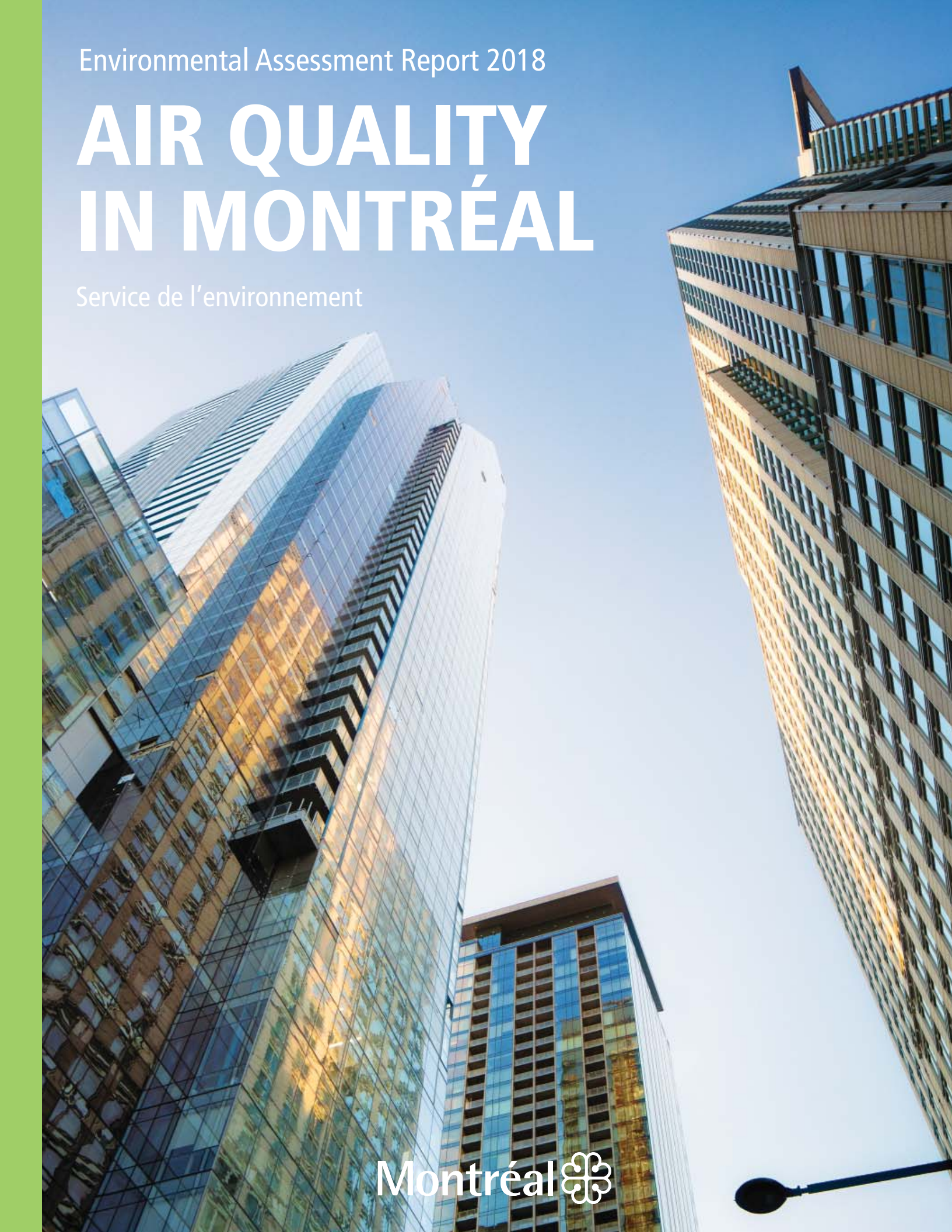


Environmental Assessment Report 2018

AIR QUALITY IN MONTRÉAL

Service de l'environnement

Montréal 





Air Quality Monitoring



The Network in Short

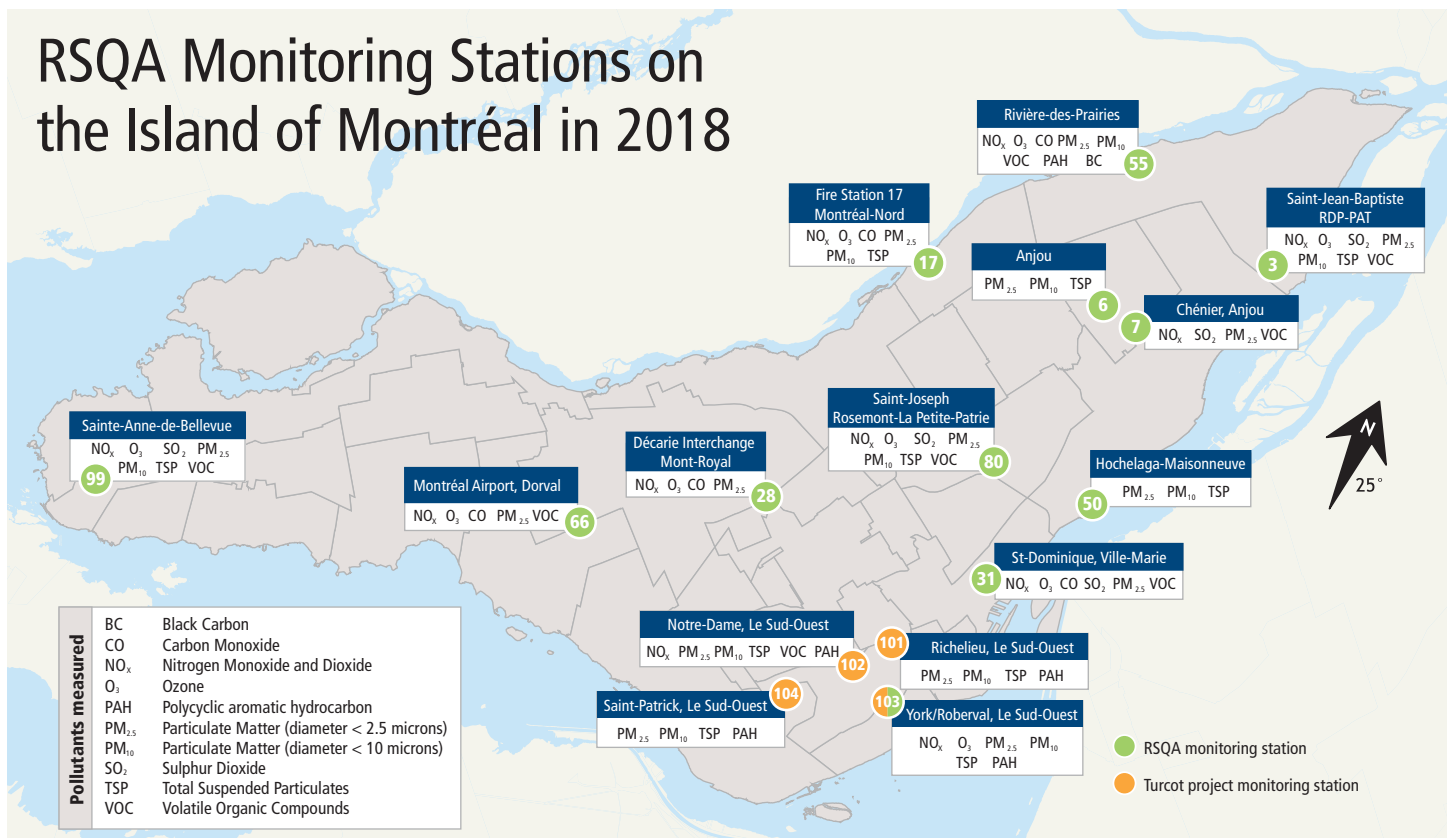
The *Réseau de surveillance de la qualité de l'air* (RSQA) (the Network) consists of 15 monitoring stations equipped with analyzers for the continuous monitoring of pollutant concentrations such as fine particulate matter, ozone, sulphur dioxide, nitrogen oxides and carbon monoxide. The results obtained allow us to draw an annual portrait and follow the evolution of the situation of these pollutants over the years in Montréal. Moreover, real-time information on air quality in Montréal is available on the Network's Web site at rsqa.qc.ca.



QA/QC Program

The Service de l'environnement continues its long-term work to renovate its monitoring stations and enhance their functionalities and aesthetics, while conforming to applicable construction and safety codes. The Network is involved in an ongoing quality assurance and quality control (QA/QC) improvement process to comply with the guidelines of Environment and Climate Change Canada's National Air Pollution Surveillance (NAPS) program, of which it belongs. The NAPS relies on some 300 stations throughout Canada.

RSQA Monitoring Stations on the Island of Montréal in 2018





Facility Upgrading

Station 55, located in Rivière-des-Prairies since 1998, has undergone a major rejuvenation at the end of 2018. The transition between the two buildings was completed in less than two weeks, which resulted in a minimum loss of data and fewer days of downtime during which the station was unfit for service. This station is the Network's most complete in terms of equipment. Indeed, it is categorized as being Tier 1 according to the NAPS program criteria, meaning that all of the parameters recommended by the program are monitored (reference method, characterization and continuous monitoring for PM_{2.5}, O₃, NO_x, CO, COV [polar and non-polar], PAH and PM₁₀).



Station 55
Rivière-des-Prairies



Continuing Education

In June 2018, the Network's team attended the 111th Annual Conference of the Air & Waste Management Association (AWMA) in Hartford, Connecticut. The event brought together the majority of global actors in the field of air quality. The conference, among other benefits, allowed us to learn more about new analysis techniques, emerging pollutants such as nanoparticles, the impact of atmospheric chemistry on air quality as well as the use of satellite measures to obtain air quality forecasts and an overview of their health effects. Team members are also involved in the organization of the AWMA's 112th Annual Conference to be held in Quebec City from June 25 to 28, 2019.



Turcot Project

Work on the rebuilding of the Turcot Interchange continued throughout 2018. Station 102 was yet again the one that recorded the most exceedances of the 30 µg/m³ standard set by the *Ministère de l'Environnement et de la Lutte contre les changements climatiques* (MELCC) for average daily concentrations of fine particulate matter (PM_{2.5}). These exceedances of the standard are due to the traffic, the various road works carried out and the truck traffic nearby.

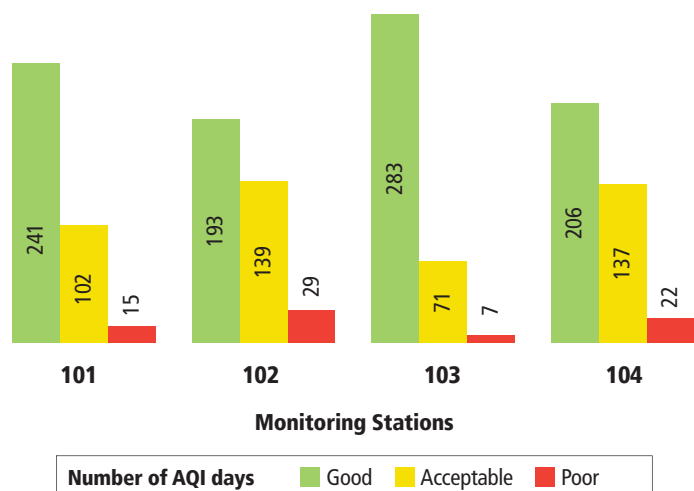
Exceedances of the Standard for Fine Particulate Matter (PM_{2.5})

Stations	101	102	103	104
Total 2016	1	13	1	3
Total 2017	0	4	0	1
Total 2018	2	7	2	3

Highlights

- Station 101: Near the new storage site for excavation and backfilling materials
- Station 102: Continuation of the demolition and construction work at the heart of the new Interchange
- Station 103: Dismantling of the exit ramp near the station
- Station 104: Presence of work upstream of the Lachine Canal

Air Quality Index (AQI) by Turcot Project Monitoring Station in 2018



The data are available online at the Web site of the Ministère des Transports, formerly known as the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports (MTMDET), at seti-media.com/infopopulation/rsqa_turcot.



Canadian Ambient Air Quality Standards (CAAQS)

The Canadian ambient air quality standards (CAAQS) deal with fine particulate matter (PM_{2.5}), ozone (O₃), sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) since 2017. These standards are the core of the Air Quality Management System (AQMS) promoted by the Canadian Council of Ministers of the Environment. These data are presented in micrograms per cubic metre (µg/m³) or parts per billion (ppb).

Since 2012, an improvement in PM_{2.5} concentrations has been observed in Montréal's ambient air. The situation is similar to last year and the results are below the standards to be attained by 2020.

Fine Particulate Matter (PM_{2.5}) Concentrations Expressed in µg/m³

3-year average of the annual 98 th percentile of the daily 24-hour average concentrations Standard = 28 in 2015 Standard = 27 in 2020				
2012–2014	2013–2015	2014–2016	2015–2017	2016–2018
25	24	21	20	20

3-year average of the annual average concentrations Standard = 10 in 2015 Standard = 8.8 in 2020				
2012–2014	2013–2015	2014–2016	2015–2017	2016–2018
9.6	9.4	8.6	7.5*	7.4

* 2015–2017, corrected value

The trend for O₃ is rather stable with 3-year averages varying between 55 and 58 ppb from 2012 to 2018. The concentrations recorded are always below the 2020 standard.

Ozone (O₃) Concentrations Expressed in ppb

3-year average of the annual 4 th highest daily maximum 8-hour average concentrations Standard = 63 in 2015 Standard = 62 in 2020				
2012–2014	2013–2015	2014–2016	2015–2017	2016–2018
55	55	56	58	57

The results of the past 5 years for SO₂ show a constant improvement and are compliant with the 2020 standard. The variation is very slight since last year.

Sulphur Dioxide (SO₂) Concentrations Expressed in ppb

3-year average of the annual 99 th percentile of the daily maximum 1-hour average concentrations Standard = 70 in 2020 Standard = 65 in 2025				
2012–2014	2013–2015	2014–2016	2015–2017	2016–2018
23	23	21	18	17

Arithmetic average over a single calendar year of all 1-hour average concentrations Standard = 5.0 in 2020 Standard = 4.0 in 2025				
2014	2015	2016	2017	2018
1.1	0.9	0.7	0.8	0.6

The 3-year averages for NO₂ show little variation between 2012 and 2018. The concentrations recorded in 2016–2018, i.e. 45 ppb, are far below the 2020 standard, but just above the standard for 2025 (42 ppb). The use of fossil fuels in motor vehicles and home heating systems is the main source of NO₂ emissions. As regards the yearly average, it lies below the 2020 and 2025 standards despite a slight increase in 2018.

Nitrogen Dioxide (NO₂) Concentrations Expressed in ppb

3-year average of the annual 98 th percentile of the daily maximum 1-hour average concentrations Standard = 60 in 2020 Standard = 42 in 2025				
2012–2014	2013–2015	2014–2016	2015–2017	2016–2018
44	46	45	45	45

Arithmetic average over a single calendar year of all 1-hour average concentrations Standard = 17 in 2020 Standard = 12 in 2025				
2014	2015	2016	2017	2018
9.5	8.4	10.0	10.3	10.4

Portrait of Air Quality



Air Quality Index (AQI) by Station

Did you know that human activities were responsible for poor air quality days in Montréal? For instance, fireworks were responsible for the poor air quality recorded during the evenings of July 11–12, 14–15 and 21, 2018. The concentrations of fine particles increased during the fireworks and then only decreased after midnight, which explains the 2-day count. All of these occurrences have in common the stagnation of pollutants due to low or no circulation of air masses.

Other than for smog days, the events responsible for poor air quality days in Montréal in 2018 are:

- industries in the east end of Montréal (station 3);
- the fleet work yards of Montréal-Nord (station 17);
- highway traffic (stations 28 and 103);
- the activities of the Port de Montréal and traffic on Notre-Dame Est Blvd. (station 50);
- wood burning in the winter (station 55);
- the Loto-Québec fireworks (stations 7, 50 and 80);
- other human activities with a local scope (all stations).



Wood Burning By-law

The By-law concerning solid fuel-burning devices and fireplaces (15–069), adopted August 24, 2015, is two-pronged.

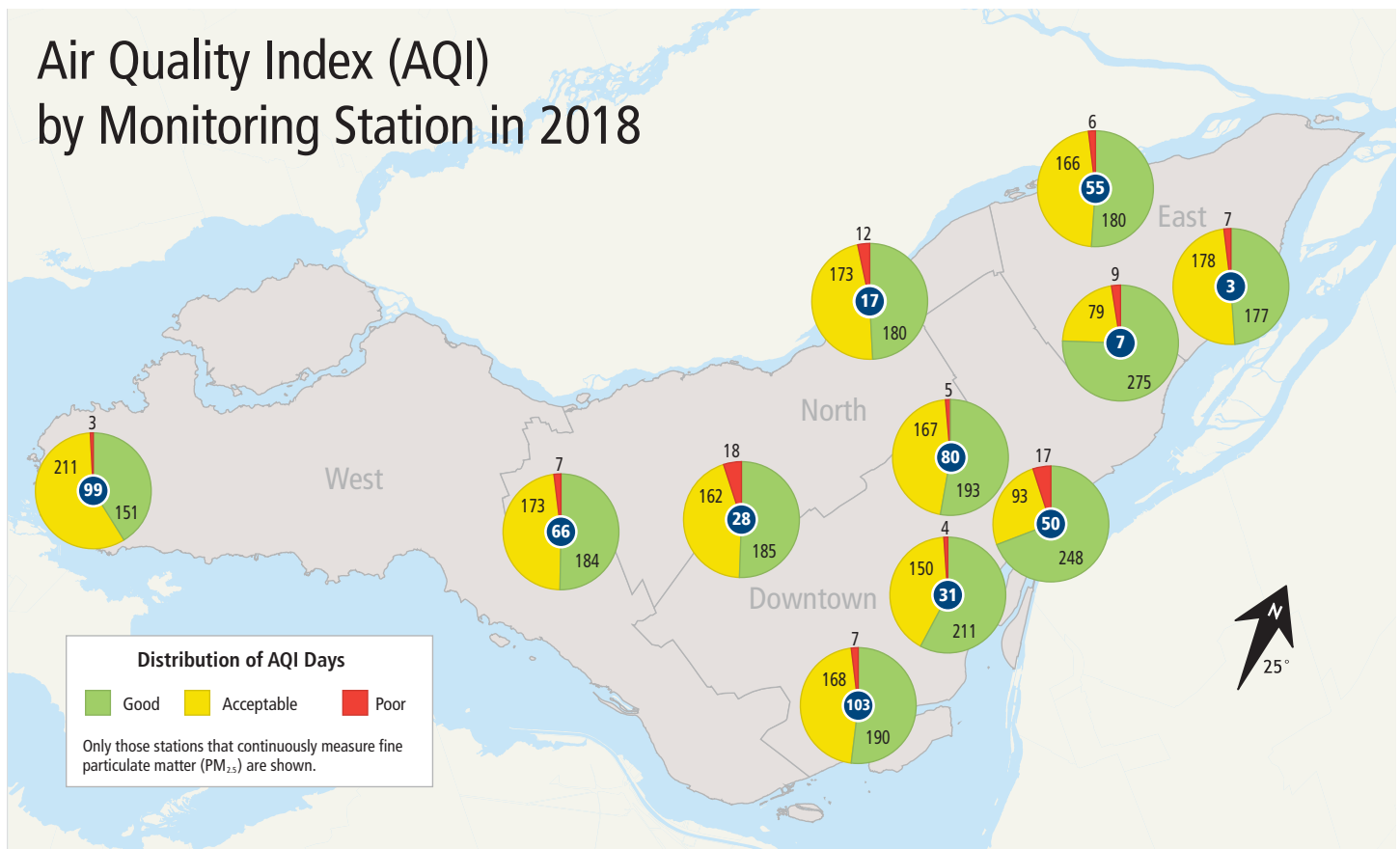
The first prohibits the use of any solid fuel-burning appliance on the territory of Montréal during a smog warning, and this, since the adoption of the By-law in 2015.

The second, effective since October 1, 2018, prohibits the use of any solid fuel-burning device or fireplace, unless it is recognized by an organization identified in schedule B of the By-law, as part of a certification process (CSA/B415.1-10 or EPA), establishing that it has an emission rate no greater than 2.5 g/h of particles into the atmosphere.

Nevertheless, the By-law authorizes the exceptional use of any solid fuel-burning device (compliant or not) during electricity outages of more than three hours.

For more information on By-law 15–069, please consult the Web site at www.ville.montreal.qc.ca/woodburning.

Air Quality Index (AQI) by Monitoring Station in 2018





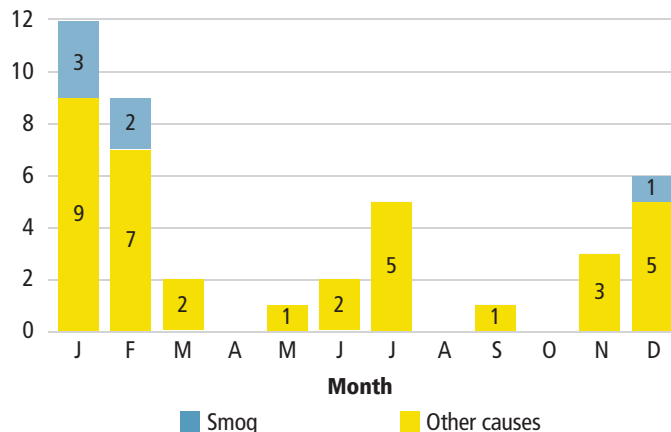
Poor Air Quality Days

In 2018, 41 poor air quality days were recorded, of which 6 smog days, on the territory of Montréal. Fine particulate matter is responsible for all poor air quality days distributed over 9 months during the year. April, August and October were exempt from any poor air quality days. As far as smog days are concerned, they occurred in January, February and December. Despite a slight increase in the number of poor air quality days compared to 2017 (34), it's important to understand that their number fluctuates from one year to another depending on weather conditions (wind speed and direction, length of winter with its varying temperatures).

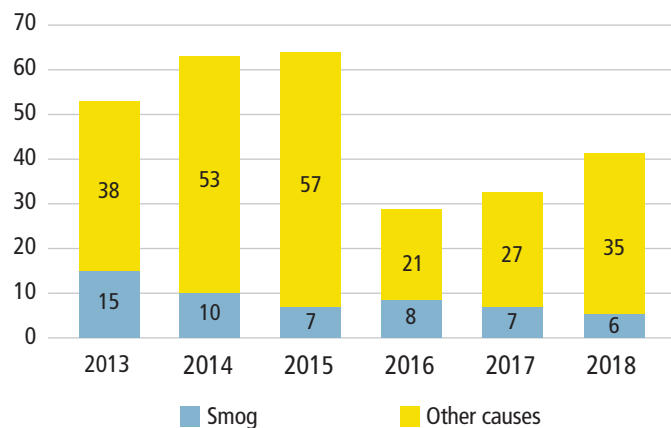
An analysis of the results obtained since 2013 shows that the number of smog days is decreasing. Over the past few years, the majority of smog occurrences observed in Montréal were recorded in the wintertime and were caused by a heavy concentration of fine particulate matter. In Québec, the key drivers for smog days are residential wood burning, industrial activities and transportation. During a smog occurrence, the fine particulate matter remains at ground level when there is no wind and when there is a change in temperatures. A mild spell may result in some smog, which was the case for some of the episodes observed in 2018, when temperatures exceeded the freezing point during a few hours.



Poor Air Quality Days in Montréal in 2018



Poor Air Quality Days in Montréal Since 2013



Poor air quality or smog?

A day is deemed poor in terms of air quality as soon as fine particulate matter concentrations ($PM_{2.5}$) exceed $35 \mu\text{g}/\text{m}^3$ for at least 3 hours in a given station. A day is characterized as a smog day when concentrations of $PM_{2.5}$ exceed $35 \mu\text{g}/\text{m}^3$ during at least 3 hours over more than 75% of the agglomeration's territory. During a smog day, concentrations of $PM_{2.5}$ generally remain high for 24 hours and sometimes longer.

PRODUCTION

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Réseau de surveillance de la qualité de l'air (RSQA)

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