Carbon Pricing Ratio

TECHNICAL MANUAL

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Québec

Carbon Pricing Ratio

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SUMMARY

Since 2013, Québec has priced its greenhouse gas (GHG) emissions by means of a cap-and-trade system for greenhouse gas emission allowances (CAT system).

— Under this system, reporting emitters must obtain an emission allowance to cover each tonne of GHG emitted.

— The total amount of emission units made available to businesses is declining each year, especially in light of Québec's GHG emission reduction targets.

At the international level, noteworthy progress has been achieved in recent years in the realm of carbon pricing.

— Despite this progress, carbon pricing practices continue to differ significantly internationally.

For this reason, carbon pricing in the world usually includes instruments aimed at mitigating its impact on corporate competitiveness and limiting the risk of relocating industrial activities to countries where carbon pricing is weaker.

— In Québec, in the context of the CAT system, large industrial businesses therefore receive a free allocation of emission units.

❑ A ratio to measure Québec's lead in carbon pricing

The measurement of the carbon-pricing differential between Québec and the rest of the world is a useful tool for elaborating climate policies such as the free allocation of emission units aimed at large industrial businesses exposed to international trade.

The free allocation rules proposed for 2024-2030 have been elaborated to consider Québec's current advance in the realm of carbon pricing in relation to the rest of the world, as measured by the **carbon pricing ratio.**

Overall, the ratio reflects the relationship between average carbon pricing in Québec and elsewhere in the world.

— It simultaneously considers the explicit price of one tonne of GHG, and the proportion of emissions covered in all jurisdictions the world over.

For 2019, the estimated value of the ratio is 6.4, which means that carbon pricing is roughly six times more present in Québec than in the rest of the world.

The government intends to publish annually by way of indication an update of the value of the carbon pricing ratio.

1. A RATIO TO MEASURE QUÉBEC'S LEAD IN CARBON PRICING

1.1 Québec is a leader in the realm of carbon pricing

Like other jurisdictions at the international level, Québec has made carbon pricing a central component of its strategy to fight climate change.

Indeed, in 2013 Québec established the cap-and-trade system for greenhouse gas emission allowances (CAT system).

— Under the system, the level of greenhouse gas (GHG) emissions cannot exceed the amount that the government sets for a given period (emission cap).

— The amount of authorized emissions is decreasing each year, especially in light of Québec's GHG emission reduction targets.[1]

— The price is changing according to interaction between supply (the emission cap set by the government) and demand (emitters' needs).

The CAT system covers GHG emissions from large industrial businesses[2] and those attributable to fuel consumption.

— Establishments subject to the CAT system must obtain an emission allowance for each tonne of GHG emissions for which they are responsible.

❑ A system that allows for the attainment of the desired reductions at lower cost

From an economic standpoint, the CAT system is the most effective way to reduce GHG emissions.

— Indeed, it reduces emissions in the sectors that the system covers while allowing households and businesses to choose the best means of doing so.

What is more, the CAT system is linked to California's system, which pools the two governments' reduction targets and enables all businesses present on the market to exchange emission units.

— The establishment of a joint market thus promotes the attainment at lower cost of Québec's and California's climate targets.

— Indeed, a common carbon price fosters the initial attainment of the least costly reductions, independently of their place of origin, thereby reducing the economic impact of the fight against climate change.

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1 Québec has set as its target a 37.5% reduction in its GHG emissions in 2030, in relation to 1990. It is also targeting carbon neutrality by the year 2050.

2 The term "large industrial businesses" designates industrial establishments subject to the CAT system, that is, major industrial emitters that emit 25 000 tonnes of CO_2 equivalent or more annually.

❑ Differences around the world in carbon pricing practices

At the international level, noteworthy progress has been achieved in recent years in the realm of carbon pricing.

— More than 60 countries, provinces, states, regions, or cities on five continents have already established a form of carbon pricing or announced their intention to do so.

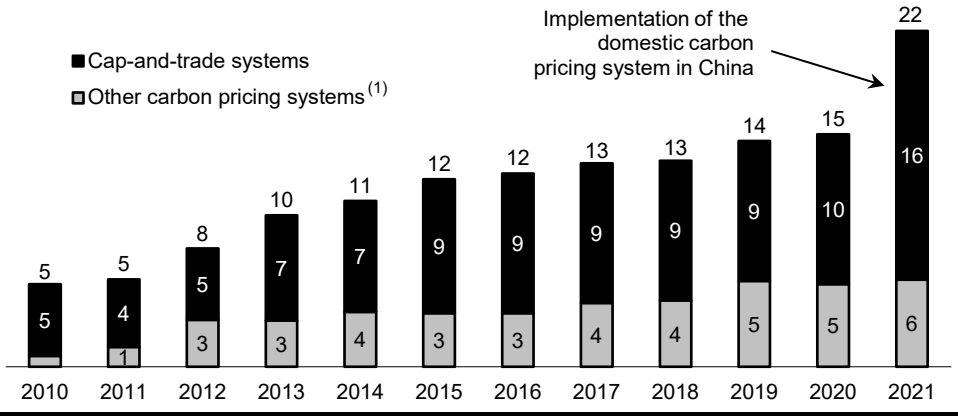
Indeed, between 2010 and 2021, the proportion of global GHG emissions covered by carbon pricing rose considerably, from 5% to 22%, mainly because of the establishment of a domestic carbon market in China.

— It should be noted that in 2021, 16% of global GHG emissions were covered by a GHG emission cap-and-trade system, compared with 6% for the other carbon pricing systems.

Despite this progress, significant differences remain in carbon pricing practices internationally.

CHART 1

Global GHG emissions covered by carbon pricing
(percentage of total emissions)



(1) Carbon tax and output-based pricing systems.
Source: World Bank.

1.2 Why measure differences in carbon pricing?

❑ Instruments to limit carbon leakage

Carbon pricing is essential to accelerate the decarbonization of the economy since it generates a price signal that encourages more carbon-efficient behaviour.

In open economies like Québec's, industrial enterprises sometimes have limited latitude to raise their prices to recover the cost of carbon pricing.

— For example, Québec businesses are competing with establishments that are sometimes situated in administrations where carbon pricing is limited or absent.

— Moreover, the prices of several industrial products are set on international markets.

Substantial carbon pricing thus risks harming the competitiveness of certain industrial enterprises and leading to the relocation of their GHG-emitting operations to administrations with lower or non-existent carbon pricing (carbon leakage).

— This can culminate in plant closings, the partial relocation of operations, or a loss of market share to foreign firms that are not subject to the same constraints.

Carbon leakage can lead to higher global GHG emissions, especially when production is shifted to administrations where less efficient technologies and more emissive energy are used.

For this reason, carbon pricing policies in the world usually includes instruments aimed at mitigating its impact on corporate competitiveness and limiting carbon leakage.

— In Québec, large industrial businesses receive a free allocation of emission units when the risk of carbon leakage warrants doing so, following the example of other cap-and-trade systems.

❑ A policy elaboration tool

The measurement of the carbon-pricing differential between Québec and the rest of the world is a useful tool for elaborating policies such as the free allocation of emission units aimed at large industrial enterprises exposed to international trade.

Indeed, as long as global carbon pricing practices are not more uniform, it will be relevant to adapt policy instruments to this situation as will it be warranted to offer free of charge a portion of the emission units to the Québec industrial sector.

— However, the changing level of free allocation should be planned so as to reflect climate policies outside Québec.

Anticipated free allocation rules for 2024-2030

The *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances* establishes the rules governing the calculation of the free allocation for large industrial businesses until 2023.

Starting in 2024, the Québec government intends to gradually reduce the overall level of the free allocation granted in keeping with its climate targets while considering Québec's current advance in the realm of carbon pricing.

– The carbon pricing ratio has facilitated the measurement of this advance.

Accordingly, the proposed approach respecting the 2024-2030 free allocation rules stipulates that the annual reduction in the free allocation granted to businesses will be less pronounced in the short term to consider Québec's current advance in the realm of carbon pricing.

On the other hand, the reduction will subsequently accelerate gradually until 2030 so that the volume of free allocation granted in 2030 reflects Québec's climate targets.

Note: The anticipated free allocation rules for 2024-2030 are presented in greater detail in the document entitled *Impacts of the 2024-2030 Free Allocation Rules on the Economy and GHG Emissions Reduction* available online: http://www.finances.gouv.qc.ca/documents/Autres/en/AUTEN_ImpactsEconomy_ReductionEmissionGHG.pdf.

2. CALCULATION OF THE CARBON PRICING RATIO

The carbon pricing ratio expresses the average level of carbon pricing in Québec in relation to that in the rest of the world and is obtained by means of the following equation:

$$\text{Ratio} = \frac{\text{Average carbon pricing in Québec}}{\text{Average carbon pricing in the rest of the world}}$$

Average carbon pricing considers both the price of carbon and the proportion of emissions that carbon pricing covers (the coverage rate).

$$\text{Average carbon pricing} = \text{carbon price} \times \text{ coverage rate}$$[3]

Hence, the ratio will decrease when average global carbon pricing increases more rapidly than in Québec.

Conversely, the ratio will increase when average global carbon pricing increases less rapidly than in Québec.

[3] For example, were the carbon price in an administration $10 and the proportion of GHG emissions covered 50%, the average carbon pricing would be $5.

2.1 Components of the ratio

The carbon pricing ratio relies essentially on data pertaining to:

- the price of carbon in Québec and in different carbon pricing systems on international markets;
- the coverage rate of GHG emissions in Québec and in the rest of the world.

2.1.1 Carbon price

The ratio incorporates the full data set accessible focusing on explicit carbon pricing initiatives.

Explicit carbon pricing is a mechanism that calls for a price for each tonne of GHG emitted and covered so as to encourage economic agents to adopt practices to reduce their carbon footprint. The price can be set by the government or determined by a market mechanism.

- The initiatives included in the calculation encompass direct carbon pricing mechanisms such as carbon taxes and fuel taxes.
  - To be considered in the calculation of the ratio, a fuel tax must focus specifically on the carbon content of the fuels.
  - The taxes on gasoline applied to the volume of fuel, even though they indirectly target a source of GHG emissions, do not take into consideration the real carbon content of the fuels consumed. They are, therefore, excluded from the calculation.
- GHG emission cap-and-trade systems such as the CAT system, under which the amount of emissions is set or the price is determined according to supply and demand, are also considered.
- Lastly, hybrid systems such as output-based pricing systems are also considered. Under these systems, businesses pay an amount per tonne of carbon emitted but only on the emissions that exceed a benchmark set by the government.

Other forms of carbon pricing could be included in the future, such as carbon border adjustment mechanisms, some of which could emerge in the coming years.

Carbon adjustment mechanisms at the border

A carbon adjustment mechanism at the border seeks to mitigate carbon-pricing differentials with trading partners so as to maintain domestic corporate competitiveness against external competition and thereby reduce the risks of relocation.

Depending on the situation, this type of mechanism can take the form of:

– import duties applied according to the carbon content of imported goods so that the carbon cost is similar to that assumed by domestic producers;

– a carbon cost offset for exported products so that the goods produced in the country remain competitive on international markets.

The European Union has tabled a draft regulation that seeks to establish such a mechanism by 2026 for the cement, steel and iron, aluminum, fertilizer, and electricity sectors.

In Canada, the federal government is examining the question and has initiated a public consultation process in this respect. The United States has also expressed an interest in this type of mechanism.

2.1.2 **Coverage rate**

The consideration of the coverage rate, that is, the percentage of emissions covered by carbon pricing, is an essential factor to fully reflect the economic impacts of carbon pricing.

— In this way, the ratio measures the presence of carbon pricing in the economy as a whole.

For example, without considering the coverage rate, an administration that prices 100% of its emissions at $10/tonne of carbon and an administration that prices 10% of its emissions at the same price would contribute in the same way to the carbon pricing ratio.

— However, the carbon price signal of carbon pricing is much more present in the first administration.

The consideration of the coverage rate also avoids double counting of priced emissions in administrations where several pricing systems overlap, for example, in certain European countries.

Carbon pricing affects the overall value chain

The carbon pricing ratio does not solely consider the price signal to which industrial enterprises are directly subject.

Since the ratio is established according to the coverage rates of different initiatives, it considers the impact of carbon pricing on the economy as a whole, including the transportation and energy sectors.

The consideration of all sectors enables the ratio to reflect the impact of carbon pricing in the entire value chain of businesses. For example:

– when the transportation sector is targeted by a fuel tax, all the industries that use fuels in their chain of production pay a cost associated with carbon pricing, even if the cost is recorded outside their economic sector;

– in response to carbon pricing applied to fossil fuels, households could demand higher wages to protect their purchasing power, thereby transferring part of the cost of carbon pricing to their employers, including businesses in the industrial sector.

2.2 Ratio calculation method

To calculate the carbon pricing ratio, it is necessary to determine average carbon pricing both in Québec and in the rest of the world.

2.2.1 Calculation of average carbon pricing in Québec

Obtaining the average carbon price requires the measurement of the carbon price for the emissions covered and the measurement of the proportion of the emissions covered by carbon pricing initiatives.

In Québec, the carbon price signal is generated through the CAT system.

— For each year, an emission cap is determined and, according to such a cap, a number of emission units is auctioned. The market determines the price of such units.

However, it is not the economy as a whole that carbon pricing directly targets. Indeed, the CAT system mainly targets large industrial businesses and fuel distributors (transportation and buildings) and excludes, for example, the residual materials sector.

Accordingly, average carbon pricing in Québec is obtained, depending on the definition adopted, by multiplying the price of carbon under Québec's CAT system by the coverage rate of carbon pricing in Québec, that is, by the proportion of GHG emissions subject to the system:

$$\text{Average carbon pricing in Québec} = \text{Carbon price in Québec} \times \text{Coverage rate of carbon pricing in Québec}$$

❑ The price of carbon in Québec

In Québec, the main part of the price signal of the CAT system is generated through sales of emission units during joint Québec-California auctions. Consequently, it is these selling prices that are used to determine the price of carbon.[4]

— The price of the offset credits and the units traded on the secondary market are not considered in the calculation.

Joint auctions are held four times a year. Prices and quantities can vary from one auction to the next.

To obtain a price that is representative of carbon pricing for a given year overall in Québec, an average closing price for each auction weighted by the quantity of units sold is used. Only current vintage units are considered.

— For example, according to this method, the price of carbon in Québec was US$16.78 in 2019.

The information used to perform this calculation is found in the summary auction reports published by the Ministère de l'Environnement et de la Lutte contre the changements climatiques (MELCC)[5] and the California Air Resources Board (CARB).[6]

TABLE 1

Carbon price in Québec – 2019
(in US dollars, unless otherwise indicated)

	February	May	August	November	Total
Current vintage units sold(1)	80 847 404	66 321 122	66 289 515	67 435 661	280 893 702
As a % of the total (A)	*28.8%*	*23.6%*	*23.6%*	*24.0%*	*100.0%*
Final selling price (B)	15.73	17.45	17.16	17.00	—
Weighted price (A x B)	**4.53**	**4.12**	**4.05**	**4.08**	**16.78**

(1) Since Québec and California jointly conduct the auctions, all the current vintage units sold to emitters in both administrations are considered.
Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

4 Selling price of current vintage units.

5 Ministère de l'Environnement et de la Lutte contre les changements climatiques, *The Carbon Market – Cap-and-Trade Auction Notices and Results*, [online] [https://www.environnement.gouv.qc.ca/changements/carbone/ventes-encheres/avis-resultats-en.htm].

6 California Air Resources Board, *Auction Notices and Reports*, [online] [https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/auction-information/auction-notices-and-reports].

Compliance tools for businesses subject to the CAT system

To ensure their compliance with the cap-and-trade system for greenhouse gas emission allowances (CAT system), businesses whose operations are likely to be delocalized because of carbon pricing (carbon leakage) can receive a free allocation of emission units.

The compliance of businesses subject to the CAT system is supplemented especially through the purchase of the emission units auctioned by Québec and California.

– The auctions constitute the primary market and are held four times a year. They are open both to emitters subject to the CAT system and to investors.

– Most of the emission units sold are current vintage.

– The participants also have the possibility of obtaining future vintage units, which can be used to ensure compliance by subject businesses during future compliance periods.

Since the main part of the CAT system price signal is linked to the price at which emission units are sold on the primary market, it is these selling prices that will be used to determine the carbon price in the calculation of the carbon pricing ratio.

However, beyond the primary market and free allocation, other possibilities enable businesses to comply with the obligations under the CAT system, including:

– the purchase of units on the secondary market;

– the acquisition of offset credits.

These compliance tools are also contributing, to a lesser extent, to the CAT system price signal.

The secondary market

The secondary market encompasses transactions that can be conducted using emission units initially sold on the primary market or distributed free of charge to large industrial businesses.

Such transactions can be carried out by mutual agreement or on the derivatives market, comprising futures contracts or options negotiated on transactional platforms.[1]

Offset credits

An offset credit is a compliance unit stemming from an activity not covered by the CAT system that can be sold to subject emitters.

– Projects that lead to the issuance of offset credits must focus on permanent emissions reductions that would not otherwise have occurred.

The purchase of offset credits can reduce the carbon bill of subject emitters if the price of such credits is lower than that of the emission units on the primary and secondary markets.

– However, the regulation stipulates that offset credits can ensure a maximum of 8% of compliance by businesses.

To date, Québec offset credit protocols exist for the destruction of methane in landfill sites, in mines, or from slurry pits, and for the destruction of ozone-depleting substances (ODS).

– Deliberations are under way to determine other activities in respect of which offset credit protocols could be established, for example in the forest sector.

– Subject emitters can also use offset credits from California.

1 The most widely used transactional platforms for this type of trading include the Intercontinental Exchange (ICE) and the Nodal Exchange.

❑ Coverage rate of carbon pricing in Québec

Once the price of carbon in Québec has been determined, it must be multiplied by the proportion of the emissions covered to obtain average carbon pricing in the Québec economy overall according to the definition adopted.

To determine the coverage rate, data from the latest Québec GHG emissions inventory are used, from which the following emissions are excluded from sources not subject to the CAT system:

— all emissions from the agriculture and waste sectors that do not stem from the combustion of fuels;

— emissions from air transport and maritime transport;

— halocarbons leakage from small industrial emitters not subject to the CAT system;

— fugitive emissions[7] from emitters not subject to the CAT system;

— emissions from residential fuelwood.

The coverage rate of the CAT system is then obtained by measuring the ratio between the emissions covered and total emissions in the inventory.

— In 2019, the coverage rate was evaluated at 76.9%.

TABLE 2

GHG emissions and coverage rate by sector – 2019
(thousands of tonnes of CO_2 equivalent, unless otherwise indicated)

	GHG emissions according to the inventory	Emissions covered	Coverage rate (%)
Transportation	36 518	34 525	94.5
Industry	24 799	22 609	91.2
Residential, commercial and institutional sector	8 422	7 502	89.1
Agriculture	7 776	—	—
Waste	6 584	—	—
Electricity	219	219	100.0
TOTAL	**84 318**	**64 855**	**76.9**

Source: Ministère de l'Environnement et de la Lutte contre les changements climatiques.

[7] Fugitive emissions usually stem from leaks that occur during the transportation and distribution of natural gas.

❑ Average carbon pricing in Québec

Average carbon pricing in Québec for a given year is obtained by multiplying the price of carbon under the CAT system by the most recent GHG emission coverage rate available.

It is interpreted as an average price signal measure in all economic sectors.

— In 2019, the price of carbon stood at US$16.78 (CA$22.31) in Québec, while the most recent coverage rate available stood at 76.9%.

— Consequently, the average carbon pricing is estimated at US$12.90.

The time lag between price- and emissions-related data

In Québec as in the other administrations considered for the calculation of the carbon pricing ratio, data on prices and emissions of a given year are not generally available at the same time.

For example, in Québec it takes considerable time to collect and process information on GHG emissions, contrary to the selling price of the emission units.

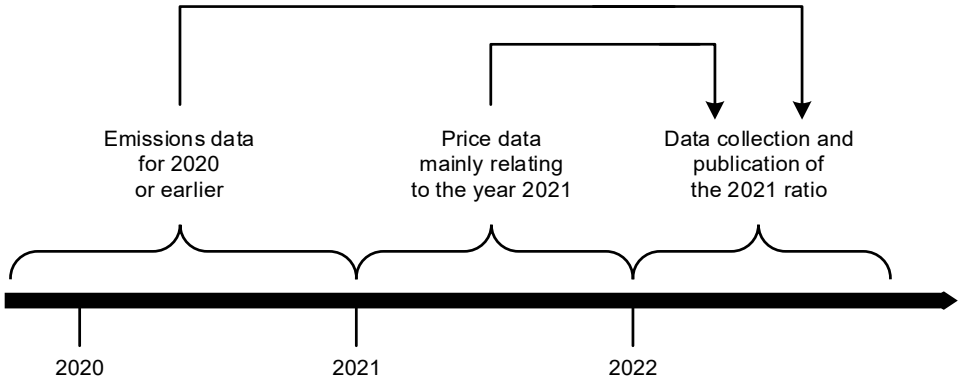
– At the end of a given year, businesses must calculate and report their emissions. The government departments concerned must then process the reports. More than a year can elapse before emission data for a given year are published.

– Data pertaining to the results of an auction are obtained only one week after the auction.

To avoid delaying the publication of the carbon pricing ratio, the coverage rates of the GHG emissions used in the calculation could thus be based on a year previous to that of the carbon prices.

– The coverage rate of emissions in Québec is nevertheless fairly stable from one year to the next. The use of a previous coverage rate does not, therefore, affect the reliability of the average carbon price in Québec estimated for the ratio.

Illustration of the discrepancy between emissions data and price data



❑ Recent changes in average carbon pricing in Québec

According to the information compiled when this document was elaborated, average carbon pricing in Québec rose from US$9.54 (or CA$12.14) to US$12.90 (or CA$17.15) between 2015 and 2019.

— Since 2015, average carbon pricing in Québec has thus risen on average by 8% annually.

Since the coverage rate is fairly stable from year to year, the increase is attributable mainly to the increase in the price of the emission units auctioned jointly by Québec and California in the context of the CAT system.

TABLE 3

Average carbon pricing in Québec
(in US dollars, unless otherwise indicated)

	2015	2016	2017	2018	2019
The price of carbon in Québec	12.44	12.73	14.49	14.88	16.78
Coverage rate (as a percentage)	76.7	76.2	77.2	76.8	76.9
TOTAL	**9.54**	**9.70**	**11.18**	**11.43**	**12.90**

Note: Totals may not add due to rounding.
Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

2.2.2 Calculation of average global carbon pricing

To assess the relative importance of carbon pricing in Québec in relation to the rest of the world, the measurement considers administrations that have established carbon pricing systems but also those that do not have such a system.

— Implicitly, the price of carbon is deemed to be null for the administrations that do not price carbon in their territory.

Consequently, the average carbon price in the rest of the world is calculated as follows:

$$\begin{matrix}\text{Average global carbon}\\ \text{pricing (excl. Québec)}\end{matrix} = \sum \left[\begin{matrix}\text{Carbon price for}\\ \text{each initiative}\end{matrix} \times \begin{matrix}\text{Proportion of emissions covered}\\ \text{in relation to global emissions}\end{matrix} \right]$$

This represents a weighted average of the carbon prices of each explicit carbon pricing initiative, excluding Québec.

The proportion of emissions covered by each initiative is obtained by dividing the GHG emissions covered under the initiative by total global emissions, excluding Québec.

$$\begin{matrix}\text{Proportion of emissions covered}\\ \text{in relation to global emissions}\end{matrix} = \frac{\text{Emissions covered by the initiative}}{\text{Total global emissions (excl. Québec)}}$$

The measurement thus obtained expresses the presence of carbon pricing in all administrations outside Québec also bearing in mind the administrations that do not price carbon.

— Hence, an administration that does not price carbon will lower average global carbon pricing.

❑ Calculation of the price of carbon by initiative in the rest of the world

For most of the carbon pricing initiatives included in the calculation of the ratio for a given year, the price of carbon used will be that observed on July 1 of the year, expressed in US dollars.

However, the method used to determine the price of carbon differs according to the carbon pricing mechanism.

— Certain prices are estimated based on revenue collected through an administration's carbon pricing or are estimated by means of averages, especially in administrations with several levels of carbon prices.

— The calculation methods specific to each initiative will be described in greater detail in the databases that the Ministère des Finances du Québec will publish annually.

The conversion into US dollars of carbon prices will be based on the average annual exchange rate published by the International Monetary Fund (IMF).

— The use of an annual average helps to limit the possible impact of cyclical variations on the ratio, such as a sudden, temporary increase in the exchange rate for a currency.

❑ Emissions covered by carbon pricing initiatives in the rest of the world

Information concerning emissions is usually obtained by means of national GHG emission inventories and other information that the governments in question make available.

As is true of the price of carbon, the method of determining the emissions covered could differ from one pricing mechanism to another, and certain exceptions might be noted.

— For example, in the case of carbon tax initiatives, the emissions covered will usually be obtained by dividing the revenue that governments collect by the explicit price of carbon.

— As for carbon market initiatives, it will usually be possible to obtain the emissions reported by the subject entities, made available by public authorities. However, in the absence of such data, emission caps could be used.

❑ Global greenhouse gas emissions

The calculation of global carbon pricing requires that the price of carbon of each initiative be weighted by the share of the emissions covered over total global emissions, excluding Québec.

The collection of emissions data from all countries, including those that do not price carbon, can be complex and difficult to carry out annually.

In this respect, an annual evaluation of global GHG emissions, based on the latest literature, will be used to calculate the ratio.

❑ Average global carbon pricing

By multiplying, for each initiative, the price of carbon by the proportion of emissions covered over global emissions and by adding the results for all initiatives, a measurement is obtained of average global carbon pricing.

— According to the most up-to-date information available at the time of publication of this document, average global carbon pricing stood at US$2.02/tonne of CO_2 equivalent in 2019.

■ The contribution of different initiatives to global carbon pricing

All told, 65 carbon pricing initiatives were listed for 2019. The initiatives vary considerably from one place to the next as regards the importance of the price of carbon and the proportion of emissions covered.

— For example, average carbon pricing was evaluated at US$16.20/tonne of CO_2 equivalent in 2019 in the countries participating in the Community Emissions Trading Scheme, a carbon market established by the European Union.

— In the United States and China, average carbon pricing is evaluated at US$0.88 and US$0.41/tonne of CO_2 equivalent, respectively.

— In the rest of the world, average carbon pricing stood at US$1.00/tonne of CO_2 equivalent in 2019.

Weighting the average pricing of each country or each block of countries by its relative importance in global GHG emissions produces the latters' contribution to global carbon pricing, which stands at US$2.02/tonne of CO_2 equivalent.

TABLE 4

Contribution of different initiatives to average global carbon pricing – 2019
(in US dollars per tonne of CO_2 equivalent, unless otherwise indicated)

	Europe[1]	United States	China	Rest of the world[2]	Total[2]
Initiatives listed (number)	18	3	8	28	65
Average carbon price[3] (A)	32.32	15.67	3.99	8.87	15.16
Coverage rate[4] (%) (B)	50.1	5.6	10.2	11.3	13.3
Subtotal – Average global carbon pricing (C = A x B)	**16.20**	**0.88**	**0.41**	**1.00**	**2.02**
Proportion of global GHG emissions (%) (D)	7.9	12.6	26.8	52.8	100.0
Total – Contribution to average global carbon pricing (C x D)	**1.27**	**0.11**	**0.11**	**0.53**	**2.02**

Note: The results presented must be interpreted with caution. For certain initiatives, the coverage rate is not available, but carbon pricing revenues are. For such initiatives, the price of carbon is obtained by dividing the revenues collected by the administration's total emissions.
(1) This group includes all the European Union (EU) countries and the countries outside the EU that are participating in the Community Emissions Trading Scheme, the carbon market established by the EU. The non-EU countries included in the calculation are the United Kingdom, Norway, Iceland, and Liechtenstein.
(2) This category excludes Québec.
(3) The average carbon price applied to each tonne of CO_2 equivalent covered by carbon pricing.
(4) The proportion of the emissions covered in the countries where the initiatives were established.
Sources: International Carbon Action Partnership, Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

❑ Current trends in average carbon pricing in the world

Between 2015 and 2019, average global carbon pricing more than doubled, from US$0.96 to US$2.02.

— Average carbon pricing has thus increased by roughly 20% annually in the world since 2015.

The most significant increase in global carbon pricing occurred between 2017 and 2018, when it rose from US$1.16 to US$1.67/ tonne of CO_2 equivalent, up nearly 45%.

— This variation is mainly attributable to the rapidly rising price of emission units on carbon markets in the European Union and in South Korea.

Changes in average global carbon pricing over the past five years stem, by and large, from the higher carbon price in the countries that have already established carbon pricing systems.

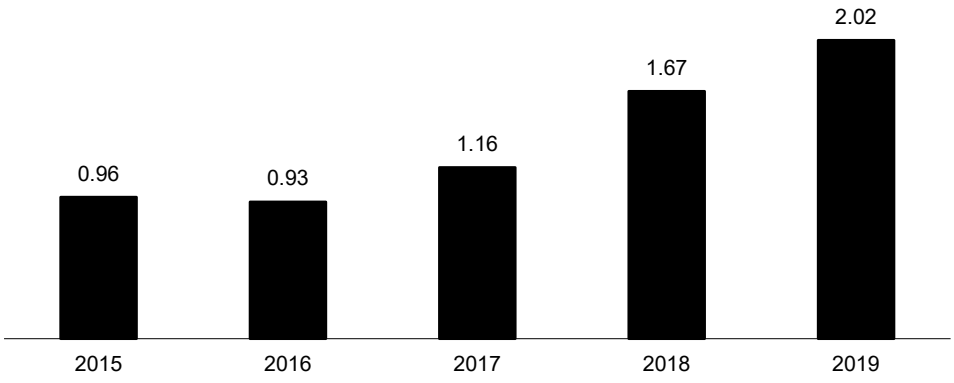
— In particular, average carbon pricing in the European countries that participate in the Community Emissions Trading Scheme increased from US$6.34 to US$16.20 between 2015 and 2019.

The proportion of emissions covered in the world appears to have stalled during the same period, decreasing from 13.4% to 13.3%,[8] mainly because of higher emissions in the countries that do not price carbon.

— Going forward, the inclusion of new carbon pricing systems in the calculation of the ratio, such as the domestic carbon market in China, should increase the global coverage rate.

CHART 2

Evolution of the global average carbon price
(in US dollars)



Sources: International Carbon Action Partnership, Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

[8] The data that underpin the evaluation of the coverage rates for 2018 and 2019 are, however, mainly drawn from previous years.

❑ CALCULATION OF THE CARBON PRICING RATIO

Once average carbon pricing has been calculated for Québec and for the rest of the world, the carbon pricing ratio can be obtained simply by dividing the two levels of average pricing.

— This operation produces a measurement of the relative difference between average pricing in Québec and in the rest of the world.

According to the information presented in this document, the carbon pricing ratio stood at 6.4 in 2019.

— Indeed, average pricing stood at US$12.90 in Québec in 2019, but at US$2.02 in the rest of the world.

In 2019, explicit carbon pricing was thus approximately six times more present in Québec than in all other administrations in the world.

❑ Current trends in the carbon pricing ratio

Over the past five years, the carbon pricing ratio has changed greatly as a result of the combined impact of:

— moderate growth in average carbon pricing in Québec;

— relatively rapid change in average global carbon pricing.

Since annual growth in average global carbon pricing (roughly 20%) exceeded that of Québec (roughly 8%) between 2015 and 2019, the carbon pricing ratio has dwindled.

— During this period, the ratio fell from 9.9 to 6.4.

The most significant reduction in recent years in the ratio occurred from 2017 to 2018, when it fell from 9.6 to 6.8.

— The drop is attributable to a rapid increase in global carbon pricing (44%), combined with a modest rise in the price of the emission units auctioned under the CAT system in Québec (3%).

TABLE 5

Carbon pricing ratio
(relationship between average carbon pricing in Québec and in the rest of the world)

	2015	2016	2017	2018	2019
Average carbon pricing in Québec (in US dollars)	9.54	9.70	11.18	11.43	12.90
Average global carbon pricing (in US dollars)	0.96	0.93	1.16	1.67	2.02
Carbon pricing ratio	**9.9**	**10.5**	**9.6**	**6.8**	**6.4**

Note: Totals may not add due to rounding.
Sources: International Carbon Action Partnership, Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

2.3 Accessibility of the data used to calculate the ratio

❑ Data collection

The full data set used to calculate the carbon pricing ratio will be compiled both by the Québec government and by an independent data supplier.

The Québec government will provide data focusing on prices under the CAT system and emissions in Québec.

Most of the data will, however, be supplied to the Québec government by the data supplier and updated annually. Such data will include, in particular, for each explicit carbon pricing initiative listed:

— the type of pricing, whether a carbon tax, a cap-and-trade system, or an output-based pricing system;

— the price of one tonne of carbon;

— the exchange rates used to convert the carbon prices into US dollars;

— the GHG emissions covered;

— the total GHG emissions of the administration in which the initiative was established.

❑ Data source and annual update

All data used to calculate the ratio will come from official sources:

— the GHG emission inventories of the administrations studied;

— other sources, such as summaries of auctions in the case of carbon markets;

— international organizations such as the IMF.

The ratio will be published annually once the requisite data have been compiled and the full data set used for the calculation will be made public.

— The carbon pricing ratio will be used to sustain reflection on the elaboration of government policies aimed at large industrial businesses.

The International Carbon Action Partnership: Objectively and transparently collected data
Québec is a member of the International Carbon Action Partnership (ICAP), an organization specializing in cap-and-trade systems that serves, in particular, as a knowledge-sharing platform. In collaboration with Québec, the ICAP has created a data bank that lists existing carbon pricing initiatives. The data bank was used to calculate the carbon pricing ratio for 2019. Participation by an independent organization recognized in its field also ensures that the approach leading to the elaboration of the ratio is objective and transparent.

Finances Québec