PUBLIC PERCEPTION OF INDOOR AIR QUALITY IN CHINA, BELGIUM AND FRANCE: the discovery of an invisible enemy

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Having remained relatively unrecognized by public opinion until the early 2000s, indoor air pollution is now seen by a majority of French, Belgian and also Chinese residents as the probable cause of symptoms such as headaches, fatigue, irritation of the eyes and respiratory tract, and health problems in general. However, the lack of information on indoor air quality in frequently visited enclosed spaces (private premises, workplaces and common areas, transportation) often leads to subjective diagnoses, exacerbated by the difficulty in identifying the sources of indoor air pollution. Nevertheless, it must be regarded as a public health issue, as reflected by growing anxiety among parents about the quality of the air their children breathe inside school buildings, for example. In this context, more robust legislation and standards are considered indispensable in ensuring better prevention and risk assessment.

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INTRODUCTION

The focus of worldwide public attention on air quality is not new, but has completely changed in nature and intensity over the last 20 years. It is the product of a long journey toward awareness, the most recent stage of which is drawing the general public's attention to the air we breathe inside enclosed living spaces (homes, schools, offices, transportation, entertainment venues, eateries, etc.). These are the spaces in which we spend around 80% of our time, even when we live in mild climates. Having long been overlooked by the media and governments, indoor air quality is now a new specter looming in the long list of ecological dangers. The story of how public opinion discovered this new "public enemy" begins with a change of viewpoint at the moment the environment became everyone's problem, having previously been the credo of the worried few. This detour is necessary to understand why and how, in 2019, residents of Shanghai, Belgium and France all questioned the current weaknesses in assessing indoor air quality and called for collective action, whereas in the early 2000s, indoor air had been of interest only to academics.

1 Consumer Science and Analytics (CSA) is a leading institute for market research and opinion studies.

THE DAY THE ENVIRONMENT BECAME "EVERYONE'S PROBLEM"

In December 2017, two years after the Paris Agreement was signed, businesses, governments, public institutions and philanthropists at the *One Planet Summit* declared: "We are ONE planet."

This self-evident fact became a conviction with the emergence of a global awareness of our interlinked destinies. In Asia, America, the Middle East, Europe, Africa and Oceania[2], a large majority of people are saying *"whichever country we live in, our destinies are linked by the choices we make today in the fight against pollution."*

The certainty of this shared destiny is accompanied by a sense of urgency that transcends national borders[3]. It is taking on forms and adopting courses of action we have never seen before. In August 2018, Greta Thunberg initiated school strikes, an unprecedented form of mobilization. On every continent, climate marches took place, with massive participation of both middle- and working-class people. And all around the world, judicialization became part of the arsenal against climate change.

It would be naive or dishonest to ignore the dissenting voices, the tenacious resistance of climate skepticism, and private and public compromises to the environment's detriment. They are legion and ubiquitous, partly because fear alone is not enough to give up ways of life that have been forged over generations.

However, environmental concerns have gained in intensity and, above all, radically changed in nature. In doing so, they have transcended sociological, ideological and partisan divides.

So, what happened? A deeply selfish revolution: the environment has become an issue of personal well-being and thus everyone's problem.

At the end of the first decade of the 21st century, so-called "eco-anxiety" is no longer abstractly collective and distant (the "humanity" and "future generations" we were so fond of talking about in the 1990s), but individual and immediate.

People have been voicing concerns since the 1970s, but they were in a minority. In 1968, the Club of Rome met for the first time. In 1971, Greenpeace emerged. In France, Friends of the Earth took part in the 1974 presidential election. Political ecology was born, though public opinion was mostly unaware of it for almost the next two decades. The environment was the credo of the few.

From the 1990s onward, public opinion began to react under the combined effects of government awareness-raising campaigns, the environment's appearance on the national and international political agenda and traumatic events, which although they were not necessarily the results of climate disruption, were attributed to it at the time (in France, for example, the floods of 1992, the hurricane in 1999, the "Black Tide" of January 2000 and the 2003 summer heat wave).

The years 2007 and 2008 were marked by the awarding of the Nobel Peace Prize to the Intergovernmental Panel on Climate Change (IPCC) and to Al Gore for his documentary *An Inconvenient Truth*. Ecological awareness was growing. The concerns reported in opinion polls increased noticeably and there was a proliferation of "responsible" actions.

But people got tired of being afraid. Concerns ebbed as fewer images appeared in the media, and emotions, which are naturally and necessarily temporary, subsided. Economic and social demands rapidly and legitimately diverted the public's attention to the "end of the month."

THE ENVIRONMENT IS THE CREDO OF A GROWING MINORITY AND THE OCCASIONAL CONCERN OF A SMALL MAJORITY

We now hear "the end of the world" reported more and more often. And more and more violently. It's coming – to the point where daily life regularly seems like a kind of dress rehearsal for what could become a permanent state of affairs: heat waves, droughts, pollution spikes and their economic and health consequences here and now are no longer hypotheticals that vary according to the mathematical model used. We have passed from theory (refutable) into experience (irrefutable): chronic respiratory illnesses, cardiovascular disorders, rain that no longer falls, heat that prevents us from working and curtails our mobility and leisure time, drought that weakens houses and reduces crops. Our immediate environment

2 "The challenge of our resources," an Elabe study for Veolia in December 2017, involving 14,000 people in 28 countries (national samples representative of the resident population aged 18 years and over in each of the 28 countries). https://challenge-of-resources.veolia.com/

3 A majority of residents in the countries surveyed believe it is necessary to act quickly to meet the ecological challenge (water, air and soil pollution, climate legislation). "The challenge of our resources," an Elabe study for Veolia in December 2017, involving 14,000 people in 28 countries (national samples representative of the resident population aged 18 years and over in each of the 28 countries). https://challenge-of-resources.veolia.com/

is deteriorating. Between 2011 and 2016, the proportion of French people who rated the environment in their neighborhood as good dropped from 58% to 34%[4]. Over the same period, the percentage of French people who said they personally experienced the consequences of climate disruption in their everyday life rose from 43% to 60%[5].

In 2019, 91% of French people are worried about the environment, with 61% of these "very worried[6]." Additionally, the environment has become the number one priority of French people who identify as working class, just ahead of buying power[7]. Pollution and climate events take no account of origin, social class, political views, religion or region. We have now reached a point where the gap between people who make environmental issues their priority and those who consider them secondary is considered the principal division in French society, ahead of even the social divide[8].

THE ENVIRONMENT IS NOW EVERYONE'S PROBLEM

Climate disruption and atmospheric pollution are the prime movers behind this paradigm shift. Science and medicine brought about the change of scale, by establishing and publicizing the causal links between health and environment, triggering a relentless, powerful increase in concerns about the contamination of the human body by pollutants in the air.

INDOOR AIR: THE EMERGENCE OF A NEW, INVISIBLE ENVIRONMENTAL THREAT

AIR POLLUTION IS NOW ONE OF OUR MOST FEARED ENEMIES[9]

In Europe, it is deemed the most worrying problem after climate change[10]. Indeed, on most continents, air pollution is cause for concern and one of the top three priorities for environmental action, alongside water and ocean pollution, and access to quality nutrition for health[11].

4 "Baromètre annuel sur les opinions et pratiques environnementales des Français," INSEE for the French Data and Statistical Studies Department (SDES), 2011 and 2016.

5 ibid.

6 Elabe study, July 2019.

7 "Fractures françaises," Ipsos for Le Monde, the Fondation Jean-Jaurès and the Institut Montaigne, September 2019.

8 ibid.

9 Third-greatest environmental concern, just behind water pollution and climate disruption, Elabe study, July 2019.

10 "Eurobaromètre spécial 468 : attitudes des citoyens européens vis-à-vis de l'environnement," covering the population aged 15 and over who are nationals of and reside in one of the 28 European Union member countries, October 2017. https://data.europa.eu/euodp/fr/data/dataset/S2156_88_1_468_ENG

11 "The challenge of our resources," an Elabe study for Veolia in December 2017, involving 14,000 people in 28 countries (national samples representative of the resident population aged 18 years and over in each of the 28 countries). https://challenge-of-resources.veolia.com/

KEY INSIGHTS ON AIR QUALITY IN CHINA

2012 can be considered a milestone year for air quality issues in China. Since then, "air quality" has become a hot topic for Chinese citizens, companies and the government. Many individual and systemic initiatives have been taken to achieve a positive shift in China, both in terms of data monitoring and air quality improvement. Here are some highlights.

Increasing awareness regarding air pollution issues:

- In 2013, GreenPeace and Beijing University published a report: *Dangerous Breath 2: Effect of PM2.5 on Chinese Urban Public Study*[12]. At that time, the conclusion showed that PM2.5 had caused 257,000 deaths in 31 major Chinese cities.
- The NGO campaign "Air Warriors", launched in 2014 by Zhao Liang, led to an investigation into some 1000 gas-emitting companies, as well as to 600 environmental upgrading projects and a 1.5 billion RMB investment plan[13].

Changing perceptions of the public:

- According to a 2013 public survey of Shanghai residents[14], social media is the preferred channel to obtain information about air pollution (46.0 %), followed by television (40.3 %), the internet (39.9 %) and mobile television (38.4 %). Few use the hotline call (0.6 %) or an App (2.9 %).
- As reported in the same survey, 58 % of Shanghainese respondents stated that they would reduce or stop outdoor activities during a bad air pollution period and 27 % said they would use protective equipment.
- Since 2011, the e-commerce sector has recorded a large increase in the sales of protective equipment (ex. masks, air purifiers) in China. Between November and December 2015, a period marked by numerous red alarms concerning air pollution, the sales of pollution masks on the Alibaba platform increased almost tenfold[15].
- In 2016, Beijing University and Yale University produced a report which concluded that Chinese city dwellers were willing to pay 539 RMB per year, around 3.8 % of annual family revenue, in order to reduce 1 mcg/m^3 of PM2.5[16].

The Government's initiatives to enhance performance and information disclosure:

- Air monitoring is part of a whole national environmental monitoring system. The main focus is on ambient air and industrial emissions monitoring.
- Official information on air pollution is mainly disclosed by the Ecological and Environment Department as well as the China Environment Supervision Station. They take care of 3 main tasks: real time data disclosure in 338 cities, monthly top and worst air quality ranking and air quality forecasts several times per month. In 2019[17], a lot of progress was made in the 74 cities that had implemented the ambient air quality standards. Compared to 2013, the average PM2.5 and SO_2 concentrations decreased by 42 % and 68 % respectively.

12 https://www.greenpeace.org.cn/press-releasedangerous-breath-2/ 《危险的呼吸2: 大气PM2.5对中国城市公众健康效应研究》

13 http://epaper.cenews.com.cn/html/2019-09/30/content_88022.htm

14 https://max.book118.com/html/2018/0326/158823852.shtm

15 http://www.199it.com/archives/419969.html

16 https://mp.weixin.qq.com/s/4Po_qmFzYo9TkUgANazlow

17 <China Air Quality Improvement Report (2013-2018) http://www.gov.cn/xinwen/2019-06/06/content_5397950.htm 《中国空气质量改善报告（2013-2018年）》

WHY SO MUCH ATTENTION?

A 2019 study involving the general public in France, Belgium and Greater Shanghai[18] revealed that the link between health and air quality is an established one.

The effects of outdoor and indoor air on health are considered definite or at least probable by most residents, which represents a huge majority of people who think the state of their health is affected by the quality of the air they breathe, whether outdoors or in enclosed indoor spaces.

18 "La qualité de l'air intérieur," Elabe study for Veolia carried out in France, Belgium and Greater Shanghai, June 2019. https://www.veolia.com/fr/newsroom/dossiers-thematiques/ameliorer-qualite-air

Elabe 2019 study on French, Belgian and Chinese people's perceptions of air quality

In your opinion, does the quality of the air you breathe have an impact on your health?

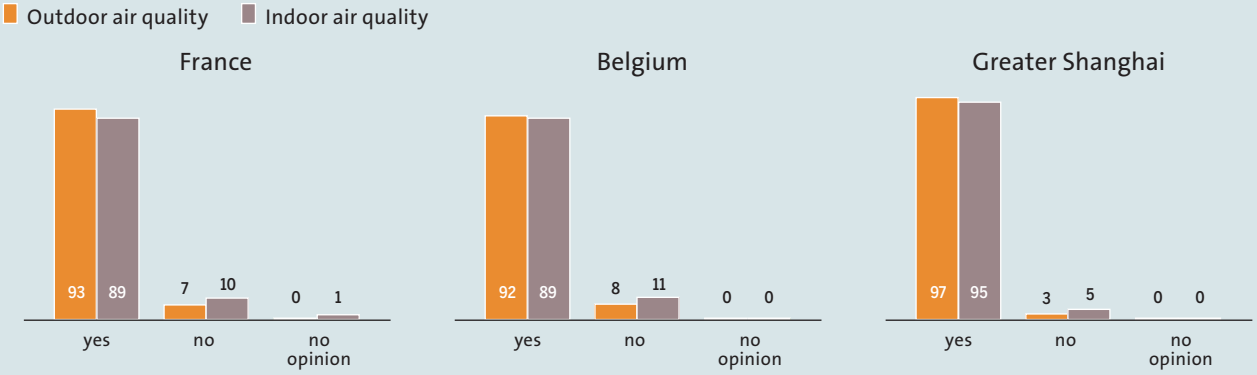

Figure 1

This alignment of opinion between ambient air and indoor air is recent. Indoor air pollution remained relatively unrecognized by public opinion until the early 2000s, unlike outdoor air pollution, which has been regulated for decades and, notably, more widely reported in the media. This reconciliation of opinion followed a chronology similar to that of the medical community's interest in indoor air. It was only in the 1990s that chemical and biological pollution of the air in homes became a plausible explanation for the increase in respiratory illnesses observed by allergists and respirologists[19]. After decades of social silence, the environmental approach to these illnesses began to spread and gradually construct the public existence of indoor air.

Today, indoor air has been identified as a possible source of headaches, fatigue, and irritation of the eyes and respiratory tracts. These symptoms remain occasional for the majority of Europeans. But they at least occasionally affect 29% of French people in their homes, almost two in five in public (entertainment, administration or health care) spaces, one in two in public transportation and 43% of the working population in their places of work. In Belgium, the figures are similar.

19 "Entre expertise et contestation : la problématisation de l'air intérieur comme nouvelle menace environnementale et sanitaire," Céline Guilleux, 2011.

Elabe 2019 study on French, Belgian and Chinese people's perceptions of air quality

Have you personally experienced any effects of indoor air quality on your health?

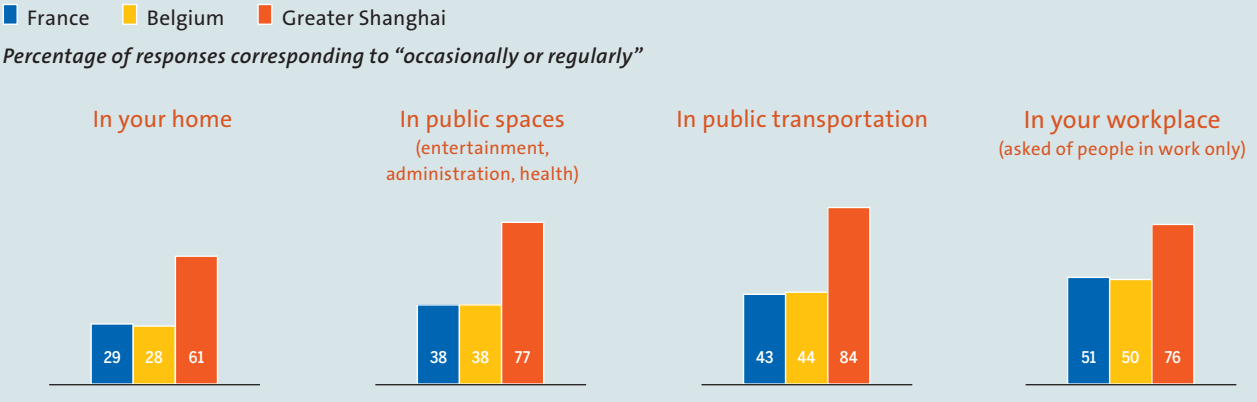

Figure 2

In Greater Shanghai, experience of this pollution is much more frequent: 61% of residents have already experienced these effects in their homes, three in four in their workplaces, 77% in public spaces and up to 84% in public transportation, of whom 37% experience them regularly.

BUT THE RISK IS STILL UNDERESTIMATED

A gap remains to be bridged between awareness of the issue and the correct information.

In France, Belgium and Shanghai, the health risk is being assessed incorrectly – indoor air pollution is still underestimated and the sources of pollution are relativized or ignored.

Make no mistake, French and Belgian people are aware they are guessing and getting it wrong: they all express the same sense of lacking information about prevention, measurement and applicable legislation in the area of indoor air quality.

Elabe 2019 study on French, Belgian and Chinese people's perceptions of air quality

Overall, would you say you are well or poorly informed about:

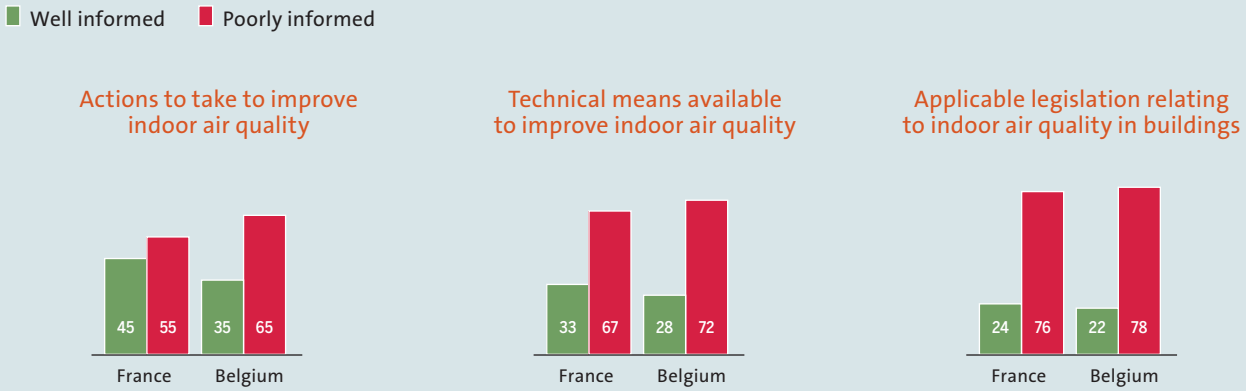

Figure 3

THE RISK OF OVEREXPOSURE TO POLLUTION INSIDE BUILDINGS IS NOT RECOGNIZED

Respectively 52% of French, 60% of Belgian and 62% of Greater Shanghai residents were surprised (with 14% to 16% of these very surprised) to learn that we are exposed to more air pollution inside our homes and the buildings we visit regularly than we are outdoors. Between 2% and 4% were actually convinced this information was false and refused to believe it.

Elabe 2019 study on French, Belgian and Chinese people's perceptions of air quality

In general, we are more exposed to pollution inside our homes and buildings we visit frequently than we are outside. What is your reaction to this information?

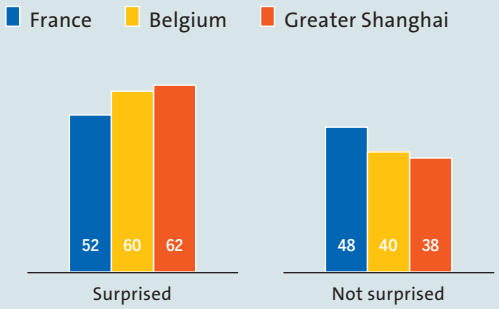

Figure 4

Given this lack of access to an objective assessment of air quality inside frequently visited enclosed spaces[20], diagnosis is made intuitively, by feeling, or viewed through the filter of the home's anthropological function, which is to shelter and protect. These are biased and unreliable indicators in this situation.

The general public basically established three major categories:

1/ Private spaces. These are deemed relatively free from pollution. The more "under control," personal and comforting the space is perceived to be, the more the air is assessed as being of good quality.

Our dwelling is the safest refuge (fewer than one in four people deem the air there to be polluted). In effect, it is difficult to admit that our house, our home is "poisoned" (92% of French people define their dwelling as "a place that feels safe")[21]. The universal image of the protective dwelling is without doubt a psychological obstacle to viewing this place as a potentially dangerous space.

The air in occasional accommodation (hotels, bed and breakfasts, holiday rentals) and in the workplace is also mostly positively assessed, albeit significantly less so. Doubt is much more frequent here.

2/ Open and common spaces. Administrative buildings, shopping malls, public entertainment and health care spaces, educational establishments and retirement facilities are all spaces where indoor air quality divides opinion or raises questions. Often, people even give up trying to make a diagnosis, as feelings are not sufficient. They simply admit they lack the means to assess air quality in these places.

3/ Transportation (individual or shared). In these spaces, a majority are certain they are breathing polluted air.

The subjectivity of diagnosis is exacerbated by the difficulty in identifying the sources of indoor air pollution.

It was found that 55% of French people and 62% of Belgians considered themselves poorly informed about what actions to take to improve indoor air quality, including their choices of cleaning products. Also, 37% of French respondents, 31% of Belgians and 60% of Greater Shanghai residents deemed themselves only "reasonably well informed."

In this area, the estimation of information is the source of all errors. It leaves the field open to intuition and reliance on the senses (smell, sight).

How can we trust these when we know the risk is lurking even in this lovely candle we bought to "purify" the air, or fur from the cat we bought for our youngest child after lengthy negotiations, but which the whole family now adores? Heaping the blame onto household objects is not an easy change to make.

The proof is that in the game of identifying sources of pollution, there are more losers than winners.

Odorless or "family" sources of pollution are false friends, relativized or unrecognized: incorrect opinions ("not a source of pollution") or nonrecognition ("I have no idea whether it's a source of pollution") exceed 25%, and sometimes reach 41%, for insulating materials, particleboard or plywood furniture, and pets.

Conversely, things that produce unpleasant "odors" or show signs of "visible dirt" or "disrepair" are a clearly identified and feared source of pollution: tobacco smoke, badly maintained chimneys or stoves, molds, heating appliances, boilers, worn-out or badly maintained water heaters and glues are predominantly identified as significant sources of pollution.

In between these two categories, numerous sources are identified, but relativized because they are deemed unimportant: air fresheners, household products, paints, wall and floor coverings, dust, dust mites, candles, incense and room fragrances.

20 Around three in four respondents said they were poorly informed about air quality in the places they visit frequently.
"La qualité de l'air intérieur," Elabe study for Veolia in France, Belgium and Greater Shanghai, June 2019.

21 "Enquête Conditions de vie et aspirations des Français," CREDOC, June 2008.

INDOOR AIR QUALITY IN SCHOOLS IN FRANCE: CONCERNED PARENTS WANT TO KNOW [22]

A PUBLIC HEALTH CHALLENGE FOR THE FRENCH, A CONCERN FOR PARENTS

Aware of indoor air quality's effect on their health, the French are naturally establishing this same link between children's health and the quality of the air they breathe in schools (86%, of whom 43% are certain and 43% consider it probable).

Albeit with a little more hesitation, seven in ten French people also associate air quality with an impact on their children's learning and memorization abilities (71%, of whom 27% are certain and 44% consider it probable).

Directly concerned by the quality of their children's learning environment, more and more parents are making these connections.

Elabe 2019 study on parents and indoor air quality in schools (September, 2019)

In your opinion, does the quality of the air children breathe in schools have an impact?

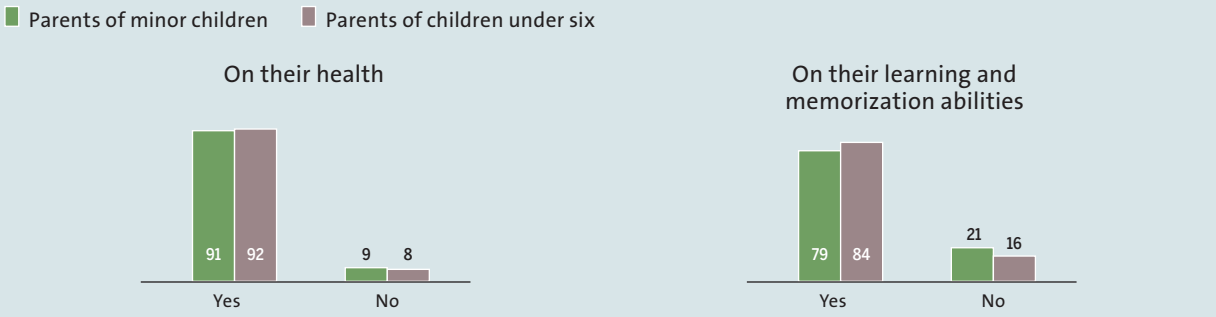

Figure 5

As a focus of attention for most parents, indoor air quality in their children's nursery, elementary, junior and senior high schools is a cause for concern for almost six in ten parents (59%). Concern is all the more acute when the schoolchild is young and therefore vulnerable (66% of parents of children younger than six say they are concerned about indoor air quality in their nursery or school, with 17% of these very concerned).

DEPRIVED OF INFORMATION, PARENTS WANT TO KNOW

Their concern is heightened by the lack of information: 81% of parents of children younger than 18 believe they are poorly informed about indoor air quality in the establishment where their child is enrolled, including 38% who feel very poorly informed.

This sense of shortcoming is confirmed by the inability of one in three parents to make even an approximate assessment of the quality of the air their children breathe in school: 33% state that they currently have no way of knowing what the situation is. And while 67% are prepared to hazard an assessment, this is most often hesitant and cautious: 39% of parents think the indoor air in their children's school is of reasonably good quality, but 23% think it is of quite poor quality. With information lacking, doubt sets in and concerns increase, which may be irrational or baseless in many cases. But it's there.

The first battle on the subject of indoor air quality is therefore in finding this "way of knowing" and putting an end to doubt: 83% said that as a parent, it is important for them to have access to an assessment of the quality of the air their children breathe (of these, 30% said very important).

22 "Les parents et la qualité de l'air intérieur dans les écoles", Elabe study for Veolia, September 2019. https://elabe.fr/les-francais-et-la-qualite-de-lair-interieur-dans-les-ecoles/

CONCLUSION

The gap between awareness of the threat to health and access to a minimum of information (Is the air I breathe of good quality? Should I take preventative or corrective measures or demand they be taken?) highlights the **seriousness of the information and prevention issue**.

The French, Belgians and Shanghai residents are not mistaken; they are convinced that information on sources of pollution and the actions to take is an essential lever for improving indoor air quality (90% consider it important, of whom 39% deem it very important).

But information and changes in individual practices are not enough.

The general public believes that **indoor air is not simply a domestic problem for which individuals alone are responsible**. More robust legislation and standards are considered indispensable, along with collective action and the involvement of all players concerned with indoor air quality, construction and legislation.

Elabe 2019 study on French, Belgian and Chinese people's perceptions of air quality

In your opinion, how important is each of these levers for improving the indoor air quality of buildings?

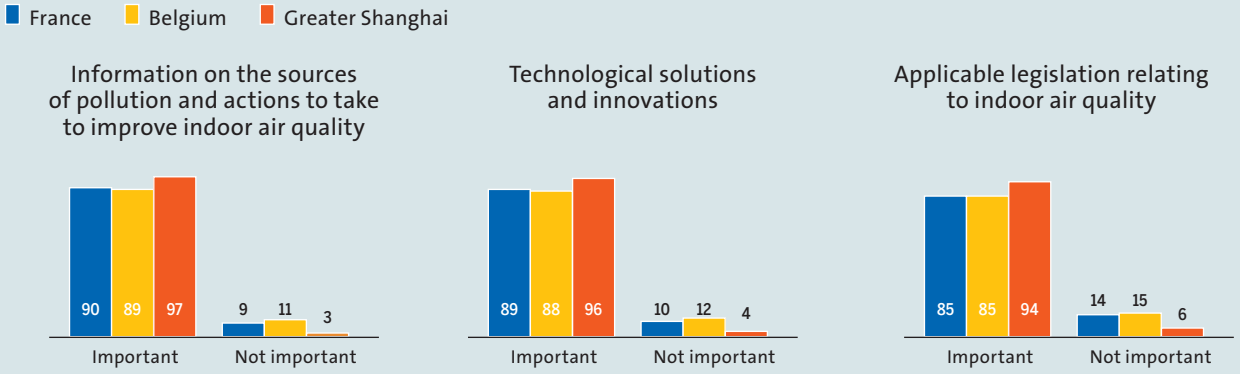

Figure 6

In your opinion, how important is each of the following actors in improving indoor air quality in buildings?

Percentage of the importance of the different actors' roles in improving indoor air quality in buildings	France	Belgium	Greater Shanghai
The companies that manage the buildings' ventilation and heating systems	89	90	95
Construction companies	88	86	93
Government	85	85	96
Health professionals	85	85	83
Manufacturers (furniture, decoration, construction, household products)	85	81	95
Retailers (furniture, decoration, construction, household products)	81	74	90
Installers and fitters	86	84	85
Local government authorities	81	77	88
Consumer associations	79	74	83
My employer *(asked of in-work respondents only)*	69	77	88

ELABE 2019 STUDY ON FRENCH, BELGIAN AND CHINESE PEOPLE'S PERCEPTIONS OF AIR QUALITY AND ELABE 2019 STUDY ON PARENTS AND INDOOR AIR QUALITY IN SCHOOLS (SEPTEMBER, 2019)

Surveys	Indoor air quality perception Survey 1: The French and indoor air quality	Indoor air quality perception Survey 2: The Belgian and indoor air quality	Indoor air quality perception Survey 3: Shanghai residents and indoor air quality	Indoor air quality in schools
Panel	A sample of 1,063 people, representative of Continental France residents aged 18 and over. Quota method applied to gender, age, socio-professional status, city-level and regional-level criteria.	A sample of 1,056 people, representative of the residents of Belgium aged 18 and over. Quota method applied to gender, age, socio-professional status, city-level and regional-level criteria.	A sample of 1,001 people, representative of the residents of Shanghai aged 18 and over. Quota method applied to gender and age criteria.	A sample of 1,010 people, representative of residents of metropolitan France aged 18 and over, and an oversample of 351 parents with children under 18, i.e. a total sample of 1,361 people, including 607 parents of minor children. Quota method applied to gender, age, socio-professional status, city-level and regional-level criteria.
Distribution	Online surveys			
Dates	Friday 12 to Monday 15 April 2019	Wednesday April 24 to Wednesday May 1, 2019	Thursday May 2, to Monday May 13, 2019	Tuesday September 3, to Wednesday September 4, 2019