

SUMMARY OF THE INVENTORY OF GREENHOUSE GAS AND AIR POLLUTANT EMISSIONS ON PORT TERRITORY IN MONTREAL AND CONTRECOEUR — 2017

In the 2000s, Transport Canada developed a Port Emissions Inventory Tool. This tool, now in its fourth version, is available to members of Green Marine, of which the Montreal Port Authority (MPA) is a founding member.

With the help of this tool, the MPA carried out a detailed inventory of greenhouse gas (GHG) and air pollutant emissions on Port territory in Montreal and Contrecoeur for the year 2017. The results of this inventory are the subject of this summary.

OBJECTIVES

The objectives of the MPA and its partners are:

- Know the carbon footprint of all port activities.
- Establish a baseline of GHG and air pollutant emissions to set reduction targets for the MPA and terminal operators.
- Publicly communicate GHG and air contaminant emissions from all port activities.
- Support the environmental management of port activities and sustain initiatives to reduce GHGs and air pollutants.

ACTIVITIES AND TERRITORIES COVERED

The following activities were covered:

- Administration
- Handling equipment
- Road vehicles
- Rail transport
- Local marine traffic
- Shipping traffic

Emissions from land-based activities were calculated for the road and rail networks on Port territory in Montreal and Contrecoeur. Marine activities were covered for all vessel movements (round trip) calling port facilities in Montreal and Contrecoeur within the territorial limits of the waters under MPA jurisdiction, i.e. between Sorel-Tracy and the Victoria Bridge.

METHODOLOGY

To calculate emissions, priority was given to activities reported with supporting documentation (invoices) such as fuel or electricity consumption, when this information was available. In other

cases, emissions were estimated according to the type of activity. To give an example, for trucking, engine running time and idling time were estimated, and the distance travelled on the network and the total time spent on Port territory were determined using the 27 licence plate readers divided among four separate checkpoints on the territory.

For vessels, the distance covered in MPA territorial waters, the (estimated) speed of navigation, time spent docked and engine power were all taken into account.

For CN and CP rail emissions, train weight and distance travelled on Port territory were estimated.

AIR POLLUTANTS AND GLOBAL WARMING POTENTIAL

The air pollutants examined during the inventory are:

CO: Carbon monoxide

NH₃: Ammoniacal nitrogen

NO_x: Nitrogen oxides

PM₁₀: Particulate matter < 10 microns

PM_{2.5}: Particulate matter < 2.5 microns

SO_x: Sulphur oxides

VOC: Volatile organic compounds

DPM: Diesel particulate matter

Black carbon

Global warming potential (GWP) values used for comparison over a 100-year time horizon are: CO₂ = 1; CH₄ = 28; and N₂O = 265 (Intergovernmental Panel on Climate Change Fifth Assessment Report)

2017 HIGHLIGHTS

Table 1 below shows GHG and air pollutant emissions from activities specific to the MPA.

Table 1

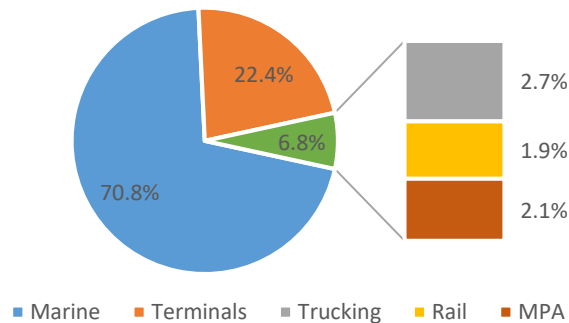
Contaminant	CO	NH ₃	NO _x	PM ₁₀	PM _{2.5}	SO _x	COV	MPD*	Black carbon	CH ₄	CO ₂	N ₂ O	CO ₂ eq**	Contribution (%)
Source	TONNE													
MPA including tenants	0.56	0.04	0.33	0.05	0.05	0	0.01	0	0.01	0	774	0.02	778	21.55%
Handling equipment	0.02	0	0	0	0	0	0	0	0	0	1	0	1	0.03%
MPA vehicle fleet	3.29	0.02	0.45	0.09	0.03	0.01	0.1	0.02	0.01	0	432	0.02	438	12.13%
Marine transportation	0.04	0	0.31	0.01	0.01	0.01	0	0.01	0.01	0	20	0	21	0.58%
MPA locomotives	6.09	0.25	13.71	0.4	0.39	0.02	0.5	0.39	0.31	0.1	2156	0.81	2,373	65.72%
Total MPA emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	3,383	0,00	3,611	

Table 2 below shows the GHG and air pollutant emissions for the entire Port territory in Montreal and Contrecoeur per type of activity. Figure 1 illustrates the distribution of GHG emissions on Port territory.

Table 2

	TONNE												
	CO	NH ₃	NO _x	PM ₁₀	PM _{2.5}	SO _x	COV	MPD*	Black carbon	CH ₄	CO ₂	N ₂ O	CO _{2 eq} **
Vessels	150	1	1,580	32	29	71	60	29	23	11	120,454	3	121,576
Terminals	91.98	1.15	180	12.64	11.67	1.90	14.84	10.89	9.37	1.34	37,893	1.74	38,383
Trucking	8.87	0.08	28	2.82	1.82	0.04	2.26	1.69	1.09	0.25	4,678	0.14	4,685
MPA	10	0.31	15	0.55	0.48	0.04	0.73	0.42	0.34	0.17	3,383	0.85	3,611
Rail (CN-CP)	7.99	0.09	45	1.36	1.32	0.03	2.01	1.32	1.04	0.17	3,039	1.14	3,344
TOTAL	268.84	2.63	1,848	49.37	44.29	73.01	79.84	43.32	34.84	12.93	169,447	6.87	171,599

FIGURE 1 - DISTRIBUTION OF GHG EMISSIONS ON PORT TERRITORY IN MONTREAL AND CONTRECOEUR



- Total GHG emissions on Port territory in Montreal and Contrecoeur amount to 171,599 tonnes for a total of 38,041,530 tonnes of cargo handled, i.e. an intensity of 4.5 kg of CO_{2 eq}/tonne handled.
- The MPA is currently revising Transport Canada’s 2010 emissions inventory using the latest version of the inventory tool and the same assumptions used in 2017 to obtain an equivalent basis for comparison. The findings of the review and the change in emissions over time will be posted on the MPA website.
- Shore power for wintering vessels and cruise ships made it possible to reduce GHG emissions by 1,016 tonnes in 2017.

Table 3 below shows the GHG emissions on Port territory, in Quebec, in Canada and worldwide.

Table 3

	World (2012)* Tonne CO ₂ (eq)	%	Canada (2016) Tonne CO ₂ (eq)**	%	Quebec (2016) Tonne CO ₂ (eq)***	%	MPA's GHG emissions — 2017 Tonne CO ₂ (eq)	%
Total emissions	36,745,000,000	0.0005%	704,200,000	0.02%	78,600,000	0.2%	171,599	
Marine transport	961,000,000	2.6%	4,000,000	0.6%	740,000	0.9%	121,576	70.8%
Road transport			143,000,000	20.3%	27,040,000	34.4%	4,685	2.7%
Rail transport			7,000,000	1%	670,000	0.9%	3,344	1.9%
Air transport			7,000,000	1%	700,000	0.9%		
Autres	35,784,000,000	97.4%	543,200,000	77.1%	49,450,000	62.9%	41,994	24.5%

*Third IMO Greenhouse Gas Study, 2014, 327 p.

**http://publications.gc.ca/collections/collection_2018/eccc/En81-4-2016-1-fra.pdf

***Inventaire québécois des émissions de gaz à effet de serre en 2016 et leur évolution depuis 1990, Gov. du Québec, 40 p.

Table 4 below shows the contribution of air pollutant emissions on Port territory compared to inventoried Canadian emissions.

Table 4

Air pollutant	Emissions (tonne)		Contribution %
	Montreal-Contrecoeur Port territory 2017	Canada 2016*	
PM ₁₀	49	7,200,000	0.0007
PM _{2.5}	44	1,600,000	0.0028
So _x	73	1,100,000	0.0066
No _x	1.8	1,800,000	0.1027
COV	80	1,800,000	0.0044
CO	269	5,800,000	0.0046
NH ₃	3	490,000	0.0005

*Source: Inventory of air pollutant emissions 1990-2016, Environment and Climate Change Canada, p. 100

TARGETS AND OPPORTUNITIES

In 2019, the MPA is developing an energy efficiency and greenhouse gas and air pollutant reduction plan. This plan will be used to set performance indicators, which will be integrated into the 2020-2022 three-year sustainable development plan.

During the 2018-2019 transitional period, the MPA aims to:

- Reduce its activity-specific emissions intensity by 1% per year. The same target is set for emissions intensity on Port territory in Montreal and Contrecoeur.
- Show terminal operators the added value of their participation in inventories and initiatives to reduce GHGs and air pollutants. The next detailed inventory for Port territory as a whole is planned for 2020.
- Reduce vessel dwell time in conjunction with terminal operators.
- Encourage shipping lines to electrify their future vessels, particularly container ships and tankers that regularly call the Port of Montreal.
- Improve the fluidity of road transport.