

# Industrial pollution: what is clean industry?

## Preface

**Jacques Vernier**, Chairman of the French High Council for Technological Risk Prevention

## Introduction

**Philippe Merle**, General Mining Engineer, permanent member of the General Economic Council

## Environments and impacts

### Trends in emissions of certain atmospheric pollutants in mainland France

**Nadine Allemand** and **Jean-Pierre Chang**, Deputy Directors, Citepa

This article looks at trends in emissions of certain atmospheric pollutants between 1990 and 2022 and the contribution of the major emitting sectors, with a specific focus on the industrial sector and energy production. The pollutants considered are SO<sub>2</sub>, NO<sub>x</sub>, NMVOCs and PM<sub>2.5</sub>. These four pollutants are subject to emission reduction commitments, established by the amended 2012 Gothenburg Protocol of the United Nations Commission for Europe (UNECE) and by European Directive 2284/2016 on the Reduction of Emissions of Certain Atmospheric Pollutants, which are set out in the National Plan for the Reduction of Emissions of Atmospheric Pollutants or PREPA. France has succeeded in meeting its commitments to reduce total emissions of SO<sub>2</sub>, NO<sub>x</sub>, NMVOCs and PM<sub>2.5</sub> by 2020. Emissions of these four pollutants have fallen significantly in all sectors. While emissions from the energy production and manufacturing sectors were very high in the 1990s, their contribution to total emissions today is much lower than that of road transport and agriculture for NO<sub>x</sub>, domestic wood heating for PM<sub>2.5</sub> and for this same sector, but also agriculture, for NMVOCs. Emissions from the energy industry fell by 80% for NO<sub>x</sub> and 96% for PM<sub>2.5</sub> between 1990 and 2021. For the manufacturing industry, reductions of 58% in NO<sub>x</sub> and 61% in PM<sub>2.5</sub> have been achieved over the same period. These reductions can be explained in part by lower levels of fuel consumption in electricity generation or lower levels of activity in certain industrial sectors, but in relation to the unit of fuel consumption or unit of production, emissions have fallen under the impetus of the regulations implemented and in particular the Industrial Emissions Directive, which requires the use of best available techniques or equivalent. For 2030, reduction measures will have to be continued to ensure compliance with future commitments, particularly for NO<sub>x</sub> and PM<sub>2.5</sub>.

### Water and industry: what can be done to improve water management by industry in France?

**Domitille Legrand**, Head of the Bourgogne Franche-Comté Regional Economic Service and Economic and Innovation Advisor to the Regional Prefect

How can the gap between preserving the quality and availability of water resources and (re)industrialization be bridged? Paths can be considered at the level of an industrial territory. By building close public-private collaboration on this scale, economic development stakeholders can build an ecosystem vision of industrial water management and strengthen their solidarity in the management of this essential resource for industrial activities.

### Fundamental principles and strategic guidelines for soil and subsoil protection policy in France

**Guillaume Bailly**, Head of the Soil and Subsoil Office at the Directorate-General for Risk Prevention (DGPR)

State action to protect soil and subsoil is based on three inseparable general principles: pollution prevention and remediation, a case-by-case study of the situation at each site, taking into account the vectors and targets of exposure, and risk assessment based on the uses to which the site is put.

The recent Climate and Resilience Act enshrined these principles by introducing a single new chapter in the Environment Code dedicated to the "General principles of soil and subsoil protection".

### What indicators should be used to monitor the health of the general population around France's major industrial areas?

**Candice Roudier** and **Cécile Kairo**, Santé publique France

Living around an industrial area is a concern for local residents considering the potential impact on their health. We propose to present here the health indicators that could be studied around the major French industrial areas. Two approaches have been considered: a review of the literature and data from certain environmental studies (around industrial area).

Respiratory pathologies and cancers (hematological malignancies, solid tumors of the lung, liver and respiratory tract) appear to be the most frequently studied health effects, followed by cardiovascular, hepatic and renal pathologies, as well as perinatal indicators and more particularly congenital malformations.

Nevertheless, French health databases are limited in their ability to provide reliable, exhaustive estimates of some of the indicators identified. These initial elements should be taken into consideration when setting up epidemiological surveillance systems around France's major industrial areas.

## What standards for the future?

### Revision of the IED directive

**Jean-Luc Perrin** and **Loïc Malgorn**, Directorate-General for Risk Prevention (DGPR)

Since 1996, European regulations have governed the design and operation of the industrial facilities that emit the most pollutants, with the aim of promoting the implementation of the best available techniques in order to reduce emissions at source and in an integrated manner with respect to all environments.

The application of best available techniques is based on the so-called "Seville process" for drawing up "BREF" documents. This process involves collecting existing emissions data from the industries concerned and basing the technical obligations on real data on the availability and effectiveness of the techniques.

The current revision of the directive strengthens the reporting obligations of Member States, the information to be published for the public, allows additional derogations for innovative technologies and tightens the conditions for issuing permits. The possibility of compensation for individuals has been extended.

### Vision of the European Environmental Bureau for the revision of the IED Directive

**Christian Schaible**, European Environmental Bureau (EEB)

The Industrial Emissions Directive 2010/75/EU – integrated pollution prevention and reduction recast - (hereafter "IED") covers around 50,000 industrial activities which are responsible for the emissions of around 40% of greenhouse gases, 50% of other air pollutants, and 20% in load for emissions into water with an external cost estimated between 277-433 billion euros per year.

The main provisions arise from the obligations set out in the requirements contained in the permits (permit conditions), determined by the competent authorities of the Member States. The permit conditions must respect general principles and obligations, in particular consistency with the conclusions on the Best Available Techniques (BATs) of the best available techniques reference documents (known as the "BREFs"), which are periodically revised on the basis of an information exchange between the industry concerned, Member States, environmental NGOs (such as the European Environmental Bureau – EEB) and the European Commission.

The author addresses only the key points and major issues of the revision of the IED (hereinafter "IPPC 3.0")

and the Regulation on the Industrial Emissions Portal (hereinafter "IEP-R") from his (personal) perspective and/or on behalf of his organization (EEB), particularly with focus on the question on the possible added value of this new framework to define or promote a "clean industry". Diverging views between the positioning of NGOs, certain industries (notably intensive livestock farming) and/or certain national governments on these points are highlighted.

Note: The assessment below assumes that the Joint Agreement version (December 15, 2023) will be the final version of both legal frameworks.

In summary, the revised framework(s) could provide some useful progress on the transition to a "clean" industry on the following aspects/issues:

A re-framing of what is a best available technique (BAT), which will exclude any fossil age option and which will focus more on the protection of health and the substitution of dangerous substances with a duty of continuous progress. The concrete added value of the new definition of "in-depth transformation" with a triple protection objective to be achieved before 2050 will largely depend on the honesty and real commitment of the stakeholders involved in the determination of these new BATs and the concrete meaning to be given to what can be considered as "deep transformation", including during the elaboration phase of the Transformation Plans by operators. The duty for the operator to develop "Transformation Plans" at installation level means that concrete and measurable commitments are expected, however this risks becoming a greenwashing exercise. The fact that these Transformation Plans will have to be provided only by 2030 at earliest is already too late for certain sectors which have investment projections of at least 15-20 years.

While the aspect of resource efficiency is reinforced, particularly with regard to water, a legal inconsistency and contradiction on substance persists regarding the aspect of energy efficiency, which remains optional for both operators and competent authorities. The concrete performance requirements to be achieved remain to be defined in future BREFs for the majority of sectors.

The biased approach of almost systematic alignment by the authorities of emission limit values towards the upper range of emission levels associated with BATs (BAT-AELs) is reversed in principle, but with a (frightening) naivety of the decision-makers given that it will be 1) the operators concerned themselves who will have to develop an analysis of the non-feasibility of complying with the stricter BAT-AELs 2) no precise deadline has been set for these operators to do that job in self-assessing their permit conditions and 3) no explicit quality control by third parties (i.e. the public concerned) is explicitly foreseen. The review of the permits in question may be postponed for up to 12 years by the competent authorities, which will allow the competent authorities close to their industry to maintain a status of regulatory standstill for a decade to come.

On the other hand, a new dynamic is created for Member States which transpose the BAT conclusions through the general binding rules, such as France.

From now on public authorities must align the rules in accordance with the IED spirit, i.e. ensure the strictest achievable emissions limit values so to achieve prevention/reduction of emissions and therefore move towards the strict ranges of BAT.

There is a livestock rearing exception to all above principles however: the revised framework will lead to a generalized regulatory backtracking on intensive rearing activities compared to the 1996/2010 situation concerning pigs and poultry. There is a further inaction on large scale cattle rearing.

The provisions aimed on strengthening the right to compensation for victims of illegal pollution and sanctions have been weakened in such a way that we see an inversion of the polluter pays principle.

A minor scope extension has been made that is however close to meaningless as to real impacts (metals mining, Giga battery factories), some minor improvements have been brought to requirements on the (co)-incineration of waste.

Progress on the transparency and more useful contextualization of environmental performance data has been made in particular through the linked Regulation establishing the Industrial Emissions Portal and the obligation of an e-permit system/electronic procedures.

### Technology-based and risk-based: two complementary approaches to determining discharges

**Matthieu Schuler**, Deputy Director General of the French Agency for Food, Environmental and Occupational Health and Safety (ANSES)

The upgrading process of the IED directive is one of the actions taken following the European "Green Deal". Mainly based on a mechanism of optimization, with respect to the best available technologies, the IED way of setting limits for releases to the environment is a clearly different mechanism compared to the one that would be based on a quantitative risk assessment of the corresponding releases. A qualitative comparison of the two approaches is interesting in order to identify their respective limits, differences and complementarities. The latter might be useful, when facing an alert or vigilance situation, that could request changes of the existing limits. Lastly, the registration requirement of the releases for a certain number of substances, in order to contribute to a large public information, shall also be taken into account in an organised data banking mechanism, keeping in mind potential uses and opportunities for a cross analysis of environmental data and health data.

### The virtues of the ALARA principle in radiation protection - opportunities and limits of a transposition to the field of industrial impacts

**Pierre Bois**, Deputy Director General of the French Nuclear Safety Authority (ASN)

The ALARA (as low as reasonably achievable) principle aims "to keep radiation exposure as low as rea-

sonably achievable, taking into account economic and social factors". This simple statement has shown an impressive effectiveness through the results obtained in the professional and medical fields, where the doses received by workers and patients have been considerably reduced over time, well beyond compliance with regulatory limit values. Providing keys to acting in uncertainty, opening decision-making processes to multi-criteria analysis, and placing all actors in responsibility, the ALARA principle gives in fact birth to a functioning and effective risk culture. It could usefully inspire future developments in the field of industrial emissions control, and thus contribute to opening a new sequence in the continuous improvement of the management of the environmental impacts of human activities.

### How can we have an efficient policy for reducing the impact of industry?

**Sylvie Sutter** and **Thomas Léopold**, Fédération professionnelle France Chimie

Reducing the impact of industry is governed by legislative and regulatory provisions, as well as existing tools and best practices. The implementation of these tools makes it possible to impose high standards on industry.

In particular, the fundamental principles to be implemented are :

- the "Avoid, Reduce, Compensate" approach, which aims to prevent as far as possible the risks of a project having a negative impact on the environment;
- controlling impacts, so that the benefits of the activity outweigh any environmental damage resulting from it, both during the project phase and when the industrial facilities are in operation.

The impact study identifies the environmental issues and guides the technical and economic choices made towards a project with the "least impact", in particular through a quantitative assessment of the health risks.

### Other views

#### Pollution caused by accidents: a blind spot?

**Jacky Bonnemains**, Founder and Director of the Robin des Bois association

Pollution caused by accidents at classified facilities for environmental protection is increasingly being taken into account. But after numerous accidents, particularly fires, trivialisation remains a priority. The usual clichés - "more fear than harm", "the waste has gone up in smoke", "the wind has scattered it" - and the reassuring words of the fire brigade, echoed by the prefects, urge a return to normality as quickly as possible, even though an abnormal event has occurred that is damaging to the environment and public health. A major blind spot concerns non-classified facilities. Notre-Dame Cathedral in Paris is the most striking example. Tomorrow's disasters, with the new low-carbon modes

of propulsion, have not been anticipated. The pollution caused by the extraction of lithium, cobalt and other rare metals, both in France and abroad, is also being concealed. There is an urgent need for the public to be informed of these new risks, and for proportionate means of combating them to be assessed, financed and put in place.

### Pollution prevention in the United States

**Alexandre Damiens**, Energy-Climate-Environment Counsellor at the French Embassy in the United States

In the United States, federal laws require industrial facilities to take measures in order to protect air, water and soil... The U.S. legislative framework is complex. It began to take shape in the 1970s and then evolved until the mid-1990s. This framework is partly simplified by the actions of the Environmental Protection Agency (EPA), a federal entity of the executive branch.

The institutional organization gives Congress primacy at federal level, jurisdiction over environmental matters to the States, and critical importance to the courts. The U.S. environmental legislative and regulatory framework is far from integrated. Political alternation seems to have a strong influence on environmental programs, an area in which no significant legislation has been passed since 1997.

Jurisdiction over environmental policy between the federal government and the States varies according a great number of parameters and circumstances. The management of environmental permitting is a mosaic: there is no single permit neither uniform permit throughout the entire country.

The plethora of normative texts makes it difficult to navigate within the laws, rules and standards. Technical and technological requirements, ranging from obligation of means to performance obligation, are part of an architecture that is difficult for the general public to understand.

Moreover, the alternation in the political leadership of the U.S. federal executive (Clinton-Bush, Bush-Obama, Obama-Trump, Trump-Biden) has an impact on environmental programs. Thus, environmental issues in the United States are subject to frequent reversals. The Supreme Court arbitrates the resulting conflicts. In Congress, incentive-based approaches are favored, as prescriptive approaches seem doomed to failure. The Inflation Reduction Act (IRA, 2022), which distributes substantial tax incentives to deploy low-carbon technologies, is the product of such findings.

Today, there is a strong desire in the U.S. to regain industrial leadership and sovereignty. Current debates highlight the balance that needs to be reached between industrial and environmental policies. And today, environmental permit reforms are awaiting the outcome of the federal Congress.

### How can industrial pollution be controlled in China?

**Julien Boudet**, Regional Economic Department of the French Embassy in Beijing

China's exceptional economic and industrial development has been at the expense of its environment. Nonetheless, a growing awareness of environmental issues that began in the 2010s has led to a rapid strengthening of public environmental policies. At the heart of the Chinese economy, accounting for almost 28% of its GDP, the manufacturing sector is naturally one of the first to be affected by these new measures. This is particularly true of the heavy industry sector, which is a major source of atmospheric pollutants and greenhouse gases. In China, pollution control is based on environmental impact assessments and pollutant discharge permits. The latter is the main tool for monitoring industrial pollution. The regulations introduce differentiated measures for different industries and emission zones. The success of this tool, still under construction, will depend on the human, technical and political resources put in place.

### Pollute less here, pollute more elsewhere? Europe's competitiveness

**Éric Bourdon**, Deputy Managing Director of the Vicat Group, **Emmanuel Normant**, Director of Sustainable Development, Saint-Gobain Group and **Philippe Prudhon**, Former Director of Technical Affairs at France Chimie

Polluting here or elsewhere means first of all providing solutions here and elsewhere! Companies develop first where markets are strong, and many of French companies are at the heart of the environmental transformation of their value chain through the solutions and services they develop. And they act in the same way on a daily basis to reduce their environmental footprint.

But they are faced with strong competition, both in choosing where to develop, but also with competitors who could come from areas with weaker constraints.

The decarbonization of our economy, the sovereignty of our country, all are opportunities to invest in our territory. To succeed and accelerate these transitions, it is necessary to integrate a number of key parameters (energy cost, regulatory fairness, technological fairness, instruction time to open a factory, etc.) in order to ensure the sovereignty of France and Europe and to minimize environmental impacts.

### Green mining and refining: yes this is possible

**Victoire de Margerie**, Founder & Co Chair World Materials Forum

While the global production of minerals has doubled over the last 40 years pushed by the energy transition, the share of Europe has steadily declined during the same period from 25.1 to 6.8%. To maintain sufficient strategic autonomy, Europe must develop green mining and refining operations, green thanks to low CO<sub>2</sub> emis-

sions, low energy consumption, low water usage and low production of solid waste. Ten technologies already tested would allow to produce minerals in Europe. If we do not lose it all with multiple standards and slow permitting processes.

## Miscellany

### The challenges of quantum technologies

**Ilarion Pavel**, General Economic Council

Significant efforts are being made today to develop quantum technologies, but will the results meet expectations? The quantum computer is able to solve some

difficult problems that would take too much computing time for the classical computer; it can also attack current encryption schemes. However, building a quantum computer powerful enough to solve practical problems remains a real technological challenge. There are several hardware implementation technologies, each with its advantages and disadvantages. Research is also moving towards the development of analog quantum computers and quantum simulators, which are easier to build. At the same time, a consequence of these developments is the design of extremely sensitive sensors with many applications in the geological prospecting industry, medical imaging and military technologies as well as the development of new encryption methods immune to attack by quantum algorithms.

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