

Allocating allowances in an ETS

Options, implications and experience

CPA's Carbon Pricing and Article 6 Workshop and REdiCAP

Santiago (Chile)

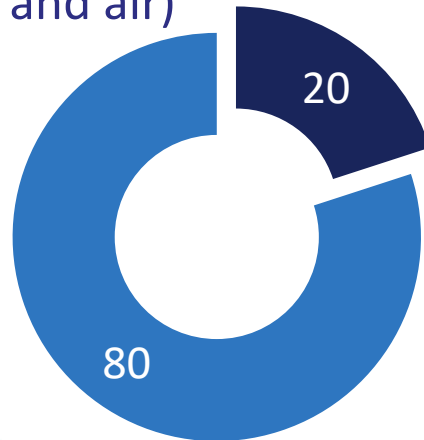
July 23, 2024

Scope of Québec C&T Program

Québec Cap and Trade program

Covered sectors (close to 80% of total emissions) :

- Electricity generation
- Industry
- Fuel distribution
 - Transport (excluding marine and air)
 - Buildings



Low cost mitigation opportunities
in both covered and non covered
sectors

Non covered sectors (18% of emissions) :

- Agriculture
- Déchets
- Transports (aérien et maritime)

Why Free Allocation?

Ideally, there should be no free allocation to anyone

Why?

- Prevent leakage
- Competitiveness considerations
- Reduce burden on low income households and communities
- Avoid the double imposition of carbon cost (ex.: electricity imports from another C&T jurisdiction)
- Other considerations

Who should receive free allocation?

- **Price makers vs. Price takers**
 - Price makers should not receive free allocation
 - Price takers could be allowed to receive free allocation

Free allowances

Who is eligible in Québec

Industrial sector

Eligible to receive free allocation:

- Aluminum
- Lime
- Cement
- Chemistry and petrochemistry
- Metallurgy
- Mines and pelletizing
- Pulp & paper
- Petroleum refining
- Others

Electricity

Generally not eligible) Two exceptions:

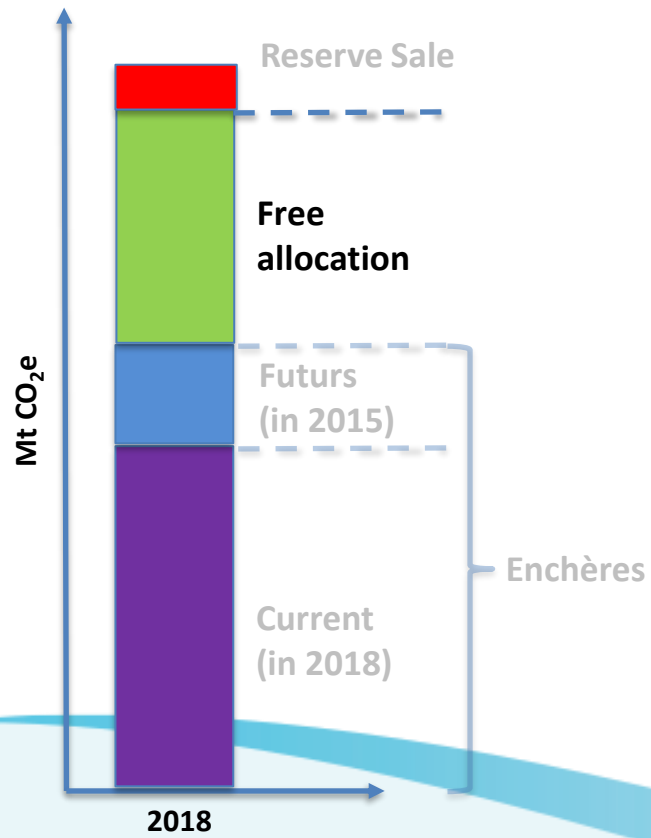
- Electricity producers with long-term contract signed prior to 2008 containing no clause to adjust sale price to take into account a carbon cost
- Electricity imported from other states or countries where a non-WCI C&T system is in place
 - Equivalent to carbon cost assumed in the non-WCI C&T system

Fuel distribution

NOT eligible to receive free allocation

- Transport fuels
- Heating Fuels (Buildings)
- Combustion for small industry, agriculture, waste, etc.

Distribution of allowances



Price Ceiling Mechanism (4%)

Free allocation
(+/- 30%)

Futur Vintages sold at auction (10 %)

Current Vintages sold at auction
(+/- 56%)

Free allowances

General Formula (2013 – 2023 period)

$$A_i = P_{Ri} \times I_i \times FA \times FD_i$$

A_i : Free allowance at year i

P_{Ri} : Reference unit (production level or raw material consumed)

I_i : Target emissions intensity (benchmark)

FA: Assistance factor (implemented as of 2021)

FD_i : Annual decline factor

Free allowances

Reference Unit

- Factors considered
 - Mainly based on the finished goods, but also on intrants (raw materials consumed) when less feasible to consider output
 - More than 1 product per site possible if able to separate GHG emissions by product and GHG emissions intensiy significantly different depending on product
 - Intrants considered if too many different products or unable to separate GHG emissions by product
 - Point of measure must take into account
 - potential recycle loops
 - availability of precise measuring equipment

Free allowances

Intensity target (benchmark)

- Calculated using a representative number of years
 - 2007 to 2010 for emitters covered as of start of C&T system (2013)
 - Minimum 3 years, excluding start-up year, for new emitters
 - No data exclusion (strike, recession etc.)
- Until 2023, separated by emission type (combustion, fixed process and other emissions)
- Based on average GHG emissions per reference unit (output or input)
- Individual basis except for sectors containing at least 3 establishments that produces similar goods (aluminum, cement, lime)
 - Data confidentiality
 - Benchmark representativity

Free allowances

Assistance factor

- Differentiate activities or sectors based on carbon leakage risk
 - Value of 0.9, 0.95 or 1 (90 %, 95 % or 100 %) for industrial sector
 - Value of 0.6 (60 %) for electricity producers eligible to free allowances

- Trade exposure ratio:

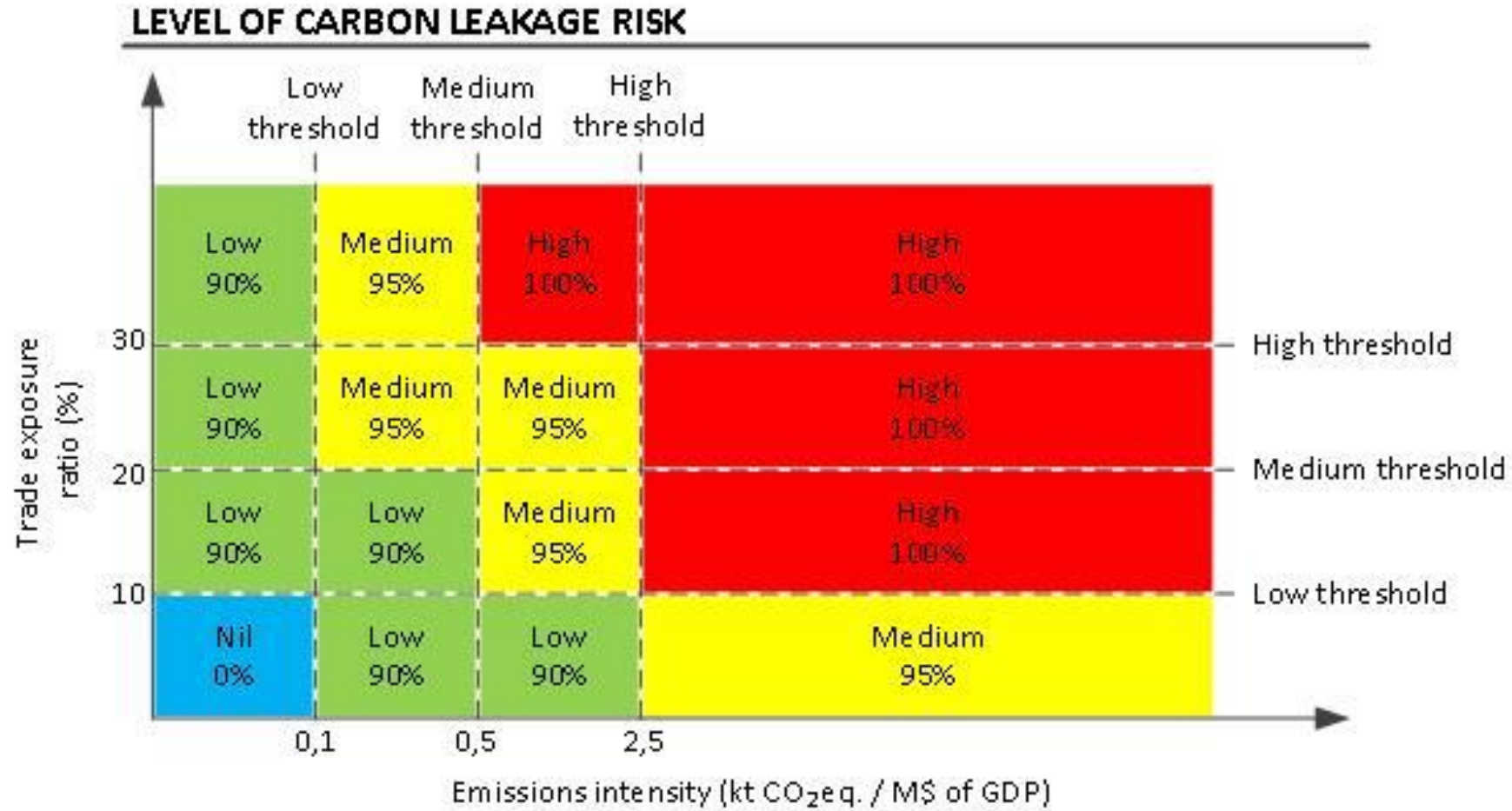
$$\frac{(\text{Exports} + \text{Imports})}{(\text{Domestic production} + \text{Imports})}$$

- Emissions intensity:

$$\frac{\text{GHG emissions}}{\text{Gross domestic product (GDP)}}$$

Free allowances

Assistance factor



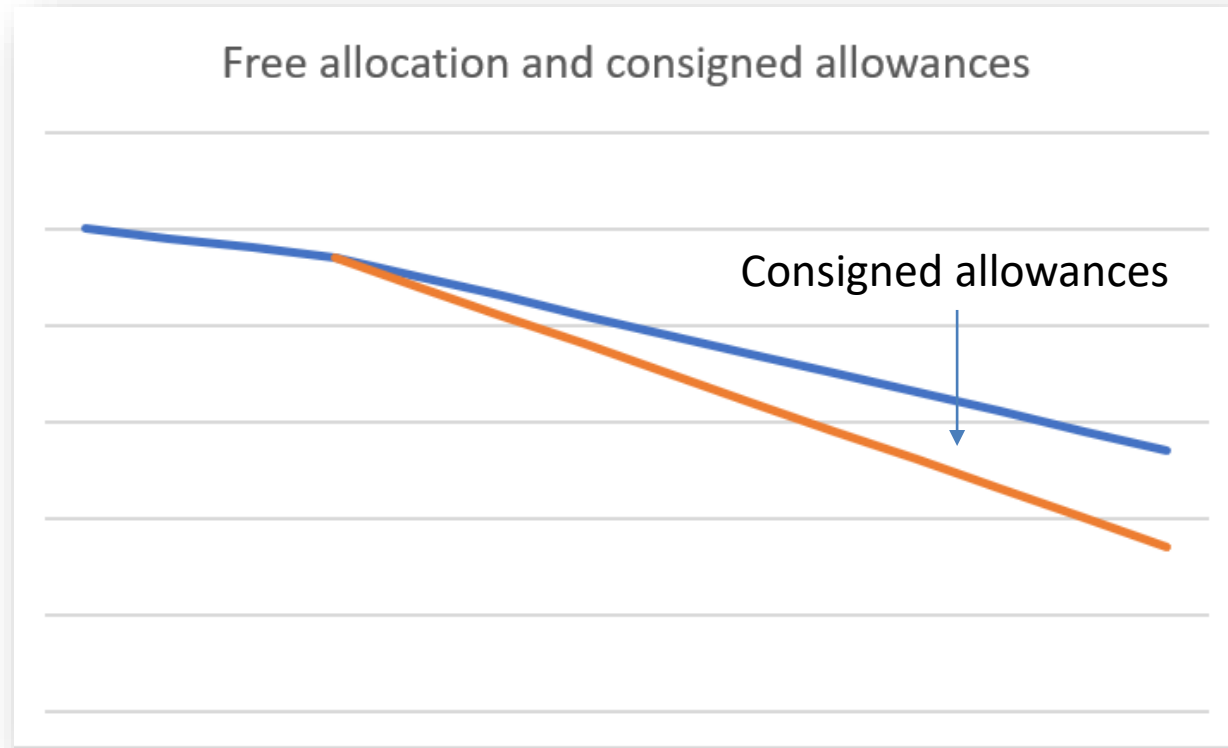
Free allowances

Decline factor (2013 – 2023 period)

- Differentiated by emission type (2013 – 2023 period)
 - Combustion emissions
 - Transition between preexisting Green Fund Levy on fuels C&T system (80 % free allowance in 2013 and 2014 for fossil fuels previously covered by Green Fund levy)
 - 1 – 2 % annual decline during 2015-2020 period
 - 1,5 % annual decline for 2021-2023 period
 - Fixed process emissions
 - 100 % free allowance during the 2013-2020 period (no annual decline)
 - 0,5 % annual decline for 2021-2023 period
 - Other emissions
 - Mainly fugitive emissions
 - 100 % free allowance in 2013 and 2014
 - 1 – 2 % annual decline during 2015-2020 period
 - 3 % annual decline for 2021-2023 period

Free Allocation for Industrial Sector

New concept : consignment approach post-2023



Starting in 2024:

- Only IETE covered facilities are allowed to receive free allocation;
- Free allocation will be reduced faster;
- Part of the allocation will be kept as « consigned allowances » and sold at auctions;
- Revenues kept in the name of covered entities;
- Covered entities will have to provide the government with Complete study of all mitigation opportunities and costs to access the money;
- Covered entities will have 5 years to use the money to invest in mitigation projects

2024-2030 Free allowance rules

Consignment

- Eligible projects
 - GHG reduction projects
 - Research and development (R&D)
- Eligible expenses
 - Capital expenditures (CAPEX)
 - Surplus operating costs (OPEX) for low-GHG energy sources
 - Must have a low GHG footprint throughout its life cycle
 - Examples: renewable electricity (hydroelectricity, wind, solar), residual biomass (forest, agricultural or industrial), pyrolysis oil from residual biomass, green hydrogen
 - Surplus costs related to the electrification of off-road mobile equipments used on-site (mining sector)
 - Can be combined with existing GHG reduction programs

Alternative Approach to Free allowances

Energy-based methodology

$$- A_i = (CE_{Total\ i} \times FE + GES_{PF\ i} + GES_{A\ i}) \times FA \times FD_i$$

Parameter	Description
A_i	Free allowance for year i
$CE_{Total\ i}$	Energy consumption during year i
FE	Natural gas emission factor
$GES_{PF\ i}$	Fixed process emissions during year i
$GES_{A\ i}$	Other emissions during year i
FA	Assistance factor
FD_i	Annual decline factor

MERCI!



My Favorite Street, Santiago de Chile 😊



SUPPLEMENTAL SLIDES

**(MORE DETAILS ON POST-2023 FREE
ALLOCATION APPROACH)**

2024-2030 Free allowance rules

Approach considered

- Gradual update of benchmarks
- Decline factor
- Consignment



2024-2030 Free allowance rules

Gradual update of benchmarks

- Current emission intensity target (benchmark)
 - Based on 2007-2010 period for most industrial activities
 - More recent years for new activities / sites
 - Individual basis except for sectors containing at least 3 sites (aluminum, cement, lime)
 - Data confidentiality
 - Benchmark representativity
 - Average annual decline during 2013 – 2023 period of 1 – 2 % based on emission category
 - combustion, fixed process or other (mainly fugitive) emissions

2024-2030 Free allowance rules

Gradual update of benchmarks

- Starting in 2024, gradual update of benchmarks
 - 90 % of emission intensity target of previous year
 - Based on historical data (2007-2010 period for most emitters)
 - 10 % of actual emissions intensity calculated with 2017-2019 data
 - $I_{target\ 2024} = 0,9 \times I_{target\ 2023} + 0,1 \times I_{actual\ 2017-2019}$
 - $I_{target\ 2025} = 0,9 \times I_{target\ 2024} + 0,1 \times I_{actual\ 2017-2019}$
 - Free allowance level limited to avoid an increase compared to previous year

2024-2030 Free allowance rules

Decline factors

- No distinction by emission category
- Cap decline factor (applicable to all)
 - 2,34 % / year
 - Based on the annual rate of decline of Quebec's emission caps during the 2024-30 period
- Extra expected effort
 - Between -0,27 % / year and 1,36 % / year based on the carbon leakage risk
 - Takes into consideration trade exposure and emissions intensity
 - Reduced decline rate if ≥ 50 % fixed process emissions (-0,27 % / year)

2024-2030 Free allowance rules

Decline factors

- Classification in one of the seven risk levels based on emissions intensity

	Level 1 (low risk)	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7 (high risk)
Emissions intensity (kt éq. CO ₂ / M\$ GDP)	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	≥ 6
Extra expected effort	1,36 pp / yr	1,09 pp / yr	0,82 pp / yr	0,54 pp / yr	0,27 pp / yr	0 pp / yr	-0,27 pp / yr
Cap decline factor	2,34 pp / yr						
Fixed process emission (FPE) proportion factor	- 0,27 pp / yr or 0 pp / yr						
Total decline (< 50 % FPE)	3,70 pp / yr	3,43 pp / yr	3,16 pp / yr	2,88 pp / yr	2,61 pp / yr	2,34 pp / yr	2,07 pp / yr
Total decline (≥ 50 % FPE)	3,43 pp / yr	3,16 pp / yr	2,88 pp / yr	2,61 pp / yr	2,34 pp / yr	2,07 pp / yr	1,80 pp / yr

2024-2030 Free allowance rules

Trajectory modulation factor

- Less important decline of free allowances during first years in order to take into account the current level of carbon pricing in Quebec vs. rest of world and increased decline rate afterwards.
- Example (level 1 (low risk) with < 50 % fixed process emissions)

Year	Decline Factor	Trajectory Modulation	Total Decline
2024	3,70 pp	- 0,5 pp	3,20 pp
2025	3,70 pp	- 0,5 pp	3,20 pp
2026	3,70 pp	-0,25 pp	3,55 pp
2027	3,70 pp	0 pp	3,70 pp
2028	3,70 pp	0,25 pp	3,95 pp
2029	3,70 pp	0,5 pp	4,2 pp
2030	3,70 pp	0,5 pp	4,2 pp

2024-2030 Free allowance rules

Consignment

- Portion of free allowance units not issued to emitter but rather sold at auctions
 - Amounts collected reserved in the name of each eligible entity in order to finance GHG reduction projects or R&D
- Realise a GHG reduction technico-economical potential study
 - Determine possible GHG reduction projects (cost, reduction potential)
 - Third-party verified
- Possibility to anticipate (pre-approved project realised before the consigned funds become available)
- Consigned funds could be shared amongst multiple covered establishments operated by the same emitter or linked entities in a corporate group
- Unused funds expire after 5 years (returned to Electrification and Climate Change Fund)

2024-2030 Free allowance rules

Consignment

- Eligible projects
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 - Can be combined with existing GHG reduction programs

2024-2030 Free allowance rules

Equations

$$A_{\text{establishment}} = A_{\text{v establishment}} + A_{\text{E establishment}}$$

$A_{\text{establishment}}$: Total allowance

$A_{\text{v establishment}}$: Consigned allowances

$A_{\text{E establishment}}$: Issued GHG emission units (units deposited in the emitter's CITSS account)

Total allowance:

$$P_{\text{R}} \times I \times (FA - MEE)$$

P_{R} : Actual production level

I : Target emissions intensity, gradually integrating actual GHG emissions intensity

FA: Assistance factor

MEE : Minimal expected effort (1 % / year)

2024-2030 Free allowance rules

Equations

Issued GHG emission units :

$$P_R \times I \times (FA - FDP - ESA - FMT)$$

P_R : Actual production level

I : Target emissions intensity, gradually integrating more recent GHG emissions intensity

FA: Assistance factor

FDP :Cap decline factor (2,34 % / year)

ESA: Extra expected effort

FMT : Trajectory modulation factor

$$\text{Consigned allowances} = (\text{Total allowance}) - (\text{Issued GHG emission units})$$