

## How economic instruments can help fight air pollution

- Despite a sharp fall in emissions during the last two decades, the concentration of certain local atmospheric pollutants (which are different from greenhouse gases) in the air is still above recommended or regulated thresholds and there are recurrent pollution spikes in major agglomerations. Existing studies estimate the health costs of air pollution to be at least €20 to €30 billion per year, which represent at least 1% of gross domestic product.
- Heating and transportation are major sources of pollution (in particular fine particulate matter and nitrogen oxides), especially in urban areas. This could be addressed through regulation (standards on open fires and heating appliance efficiency), development of public transport networks or enhancement of economic incentives (through congestion charge schemes, taxation of trucks on the French road network).
- Industry, energy generation and agriculture are also high-emitting sectors, particularly for fine particulate matter, sulphur dioxide and ammonia. In addition to awareness-raising campaigns to alter behaviour, sending out an incentive price signal by bolstering the general tax on polluting activities (TGAP) and introducing a new instrument on nitrogen mineral fertilisers and pesticides would spur a reduction in these emissions.
- Owing to the adverse effects of a number of these measures on households' purchasing power and businesses' competitiveness, flanking support provisions for the most vulnerable economic agents should be provided.
- Better measuring of air pollution and its repercussions is also required as are improvements in governance. Taking better account of specific contexts could be achieved, inter alia, by reinforcing the local steering of air protection policies.

**Number of days per year when the PM10 fine particulate matter threshold was exceeded at an urban monitoring station (Paris-Auteuil)**



Source: DG Trésor calculations using the Airparif hourly database. For 2019, data was cut off as of 4 December.

How to read this chart: In 2011, the average concentration of particles with a diameter of less than 10 micrometres (PM10) exceeded the threshold of 50µg/m<sup>3</sup> at the Paris-Auteuil monitoring station for 152 days. Under European regulations, this threshold should not be exceeded on more than 35 days per year.

# 1. Air pollution and its effects in France

## 1.1 There are many sources of air pollution

Pollution is the presence of substances in the air which are detrimental to human health or the local environment. These substances primarily originate from human activity such as road transport, agriculture, industry and heating. As regards non-compliance with European and national regulatory goals, the three most-offending pollutants are nitrogen oxides (NO<sub>x</sub>), essentially related to the use of fossil

fuels (oil, coal, gas), fine particulate matter (PM), originating from industrial or domestic combustion activities (wood-fired heating, diesel vehicles) and ammonia (NH<sub>3</sub>), which is formed from nitrogen from animal manure or mineral fertilisers. Air pollution is also due to the presence of ozone (O<sub>3</sub>), carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>) and heavy metals such as lead and cadmium.

### Box 1: Analysing the causes and effects of air pollution is a difficult exercise

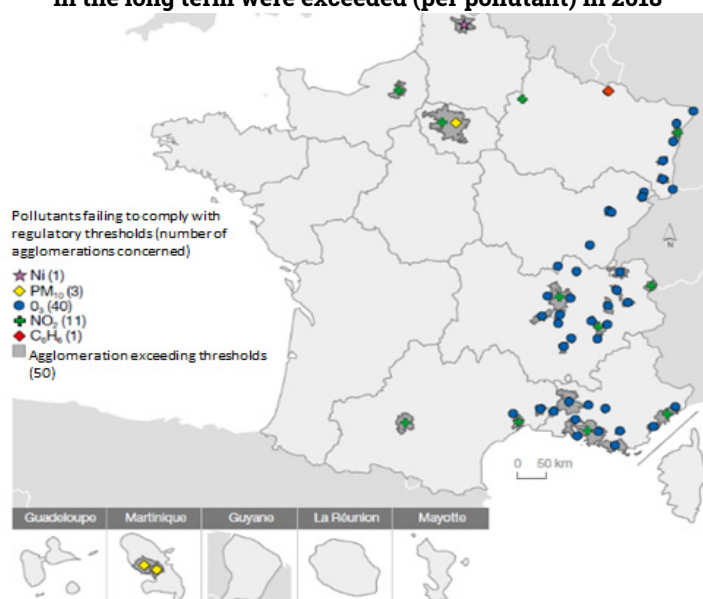
It is difficult to analyse air pollution and its effects. This is principally due to the fact that it originates from both primary pollutants, which are directly emitted by the source and have a local impact, and secondary pollutants, which are formed by chemical reaction, can cover large distances and whose concentration in the air can be closely correlated with weather conditions (for instance, heat fosters the formation of ozone). In addition, it is also difficult to pinpoint the effect of each pollutant as, usually, a number of pollutants are present in the air at the same time and complementary exposure to several pollutants can multiply the adverse effects of each (the so-called "cocktail effect"). It is also a hard task to gauge the consequences for health as it is difficult to directly attribute an illness to air pollution as it may also be explained by other factors (especially genetic or behavioural ones). Lastly, recent scientific work has drawn attention to pollutants which are not systematically monitored and are not subject to regulations. In an opinion issued in July 2019, the French Agency for Food, Environmental and Occupational Health & Safety (ANSES) recommends paying greater attention to ultrafine particles (UFPs) with a diameter of less than 100 nanometres.

## 1.2 Is the air in France polluted?

Emissions of pollutants have decreased significantly in France over the last two decades but atmospheric concentrations are still high and there are recurrent pollution spikes. Concentrations of nitrogen dioxide, fine particulate matter and ozone regularly exceed the

thresholds set at European level<sup>1</sup> (see Figure 1) and, especially, the WHO Guidelines which are stricter. This has led the European Commission to institute a number of infringement proceedings against France concerning nitrogen dioxide and fine particulate matter.

**Figure 1 : French agglomerations where regulatory thresholds for air quality for the protection of health in the long term were exceeded (per pollutant) in 2018**



Source: Review of the quality of outdoor air in France in 2018, General Commission for Sustainable Development (CGDD), November 2019.

(1) Paris, Marseille, Toulon, Grenoble, Lyon, Nice, Clermont-Ferrand, Montpellier, Toulouse, Reims, Strasbourg, Rennes, Rouen as well as the Douai-Béthune-Valenciennes agglomeration, the regional urban areas of Provence-Alpes-Côte d'Azur, Languedoc-Roussillon and Poitou-Charentes, Martinique and the Vallée de l'Arve in the Haute-Savoie *département*.

### 1.3 Air pollution has serious consequences for health and the environment

Exposure to pollutants has harmful effects on the respiratory and cardiovascular systems. This increases the number of illnesses and the amount of premature mortality. It is thought that there are between 48,000 and 67,000

premature deaths per year<sup>2</sup> due to air pollution in France. Studies point to the fact that most of the health effects are due to chronic exposure to pollutants rather than to the short term consequences of acute pollution. This means that a reduction in the number of pollution spikes would be insufficient in itself to substantially mitigate the adverse effects of air pollution on health.

#### Box 2: The socio-economic cost of air pollution

Based on a review of the literature in 2013, the Office of the Commissioner General for Sustainable Development (CGDD) assessed the health costs of outdoor air pollution in France (namely loss of personal wellbeing as well as financial costs for the healthcare system) at between €20 and €30 billion per year. These figures are comparable to costs relating to obesity. In 2015, a report from a Senate committee of inquiry on the economic and financial cost of air pollution put forward much higher figures, estimating annual health costs at between €68 and €97 billion in 2000, which represent up to more than 5% of gross domestic product. These costs are supplemented by non-health costs which the Senate's report estimated at over €4 billion. The latter include environmental impact, in particular on biodiversity and crop yields. Much uncertainty still surrounds estimates of the overall socio-economic costs for the community with a number of assumptions, such as the monetary value of years of life lost, being highly sensitive.

## 2. What economic instruments can be used to fight air pollution?

### 2.1 Guidelines for identifying suitable economic instruments

From an economic standpoint, air quality is a non-rival (consumption by one agent does not affect the amount available for others) and non-excludable (it is difficult to restrict access to it if it is available) good. It is therefore a local public good which means that the public authorities have due grounds for intervening to safeguard its quality by mitigating pollution. Due to the large number of pollutants involved and the wide range of emission sources, various tools are required to effectively achieve this goal. Most measures to fight air pollution also help combat climate change.<sup>3</sup>

The anti-air pollution policies which have been rolled out up to the present, especially regulatory policies, have enabled significant progress to be made in cutting pollutant emissions from stationary sources (particularly industrial facilities). They have been less effective in reducing pollution emitted by mobile (transportation) or more diffuse (agriculture, residential) sources. One way of addressing this issue is to make households and businesses that emit pollutants bear more of the social cost of pollution.

However, it must be ensured that the targeted agents are not "captives" of the emitting technologies they use and that the price signal actually fosters a change in behaviour. To this end, additional support measures may be required.

### 2.2 A number of sectoral and cross-cutting measures could be considered

Furthering the fight against air pollution will involve targeted initiatives in the main polluting sectors. The most effective way of reducing emissions from the industrial and energy sectors is to increase the rates of the "polluting emissions" component of the general tax on polluting activities (TGAP). Concurrent streamlining of the tax base would make this measure more acceptable. These changes to taxation would have to be supplemented by support measures<sup>4</sup> and be harmonised at European level to safeguard these sectors' competitiveness.<sup>5</sup>

In order to ensure upstream reduction of emissions from the agricultural sector, an incentive price signal should be used, mainly through taxation on nitrogen mineral fertilisers and pesticides,<sup>6</sup> along the lines of the diffuse pollution tax (*redevance pour pollutions diffuses*) which was already

(2) Source: Santé Publique France, 2016; European Environment Agency, 2019.

(3) But, this is not always the case. For instance, diesel engines or wood-fired heating emit less CO<sub>2</sub> than petrol engines or oil or gas-fired heating. Nevertheless, these are technologies that emit large volumes of atmospheric pollutants such as fine particulate matter and nitrogen dioxide.

(4) For instance, the IGF-CGEDD-CGE (Inspectorate General of Finance/General Council for the Environment and Sustainable Development/General Council for the Economy) taskforce suggested measures to redistribute tax to industry with an eye to supporting its environmental investment projects, measures for the full or partial exemption of certain sectors particularly subject to international competition and even a reduction of certain taxes levied on industry as part of a broader reform with tax revenue being maintained.

(5) It is thought that the most affected sectors would be coking and refining, metallurgy, woodworking and mining and quarrying.

(6) See Anjuère M., Blake H., Devineau C. and O. Touze (2017), "La politique agricole après 2020", *DG Trésor working document no. 2017/03* (in French).

bolstered in 2019. Support measures, such as proportional relief of tax or contributions on agricultural production, should be introduced to avoid penalising the sector. In the specific case of pesticides, the plant protection products savings certificates (CEPP), which were provided for in the Ministry for Agriculture's Ecophyto II plan, represent a practical instrument.

In the residential-tertiary sector, wood-fired heating (use of inefficient open fires and heating appliances) accounts for the large majority of emissions. Regulations and subsidies appear to be the most suitable instruments. These would include stricter standards for new equipment, a bonus for replacing old heating appliances to foster faster equipment renewal and a ban on installing or using open hearths in highly polluted areas.<sup>7</sup>

As regards transportation, the introduction of congestion charge schemes<sup>8</sup> would allow for broader application of the "polluter pays" principle in major urban areas. In order for such an initiative to be accepted, alternatives to single-person car use would have to be developed by promoting new modes of mobility, as stipulated in the Mobility Framework Act of 24 December 2019, and the public transport offering would have to be upgraded, as is

currently happening in the Greater Paris region with the Grand Paris Express project which constitutes a €35 billion investment. Local authorities can also set up low-emission zones (ZFE) to limit circulation of the most-polluting vehicles. In addition, it would be advisable to increase the HGV tax on the national road network. Lastly, increased use of onshore power connection for vessels at the quayside<sup>9</sup> would reduce maritime transport-related emissions in ports of call.

All these sectoral measures could be supplemented by cross-cutting initiatives. This means that it would be desirable to improve monitoring of air pollution and its consequences by looking into the impact of pollutants other than fine particulate matter, by further assessing the benefits derived from actions to cut pollution and by stepping up use of cost-benefit analyses. For a proper understanding of the specific features of certain regions (topography, weather conditions), the resulting implications on the cost of pollution and the benefits provided by its reduction, the steering of local policies to fight air pollution should be actively pursued, especially by expanding and bolstering the atmosphere protection plans (PPA).

**Aurore Bivas, Benjamin Carantino, Stéphane Cremel, Carole Gostner, Thomas Salez**

(7) Also see A. Souletie (2018), "Renewable energy sources for heating", *DG Trésor working document no. 2018/2 and Trésor-Economics no. 222*.  
(8) See C. Gostner (2018), "Lessons from foreign urban charging schemes", *DG Trésor working document no. 2018/1 and Trésor-Economics no. 224*.  
(9) This involves allowing vessels on stopovers to connect to the onshore electricity network rather than consuming fuel to power their auxiliary generators, thus reducing emissions of local atmospheric pollutants as well as greenhouse gases.

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**Editor in chief:**  
Jean-Luc Schneider  
(01 44 87 18 51)  
tresor-eco@dgtresor.gouv.fr

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