development stage).

Several exploration projects at less-advanced stages are focused on rare earths as principal commodities or as by-products.

CHOOSE QUÉBEC'S MINING SECTOR – RARE EARTH PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Eldor (Ashram)</b> Commerce Resources Corporation <a href="http://www.commerceresources.com">www.commerceresources.com</a>	Appraisal	Rare earths			29.3	TREO: 1.89%	OP	Prefeasibility study underway. Production forecast: 36 kt/yr of mixed rare earth carbonate.
		Light rare earths				LREO: 1.80%		
		Heavy rare earths				HREO: 0.05%		
		Yttrium				Y <sub>2</sub> O <sub>3</sub> : 0.04%		
<b>Kipawa (Zeus)</b> Matamec Explorations Toyota Rare Earth Canada <a href="http://www.matamec.com">www.matamec.com</a>	Appraisal	Rare earths	19.8	TREO: 0.41%	23.9	TREO: 0.41%	OP	Feasibility study completed. Resources are inclusive of reserves. Production forecast: 1.5 kt/yr of heavy rare earth concentrate, 2.1 kt/yr of light rare earth concentrate.
		Light rare earths		LREO: 0.26%		LREO: 0.26%		
		Heavy rare earths		HREO: 0.06%		HREO: 0.06%		
		Yttrium		Y <sub>2</sub> O <sub>3</sub> : 0.09%		Y <sub>2</sub> O <sub>3</sub> : 0.09%		
		Zirconium				ZrO <sub>2</sub> : 0.91%		
<b>Strange Lake /B-Zone</b> Quest Rare Minerals <a href="http://www.questrareminerals.com">www.questrareminerals.com</a>	Appraisal	Rare earths			278.1	TREO: 0.93%	OP	Feasibility study commenced in autumn 2014. Resources are inclusive of reserves. Production forecast: 10 400 t/yr of rare earth oxides.
		Light rare earths				LREO: 0.57%		
		Heavy rare earths				HREO: 0.12%		
		Yttrium				Y <sub>2</sub> O <sub>3</sub> : 0.24%		
		Hafnium				HfO <sub>2</sub> : 0.05%		
		Zirconium				ZrO <sub>2</sub> : 1.92%		
Niobium				Nb <sub>2</sub> O <sub>5</sub> : 0.18%				

(1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

(3) Mt: million metric tons, %: percentage.

(4) TREO: sum of all rare earth oxides plus yttrium oxide; LREO: sum of light rare earth oxides (La-Sm), HREO: some of heavy rare earth oxides (Eu-Lu).

(5) OP: open pit, UG: underground.

## Rare earth elements - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.

\*\* Source: SIGÉOM

# Lithium

## MINING PROJECTS

### Current situation

Lithium is of strategic importance and the demand is growing significantly, notably for the production of electrical storage cells (accumulators).

Québec is poised to become a lithium producer and processor with the reopening of the Québec Lithium mine at La Corne in the Abitibi-Témiscamingue region. This underground mine was in operation from 1955 to 1965. Québec Lithium, a wholly owned subsidiary of RB Energy<sup>32</sup>, has commenced open pit mining at the Québec Lithium project and construction of the lithium carbonate processing plant is now complete. The plant is at the ramp-up phase and should attain commercial production within the next few months. Its main customers are in Asia, and the target is the electrical accumulator market.

Québec's potential and position are favourable for the production and processing of lithium. The province aims to become a major player on the world stage, on both fronts. Québec has already distinguished itself for its production of lithium components and batteries, as well as for its initiatives in the development of electric vehicles. It also has research centres dedicated to batteries or haulage equipment. The essential elements for lithium battery and electric vehicle industries are evidently in place.

### Notable mining projects

Two regions in Québec stand out for lithium projects: Abitibi-Témiscamingue and James Bay. Three projects are at the deposit appraisal stage. Near the Québec Lithium mine, Glen Eagle Resources envisions the production of a spodumene concentrate at its Authier project, perhaps even lithium metal. This project is at the feasibility stage.

In the James Bay region, there are two projects: Whabouchi and Rose Tantalum-Lithium. A feasibility study has recently been published for the Whabouchi project of Nemaska Lithium. The company is presently seeking financing. The extraction and concentration of spodumene would be done in the James Bay region, but the processing of the concentrate into lithium hydroxide and lithium carbonate would take place at a chemical plant in Salaberry-de-Valleyfield.

Critical Elements Corporation aims to mine its Rose Tantalum-Lithium deposit in the James Bay area, where it would extract spodumene to produce lithium carbonate and a tantalum concentrate.

### Exploration and potential

Other projects worth noting are the Moblan project of Perilya<sup>33</sup> and SOQUEM, and the James Bay project of Galaxy Resources.<sup>34</sup> The appraisal of these projects, which contain measured and indicated resources, has been temporarily suspended. A number of other showings are also known in the James Bay region.

<sup>32</sup> [www.rb-e.com](http://www.rb-e.com)

<sup>33</sup> [www.perilya.com.au](http://www.perilya.com.au)

<sup>34</sup> [www.galaxyresources.com.au](http://www.galaxyresources.com.au)



Photo: Francis Fontaine for the MERN

CHOOSE QUÉBEC'S MINING SECTOR - LITHIUM PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Québec Lithium</b> Québec Lithium RB Energy <a href="http://www.canadalithium.com">www.canadalithium.com</a>	Develop- ment	Lithium	17.1	Li <sub>2</sub> O: 0.94%	33.2	Li <sub>2</sub> O: 1.19%	OP	Resources are inclusive of reserves. Production forecast: 20,000 tonnes of lithium carbonate per year.
<b>Authier</b> Glen Eagle Resources <a href="http://www.gleneagleresources.com">www.gleneagleresources.com</a>	Appraisal	Lithium			7.6	Li <sub>2</sub> O: 0.96%	OP	Preliminary economic assessment completed. Production forecast: 100 kt/yr of spodumene concentrate.
<b>Rose Tantalum-Lithium</b> Critical Elements Corporation <a href="http://www.cecorp.ca">www.cecorp.ca</a>	Appraisal	Lithium			26.5	Li <sub>2</sub> O: 0.98%	OP	Feasibility study underway. Production forecast: 26.6 kt/yr of lithium carbonate and 94 t/yr of tantalum concentrate.
		Tantalum				Ta <sub>2</sub> O <sub>5</sub> : 163 g/t		
<b>Whabouchi</b> Nemaska Lithium <a href="http://www.nemaskalithium.com">www.nemaskalithium.com</a>	Appraisal	Lithium	27.3	Li <sub>2</sub> O: 1.46%	28	Li <sub>2</sub> O: 1.57%	OP/UG	Feasibility study completed. Resources are inclusive of reserves. Production forecast: 216 kt/yr of spodumene concentrate that will be transformed into 28 kt of lithium hydroxide and into 3 kt of lithium carbonate.

(1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

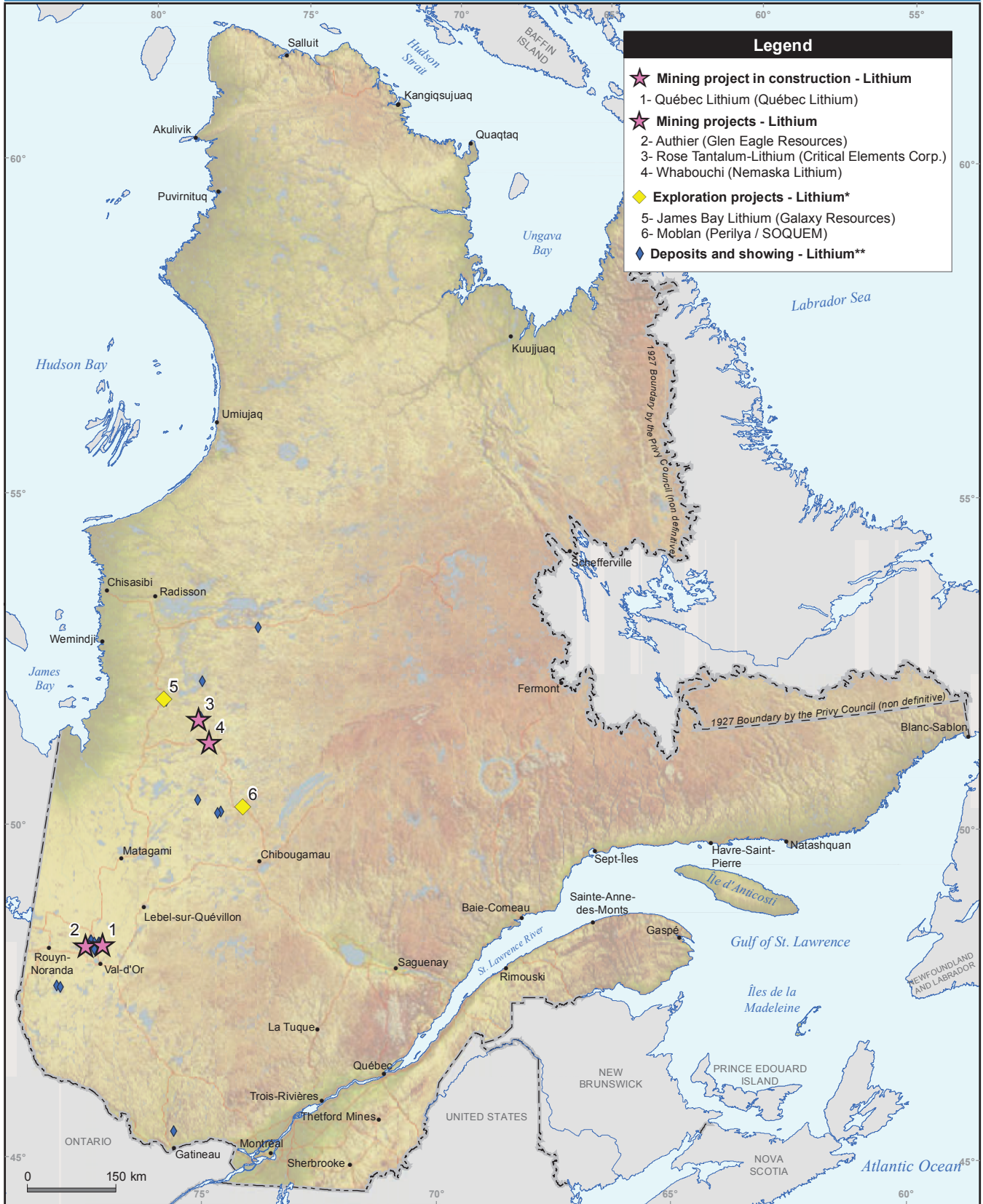
(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

(3) Mt: million metric tons, %: percentage, g/t: gram per metric ton.

(4) OP: open pit, UG: underground.



# Lithium - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.

\*\* Source SIGEOM.

# Graphite

## PRODUCTION AND MINING PROJECTS

### Current situation

The global market for graphite is stable, with an average forecasted growth of 3% per year until 2016. A new market is developing for high-tech applications, such as lithium-ion batteries in hybrid and electric cars, the new generation of nuclear reactors, and electrical conductors. These new applications require high-quality flake graphite. Québec could be a supplier to this emerging market. In the traditional market, graphite is used for batteries, automobile components, lubricants, metallic powders and refractory products.

Only two graphite mines are active in North America. One is located in British Columbia (the Black Crystal mine of Eagle Graphite) and the other in Québec, in the Laurentians, near Mont-Laurier (the Lac-des-Îles mine of Timcal Graphite & Carbone). Timcal supplies natural graphite for the manufacture of traditional batteries and metallic powders.

Over the past few years, there has been a significant increase in the number of graphite exploration projects, mainly in Québec but also in Ontario and British Columbia. In Québec, in the summer of 2013, nearly one hundred graphite exploration projects were recorded at various stages of advancement. Two of these projects are at the deposit appraisal stage. Historically, many graphite deposits have been discovered and even mined in Québec, particularly in the geological Grenville Province.

### Notable mining projects

In the Côte-Nord region, two projects are at the feasibility stage. The Lac Knife project, of Focus Graphite, is located south of Fermont. The flake graphite in this deposit is of much better quality than what is generally available on the market. The deposit could produce 44,300 tonnes per year of graphite concentrate grading 98% graphitic carbon over a period of 25 years. The second project of importance is the Lac Guéret property of Mason Graphite Corp., located 60 kilometres northwest of the Daniel-Johnson dam (Manic 5). The project provides for an annual production of 50,000 tonnes of graphite concentrate over 22 years. The deposit contains 7.6 million tonnes of graphite grading 20.4% graphitic carbon.

### Exploration and potential

Many of the graphite exploration projects are taking place on properties that were explored or even mined in the past.

Many are in the Outaouais region, such as the Mousseau West project belonging to Graniz Mondal<sup>35</sup>, who published mineral resources.

<sup>35</sup> [www.granizmondal.com](http://www.granizmondal.com)



Photo: Francis Fontaine for the MERN

CHOOSE QUÉBEC'S MINING SECTOR - GRAPHITE PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Lac des Îles</b> TIMCAL Graphite & Carbone <a href="http://www.timcal.com">www.timcal.com</a>	Active mine	Graphite	c <sup>(5)</sup>	c	c	c	OP	
<b>Lac Guéret</b> Mason Graphite Corporation <a href="http://www.masongraphite.com">www.masongraphite.com</a>	Appraisal	Graphite			50	Cg: 15.63%	OP	Feasibility study underway. Production forecast: 50 kt of graphite per year.
<b>Lac Knife</b> Focus Graphite <a href="http://www.focusgraphite.com">www.focusgraphite.com</a>	Appraisal	Graphite	7.9	Cg: 15.13%	9.6	Cg: 14.77%	OP	Feasibility study completed. Resources are inclusive of reserves. Production forecast: 44.3 kt of graphite per year.

(1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

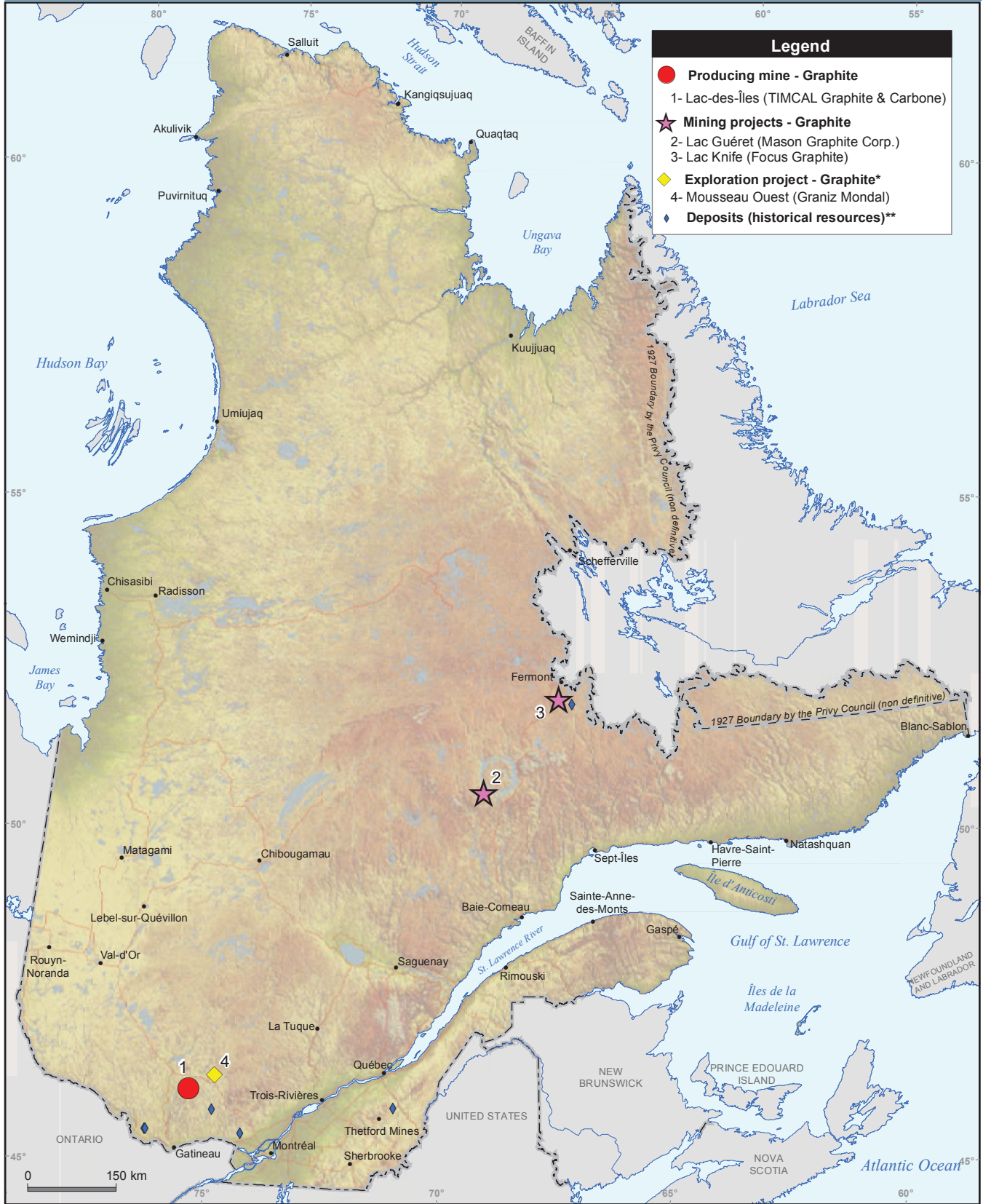
(3) GP: graphite, Mt: million metric tons, %: percentage.

(4) OP: open pit, UG: underground.

(5) c: confidential data.



# Graphite - Mining activities in Québec



\* Exploration projects with NI 43-101 resources published between 2009 and 2014.

\*\* Source: SIGÉOM.



# Phosphate

## MINING PROJECTS

### Current situation

The consumption and demand for phosphate have been rising for several years and the future outlook is positive. Phosphate is one of the raw materials used, among other items, in the manufacture of fertilizer.

More than 40 phosphate mines were in operation from the 1800s to 1950. Almost all these phosphate mines were in the Outaouais region. There are currently no active phosphate mines in Québec. However, the forecast of increasing demand is reviving exploration, and new projects have emerged in the province. Geologically, these projects are associated with anorthositic and mafic complexes.

### Notable mining projects

Two mining projects are at the deposit appraisal stage and could enter into production during the next two years. Both are apatite (calcium phosphate) projects.

The Lac à Paul project of Arianne Phosphate has an estimated mine life of 26 years, with an average annual production of 2.9 million tonnes of phosphate concentrate. This project is located about 200 kilometres north of the town of Saguenay, and is accessible by a major network of forestry roads. A feasibility study was completed in October 2013.

The Arnaud project of Mine Arnaud has an estimated mine life of 26 years, with an average annual production of 1.2 million tonnes of phosphate concentrate. This project is located about 15 kilometres west of the town of Sept-Îles, and important infrastructure is already present: provincial highway 138, the Arnaud railway, the port of Sept-Îles and power lines. A feasibility study is expected in the third quarter of 2014.

### Exploration and potential

Anorthositic and mafic complexes containing apatite mineralization are numerous and common throughout the province. Therefore, exploration targets are plentiful.

A dozen projects are currently at the exploration stage, at different levels of advancement, in the Saguenay–Lac-Saint-Jean and Côte-Nord regions.



Photo: Francis Fontaine for the MERN

CHOOSE QUÉBEC'S MINING SECTOR - PHOSPHATE PROJECTS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Arnaud Mine Arnaud</b> <a href="http://www.minearnaud.com">www.minearnaud.com</a>	Appraisal	Apatite	324.4	P <sub>2</sub> O <sub>5</sub> : 4.42%	481.7	P <sub>2</sub> O <sub>5</sub> : 4.18%	OP	Feasibility study underway. Resources are inclusive of reserves. Production forecast: 1.4 Mt of apatite concentrate at 39% P <sub>2</sub> O <sub>5</sub> per year.
<b>Lac à Paul</b> Arianne Phosphate <a href="http://www.arianne-inc.com">www.arianne-inc.com</a>	Appraisal	Apatite	472.1	P <sub>2</sub> O <sub>5</sub> : 6.88%	590.2	P <sub>2</sub> O <sub>5</sub> : 7.13%	OP	Feasibility completed. Resources are inclusive of reserves (Paul Zone). Production forecast: 2.9 Mt of apatite concentrate at 39% P <sub>2</sub> O <sub>5</sub> per year.

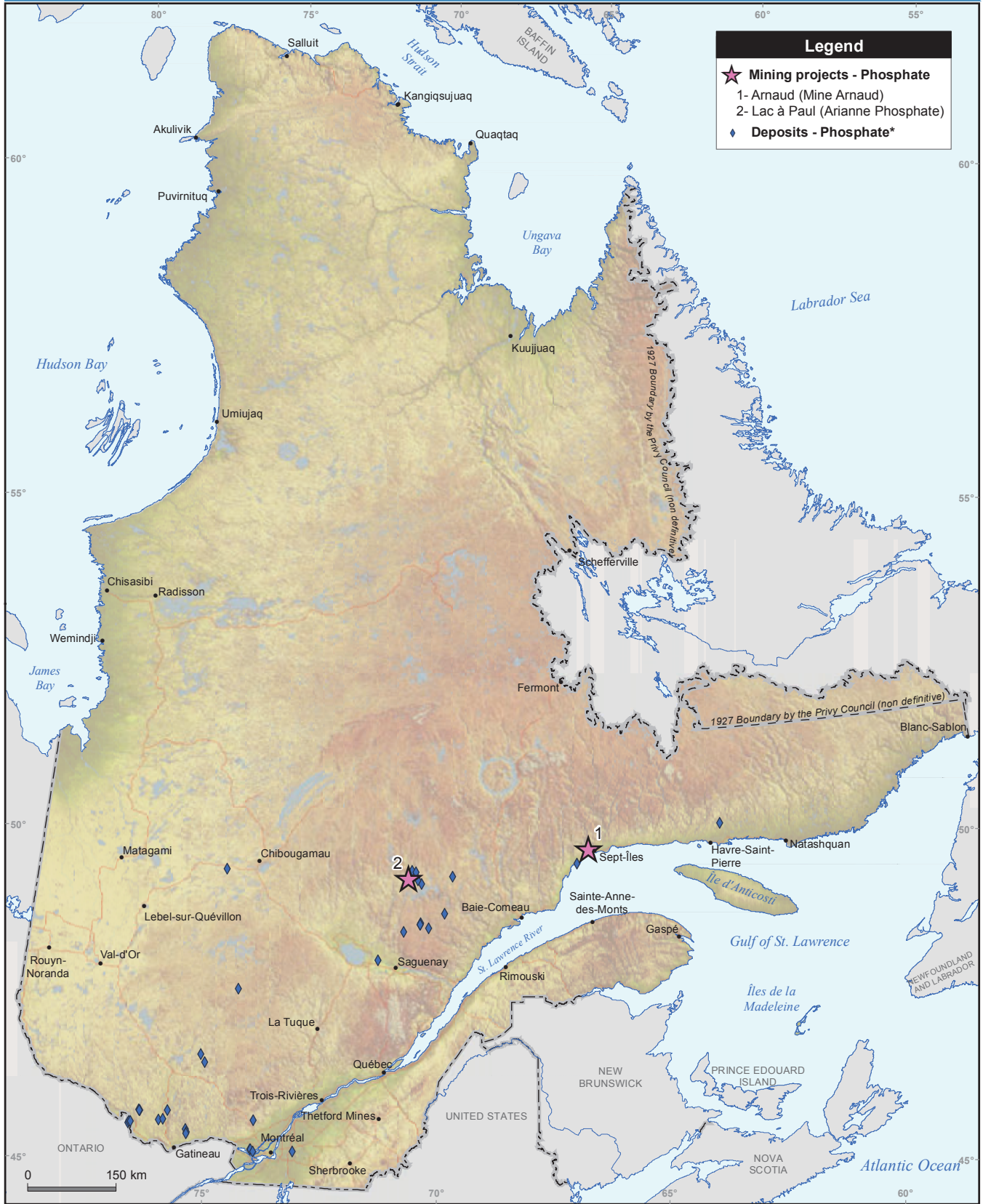
(1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

(3) Mt: million metric tons, %: percentage

(4) OP: open pit, UG: underground

# Phosphate - Mining activities in Québec



\* Source: SIGÉOM.

# Diamonds

## MINING PROJECTS

### Current situation

The global market for diamonds is growing rapidly. Prices have risen significantly over the last few years and the outlook is positive. Canada's position in the market (production and processing) is becoming increasingly important. Although Québec is not yet a diamond producer, it may become one in the near future.

### Notable mining projects

The Renard diamond project, owned by Stornoway Diamonds Corporation, is promising. The feasibility study, published in 2011, reports mining reserves capable of providing for 11 years of production. The initial investment for production is estimated at about CA\$946 million. Stornoway officially announced the construction of the mine on July 10, 2014. Production is scheduled to start in 2016. The mine will create about 450 jobs.

These diamonds could be used in jewelry in Québec.

### Exploration and potential

The diamond potential of Québec remains relatively underexplored. Diamonds are generally found in kimberlites that were emplaced in thick ancient cratons such as those of the Superior Province.

The opening of a diamond mine could revive exploration activities in all areas identified as favourable following exploration efforts in the early 2000s.

CHOOSE QUÉBEC'S MINING SECTOR – DIAMOND PROJETS <sup>(1)</sup>								
Project	Status	Commodities	Proven and Probable Reserves <sup>(2,3)</sup>		Measured and Indicated Resources <sup>(2,3)</sup>		Type <sup>(4)</sup>	Comments
			Tonnage (Mt)	Grade	Tonnage (Mt)	Grade		
<b>Renard</b> Stornoway Diamond Corporation <a href="http://www.stornowaydiamonds.com">www.stornowaydiamonds.com</a>	Development	Diamonds	23.8	0.76 c/t	35.5	0.76 c/t	OP/UG	Feasibility study completed. Construction scheduled for summer 2014. Resources are inclusive of reserves. Production forecast: 1.6 M carats per year.

(1) Non exhaustive list; refer to the MERN's Report on Mining Activities for the complete list ([www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp](http://www.mern.gouv.qc.ca/english/mines/publications/publications-report.jsp))

(2) Mineral reserves and mineral resources are reported according to NI 43-101 standards; note: mineral resources do not have demonstrated economic viability and there is no certainty that resources will be converted into reserves, either in whole or in part.

(3) Mt: million metric tons, c/t: carat per ton.

(4) OP: open pit, UG: underground.

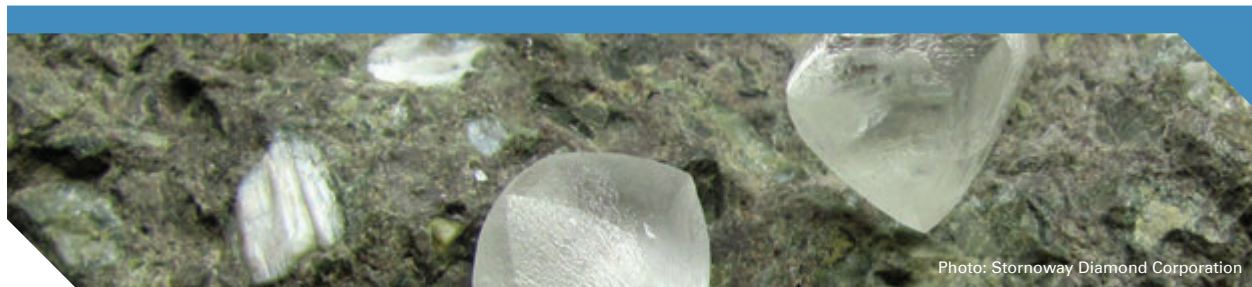


Photo: Stornoway Diamond Corporation



## Diamond - Mining activities in Québec



\* Source: SIGÉOM.

# Other metals

## Current situation

In Québec, small quantities of certain metals are produced during the refining of zinc and copper, or are extracted as by-products during gold or base metal mining operations. Although the production of these substances is generally on a small scale, it once again demonstrates the diversity of Québec's mineral potential and its capacity to mine its resources.

Shipments of other metallic minerals from Québec, 2013		
Substances	Quantities	Value (k\$)
Antimony (t)	3	34
Bismuth (t)	5	100
Cadmium (t)	101	199
Iron, remelt (t)	c	c
Lead (t)	419	924
Selenium (t)	26	1 990
Tellurium (t)	2	197

c: confidential information  
Source: Preliminary data from the Institut de la statistique du Québec and Natural Resources Canada

The supply of some of these metals is considered strategic by many nations (for example, the USA, Japan, South Korea, the European Union) because they are required by industries such as aeronautics, electronics, green energies and high technology. These metals include the rare earths, lithium, niobium, tantalum and graphite. Both mining and exploration projects in Québec could benefit from the interest of these nations for such metals.

Québec can offer a stable supply of several of these metals. It is already the second largest producer of niobium in the world, the third for titanium dioxide, and among one of the few graphite producers. Lithium can now be added to that list.

There is also considerable potential in Québec for mineral deposits containing antimony, bismuth, cadmium, lead, selenium and tellurium. In the near future, advances in geoscientific knowledge and increased exploration efforts, particularly north of the 49<sup>th</sup> parallel, could lead to the discovery of new mineralization containing these metals.





## MINERAL AND METAL PROCESSING: EXISTING ACTIVITIES, PROJECTS AND INCENTIVES

### A good context for processing activities

Québec wants to increase the processing of mining products within its borders and can count on some interesting advantages to do so, namely its location just northeast of the United States, its mineral potential, its infrastructure, its workforce, and its clean electric power-generation capacity.

The Government of Québec offers an investment tax credit for manufacturing and processing equipment. Depending on the type of investment project, it may also offer competitive power rates.

The processing allowance provided for in the Mining Tax Act is intended to encourage mining companies to perform processing and transformation activities within Québec, such as concentration, smelting, refining, pelletizing, and the production of steel powder and billets, copper cathodes and zinc ingots. The processing allowance was enhanced in January 2014, when the new mining tax regime came into effect.<sup>36</sup>

Here are a few examples of metal manufacturing and processing activities currently taking place in Québec.

- The Horne smelter produces primary copper anodes, which are refined by CCR refinery into high-purity copper cathodes. These anodes, primary processing products, are sold worldwide, namely in the United States, although some are also processed in Québec.
- Copper cathodes produced at the CCR refinery are transformed into wire rod, which is in turn transformed into copper winding wire destined for converter, generator and traction motor manufacturers in Québec, Ontario and the United States.
- In Québec, 144 companies manufacture copper parts or offer copper lining, plating, machining, or polishing services.
- Primary zinc produced by the CEZ refinery is namely used to make alloys (brass and bronze), but also for galvanizing. In Québec, 123 manufacturing companies use zinc.
- Rio Tinto Fer et Titane produces, from ilmenite, titaniferous slag used to manufacture titanium pigment, used as an opacity agent in paint (to get a white colour). It is also used to make Oreo cookies.
- Rio Tinto Fer et Titane also produces pig iron that is sold in part to manufacture iron castings; a significant proportion of this pig iron is used to make steel, and part of the pig iron and steel is transformed into powdered metal mainly destined for the automobile industry.
- Steel billets produced by Rio Tinto Fer et Titane are transformed into wire rod, which is used to manufacture, in Québec, steel wire, nuts and bolts.
- ArcelorMittal Montréal produces steel from iron pellets namely derived from the Mont-Wright mine in Fermont, and from scrap metal. Steel billets are transformed into steel bars and wire destined for North American markets, namely for the construction and automobile industries.
- According to a directory published by the *Centre de recherche industrielle du Québec (CRIQ)*, more than 2,000 companies manufacture steel products in Québec.

<sup>36</sup> [www.finances.gouv.qc.ca/documents/autres/en/AUTEN\\_NewMiningTaxRegime.pdf](http://www.finances.gouv.qc.ca/documents/autres/en/AUTEN_NewMiningTaxRegime.pdf)

## Primary processing plant development projects

Rio Tinto Fer et Titane has invested CA\$600 million into its metallurgical complex to upgrade its facilities. This complex produces titaniferous slag and steel from ore extracted at the ilmenite mine in Havre-Saint-Pierre.

The Québec Lithium mining project, developed by RB Energy, is in the commissioning phase. It includes, in addition to an open pit mine and a concentrator, a lithium carbonate production plant on site. Using spodumene concentrate, the plant will be able to meet the requirements of lithium battery manufacturers.

Nemaska Lithium is also considering the development of a lithium hydroxide and carbonate production plant in Québec, which would use as feedstock the concentrate from its Whabouchi mining project.

Given the advanced status of many rare earth projects, the construction of a rare earth oxide separation plant in Québec is a distinct possibility. Many companies with rare earth projects in Québec have shown some interest in this type of project.

Quest Rare Minerals has announced it is planning to build a processing plant to produce mixed light and heavy rare earth oxide concentrates in Bécancour, a CA\$1.6 billion project where construction is expected to begin in 2016. Production at the plant is scheduled to commence in 2019, and would use as feedstock ore from the Strange Lake B-Zone in northeastern Québec.

## Subsequent processing and manufacturing activities

The presence of processing plants and clusters may play a role in fostering the emergence of other manufacturing activities. Québec is in a good position to develop its processing and manufacturing industries, namely in traditional sectors such as copper, nickel or zinc, but also in non-traditional sectors such as rare earths or lithium.

Québec is already a step ahead in the production of lithium components and batteries, not to mention its initiatives in the development of electric vehicles. Two companies are currently active in this field in Québec: Phostech Lithium<sup>37</sup> and Bathium Canada.<sup>38</sup> To date, their lithium is sourced from outside of Québec.

Thus, based on the strength of the electric vehicle industry, the accessibility of a green electrical power supply and its mineral potential, Québec is seeking to attract international manufacturers in this field.

<sup>37</sup> [www.phostechlithium.com](http://www.phostechlithium.com)  
<sup>38</sup> [www.bathium.com](http://www.bathium.com)





Photo: MERN

## FREQUENTLY ASKED QUESTIONS ABOUT QUÉBEC'S MINING SECTOR

### **How are the powers shared between the Government of Québec and the federal government when it comes to the mining sector?**

The way in which jurisdiction is shared between the federal and provincial governments depends on the domain. The management and framework for the exploitation of natural resources, including mining, fall exclusively under Québec's jurisdiction.

Nevertheless, the federal government has the right to oversee certain environmental impacts. Moreover, all companies established in Canada must pay taxes to both the provincial and federal governments.

### **What is the regulatory process to approve a mining project, from the exploration stage to mine closure?**

To carry out mining activities, it is necessary to have a claim, which grants exclusive rights to search for mineral substances on a specific area of land under the Mining Act. According to the new Mining Act, a claim holder must notify the municipality and land owner of the claim acquisition within 60 days of its registration, and they must inform the municipality and land owner of the work that will be done on the claim at least 30 days before the work begins. The claim holder must also foster good relations with any Native community concerned. At all times, the claim holder must comply with the provisions set forth in the Environment Quality Act, and obtain all necessary authorizations and permits. Other laws may also apply.

If a new deposit is discovered, the claim holder must obtain a mining lease under the Mining Act in order to exploit it.

Before obtaining a mining lease, a mining company must file with the Minister of Energy and Natural Resources (MERN) a mine site rehabilitation and restoration plan, and obtain the MERN's approval, in addition to filing a scoping and market study in regards to processing in Québec. The mining company must also obtain a certificate of authorization from the Minister of Sustainable Development, Environment and the Fight against Climate Change (MDDELCC) under the Environment Quality Act. Upon granting a mining lease, the Act allows the Government of Québec, on reasonable grounds, to require that economic spinoffs be maximized within Québec, including primary processing.

A financial guarantee is also required. It represents the anticipated costs of undertaking the work provided for in the rehabilitation and restoration plan. This guarantee must be deposited in three instalments: the first (50%) within 90 days of receipt of approval of the plan and at the time the mining lease is granted, and subsequent instalments (25% each) on the anniversary date of the approval of the plan.

The Act requires an environmental impact assessment in the case of a project for the construction and operation of a metal ore processing plant, or the project for the development and operation project of a metal mine with a processing or production capacity of less than 2,000 metric tons per day, and in all cases of rare earth exploitation projects regardless of the processing or production capacity. Mining leases granted for a metal mine with a production capacity of less than 2,000 metric tons per day and leases granted to mine surface mineral substances for peat, or those required for industrial or commercial export activities, are subject to a public consultation held by the promoter.

Upon cessation of mining operations, the operator may be required to obtain one or more certificates of authorization from the MDDELCC to undertake restoration work.

### **Are the rights of foreign investors the same as those of Canadian investors?**

In Québec and elsewhere in Canada, all investors are treated equally, whether they are domestic or foreign.

However, there are certain rules governing the takeover of Canadian companies by foreign interests. For more information, consult the following website: [www.parl.gc.ca/Content/LOP/ResearchPublications/2011-42-e.htm](http://www.parl.gc.ca/Content/LOP/ResearchPublications/2011-42-e.htm)

### **Must a mining operation hire workers from a particular region or union? Can it bring in its own workers?**

The Government of Québec encourages companies to hire Québécois living in nearby communities. Québec has skilled manpower in the mining industry, and these workers are based primarily in mining regions. A company established in Québec may nonetheless hire workers from anywhere in Canada. It is generally not possible to bring in workers from outside Canada to fill positions that could be filled by Canadians, except in cases of recruitment difficulties.<sup>39</sup>

### **Does Québec have standards to ensure the safety of workers in the mining sector?**

Québec's occupational health and safety commission (*Commission de la santé et de la sécurité du travail*; CSST) is responsible for the administration of the occupational health and safety regime. In particular, it is responsible for enforcing the Regulation respecting occupational health and safety in mines.<sup>40</sup>

Moreover, the mission of the Joint Health and Safety Association, Mining Sector (*Association paritaire pour la santé et la sécurité du travail du secteur minier*<sup>41</sup>) is to help workers and employers in the mining industry to eliminate at their source any hazards to the health, safety and physical integrity of workers.

39 [www.immigration-quebec.gouv.qc.ca/FR/employeurs/index.html](http://www.immigration-quebec.gouv.qc.ca/FR/employeurs/index.html)

40 [www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/S\\_2\\_1/S2\\_1R14\\_A.HTM](http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/S_2_1/S2_1R14_A.HTM)

41 [www.aspmines.qc.ca](http://www.aspmines.qc.ca)

## What mining associations are active in Québec?

Two mining associations are active in Québec: the *Association de l'exploration minière du Québec*<sup>42</sup> and the *Association minière du Québec*<sup>43</sup>.

## What are the principal ministries and organizations with which a company wishing to invest in Québec must interact, and what are their responsibilities?

- *Ministère de l'Énergie et des Ressources naturelles*: for anything relating to mineral exploration and mining (permits, titles, mining rights, etc.)
- *Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques*<sup>44</sup>: for anything relating to the environment and environmental impacts.
- *Ministère des Finances*<sup>45</sup>, *Ministère de l'Économie, de l'innovation et des Exportations*<sup>46</sup> and *Investissement Québec*: for financial assistance, equity participation and general support for businesses.

## What are the laws and main regulations governing mineral exploration and mining?

### Statutes and regulations of Québec:

- Mining Act<sup>47</sup> / Regulation respecting mineral substances other than petroleum, natural gas and brine<sup>48</sup>
- Mining Tax Act<sup>49</sup>
- Sustainable Forest Development Act / Regulation respecting standards of forest management for forests in the domain of the State
- An Act Respecting the Lands in the Domain of the State
- Environment Quality Act / Regulation respecting pits and quarries / Regulation respecting environmental impact assessment and review
- An Act Respecting Occupational Health and Safety / Regulation respecting occupational health and safety in mines
- Natural Heritage Conservation Act
- An Act Respecting the Conservation and Development of Wildlife
- Parks Act

### Federal statutes and regulations:

- Canadian Environmental Assessment Act
- Fisheries Act / Metal Mining Effluent Regulations
- Nuclear Safety and Control Act / a number of implementing regulations

N.B.: The information in this section is provided for illustrative purposes only and has no legal value.

42 [aemq.org/EN/](http://aemq.org/EN/)

43 [www.amq-inc.com](http://www.amq-inc.com)

44 [www.mddelcc.gouv.qc.ca/index\\_en.asp](http://www.mddelcc.gouv.qc.ca/index_en.asp)

45 [www.finances.gouv.qc.ca/en/index.asp?](http://www.finances.gouv.qc.ca/en/index.asp?)

46 [www.economie.gouv.qc.ca/accueil/](http://www.economie.gouv.qc.ca/accueil/)

47 [www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/M\\_13\\_1/M13\\_1.html](http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/M_13_1/M13_1.html)

48 [www2.publicationsduquebec.gouv.qc.ca/documents/lr/M\\_13\\_1/M13\\_1R2\\_A.htm](http://www2.publicationsduquebec.gouv.qc.ca/documents/lr/M_13_1/M13_1R2_A.htm)

49 [www2.publicationsduquebec.gouv.qc.ca/documents/lr/l\\_0\\_4/l0\\_4\\_A.htm](http://www2.publicationsduquebec.gouv.qc.ca/documents/lr/l_0_4/l0_4_A.htm)



## TO CONTACT US

If you wish to get in touch with us or obtain additional information, please contact the offices of *Investissement Québec*<sup>50</sup> or those of the *Ministère des Relations internationales et de la Francophonie*.<sup>51</sup>

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<b>Name</b>	<b>Phone N°</b>	<b>E-mail</b>	<b>Website</b>
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Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques	1 800 561-1616	info@mddelcc.gouv.qc.ca	www.mddelcc.gouv.qc.ca

<sup>50</sup> [www.investquebec.com/quebec/en](http://www.investquebec.com/quebec/en)

<sup>51</sup> [www.mrif.gouv.qc.ca/fr/ministere/representation-etranger](http://www.mrif.gouv.qc.ca/fr/ministere/representation-etranger)





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