

## Impact on air quality of the first days of the second lockdown: focus on road traffic

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### Assessment on November, 9th 2020

In the Île-de-France region, the first days of the second containment were marked by a 20% drop in road traffic-related emissions of nitrogen oxides (NO<sub>x</sub>) and fine PM<sub>10</sub> particles. Given this limited decrease in emissions, concentrations measured near roads have only slightly decreased since the entry into force of the second lockdown.

As a reminder, in the first week after the first lockdown came into force, road traffic-related emissions of nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM<sub>10</sub>) had fallen by 70%. Still during the first week, nitrogen dioxide (NO<sub>2</sub>) concentrations were -20 to -30% lower than normal in the Paris area, with a drop of up to -50% near main roads.

Over the first few days, the impact of the second lockdown is also much less significant on road traffic-related emissions of carbon dioxide (CO<sub>2</sub>, a greenhouse gas): a -20% reduction was observed during the first few days of the second lockdown, while CO<sub>2</sub> emissions dropped by -70% during the first lockdown.

In order to fight against the renewed spread of COVID-19, French authorities once again implemented lockdown measures starting on Friday, October 30, 2020, with a tolerance until Sunday, November 1<sup>st</sup> to allow for the return from autumn vacations. This second lockdown is less strict than the first lockdown that took place in spring, with schools remaining open and some work-related trips being authorized.

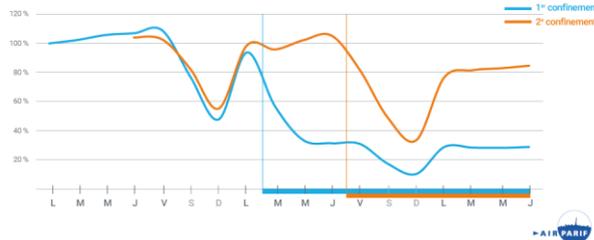
As recalled in the review of scientific literature conducted by the Île-de-France Regional Health Observatory, air pollution is an aggravating factor in the COVID-19 pandemic. A recent study, published in *Cardiovascular Research*, estimated that up to 19% of COVID-19 deaths in France are linked to long-term exposure to air pollution.

#### The impact on road traffic-related emissions is much less significant during the second lockdown

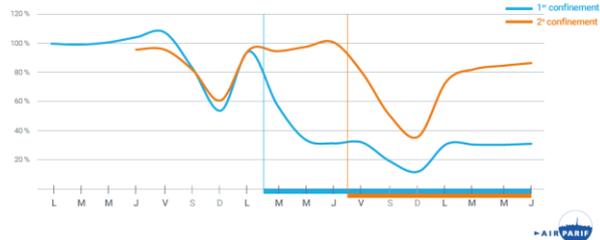
Following the entry into force of the first lockdown, road traffic-related emissions of nitrogen oxides (NO<sub>x</sub>) and PM<sub>10</sub> particles had fallen sharply, reaching a plateau at 30% of their reference levels, i.e. a drop of -70%.

During the second lockdown, emissions also fell following the authorities' declarations, but to a lesser extent - with a characteristic dip on weekend days. NO<sub>x</sub> and PM<sub>10</sub> emissions from road traffic then reached a plateau at about 80% of their usual levels, i.e. a decrease of -20% in emissions during the second lockdown.

**Évolution des émissions d'oxydes d'azote (NO<sub>x</sub>) liées au trafic routier en Île-de-France comparé à un lundi moyen de référence avant le 1<sup>er</sup> confinement**



**Évolution des émissions de particules (PM<sub>10</sub>) liées au trafic routier en Île-de-France comparé à un lundi moyen de référence avant le 1<sup>er</sup> confinement**

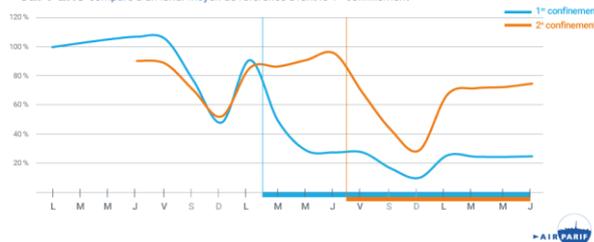


### Evolution of road traffic-related emissions in Île-de-France during the first days of lockdown.

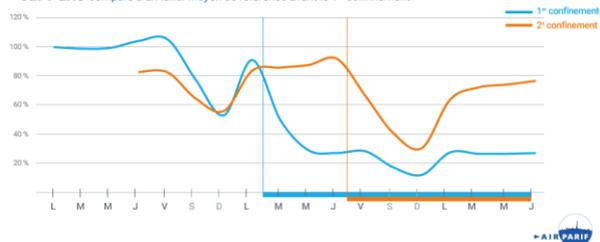
The indication of the days of the week allows to illustrate the usual daily variations observed with lower emissions on Saturdays and Sundays (excluding departure or return from holidays).

The decline in road traffic-related emissions for NO<sub>x</sub> and PM<sub>10</sub> was slightly more marked in Paris, with a -30% decrease, excluding on the Boulevard Périphérique (ring road). This decrease was -75% during the first days of the first lockdown. Regarding the Boulevard Périphérique, NO<sub>x</sub> and PM<sub>10</sub> emissions are at 85% of their usual level during the first days of this second lockdown.

**Évolution des émissions d'oxydes d'azote (NO<sub>x</sub>) liées au trafic routier sur Paris comparé à un lundi moyen de référence avant le 1<sup>er</sup> confinement**



**Évolution des émissions de particules (PM<sub>10</sub>) liées au trafic routier sur Paris comparé à un lundi moyen de référence avant le 1<sup>er</sup> confinement**



### Evolution of road traffic-related emissions in Paris (ring road excluded) after the entry into force of lockdown 1 and 2

The indication of the days of the week allows to illustrate the usual daily variations observed with lower emissions on Saturdays and Sundays (excluding departure or return from holidays).

One week after the second lockdown came into force, road traffic-related carbon dioxide (CO<sub>2</sub>) emissions fell by around -20%. As a reminder, during the first lockdown, the decrease in road traffic-related CO<sub>2</sub> emissions was about -70%.

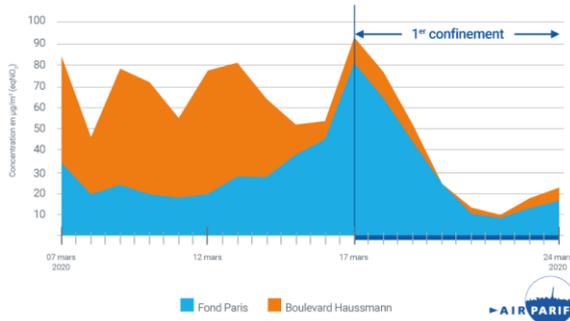
For CO<sub>2</sub> too, the impact of the second lockdown on road traffic-related emissions is therefore much less significant than for the first lockdown.

### Concentrations of nitrogen oxides (NO<sub>x</sub>), a marker for road traffic, are only slightly decreasing, in contrast to the first lockdown

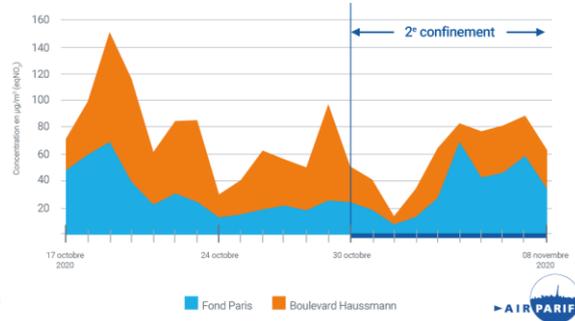
Along traffic routes, measurements show a very different impact between the first and second lockdown. For example, at the Boulevard Haussmann station, the impact of the second lockdown is much less visible than the impact of the first. Indeed, the contribution of road traffic (orange line) on concentration levels is only slightly decreasing since the second lockdown came into force, but much less significantly than during the first one.

As soon as the first lockdown came into force, a rapid decline in background concentrations was observed, along with a very significant decrease in the direct contribution of traffic to pollution levels. Concentrations in the vicinity of roadways were then back to the levels usually observed in parks and gardens. This was not true for the first days of the second lockdown: there was a clear difference between levels along the roads and levels in parks and gardens, i.e. in background conditions (blue curve).

## Évolution des concentrations journalières d'oxydes d'azote (NO<sub>x</sub>) Boulevard Haussmann



## Évolution des concentrations journalières d'oxydes d'azote (NO<sub>x</sub>) Boulevard Haussmann



### Evolution of daily NO<sub>x</sub> concentrations at the Boulevard Haussmann monitoring station, after the entry into force of lockdown 1 and 2.

The blue curve represents the background pollution, i.e. the average concentration levels recorded at the Airparif stations that are not subject to the direct influence of roads. The orange curve represents pollution in the vicinity of road traffic. The difference between the two makes it possible to assess the impact strictly related to road traffic on this axis.

The Boulevard Périphérique was already a distinctive case at the time of the first lockdown, with a less significant reduction in pollution levels compared to the other main roads. This is still true for the second lockdown: concentrations on this highway, the most important in Europe, are barely impacted during the first days of the second lockdown.

In the coming weeks, Airparif will continue to monitor the impact of the second lockdown on air quality and to extend this initial assessment. This first press release focuses on emissions from road traffic, the sector most impacted by the lockdown given the pattern of air pollutant emissions in Île-de-France. Other local sources (heating, industry, agriculture...) are therefore not mentioned.