October 2019

Factoring in environmental health issues facing businesses

entreprises pour l'environnement

Chairman's message

Despite the measures taken by companies, controversies keep flaring up over the effects of products or activities on health and the environment. While actually few in number compared to the host of products, compounds and substances we are in daily contact with, these issues occur far too often from the point of view of consumers who continue to call for greater transparency and commitment on the part of businesses.

In some cases, the effects are undeniable: undesirable risks or effects associated with a product are clearly disproportionate to its benefits. In such an event, vendor companies should take urgent measures to remedy the situation. If they fail to do so, their partners could take matters into their own hands, as with the tobacco-free initiative where 115 financial institutions, including Axa, Natixis and BNP Paribas among others, decided to stop funding tobacco companies.

In other cases, however, there is uncertainty about the adverse effects of a product whose usefulness is acknowledged by users and consumers. What should producers do in such cases? How should they react to early warning signs? Should they take proactive action or wait for established proof of adverse effects? There is a difficult balance to strike between growing societal expectations, product benefits and the underlying economic facts. Subjecting a new product to protracted tests and studies may jeopardise marketability due to excessive development costs. On the other hand, if a product has been widely available before adverse effects occur, the consequences could be severe.

Against a background of rapid innovation and scientific progress, managing such situations is becoming increasingly challenging, even where industries may rely on a robust body of regulations. Backed by regular consultation with ever more demanding stakeholders, EpE members are adopting a wide array of initiatives to improve transparency of the rationale behind their decisions, as well as stricter standards than those set by current regulations.

Publishing such practices is a way of promoting transparency, and this booklet – submitted for appraisal by the stakeholders - contributes to that effort. It aims to foster collective thinking, and to restore and encourage more objective, trustful and informed debate to meet the strong yet changing and sometimes contradictory expectations of society. Our development in the years ahead will depend on how well we manage these uncertainties.

Jean-Laurent Bonnafé
Chairman of EpE
CEO of BNP Paribas

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Introduction

When it comes to associating business, health and the environment in the court of public opinion, the debate is often contradictory and difficult at the best of times. Companies are acknowledged as offering solutions to the many needs and problems. However, they are also accused of creating products with a negative impact on one or both areas, while their leaders, in a bid to address health and safety issues, are in no doubt that they have assessed and managed their company's impacts with appropriate measures.

Historically, businesses have first and foremost been concerned about the safety of their employees. Fatal accidents were the scourge of the industrial era and had dramatic consequences for families, not to mention the economic effects of shutdowns. After eradicating the risk of the most serious accidents, companies increasingly set their sights on the risks posed by their operations to the health of their employees. Occupational health services appeared as early as the 19th century in some mining companies[1].

More recently, environmental regulation of industrial production has highlighted the need for companies to take into account **the direct and indirect effects of their activities on human and ecosystem health**.

Consumers too are increasingly mindful of these issues in their purchasing behaviour.

Yet there seems to be a long-standing, even growing misunderstanding in the wake of health crises magnified by social media, undoubtedly because people's health is a more sensitive and perceptible subject than others. A definition is required to advance the debate on this issue.

How do we define the environmental health challenges facing businesses?

Several definitions have succeeded one another internationally, recognizing the growing interaction between environment and health and ever-increasing societal expectations of the corporate sector in particular.

Agenda 21, drawn up at the Rio Earth Summit in June 1992, accordingly declared in one of its chapters entitled "Protecting and Promoting Human Health" that public health was dependent on the quality of the environment and that it was therefore necessary to link health and human environment. This link is now more and more evident.

At the Helsinki Conference in 1994, the World Health Organization (WHO) proposed a definition of environmental health which "comprises those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, psychosocial and aesthetic factors in the environment. It also refers to the policy and practice of managing, correcting, controlling and preventing those factors in the environment that can potentially affect adversely the health of present and future generations."

In June 1999, the WHO went even further declaring that "the environment is the key to better health". It included in this term parameters related to environmental quality and to all human activities ranging from atmospheric, water and soil pollution to waste, noise pollution, unsanitary conditions, and so on. Environmental conditions have since acquired growing importance as an explanatory factor for health or disease, with the WHO carrying out many studies on such issues.

The "One World, One Health" initiative launched in the 2000s to promote an integrated and unified public, animal and environmental health approach is supported by several international bodies including the WHO, the FAO and the OIE[2].

Today Sustainable Development Goal 3, defined by the United Nations as "Ensuring healthy lives and promoting well-being for all at all ages", aims in particular, through prevention and treatment, to reduce premature deaths due to non-communicable diseases by a third by 2030. Non-communicable diseases are cardiovascular diseases, most cancers, obesity, diabetes, neurodegenerative diseases, chronic respiratory diseases and asthma, which are by far the leading causes of death and illness today. Based on the results of the Observatoire de l'engagement des marques (Corporate Commitments Observatory), SDG 3 is also considered by a representative sample of businesses one of the most important areas in which action is required[3].

In this regard, BNP Paribas, along with other financial players, has made strong commitments to divest from the tobacco sector.

(1) S. Buzzi, J.-C. Devinck, P.-A. Rosental, La santé au travail, 1880-2006, La Découverte, 2006 which retraces the history of the social hygiene movement.
(2) E.P. J. Gibbs, The evolution of One Health: a decade of progress and challenges for the future, Veterinary Record, 2014, p. 85-91.
(3) FOOD 360™.

Stopping tobacco funding

The negative impact of tobacco consumption on health has long been known: lung cancer, cardiovascular diseases and impact on the health of children, victims of passive smoking. Despite these evidences, tobacco-related illnesses provoke seven million deaths worldwide each year and a forecast of one billion deaths this century. And this, despite the joint efforts of physicians, public health experts and governments taking preventive action. Furthermore, it is not muck known that a significant part of the labor force used in the world to pick tobacco leaves are children, suffering from pathologies related to contact with tobacco.

Until recently the financial sector was the missing link in global tobacco control. Tobacco companies, which are mostly "pure players" of tobacco, at least for the main ones, are profitable and were previously considered to be "normal" companies in which pension funds and managers assets invest, and which are customers of banks and insurance companies.

Fortunately, the awareness of the uniqueness of this sector of activity, which does not produce net added value for the society, the social costs significantly exceeding any profits that a few actors derive from it, took place. Now, the divestment movement from the tobacco sector is growing.

At the end of 2017, BNP Paribas decided to stop financing or investing in tobacco companies in order to be consistent with its Human Rights policy and with its objective of actively contributing to the achievement of the Sustainable Development Goals (SDGs) of the UN. The movement accelerated with the launch in September 2018, at the time of the UN General Assembly, of the Tobacco-free Finance Pledge, which now has 151 signatories and supporters, representing $ 7.5 trillion in assets under management and $ 2 trillion in corporate loan book. BNP Paribas is one of the founding members of this initiative.

Unlike other sectors, in this one there is no alternative to divestment insofar as it is not possible to engage in a dialogue to encourage companies into improving their practices: their product itself is questionable.

The European Union is also interested in environment-related pressures and risks impacting the well-being of citizens. The evolution of European law in this respect will also be addressed in this publication.

In France, the preamble of the Constitution, under Article 1 of the Environment Charter (2005), stipulates that: "Everyone has the right to live in a balanced environment which shows due respect for health". More specifically, the development of a national environmental health plan (PNSE) is provided for in Article L. 1311-6 of the Public Health Code: "A national plan for the prevention of environment-related health risks is drawn up every five years. This plan specifically takes into account the effects on health of chemical, biological and physical agents present in our various living environments, including the workplace, as well as the impacts of extreme weather events". The 3rd plan will run until the end of 2019. The 4th plan includes recommendations by the CGEDD and IGAS[4].

The terms environmental health or environment & health, therefore, denote the relations between human health and the variables of the outdoor environment, the indoor environment, the working environment (exposure to hazardous products, stress, etc.) and food.

The aforementioned concept of environmental health calls into question the historical separation between human health and environment, deeply rooted in our minds since the beginnings of modern medicine. We do not consider ourselves ordinary living beings, and give a much higher priority to the treatment of disorders and immediate remedies than to prevention. Health budgets bear no comparison with the funds set aside for the environment. The "Environmental Health" approach has shaken up this order, with impacts on nature serving as a key indicator of the potential effects on human health[5].

(4) https://solidarites-sante.gouv.fr/sante-et-environnement/les-plans-nationaux-sante-environnement/article/plan-national-sante-environnement-4-pnse-4-mon-environnement-ma-sante-2020-2024.
(5) The Watchfrog method for detecting the effects of endocrine disruption is one of the first to be developed. See www.watchfrog.fr

Introduction

Factoring in environmental health means coordinating the actions of collective and individual, private and public players who shape this environment and related exposures. This includes:

- **public authorities** who act through national prevention policies and authorisations, or local water and air policies,
- **businesses** (including those operating in the financial, banking and insurance sectors) which bring products and services to market,
- **health professionals**: including (eco)toxicologists, doctors, scientists in charge of risk assessment and monitoring,
- consumer protection **associations,**
- environmental **experts**,
- **individuals** who have a role to play in their own health.

Although these categories of actors are often considered separately, this publication seeks to highlight the interdependence between all levels of government, experts, NGOs, citizens and economic players. The aim is to enable companies to contribute effectively towards reducing environmental health risks and proposing innovations to improve the quality of life of people and ecosystems.

What is called for is mutual trust. It is futile to remain in a stand-off whereby NGOs and whistle-blowers are accused of lacking expertise and pursuing a hidden agenda when many work closely with companies in a patient and rigorous manner, and companies are rebuked for the relentless pursuit of profit at a time when mission-led companies and CSR are gaining ground in the corporate sector.

The purpose of EpE member companies is to share practices and methods that contribute to addressing environmental health issues raised by their strategies and operations and act as a source of reference and inspiration for each corporate actor.

The first section of this publication examines the factors that encourage businesses to take stock of environmental health issues throughout the lifecycle of their products and services. The second section describes environmental health risk management methods and best practices.

1

Environmental health issues for companies

Companies must bear three types of environmental health risk: legal risk, dealt with by civil or criminal law, arising from the hazardous nature of products that is not necessarily a regulatory compliance issue; reputational risk related to growing public sensitivity and media coverage of substances; economic risk when substances (and the product that goes with them) are called into question as a result of regulatory or societal scrutiny (cost of crises, withdrawals, recalls, etc.).

The ethics of responsibility[6] is the primary reason why companies factor in the potential health risks that their plants, manufacturing processes and products pose for the general public. The value chain of an industrial company is long and complex and includes multiple stakeholders such as employees[7], communities neighbouring its plants, service providers, subcontractors and the end customers for its products. All these stakeholders trust the company, and the need to preserve this trust is what leads that company to focus on health and environmental risks.

1.1. Addressing growing societal expectations

The term "societal" is a recent one denoting that the position occupied by business in society has changed and that the changes have in turn shaped citizens' expectations of the public and private sectors.

Each company is part of a social and exchange system in which high-quality dialogue with stakeholders is essential to operate and perform satisfactorily[8]. No company can afford to ignore or shut out the complex and sometimes contradictory signals that the various components of society send it.

All economic sectors are concerned, from housing and industry to agriculture and services, be it through outdoor or indoor air quality, urban or rural space, work environment, etc.

The example of the consumer product value chain clearly shows how different categories of risk impinge on companies. The globalization of the economy and the mass distribution of consumer goods have had the effect of lengthening value chains, making product traceability and knowledge of the composition and impacts of each component and substance both difficult and indispensable. The sometimes distant subcontractors of subcontractors constitute a source of uncertainty for contracting companies. Recent legislation on duty of care is an attempt to address such concerns[9].

(6) The ethics of responsibility is employed here in the sense this term is used by Max Weber, in contradistinction to the ethics of conviction.
(7) Occupational medicine is not specifically dealt with in this publication. We will refer to it in the section dealing with employee awareness building. For more information, please look up an earlier EpE publication *Connaissance de l'état de santé du personnel : Que faire? Comment? Jusqu'où aller?* – 2007, http://www.epe-asso.org/connaissance-de-letat-de-sante-du-personnel-que-faire-comment-jusquou-aller-2007/
(8) These trends have been examined in an earlier EpE publication Environment and Health : stakeholder dialogue, March 2016 available on the website http://www.epe-asso.org/en/
(9) Refer to the presentation by Deloitte to the EpE Health Commission https://blog.deloitte.fr/loi-devoir-de-vigilance-cap-gestion-risques-matiere-de-rse/amp/ as well as to a recent study carried out by Companies for Human Rights https://www.e-dh.org/fr/actualite_accueil.php?IDactu=132

Key figures on substances[10]

There are over
100 000
substances in circulation worldwide*
*Source: REACH regulation 1907/2006 & studies

In the world,
300 million
tons of artificial substances are produced each year globally*
*Source: Roland Berger Cabinet

In **1** century

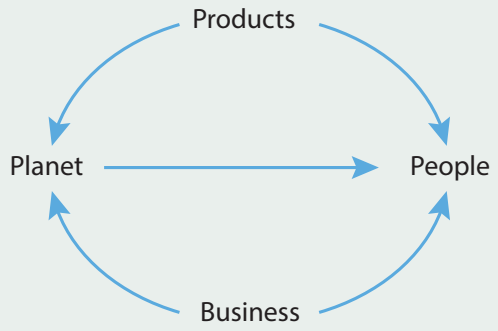
The health cost of endocrine disruptors in Europe is nearly
€150 billion*
*Source: Endocrine Society

Globally, the chemical substance industry amounts to
3,000 billion
a year*
*Source: Roland Berger Cabinet

Risk universe of products' value chain

GreenFlex

The consumer goods value chain is directly influenced by the major issues of today's world: economic issues (globalisation of the supply chain and consumer market), political issues (State protection and ensuing legislation), technological issues (digital solutions for industry and retail), societal issues (the main activity in this Anthropocene era is consumption), and environmental issues, in view of the increasingly obvious impact of manufactured goods on the environment – e.g. waste generation (particularly plastic) or chemical pollution – and the effects of these on biodiversity and human health. Corporate liability and reputation are therefore key in this rapidly changing world.



(10) https://www.greenflex.com/wp-content/uploads/2017/10/Infographie-substances-VFF.pdf

The resulting risk universe is mainly focused on environmental health issues: mandatory need for transparency and traceability in terms of product components, longer life cycle of products –as well as waste– via the circular economy, health impact of substances contained in products and, therefore, strengthened safety regulations to meet society's expectations in these fields.

To address these issues, it is crucial for businesses to adopt a risk-based approach (risk intelligence, mapping and analysis; risk management planning; etc.), as well as a digitally improved data management policy embracing the entire value chain, particularly with respect to suppliers.

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1.1.1 Anticipating new consumer demands

There are a number of consumer trend surveys. The majority of French people seem to share a sense of distrust of the processes used to manufacture some products and of being overwhelmed by the complexity of issues.

26% have little or no confidence in the quality of the food products they buy or eat[11]. More broadly, while the French enjoy the highest life expectancy (82.7 years) among the countries of Western and Northern Europe, only 67.4% consider themselves to be in good health, against an EU average of 69.7%[12].

According to recent results[13] of regular surveys carried out by CREDOC, 2019 saw a sharp rise in environmental concerns. 25% of French people polled say environmental degradation is one of their two key concerns (up 17 points in 1999). The younger generations establish a strong connection between food and health (90% of millennials from 1997 to 2006).

(11) Source: Kantar TNS January 2018. Base: Overall* (N = 502).
(12) *L'économie française*, Insee Références, 2019.
(13) Opinion poll on risk perception, Overall Results, BVA Opinion, December 2017.

Contemporary society, or "risk society"[14] as Ulrich Beck calls it in his book, would become a place of generalised distrust where lay people and sometimes even experts doubt and call into question the foundations and current functioning of society.

Risk perception by the public, however, does not only relate to objective mortality or disease probability data[15]. A number of subjective factors come into play, resulting at times in a disconnect between public risk perceptions and available scientific data. The degree of collective or individual risk impact plays a large role, as does the individual's sense of control or lack of control of risk: a forced risk is deemed less acceptable than a voluntary risk, a man-made risk is deemed less acceptable than a natural risk, a little-known risk is deemed less acceptable than a known risk, a risk containing a high degree of uncertainty is deemed less acceptable than some other risk[16]. When those exposed to a risk are considered particularly vulnerable such as babies, that risk will be perceived as especially unacceptable. The recent controversy over the toxicity of certain substances contained in nappies illustrates this variable acceptability.

Yet, discussions between scientific experts inside and outside companies on topics such as nanoparticles, micropollutants, plant health and protection, air quality including indoors and a host of other subjects remain largely inaccessible to the general public where they involve the communication of complex scientific facts. Information is disseminated when there is a crisis and is therefore alarmist.

Environmental NGOs have become professionalised, specialising in specific subjects such as air, nanotechnologies, chemical substance exposure, endocrine disruptors and plant health, often enjoying the confidence of the general public and mobilising broad sections of public opinion and government through their warnings. In the field of chemical substances, NGOs most often operate locally and nationally. The Geneva-based NGO Ciel, works on international advocacy issues related to chemicals and uses the law to change current legislation[17].

Several examples of controversy demonstrate the issues at stake:

- GMOs are banned in Europe because of lack of positive feedback and the suspicion of risks created by the agricultural practices they enable;
- the plant protection market is monopolised by Monsanto;
- there is always a chance that consumers might reject some consumer products following a controversy.

Consequently, man-made air, water and soil pollution is the subject of ever greater media coverage.

Air pollution, according to many experts, is becoming one of the major challenges of environmental health. Environmental associations are seizing upon this concern to issue ever more dire warnings to public authorities[18] and the general public on worsening air quality.

Some NGOs build parallel alliances with economic players, like the Global Alliance on Health and Pollution operating worldwide, and regional air quality monitoring agencies like Airparif.

Air pollution is often invisible and forced. No one can escape it and public opinion is becoming increasingly hostile to this lack of control. The fact that it is composite and not attributable to a single player or source is fuelling demand for global management in which all the relevant players must participate.

(14) See Ulrich Beck's Risk Society: Towards a New Modernity. Published in Germany in 1986 and translated into English in 1992 and into French in 2001, the book shows that while we are not living in a more dangerous world than before, risk has become the yardstick of our actions.
(15) https://harris-interactive.fr/opinion_polls/la-place-de-la-sante-en-europe/
(16) Santé publique France, 2007
(17) https://www.ciel.org/issues/toxics-2/
(18) Since the value setting under European Directive 1999/30/EC, air quality regulations have been tightened.

Pollution and Health: a global and comprehensive perspective

GAHP
GLOBAL ALLIANCE ON HEALTH AND POLLUTION

Battery lead recycling (ULAB)

Pollution is one of the main causes of premature death in the world. More than 9 million deaths a year, or one in six, are due to the health impact of pollution. That is three times more than deaths caused by malaria, tuberculosis and HIV combined. 92 per cent of deaths occur in low-to-middle-income countries (IHME and WHO figures). Pregnant women and children are the groups most vulnerable to the effects of pollution.

Yet, despite the existence of cost-effective solutions, the fight against the effects of soil, water and air pollution on health is one of the most poorly funded global issues. The NGO Pure Earth has for the last 20 years been working to reduce this pollution, save lives and protect the planet. The NGO has identified and assessed more than 4,000 toxic sites, affecting approximately 54 million people, including 11 million children. Its teams have carried out 110 clean-ups, innovative research and a policy study, resulting in the improvement of the lives of more than 4.5 million people.

The fight against pollution has contributed to the attainment of 10 of the 17 sustainable development goals defined by the United Nations.

Pure Earth has set up the *Global Alliance on Health and Pollution* (GAHP), a Swiss foundation that brings together various international, government and private institutions to help address urgent pollution issues. In particular, GAHP has drawn up a Health and Pollution Action Plan to help governments identify priorities and create a roadmap for reducing pollution-related deaths and diseases.

www.gahp.net

France contact alexandre@pureearth.org

The quality of indoor air is also an emerging issue. On average, the French population spends 80% of its time indoors[19]. Indoor and outdoor air is polluted. Studies show the effects of indoor air quality on employee performance and well-being.

(19) Source: France Nature Environment, 2019.

Improving air quality at underground stations

Air quality has become one of the priority health issues for public authorities and populations. In France, pollution with very fine particles is responsible for 48,000 premature deaths[20]. 19% of the particles are attributable to the transport sector, the railway industry contributes only 2.5%[21]. Underground stations are a point of attention, because in addition to pollution from outside air, specific activities such as train braking or maintenance work can emit fine particles that can accumulate in these enclosures.

Without waiting for the establishment of a dedicated regulation, SNCF carried out campaigns of measurements of fine and very fine particles (PM10[22] and PM2.5[23]) in partnership with Airparif in twenty-four underground stations of Ile de France. Since 2016, continuous measurements, available online[24], have been implemented in three stations selected as representative.

In parallel, SNCF conducts various research projects to improve air quality along three major axes:

- Reduce the emission of particles at source by acting on the railway components:
Selection of the least emitting braking pads and shoes, through tests carried out on a bench test, unique in the world, specifically developed to test and qualify the braking systems; Partnership to develop a device to suck the particles emitted during braking; Research to increase the part of electric braking instead of mechanical braking.

- Treat the air directly on platform:
Four innovative solutions are currently being tested: "positive ionization[25]" technology then wet filtration system[26] at Avenue Foch station, passive collection system[27] at Boulainvilliers station and filtration solution at Sevran Beaudottes station.

- Improve ventilation at stations
In order to reinforce the ventilation of stations without specific device, studies are being carried out to replace existing smoke ventilation devices with mixed systems operating both in the event of a fire and a normal situation.

Water pollution is another issue of great concern to people[28]. An analysis of major springs under threat from pollution establishes that prevention measures emanating from the public consultation on the environment (Grenelle de l'environnement) are broadly effective in obtaining drinking water without the need for costly decontamination. Agricultural pollution caused by the presence of nitrates and pesticides in catchment areas, however, remains the main threat to water resource quality[29]. In France, of the 35,000 or so catchments used for the production of drinking water, 400 close down every year. In 2012, the Directorate General for Health (DGS) published a study providing an overview of the reasons for these closures[30]. Also, while the problem of the presence of pharmaceuticals (human and veterinary) in water is not new – it has been an emerging risk since the 1980s, a period of growing scientific and regulatory awareness - it has reached critical proportions today, leading to the adoption of European directives and watershed monitoring plans.

The aim is to manage environmental pollution through wastewater treatment and drinking water quality through treatment at dedicated and ever more tightly monitored plants.

At the same time, quantification processes have been improved and refined[31]. In the face of some risks (in particular "the cocktail effect" of certain combinations of molecules on human and ecosystem health, double exposure, development of extremely resistant bacteria in wastewater, endocrine disruptors and sensitivity of some groups such as pregnant women, there is mounting concern and a growing call for application of the precautionary principle.

(20) https://www.santepubliquefrance.fr/determinants-de-sante/pollution-et-sante/air/documents/article/the-mortality-impacts-of-fine-particles-in-france
(21) CITEPA / format SECTEN–avril 2017.
(22) Particulate matter whom diameter is less than 10 µm.
(23) Particulate matter whom diameter is less than 2,5 µm.
(24) http://www.iseo.fr/sncf/generic.html ; https://www.airparif.asso.fr/pollution/air-interieur-gare#resultat
(25) Technology which charges particles in order to be able to capt them by constituting aggregates easily catchable.
(26) System drawing up the air to push it in water and collect particles.
(27) Air only pushed by trains pass by.
(28) For more details on the actions undertaken by companies to successfully manage water resources, look up the *A to W. Water stewardship* publication at http://www.epe-asso.org/en/from-a-to-w-water-stewardship-march-2018/
(29) https://www.quechoisir.org/action-ufc-que-choisir-enquete-sur-102-sources-d-eau-potable-grenelle-la-pollution-agricole-de-l-eau-n-est-pas-une-fatalite-n65183/
(30) https://solidarites-sante.gouv.fr/IMG/pdf/bil0212.pdf
(31) Lamiae Grimaldi-Bensouda et al. "*Les enjeux scientifiques de la sécurité sanitaire des médicaments*", Annales des Mines, novembre 2011.

Several scientific studies on endocrine disruptors have been carried out, the most recent by Public Health France. Based on a broad sample, the presence in the body of children and adults of pollutants such as bisphenols, phthalates, parabens, glycol ethers, brominated flame retardants and perfluorinated compounds has for the first time been measured by the National Public Health Agency, coinciding with the Government's presentation of its second national strategy on endocrine disruptors (SNPE)[32]. The popularization of research conducted by Barbara Demeneix on the thyroid hormone has also fuelled French concerns about the health effects of these pollution sources[33].

Suez Group's strategy to address this issue, for example, mainly focuses on the protection of aquatic resources. SNCF's approach to the release of hazardous substances in water is an illustration of best practice.

Pharmaceuticals in water: prevention and treatment

With around 3,500 active substances listed and 170,000 tonnes sold every year, France is the fourth highest consumer of (human and veterinary) medication in the world. A significant proportion of these molecules end up in the major water cycle, either via sanitation discharge or more diffuse sources such as livestock or fish farming. Medication is the principal form of organic micropollutant found in raw municipal wastewater. Yet in France, traditional wastewater treatment processes are not currently designed to totally eliminate this type of pollution.

Research on 45 molecules carried out in France by the French Agency for Food, Environmental and Occupational Health & Safety (ANSES) found a detectable level of these substances in almost 90% of surface water, 60% of ground water and 25% of tap water. It is however worth noting that, as techniques for analysing water are highly effective, this "detectable" presence actually represents a very low concentration – approximately a tenth of a mg/litre in wastewater and a nanogram (10^{-9}g) per litre in tap water – consumption of which has no proven direct impact on human health.

In the light of these nonetheless thought-provoking findings, SUEZ strategy focuses primarily on protecting water resources. In recent years, we have run important research programmes on developing solutions to treat micropollutants in wastewater discharge, principally by transposing processes used to treat drinking water. One such example is the combination of ozone oxidation and biological treatment processes, an extremely effective procedure used at Sophia Antipolis wastewater treatment plant, where performance guarantees for micropollutant treatment are required. Another example is the use of active charcoal to absorb micropollutants, a process that can be combined with the previous procedure, a solution currently being considered at Lausanne wastewater treatment plant. Catalytic ozonation processes can also be used to destroy the compounds or reduce them to biodegradable blocks. They are currently being tested at Achères wastewater treatment plant, in partnership with the Greater Paris Sanitation Authority (SIAAP).

"Nature-based solutions" can also significantly reduce many pharmaceutical compounds. This is the basis for the Zone Libellule© (Dragonfly Zone) concept developed by SUEZ. There are currently five of these artificial wetlands in France and one, covering 50 hectares, located in a Chinese industry park.

Finally, it is important to remember that priority should be given to reduction at source. For example, by installing pre-treatment solutions in hospitals, and by promoting more reasonable purchasing and use of pharmaceuticals: 50% of medication bought in France is not used.

(32) https://www.santepubliquefrance.fr/presse/2019/polluants-du-quotidien-donnees-inedites-chez-les-enfants-et-les-adultes
(33) https://bdemeneix.wordpress.com/

Micropollutant monitoring and reduction strategy

Because of its infrastructures and activities, SNCF is concerned by the water resource: water consumption and discharge, polluting emissions, infrastructures and sites related to water and ecosystems. In 2018, the group consumed 12.4 million m^3 of water.
SNCF has a Water Policy in 2016. It includes a component on the discharge of hazardous substances into water (RSDE regulation[34]) in Classified Installations for the Protection of the Environment (ICPE)[35].

The Materiel Department, supported by its entity, the Railway Testing Agency, has developed an approach for its 32 technicentres (rolling stock maintenance centers) classified as ICPE subject to authorization.
A first monitoring campaign on 17 technicentres, carried out from 2011 to 2015, made it possible to characterize the micropollutants of their effluents (high pressure washing machines, and toilet discharge installations mainly). Of the 44 substances investigated, 11 identified as Priority Hazardous Substances and 12 Priority Substances were identified based on two criteria: the occurrence (the number of times the substance was quantified) and the concentrations of the substances in the effluents.

Since then, the 32 Technicentres have measured the 23 substances selected. These measurements will be compared to those of 2015 to establish trends in evolution based on changes in industrial processes.

The origin and potential sources of these substances are also being investigated, in connection with several recognized laboratories, the LEESU (Laboratory Water Environment Systems Urban) for Alkylphenols, Polycyclic Aromatic Hydrocarbons and Phtalates and the LPTC (Laboratory of Physico- and Toxico-Chemistry of the Environment) for chlorinated VOCs. This work makes it possible to define the 2021 program to eliminate the 11 priority hazardous substances and reduce the 12 priority ones.

Automated collection device

1.1.2 Consulting with public authorities

Public authorities are responsible for protecting public health and therefore addressing growing societal expectations related to health issues.

Several bodies have been set up over the last few decades to foster dialogue between the general public, public authorities, the scientific community and the private sector. The French Agency for Food, Environmental and Occupational Health Safety (ANSES), set up in July 2010, is under the authority of five departments (Health, Agriculture, Environment, Labour and Consumer Affairs), thus illustrating the cross-cutting nature of environmental health issues. One of the tasks of ANSES is that of "contributing to informing, building and disseminating scientific and technical documentation, while prompting and promoting public debate"[36]. An Openness to Society Charter was signed in 2011 by five public bodies in charge of health risk assessment and extended to two other bodies in 2016.

(34) Rejets de Substances Dangereuses dans les Eaux. (Discharge of hazardous substances into water).
(35) ICPE sites are defined by the environment code as "plants, workshops, projects and, generally, facilities operated or owned by any private or public person or company that may endanger or hamper public health, safety, public hygiene, agriculture, nature, environmental and landscape protection, rational energy use, site and monument protection, as well as architectural heritage items".
(36) https://www.anses.fr/fr/system/files/ANSES-Ft-CharteOuverture.pdf

Many other public players operate in the field of public health, with roles ranging from knowledge production to preventive action and crisis response. In 2016, the Act established by order and by decree a national public health agency, Public Health France, which takes over all the tasks, roles and powers of three public bodies accountable to the Minister of health: the Health Monitoring Institute (Institut de Veille Sanitaire - InVS), the National Institute for Prevention and Health Education (l'Institut national de prévention et d'éducation pour la santé - INPES) and the Health Emergencies Preparation and Response Organisation (l'Établissement de préparation et de réponse aux urgences sanitaires - EPRUS).

Regional health agencies and the National Agency for the safety of medicinal and health products also participate in the definition, monitoring and prevention of environmental health issue.

For chemicals monitoring, primary responsibility lies at European level. The European Chemicals Agency (ECHA) authorises the marketing of chemicals including plant protection products, as described below in the box on REACH (1.2.1). The European Food Safety Authority (EFSA), specializing in food safety issues, is another key European agency, despite the criticism about its rules of operation levelled by observerss[37].

The private sector clearly plays a vital role since it produces and carries out the product health and environmental impact studies required by public authorities, prior to authorisations or following the emergence of new issues. Public authorities do not commission studies, but examine those produced by industry. This is a bone of contention with NGOs who believe the government should carry out its own studies.

The last few years have seen mounting demands for studies produced by companies to be subject to independent review. There is a sense among the general public that information asymmetry too often plays into the hands of companies at the expense of the precautionary principle. Given the cumbersomeness of toxicology reports, public authorities have neither the means nor the remit to repeat studies themselves, but they do ensure the rigorousness and relevance of such studies.

The issue becomes more complicated due to the laboriousness of studies involving measurement of ever smaller concentrations of ever more sophisticated substances in products with ever increasing indirect effects in ever more varied situations. The investment in test equipment is heavy and the polluter-pays principle means it is not the government's job to bear the cost of such studies. Industry therefore bears the cost of both test equipment and studies, which external experts may find inadequate. Moreover, the highly specialised nature of the products tested and of the tests carried out is such that only a small number of experts is able to fully assess the results. There is also the risk of a conflict of interest, since experts have acquired some of their expertise in industry[38].

To address this issue, a unique initiative to foster collaboration between public authorities and the private sector in Europe is under way. It consists of a platform for the prevalidation of test methods used to characterize endocrine disruptors.

(37) https://corporateeurope.org/en/efsa/2013/10/unhappy-meal-european-food-safety-authoritys-independence-problem
(38) See 2.3 for information management requirements.

Unique public-private collaboration in Europe

PEPPER

Public-Private platform for the prevalidation of test methods regarding endocrine disruptors

Against a background of mounting consumer concerns about endocrine disruptors, according to an IRSN[39] poll only one French person in ten trusts the authorities to protect the population from endocrine disruptors, or believes that the truth is being told about their dangers. One in two believes that the risks related to these substances are high.

Added to this mistrust is uncertainty over the speed of the regulatory classification process. Some twenty "suspicious" substances are being dealt with and about a hundred are under study, although "blacklists" of several hundred substances are being bandied about. Industries that use them in their products (chemicals, cosmetics, toys, clothing, medical devices, water treatment, plastics, and, further down the line, automotive, furnishings etc.) face legal uncertainty and market worries.

In November 2018, the European Union issued a communiqué on the situation[40]. Describing the various sectors involved, the communiqué acknowledged the scientific complexity of the issues and called for progress in the development and validation of test and characterization methods. In fact, as Gaston Bachelard puts it, every definition is an experiment, and at this point we still lack the test methods to characterize certain effects (obesity, neurodevelopment, etc.) or responses in some animal species.

In 2014, in tandem with the first national strategy for endocrine disruptors, France launched a public-private partnership project to ensure the robustness of biological test methods in the identification of endocrine disruption properties. These methods are also under development, along with the knowledge of effects.

In practice, the prevalidation platform will fund and organize laboratory operations to test the robustness of "test methods" (replication, application to "positive" and "negative" substances, circular tests, etc.) across facilities in France and other European countries. The results will facilitate validation by bodies such as the OECD, ISO and the European Centre for the Validation of Alternative Methods, which is a requirement in regulatory demonstrations.

The project, supported at the time by INERIS and stakeholders, was presented at an international symposium in 2016[41]. Jointly produced by a task force comprising industry, NGOs, agencies and government bodies, the project[42] was finally submitted by a "Planning Committee" to the Future Investment Programme which pledged its support in June 2019.

In December 2019, an association was launch operations and raise funds. Its governance structure consists of a scientific committee, an ethics committee and an "Advisability Committee" where all types of stakeholders (industry managers, developers, national and international agencies, NGOs, etc.) will decide on prioritising the methods to be tested.

The project may have been a long time coming, but it has led to the creation of a European-wide platform characterised by an unprecedented level of public-private collaboration in Europe in response to the European Commission's request.

Pepper planning committee

(39) https://www.irsn.fr/EN/Pages/home.aspx
(40) https://ec.europa.eu/commission/news/endocrine-disruptors-strategy-and-european-citizens-initiative-2018-nov-07_en
(41) https://www.ineris.fr/fr/ineris/actualites/caracterisation-perturbateurs-endocriniens-faisabilite-plate-forme-prevalidation
(42) https://adebiotech.org/campus04/pdfs/03-HUBERT.pdf

1.1.3 Taking stock of increases in scientific knowledge

Scientific knowledge on environmental health is rapidly expanding, even if new issues are being discovered every day. **The use of multiple substances** in products and economic activities, the performance of measurement tools for detecting low concentrations, and the knowledge of product impacts are constantly improving. Today's emerging issues include problems associated with the effects of low doses, cocktail effects when different substances are present together in an organism, accumulation effects, and so on. The public and private scientific community is struggling to keep pace with global innovation in its study of effects and complex issues, or to identify correlation and causation in the cross-fertilisation of knowledge.

In 2019, some forty international researchers jointly founded the Global Panel on the Chemical Pollution of the Environment (GPCPE), along the lines of the IPCC. Their goal is to publish a periodic report on global chemical pollution in air, water, soil and living organisms that draws on existing scientific literature.

A new issue has emerged with the development of the **circular economy**: some products derived from recycling have ever more complex compositions. Alloys and plastics with additives, once recycled, are no longer tracked or traceable, and to reuse them in new products may therefore be questionable. Knowledge of the resulting products and control of related potential risks pose new quality and traceability challenges[43].

Over the last few decades Information on environmental health has undergone profound change, thanks mainly to the Internet. As data becomes ever more widely available, the multitude of sources raises issues relating to the quality, reliability and interpretation of that data.

According to Ragnar Weissmann, Scientific Director of the NGO Objectif Santé Environnement (Environmental Health Goal), half of the health information circulating on the Internet is erroneous.

In this context, discussions with stakeholders reveal the state of knowledge and opinions which businesses would be well advised to heed when conducting research and disseminating information to the public,[44] in addition to their regulatory obligations.

The increase in knowledge and the ability to share it almost limitlessly and seamlessly ultimately helps to stoke **controversies**.

For sociologist Cyril Lemieux, "the multiplication of scientific specialities (and therefore of independent knowledge production spaces) and the growth of the media (allowing the public to be mobilised) are two conditions that fuel controversies".[45] According to him, it is essential that all actors show openness and accept controversy for the proper functioning of our democratic systems. A controversy is never extinguished; it changes space, shuttling to and fro between the scientific community and the public sphere, depending on the information available. "Uncertainty is a collective building opportunity encompassing scientific research activities, discussions about administrative tools and the formation of a relevant public"[46]

The most recent scientific reports on biodiversity and climate change underline the links between human and ecosystem health. These links are not sufficiently factored in according to some public policy experts, such as the NGO Humanité et Biodiversité.

(43) C. Zolesi, "Il faut instaurer une carte d'identité des produits", *Le Monde*, 2 novembre 2018.
(44) These trends have been examined in an earlier EpE publication, Environnement & Santé, Dialoguer avec les parties prenantes, March 2016 available on the website http://www.epe-asso.org/en/
(45) Address to the environmental health commission, EpE, 3 May 2018.
(46) Brice Laurent, "De l'incertitude-obstacle à l'incertitude productive, ou comment traiter les risques potentiels des nano-objets ? ", *Annales des Mines - Responsabilité et environnement*, 2010/1 (N°57), p. 80.

Health and Biodiversity: everything is interlinked

The Government is working on the fourth national environmental health plan (PNSE4). Already, open projects reveal the failure to link health and biodiversity.
Yet, France adheres to the WHO's "One World, One Health" concept which promotes an integrated and unified approach to public, animal and environmental health.

It is also worth remembering:

- Resolution XVIII/14 of the 12th Conference of the Parties (2014) to the Convention on Biological Diversity ("promote cooperation at national level between services and institutions in charge of biodiversity and human health");
- Recent statements following upon the IPBES Global Report[47] ("nature affects all aspects of human health");
- Specific actions taken under France's 3rd National Environmental Health Plan, including research, studies and systematic reviews; and
- The Biodiversity Plan, especially actions 27 (ecotoxicological ecosystem monitoring) and 29 (limiting biocidal products).

A dedicated working group (GT1, health-biodiversity) was set up in the Environmental Health Group (GSE). In light of its work over the past five years and the seriousness of public health issues, such as the much-needed fight against antibiotic resistance, it is essential that urgent action is taken, for example by moving towards "zero-biocides", or towards better control over biocide use, in order to drastically reduce the prevalence of antibiotic resistance as called for in the 2015 "Carlet" report, "Tous Ensemble, Sauvons les Antibiotiques" (*Together, Let's Save Antibiotics*).

It is moreover necessary to develop the concept of ecosystem health and the factors influencing it, as well as their consequences for human health, by incorporating, among other things, the consequences of climate change, ecotoxicology and a policy to promote biodiversity education and understanding of ecosystem services that highlights their positive effects on human and animal health, both nationally and locally.

Health and climate change

According to the 2018 report of the Lancet Countdown on Health and Climate Change[48], trends in impacts, exposures and vulnerability to climate change reveal an unacceptable level of risk to the current and future health of people around the world. Since 2007, articles on health and climate change published in scientific journals have increased by 182%. And since 2017, the physicians' and healthcare professionals' associations have substantially stepped up their actions on climate change.

The beneficial effects on health of the transition to a climate -friendly economy should not prevent us from analysing and factoring in the health consequences of climate warming, such as the northward spread of tropical diseases (dengue fever, malaria), allergies caused by pollens or micro-organisms different from those to which we have adapted, diseases due to heatwaves and the health impacts of extreme weather events[49].

Treatments already exist for more southern regions, but patients, labs and medical systems will have to draw on new learning to diagnose these new problems and deal with them appropriately.

(47) https://ipbes.net/news/Media-Release-Global-Assessment
(48) https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)32594-7/fulltext
(49) https://www.encyclopedie-environnement.org/en/health/climate-change-what-effects-on-health/

1.2. Avoiding breakdowns in operations and crisis risks

1.2.1 Preserving one's operating authorisations

The European REACH regulation[50], in force since 1 January 2007, was adopted to better protect human health and the environment against risks related to chemical substances, while maintaining the competitiveness of European industry. This regulation shifts from public authorities to industry the responsibility of ensuring that chemicals manufactured, imported, sold and used in the European Union are as safe as possible. All chemical substances are concerned. This legislation aims to replace the most hazardous substances with safer alternatives where they exist.

At 31 May 2018, already more than 20,000 chemical substances were known and their potential risks established[51].

Since 31 May 2018, it is no longer possible to manufacture or import more than one tonne per year of substances, if they have not been registered[l].

REACh: risk management asset

Environmental Resources Management (ERM) is the world leader in Sustainability, Health and Safety consulting. We assist our clients in the Risk Management of Human Health and Environmental topics and involve all of our subcontractors in a harmonized approach of consideration and implementation of Risk Management measures.
Regulation is one of the keystones of this approach and ERM consultants support the entire value chain in the integration of these requirements.

REACh regulation is one example: this umbrella regulation applies to all the actors in the value chain and all markets since it completes the potential lack of sectorial regulations while avoiding the duplication of regulatory requirements. The main communication tool of hazards and risks associated with the use of substances and chemical products in the value chain is defined in this regulatory framework by the Safety Data Sheet. This tool, to be effective, needs everyone's commitment: from the manufacturer to the retailer. The issue of this effective communication is crucial: ensuring the transmission of information regarding the hazards and the risks associated with the use of chemical substances.

Within this regulatory framework, companies are interdependent. The role of ERM is to make them aware of this interdependency by helping them to use this communication tool to its full potential in order to make it an asset in their risk management structure.

Regulatory pressures and public expectations are indeed steadily increasing. The news reflects regularly this tendency, which requires greater companies' knowledge of their strengths and weaknesses and of the associated risks they are exposed to. The penalties for non-compliance are increasing and the associated reputational damages are putting pressure on the entire supply chain. All of this in a context of global competition and inequality in the inspection resources of the different Member States. Regulations proficiency and perfect functioning of the supply chain therefore seem today to be a major competitive asset.

(50) REACh for Registration, Evaluation and Authorisation of Chemicals.
(51) Information published on the Ministry for Ecological Transition and Solidarity website, 4 June 2018.

The complexity of value chains also creates actual operational risks for companies in the event of supply shortfalls should a component of a product present a proven risk. It is therefore sensible to anticipate such events, in particular crisis situations created by the publication of a study or some enquiry or other.

1.2.2 Protecting corporate image and reputation

Various examples show that a positive corporate image and reputation, patiently built over many years can be undone by a few images in a TV news broadcast or a video circulated on social media. This risk requires businesses to be prepared with answers for such situations, whether or not a crisis has actually occurred.

Companies under observation

BAILIWICK

In our 24/7 connected world, no business is immune to a crisis that might undermine one of its most valuable assets: reputation. A company's ability to attract and retain talented employees and customers, to mention only two stakeholders, is actually based on its reputation, which takes years to build.

Two new events now feature on the list of corporate risk factors: social or environmental activism and cyber-attacks.

Nowadays, company leaders can no longer side-step societal issues and debates. Stakeholder concerns over these issues are getting stronger as the public gains access to more and more information.

Most crisis situations are predictable. To preserve their valuable reputation, companies need to devise and put in place the tools, processes and teams to detect early warning signals, prevent and manage crises.

Introducing even rudimentary monitoring would make it possible, for example, to detect early warning signals and prevent a situation degenerating into a crisis. It would also enhance scrutiny of regulations and obligations for compliance purposes, or analysing crises situations which competitors may have encountered, their response and ensure company's review their current practices to update them, if and where necessary.

Information collected from monitoring would, moreover, allow companies to anticipate, and deal with changing risks they might face.

Teams need regular preparation and training to adopt best practices to handle sensitive situations quickly and effectively. Simulation exercises hone crisis teams' skills to tackle complex situations, putting decision-makers under pressure replicating the crisis (media pressure, TV cameras, experts, influencers). All gain valuable insights. And time in crisis.

1.3. Creating opportunities

In this highly global landscape where their impacts are mainly indirect, and difficult to identify, isolate and attribute, how do companies choose their priorities, which studies to carry out, and what products to develop?

As the function of business is to provide products and services that meet consumer demand, companies are greatly interested in knowing what consumers (and regulators) think in order to monitor, indeed anticipate, demand, including people's perceptions of the potential health risks and environmental impacts of their products. The popularity of a product can change very quickly. A recent example is mobile phones, which are both a transitional and toxic object[52].

Significant technological advances have been made in all areas. Perceived a priori as a source of progress during the Thirty Glorious Years, today technology raises many questions of an ethical and environmental nature.

The level of trust in messages about technology emanating from politicians, industrialists and even scientists has fallen sharply. As a result, innovations are accompanied by questions, even controversy.

A proactive approach to stay ahead of regulation can be a source of competitiveness for businesses. Some EpE member companies in fact systematically assess health and environmental risks when establishing their research directions, and at times explore the opportunities they might seize from various environmental issues.

The example that follows of investment in the energy retrofitting of "heat sieves" is based on the positive correlation between environment and health.

Health costs and benefits of energy retrofits in France

Investing in the energy-efficiency improvement of inefficient housing is considered to be a political and environmental priority in France. The law on energetic transition and the Climate Plan provide for the renovation of 500,000 homes each year, at least half occupied by low income households, to eliminate 'thermal sieves' within 10 years which will help to achieve carbon neutrality at the 2050 horizon.

The aim of this research project conducted by the Service des Etudes Médicales d'EDF (SEM), EDF R&D (Département TREE), the University of Warwick, and Cemka-Eval was to assess whether the cost of investment in the renovation of thermally inefficient housing in France could be offset by savings to the health sector.

The research relies on an English methodology based on the Housing Health and Safety Rating System (HHSRS) used to identify homes that pose a threat to health. The comparison of data on dwellings with objective data on health (which is possible in England) enabled us to estimate the likelihood of the occurrence of the effects of exposure to excessively low indoor temperatures that would be potentially harmful to health, and then calculate the corresponding medical costs. Based on data from France's national Phébus survey and adopting the English approach to the assessment of housing energy efficiency, 3.5 million main homes – i.e. 13% of all main homes in France – were judged to be thermally inefficient. Adapted to the French context, health expenditure related to the energy inefficiency of housing was estimated and compared to renovation costs.

Results suggest that investment in a suitable programme of energy-efficiency improvement would lead to savings for the health system that would be even greater for low-income households. For those households, the medical costs avoided would be of the same order as the renovation costs. These results are consistent with those of the French 'Rénovons' initiative and other international studies.

Ezratty V, Ormandy D, Laurent M.H, Duburcq A, Boutière F, Cabanes P.A. Chapter 2: Health cost benefits of energy upgrades in France. Jones M, Rice L, Meraz F Ed. Designing for Health & Wellbeing; Home, City, Society. Vernon Press, 2019.

(52) The French Telecoms Federation has put out an online guide which takes stock of scientific knowledge, regulations and recommendations for users on reducing their exposure to radio waves, as part of the precautionary approach towards mobile phones adopted by the government. https://www.fftelecoms.org/en/studies-publications/my-mobile-and-my-health-2016-guide/. Telephone companies now attach this text to new subscription contracts or invoices.

1.3.1 Environmental health risks caused by innovations

While environmental health has become a crucial issue, for businesses it can also be a strategic driver embracing customers, investors and employees.

Regarding air pollution, La Poste Group (French Post Office) has, for example, developed innovative solutions to minimise the impact of urban logistics on air quality.

URBY, the urban logistics solution to limiting local air pollutant emissions and noise

In recent years, Le Groupe La Poste has strengthened its expertise regarding local atmospheric pollution issues, taking its inspiration from its approach to managing greenhouse gas emissions.

Since 2015, in cooperation with ADEME and France-Nature-Environnement, La Poste has had in place a system for monitoring emissions of four pollutants that are regulated by Euro standards and that covers the scope of the vehicle fleet managed by Véhiposte, the Group's subsidiary. Following this, the Group set ambitious objectives for atmospheric pollution by committing to reduce its NOx emissions by 30% between 2015 and 2020, and its particulate emissions by 50%.

With regards to noise nuisance, more than eight out of ten French people say that they are worried by its effects on health and sleep. The threshold for sound-related danger is set at 90 dB (A)[53], representing the noise made by heavy motorised traffic. The communities most exposed to this noise nuisance are those living in the major cities and metropolitan areas.

In the urban environment, noise nuisance is mainly caused by changes in vehicle speed, engine noise and the friction of tyres on paved roadways. Vehicle-related noise emissions during deliveries using systems such as powered tailgates or reversing alarms are one-off sources of noise pollution.

In the context of the growth of e-commerce and deliveries to companies and to private individuals, urban logistics is at the centre of these issues. Le Groupe La Poste is developing solutions to support sustainable towns and cities that will work for everyone and will achieve more environmentally-friendly logistics, given that the ambition of local authorities is to regulate traffic congestion in conurbations and to return urban spaces to residents. La Poste's brand URBY is accordingly seeking to reinvent urban logistics by concentrating flows of goods as they enter towns and cities, performing remote storage and reverse logistics, and by sharing deliveries and collections in town and city centres, while limiting the environmental impact by prioritising the use of low emission vehicles (electric, natural gas, Euro 6 standard) or physical activity (on foot or by bike).

(53) On the health impact of noise, see htpp://www.ladocumentationfrancaise.fr/var/storage/rapports-publics/064000709.pdf

Substituting substances for each other

It is not always possible to follow the example of the cosmetics industry and simplify the composition of products by reducing the number of ingredients.

Several companies have taken the often time-consuming and costly decision to find new processes or products which involve less risk to human health and have less impact on the environment[54].

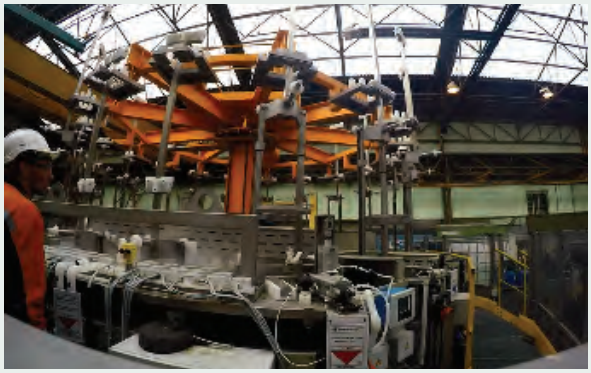
Sometimes substitutions, especially when they are decided in an emergency under public pressure, may prove to be inappropriate. The debate about replacing Bisphenol A (BPA) with BPS shows the importance of better preparing and anticipating substitutions. If a less or non-toxic substitute is ready, it must be deployed as quickly as possible. The example below shows the benefits for a company of substituting a substance under the best possible conditions. A crisis is in the making when substitutes are not yet available. The tools and methods adopted by INERIS could be particularly useful in this respect[55].

Nickel-posphate substitution

Nickel salts in liquid form are commonly used in various surface treatment techniques for metals. These Nickel salts are classified as Carcinogenic, Mutagenic and Reprotoxic (CMR). Their use is therefore very restrictive and requires the implementation of significant protection measures. In the phosphating process, nickel acts as a germination catalyst.

At Vallourec, the decision was made to work in partnership with three suppliers in order to find a substitution while maintaining at least the same quality performance on the products.

The project, led by the Vallourec technical expert community, based on the skills of a multidisciplinary team gathering suppliers, surface treatment experts and field teams who master the technical aspects of implementation. An industrial site served as a pilot site to test solutions in industrial conditions. Suppliers have thus been able to test various non-CMR substitution catalysts under industrial conditions.



Vallourec's Aulnoye Aymeries site (Nord, France)

At the same time, the opportunity was taken to work on other parameters in order to improve the industrial process and in this way to reduce water consumption (cascade use), electrical consumption (decrease temperature of treatment), waste generation (sludge) and cleaning periods for increased productivity (filtration and stability of the baths).

(54) For more details, look up the INRS chemicals risk dossier (with methodology and substitution procedures) http://www.inrs.fr/risques/chimiques/ce-qu-il-faut-retenir.html

(55) See website and methodological guide https://substitution.ineris.fr/en

Regulations prohibit some products and substances in line with advances in knowledge. In such cases, risks associated with finished products can prove expensive as a result of a break in supply during the search, selection and authorisation of a substitution product. It is therefore in the interests of business to supplement the already numerous arrangements with studies to identify such risks before they materialise.

In the automotive industry, the number of substances and parts, as well as life-cycle considerations, have brought this very issue to the fore and underlined the need for a highly structured process.

Being able to identify sensitive substances early

GROUPE RENAULT

Substances are of main concern for many issues: competitiveness of the company through the deployment of new technologies or new performance materials; environmental and health effects though their potential impacts during the life cycle of the vehicle. In order to address the growth of the regulatory scope worldwide and the diversification of obligations, ranging from ban on use to accurate communication towards private and business customers, Renault group has, for more than fifteen years, implemented a proactive anticipative policy. This approach is reflected in two specific standards for suppliers specifying for parts and process chemicals prohibited, restricted to certain uses and declarable substances, even in the absence of regulatory constraints.

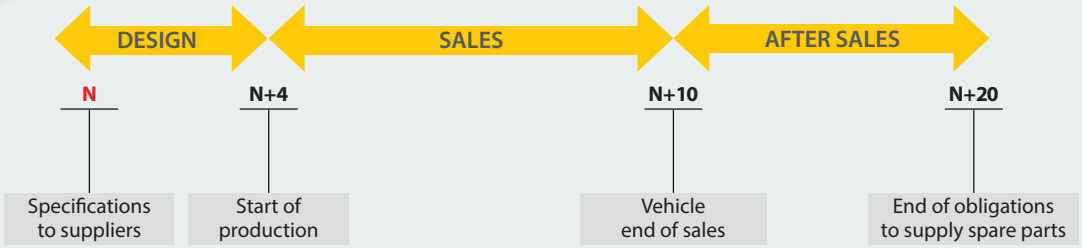
By doing so, the technico-economic optimum of parts, with life time up to more than twenty years between their design and the end of their marketing, is preserved. Renault group can thus limit the need to redesign parts, control the risk of supply disruption and anticipate the conditions of use of its products by operators at plant or commercial business units level.

At a more operational level, the Renault Nissan Mitsubishi Alliance has a process particularly suited to the early identification of future substances under constraints on a worldwide scale.
The latter are scrutinized by the knowledge available about substitution, with a particular focus on car use cases.

This approach, which the Renault group has chosen to share with other manufacturing companies through a consortium led by the CETIM (Technical Center for Mechanical Industries), makes it possible to identify for articles, by average 5 years ahead of their legal ban, the opportunities for substitution.

In addition, this collaborative work is well adapted to identify research and development topics needed within the supply chains as well as discussions to initiate with the authorities in order to highlight the most critical cases.

Automotive parts design and life



1.3.2 New scientific information measurement and sharing tools

The Internet does not only present disadvantages in terms of ecological impact and information reliability since it can, under certain conditions, promote the sharing (and at times even the pooling) of previously inaccessible scientific information, such as the documentary databases of scientific research centres and now international organizations as well. The pioneering US website, Integrated Risk Information System (IRIS), was set up in 1985 by the United States Environmental Protection Agency to provide an internal database of assessments of the impact of chemicals on human health and the environment[56].

The European Chemicals Agency (ECHA) website is a mine of information **on chemical substances**, mainly for health professionals who know how to find their way through the maze of names and scientific information[57].

Based on the active substances assessed by the European Food Safety Authority (EFSA), in December 2017 the Bayer Group opened a platform offering access to scientific studies on its plant protection products in an effort to provide stakeholders with transparency assurances[58]. "By openly sharing data that was previously reserved for the authorities, we hope to create a relationship of trust between the public and our scientific community, while demonstrating our willingness to move towards greater transparency".[59] At the end of 2018, more than 200 report summaries could be downloaded. This release of scientific information held by a company not only marks a significant departure from the sector's tradition of trade secrecy, but could also be a step towards a new relationship with stakeholders. It is certainly the first step towards reintegrating corporate scientific, technical and economic expertise into social debate in accordance with specific quality criteria and strict ethical and methodological rules.

At the other end of the spectrum, **recent smartphones apps** have also revolutionised public perception of everyday consumer products (Alim'confidence, Yuka, Open Food Facts, QuelCosmetic, PharmaPocket, Inci beauty, to name but a few). Yuka is one of the most widely known and used applications. In early 2019 in France, there were over 2.5 million products scanned daily, 10 million registered users, and 600,000 listed products. Products are rated from 1 to 100 according to their nutritional quality (60%), additive content (30%) and biological aspects (10%).

More than one French person in two has already foregone a purchase because of lack of information on a food product, according to a recent study by OpinionWay for Alkemics[60].

A victim of its success, the Yuka application has nonetheless its critics[61]. As a result, several manufacturers have opted for Nutri-Score certification created by Public Health France under the National Health and Nutrition Programme[62]. This certification, which comes with a coloured chart from A (green) to E (red), has a similar goal to Yuka, but has yet to arouse much public interest. A hundred or so companies are already committed to using it, including France's flagship retail brands. Manufacturers can choose whether or not to include their score on the packaging of products.

Consumer associations and public bodies are pushing for the labelling of cleaning products based on a calculation of overall chemical risk that takes into account the threats posed by each ingredient to health and the environment[63].

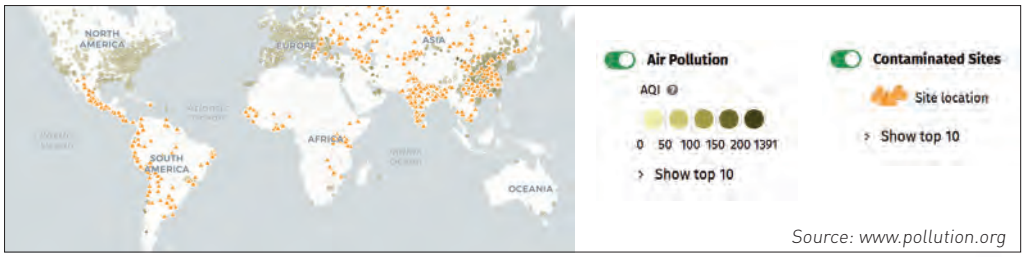
(56) https://www.epa.gov/iris
(57) https://echa.europa.eu/information-on-chemicals/cl-inventory-database
(58) https://www.cropscience-transparency.bayer.com/
(59) https://www.bayer.fr/actualite_bayer-ouvre-la-voie-en-matiere-de-transparence-sur-les-donnees-des-produits
(60) https://www.alkemics.com/en/study-food-transparency/
(61) The criticism is due to the fact that Yuka also promotes a nutritional diet for a fee. See https://www.liberation.fr/checknews/2018/05/17/yuka-est-elle-une-application-publicitaire-deguisee_1653688
(62) https://www.santepubliquefrance.fr/determinants-de-sante/nutrition-et-activite-physique/articles/nutri-score
(63) A petition to establish a Ménag'Score (household cleaning score) started by the National Consumer Institute/60 million consumers collected more than 20,000 signatures in the space of a few weeks in September 2019. This Toxiscore or Ménag'Score, similar to Nutriscore, is an idea supported by the High Council of Public Health at the "Our Environment, Our Health" great national debate in February 2019.

This rating of household cleaning products based on exposure risks could be used for educational purposes in order to avoid arousing unfounded fears. The challenge is to create a balance between the environmental, economic and chemical performance of products and the varying expectations of consumers.

As a result of the success of these rating tools, the reduction or elimination of contested substances is becoming a driver of innovation in many businesses.

Air quality is a new and growing market as well as a driver of innovation. The visibility of measurements has been enhanced through websites like **www.pollution.org**, which allows users to view pollution levels globally. The inhabitants of cities with the worst air pollution regularly consult emission measurement apps. Sales of indoor air purifiers to individuals are growing, even though they are energy intensive and often polluting because of the substances they use.

Other innovative apps include Airparif and the startup Ambiciti,[64] enabling users to monitor exposure to air and even sound pollution. These are useful tools for citizens, public authorities and companies alike to gain a better understanding of their environment.



Source: www.pollution.org

Ile-de-France air quality monitoring actions

Air quality is not a new subject, but it is a source of growing concern for people living in the Paris region.[65]

Since the 1950s, the increase in road traffic has increased pollution. Today, the sources of pollution are direct (cars, heating, industry) as well as indirect (ozone produced from nitrogen oxides emitted mainly by road traffic and from VOCs related to the domestic use of solvents and paints which, under some specific weather conditions, accumulate in the lower layers of the troposphere). Some pollutants, such as ultra-fine particles and pesticides, are emerging and not yet regulated..

If overall air quality improves, the values established by the WHO and applied in French regulations are still exceeded, with 85% of people in the Paris region living above recommended pollution levels. Airparif draws up an annual pollution report for the Ile-de-France region.

Airparif actions

Airparif has put in place an air pollution mapping system for Ile-de-France and introduced an application that calculates the least polluted routes one can take. Six million points are needed to create the maps, which are updated hourly through a variety of methods (sensors, modelling, weather and traffic monitoring), producing nearly 30 million data per hour, all of which is available as open data. The maps and data could help companies to draw up their travel plans.

Through AIRLAB[66], an air quality open innovation platform created in September 2017 which brings together the Ile-de-France Regional Council, the City of Paris, the Greater Paris Metropolis and major economic actors, Airparif is involved in the development of eighteen air quality projects.

France and the Ile-de-France region have built up acknowledged expertise in these areas. Elsewhere too the market is expanding. In China, for example, the air market is soon expected to overtake the water market.

https://www.airparif.asso.fr/

(64) https://www.inria.fr/innovation/technologies-competences/inria-et-l-internet-des-objets/application-et-plate-forme-ambiciti
(65) Study on perception of air quality among people living in the Paris region (2014: https://www.ifop.com/publication/etude-de-perception-des-franciliens-a-legard-de-la-qualite-de-lair-2/; 2018: https://www.ifop.com/publication/etude-de-perception-des-franciliens-a-legard-de-la-qualite-de-lair-2/)
(66) http://www.airlab.solutions/en

1.4. Anticipating and monitoring changes in law

The legal framework for environmental health is particularly complex due to the interdisciplinarity of the subject. International, European and domestic regulations span many sectors (chemical and toxic substances, pharmaceutical products) and continue to evolve, multiply and spread in both legislation and case law. This legal complexity makes it difficult to restore user trust in products emanating from industry. Several devices exist to address public concerns over decisions relating to health.

1.4.1 Aarhus Convention on access to information

The Aarhus Convention is a powerful instrument for environmental health issues. It gives citizens rights of participation in decision-making and access to the information on which government actions are based. Just as we may know which environmental studies are used to authorise particular products, so companies may know the grounds on which a product was not authorized. The Convention proclaims the principle of citizen participation and access to information. Specifically, it brings about a change in environmental health practices since citizens must be consulted before the start of a project[67].
The Aarhus Convention has broadened the public's rights of access to environmental information. Translated into French law[68], it has led to the setting up of a commission (Commission d'accès aux documents administratifs - CADA) to address issues raised by the application of the convention.

Accessing environmental information

The right of access to information is the right every person or body has to request and obtain from a public-law body or public authority a copy of the documents or information held by this body or authority. This right extends to an existing document, in the condition and format in which it is held by the authority.

Environmental information shall be held, received or established by a public authority (state or public-law body) or by a private body with a public service mission related to the environment. The fact that a document has not been created by the authority does not allow access to it to be denied. However, some information is excluded from rights of access, mainly because it is protected by secrets, as in the following cases:

- the request concerns information which is likely to prejudice the secrecy of discussions conducted by the government and the executive, defence secrets, the conduct of French foreign policy, state security, public security or the safety of persons, the conduct of proceedings before the courts, and the investigation of tax and customs offences;
- the request concerns information the communication of which is likely to undermine environmental protection. This includes, for example, the location of rare species likely to be captured for reasons other than scientific research, or for purposeful destruction;
- the request concerns information the communication of which is likely to compromise statistical secrecy, industrial secrecy, or privacy (CNIL Act).

The Aarhus Convention underlines the importance of disseminating environmental information by all means, including websites. This precept is reinforced by Directive 2003/4/EC which creates the obligation to provide the means to disseminate environmental information on the Internet as widely as possible.

This relatively recent convention does not facilitate access to company data; quite the contrary it protects such data explicitly. This has led to a number of issues and a growing body of case law derived from the convention's application. In France, CADA is the appeal body for citizens and NGOs denied access to industry studies. Its 2017 report[69] shows increasing openness to environmental and health interests.

One of the tasks of INERIS is that of managing databases, such as the national data bank on plant protection products sold by authorized distributors (BNV-D) whose data is publicly available since September 2017.[70]

This public provision of ever more specific information helps prepare companies for greater openness. Public **access to databases** revealing the quantity of plant protection products and their possible impact on groundwater and surface water areas would raise many issues that companies could readily address. Adopting a proactive attitude towards such issues could help them gain public trust. A strong limiting factor, however, is the public's ability to exploit the databases and the mass of information they contain. This capacity is enhanced only when a public health issue is given wide media coverage[71]. On the other hand, public authorities and the scientific community access information on an ongoing basis.

(67) https://www.conseil-constitutionnel.fr/nouveaux-cahiers-du-conseil-constitutionnel/le-principe-de-participation-un-succes-inattendu
(68) Adopted on 25 June 1998 by the United Nations Economic Commission for Europe (UNECE), the Convention entered into force on 30 October 2001. France ratified the Aarhus Convention on 8 July 2002. It entered into force on 6 October 2002 (see Law No. 2002-285 of 28 February 2002 authorising the approval of the Aarhus Convention and Decree No. 2002-1187 of 12 September 2002 publishing the Aarhus Convention).
(69) https://www.cada.fr/20184341
(70) https://www.data.gouv.fr/fr/datasets/ventes-de-pesticides-par-departement/
(71) https://www.mediapart.fr/journal/france/040719/commune-par-commune-la-carte-de-france-des-pesticides?onglet=full

1.4.2 Precautionary and prevention principles

Some of the founding principles of environmental law focus on remedy (polluter pays principle, environmental responsibility), others on risk prevention.

It would not be amiss to recall the existence of and distinction between the principles of precaution and prevention.

Analysis of the principles of precaution and environmental and health risk prevention

Elodie Simon
Cabinet Jones Day

The prevention principle applies in the case of a known and certain risk, while the precautionary principle applies in the case of an uncertain risk.

Whilst these two major principles of environmental law, as defined in article L. 110-1 II of the Environment Code and article 3 of the Environment Charter, pursue the same goal of protecting the environment and human health and both have constitutional value, their implementation is subject to very different criteria.

Prevention principle
This principle aims to prevent - rather than to remedy - known and certain forms of pollution or harm, based on a rationale of cost/benefit balance and proportionality.

Precautionary principle
The precautionary principle seeks to prevent the risk of damage in a context of scientific uncertainty. It guides the action of public authorities and consists of effective and proportionate measures with an acceptable economic cost.

While the precautionary principle is binding on administrative authorities alone, there are cases where judges use, without explicitly mentioning it, the spirit of this principle to hold private individuals liable, thus sanctioning a breach of duty of care.

Similarly, while the precautionary principle is deemed to apply only in the case of environmental risk according to the letter of the same law, judges have extended its application to cover health risks as well, as seen in the electromagnetic waves case (Conseil d'État, 8 October 2012, Commune de Lunel) and the asbestos case (Conseil d'État, 26 February 2014, Association Ban Asbestos France).

Finally, the precautionary principle is found to be used by judges in the absence of proof of causation, in particular where scientific uncertainty persists. Accordingly, the precautionary principle is particularly suited to chemicals and health products due to the evolving nature of scientific and technical knowledge in these fields.

The precautionary principle, though binding on administrative authorities alone, does nevertheless impact businesses, particularly when they expect their projects to be refused by the public authorities under this principle.

This principle is increasingly found in health, not just environmental, law. REACh is an example of its application.

1.4.3 The legal framework for consumer goods

Consumer goods reveal the great global challenges of our time. The legal uncertainty which surrounds them is a case in point. In an attempt to oversee this area of the law, the **concept of exposome** was introduced first into scientific literature[72] and then into case law. It appeared as a necessary complement to the overrepresented genome in analyses of the causes of pathologies to the detriment of environmental factors.

Development of environmental health issues within the legal framework for consumer goods

Sylvie Pugnet
Lawyer

The development of the "exposome" concept, defined in 2016 by the French Law on the modernization of our health care system as "the integration into an entire lifetime of all the exposures that can influence human health", reflects the potential liability issues currently associated with consumer products and their composition, as well as the need to preserve ecosystems to also protect human health.

Considering the challenge, the regulatory framework for products is still under target, but is being developed.

Conventional sectoral products regulations (toys, cosmetics, etc.) are focused on the protection of personal health and safety, as is regulation on general product safety.
However, the existing set of complex Product regulations is developing and the scope of the authorities' regulatory surveillance of "product(s) presenting a risk" now extends to breaches of various public interests, such as health and the environment, in particular.

Likewise, various communications issued by the European Commission (such as for the launch of the "Circular Economy Package" or the "Goods Package") support the fundamental issue of health and environmental protection.

Companies should take the issue into consideration, pending an appropriate regulatory framework.

A compliant product may effectively prove to be dangerous if it involves risks not yet covered by current legislation.
Mere compliance is therefore not sufficient, particularly in the current environmental health context where scientific uncertainty has been highlighted by the issue of controversial substances.
This legal uncertainty has also given rise to an opportunity that certain businesses have already seized: develop a risk management strategy for consumer products and identify any signs of potential major changes in regulations (eco-design, circular economy, etc.) and thus anticipate them.

1.4.4 Remedying environmental damage

Managing environmental health risk is not only a matter of societal expectations, but also one of legal liability, as the example of environmental risk insurance shows.

Feedback on environmental damage remedies

Companies have been investing over the last few years to reduce their environmental impacts. This has been driven partly by climate change commitments, pollution and biodiversity erosion, and partly by an ever more complex and demanding legislative framework.

Indeed, the foundations of environmental remedy are constantly evolving and are contained between administrative law, civil law and criminal law. In France, the environment code was adopted in 2000 by bringing together the bulk of legislative and regulatory provisions developed since the sixties. 2008 saw the first major evolution in the form of the law on environmental liability (LRE) of 1 August 2008, which entered into force on 27 April 2009 and derived from the transposition of the European Environmental Liability Directive 2004/35/EC for the prevention and remedy of environmental damage.

(72) Wild C.P. 2005. Complementing the Genome with an "Exposome": The Outstanding Challenge of Environmental Exposure Measurement in Molecular Epidemiology. *Cancer Epidemiol Biomarkers Prev* 2005 (14) (8) 1847-1850.

This law establishes an environmental liability framework based on the polluter-pays principle. In France, the competent authority in charge of triggering liability is the Prefect. Only so-called "outstanding" biodiversity (Natura 2000 areas) is covered by the redress of environmental damage. An operator responsible for damage must remedy in kind the damage caused, all financial compensation being explicitly excluded.

Lawmakers have introduced environmental damage into the Civil Code through law No. 2016-1087 of 8 August 2016 on the restoration of biodiversity, nature and landscapes[73]. This law was strongly inspired by the aforementioned environmental liability directive. The goal set out is to facilitate the filing of a claim by offering the possibility of also referring to a civil judge, and subsequently to broaden the scope of protected biodiversity. Any person who shows both title and interest may sue. This was hitherto the prerogative of the Prefect.

The 2016 Act extends the liability for damage to exceptional biodiversity (around 15% of the country) to ordinary biodiversity which covers the entire country.

Environmental damage compensation: an insurance solution

Based on the premise that despite efforts and investments, no company – regardless of its size and activity – is immune to events that could adversely impact the environment, AXA is able to support companies in managing their environmental risks.

AXA offers companies insurance for their environmental risks and has set up partnerships, in particular with CEDRE [74], aimed at helping customers respond, appropriately, and as quickly as possible in the event of an environmental incident.

Progressively over the last few years, Environmental impairment liability policies have been enhanced, becoming sophisticated environmental-risk coverage policies, and going well beyond the scope of civil liability to cover the entirety of risks that companies may face today.

AXA XL supports companies by offering environmental risk insurance policies aimed at:

Indemnifying third parties who have suffered direct damage, bodily injury and material or non-material damage;

Preserving the company's assets by cleaning up soil and water, and fixed and movable assets without the need for third party claims; preventing and repairing environmental and purely ecological damage and with expert support, without prejudice to third parties for nature per se (LRE scheme [Ecosystem Red List] and Civil Code);

Helping and supporting the company on the day of the disaster or environmental crisis, both operationally and with regard to public relations, by bringing in specialist consultants and partners; and

Supporting accident prevention through engineering services / support.

Negotiating such a contract is also an opportunity for businesses to develop greater awareness of their risks and to put in place risk reduction measures aimed at reducing their occurrence and cutting the cost of premiums and exclusions.

(73) For more details see: "La réparation du préjudice écologique en pratique" by the Association des Professionnels du Contentieux Économique et Financier and the paper by Aurélie Fallon Saint-Lo to EpE's environmental health commission, January 2019.

(74) CEDRE is a French government-certified public service association which develops international expertise in accidental water pollution. http://wwz.cedre.fr/en

Preventing and adapting insurance covers to environmental risks

In the world of risk management and insurance broking, human health and the environment are key issues. Marsh provides analysis and handles business' risks pertaining to Civil Liabilities, therefore in relation to legal and regulatory obligations, and also pertaining to Property Damage, consisting of the insured's own losses. On the other hand, Marsh's sister company, Mercer, provides coverages in health/benefits, the insurance of their employees.

A business' liability for the impact on human health due to their products is a long-standing subject for General Liability. The insurance coverage of impacts on the environment of activities and products is more recent due to a new regulatory era. Introduced in 2007 by the European Directive 2004/35/EC, the new liability for damage caused to common natural property, such as water, wildlife and protected biodiversity areas was significantly amplified by the 2016 introduction of "ecological harm" within the French Civil Code. Due to specialist legal environmental liability regimes, technical complexities, as well as more frequent and more severe losses, this risk segment is dealt with by the specialized Environmental insurance and reinsurance markets.

Marsh is the only broker on the French market to have created an environmental practice to offer clients the resources to analyze, engineer environmental risks and develop the capacity to structure coverage of a business's entire environmental liability exposure. This practice is supported by a world-wide network. There are subsidiaries and representations in 130 countries.

Risk Analysis

This approach is intended to be as much a tool to help with the selection of loss prevention measures as in adapting insurance coverage. The high-risk environmental analysis grid, developed by Marsh, is used by a wide range of companies.

Structuring and Placement of insurance programs

By structuring risks, we aim to ensure complete complementarity between traditional insurance guarantees, General Liability, Professional Liability, Officers & Directors Liability, Contractors All Risk insurance, which generally do not cover the new environmental exposures and liabilities. Wherever required we work to produce tailor-made policy wordings together with our carrier partners.

Given the rapidly changing scientific knowledge in the field of biodiversity it is an important challenge to ensure that the risk designated, "development", is taken into account. This issue relates to the consequences of normal industrial site operations, which are deemed to be harmless but due to the event of a claim are shown to generate damage to biodiversity.

Claims Management

Within the claims management practice the specialized advisors systematically team up with experts from our environmental practice. Addressing claims by such teaming allows to negotiate as well with external experts as with the carrier and optimize the outcome.

Many issues are not yet covered by case law. That said, the law can develop quickly and unpredictably. It is in the interests of businesses, therefore, to be prepared.

2

How do companies factor in environmental health issues?

From the mid-1980s till today, the concept of risk has grown and expanded, as has the search for new methods and methodologies of action, leading to a host of studies and debates focusing on the causal links between environment and public health.

The concept of risk is not new to business. Risk is an integral part of the world of entrepreneurs and inherent in every decision, as Schumpeter theorised.

Yet very often risk and danger, risk and uncertainty, legal risk and human risk are confused.

In this second section we do not only refer to the concept of legal risk, which is controllable, insurable through policies and transferable to third parties. We opt for a more inclusive definition of the word 'risk' which covers the human health and ecosystem challenges described in section one. The first step towards addressing those challenges in fact involves analysing, in a precise manner, the issues and risks to be prioritised.

2.1. Identifying issues: the roles of assessment and care

Risk management, a widespread function in business, has undergone changes[75]. Imported from Anglo-Saxon countries in the early '80s, the management of legal risk was tantamount to claims management. In the early '90s, as needs grew so did societal expectations. The late '90s saw the emergence of risk management proper, especially with the development of "risk mapping". Today, the management of risk is strategically important especially in listed companies because of its links with corporate governance.

Corporate risk management is defined as "the process applied throughout a programme which brings together the activities of identification, estimation and management of risks"[76]. This involves identifying risks, assessing them, defining control measures and simulating different crisis scenarios for analysis. The development of this methodology applies in particular to health and environmental risks.

2.1.1 Putting in place assessments and specific measures

Companies often act prior to, or as a complement to, regulation, since they are responsible for voluntary assessments carried out either internally, within federations, or in multi-stakeholder bodies. EDF, for example, has been a pioneer in the health field, setting up back in 1953 a medical committee well before the creation of national health agencies in 1992. This committee in fact developed the first health risks assessment methods in France.

The example below shows that Sanofi decided to surpass regulatory requirements and undertake, in collaboration with several stakeholders, actions across the entire life cycle of drugs to limit environmental risk.

(75) Caroline Aubry, « La naissance de la fonction 'risk manager' en France », *Management & Avenir*, vol. 55, no. 5, 2012.
(76) H. Courtot, La gestion des risques dans les projets, Economica, 1998.

Regulatory and voluntary assessment of existing medicines

An environmental risk assessment (ERA) is required by applicable regulation for any new Marketing Authorization Application (MAA) for a medicinal product. Beyond new medicines, such assessment may be also required for marketed compounds when MAA modifications result in an increase in the environmental exposure (e.g. increase in the extent of the use). The regulatory environmental risk assessment consists in a two-phase procedure described by a guideline from the European Medical Agency (EMA) published in 2006. It starts with an assessment of the exposure of the environment to the drug substance. Depending on its result and the drug substance characteristics, it is followed by an assessment of the fate and effects of the substance in the environment. This second phase implies carrying out standardized tests to assess the long-term toxicity of the substance to aquatic species, and to study its environmental fate. If these studies indicate a potential exposure of other environmental compartments, additional tests are conducted for the related compartments (e.g. ecotoxicity tests on sediment organisms or terrestrial organisms). All relevant data generated during the drug development process are also considered for the ERA. Precautionary and safety measures are proposed when potential environmental risks cannot be excluded.

Beyond regulatory ERAs required for MAAs in the European Union, in the United States and some other countries, SANOFI is committed to improve its knowledge of the environmental fate and effects of its products after their launch on the market. The environmental hazard characteristics of our strategic products are evaluated voluntarily and regularly based on all available data (i.e. Company and literature data). If available data is insufficient, then further testing is conducted to better characterize the ecotoxicity and environmental fate of the considered substances. ERAs are updated accordingly.

Innovation for the benefit of human and ecosystem health includes advances in impact measurement techniques. The proper factoring in of environmental health is an emerging issue calling for new solutions and behaviours on the part of industry players.

A new generation of biotests has come on-stream to assess the chemical and ecotoxicological properties of aquatic environments. These tests are designed to measure the effects on living beings of micro-pollutants present in the receiving environment. WatchFrog, a laboratory specialising in the measurement of the effects of endocrine disruptors and pollutants on living beings, has pioneered the field using tadpoles on account of the similarities between their organism and the human body. The analyses carried out on scuds by Biomae suggest that we can expect significant progress in the accuracy of impact measurements.

Measuring the impact on life of micropollutants present in aquatic environments

Chemical analyses provide an overview of the stress factors that can impact ecosystems, but do not by themselves provide information on the specific components that affect biological communities. Such analyses remain limited due to the impossibility, from a technical and economic standpoint, of searching and quantifying all the (known and unknown) substances potentially toxic for the aquatic environment and scientifically predicting the fraction of bioavailable and therefore potentially toxic contaminants for organisms, as well as the effects of synergy between those contaminants.

The use of biological tools, or bioassays, can help overcome this problem.
These biological/ecotoxicological tests, whether in vivo (on whole organisms) or in vitro (on cell lines), have the advantage of measuring the effect of complex environmental compounds and taking stock of substance bioavailability.

Biomae offers in situ bioassays on caged freshwater shrimp (scuds) directly exposed to the receiving environment before and after a rejection for example to assess the ecotoxicological impact on them (impact on living beings/bioassays awaiting AFNOR standardization).

2.1.2 Mapping impacts of activities, risks and measurements

The impact of new technologies and new substances is sometimes difficult to predict, which is yet another reason to build environmental and health aspects into product design. It is important that researchers in corporate research & development departments should be aware of those aspects and ready to deal with them as soon as possible.

Three corporate examples of risk mapping can usefully be mentioned: prevention and detection by Engie of risks related to legionnaire's disease in water systems; reduction of micro-pollutant releases by two companies - Sanofi and Suez - before and after use.

Environmental and health risk reporting and monitoring process

In order to manage the potential environmental and health impacts of the group's activities and to take into account weak signals as soon as possible, Engie has drawn up a mapping of the risks regarding the health of third parties and the environment induced by its industrial assets. This mapping, with a view to ensure maximum objectivity, is based on independent and recognized external documentary sources

Based on this mapping, Engie then studied the most critical situations and assessed the potential health effects. These studies identified preventive and/or corrective measures that have been implemented.

This approach is fully in line with the Group's environmental policy and its Health and Safety ambition: "Make everyone, top manager, manager, employee... a committed player in their own health and safety and that of others."

As an illustration of the actions carried out, a guide to prevent legionella risks in water systems was written and shared throughout the group. This guide recalls the basic scientific knowledge of legionella and its proliferation in water, as well as the good practices to be implemented to control the risk in water systems and cooling towers, both for workers and the population.

The risk reporting and management process implemented each year by the group makes it possible to identify and then assess any new environmental and health risks. For high-impact risks, action plans are established at site level and reviewed periodically.

Engie boiler plant at Ris Orangis (91)

Treatment of pharmaceutical micropollutants in water

Treatment of micropollutants in wastewater is a major concern for the pharmaceutical industry.
The production of active pharmaceutical ingredients (APIs) and of pharmaceuticals generates several types of effluent that are highly variable in composition and have different effects on ecosystems if no specific treatment is designed.
Sanofi is dedicated to remove these substances and their by-products from water before final discharge to a waterbody.
Each site will define a specific strategy for the management of wastewater, consisting of:

Source reduction: manufacturing activities are designed to limit the concentration of active substances in wastewater. It is based on the optimization of clean-in-place procedures of pharmaceutical processing equipment, with the development of solutions for the collection of powder before rinsing with water. However, there is a trade-off between the efficiency of source reduction and the impact on the organization of production and on occupational hygiene.

Effluent streams segregation & treatment: the idea is to implement advanced technologies to a reduced flow of effluents, targeting with high efficiency the active substances and related by-products. This solution can be implemented at site or externalized, depending on the volume collected. Usual solutions are chemical oxidation, precipitation and separation, or evaporation-crystallization. Limiting factors are conditions for installation, costs for construction and cost for operations (energy and chemicals consumption).

Conventional wastewater treatment technologies: Scientific literature has demonstrated that combination of conventional physical, chemical, and biological processes to remove solids, organic matter and other contaminants from wastewater can also be very efficient on the degradation of several pharmaceutical active ingredients. Biological treatment is often the most cost-effective solution to manage large volumes of wastewater.

Tertiary treatment such as adsorption of organic-based micropollutants on activated carbon beds, is required when the other strategies are not sufficient to limit the residual concentration of APIs in treated water.

Understanding micropollutant transfers in the Bordeaux Metropole region and mobilising actors to test reduction activities at source

Regard is a collaborative research programme, launched in 2015 and supported by Bordeaux Métropole, which aims to understand and reduce sources of contamination in local water environments caused by micropollutants. The project's scientific coordinator is LyRE, the SUEZ research laboratory based in Bordeaux. Following a diagnosis phase, during which the different types of pollution were characterised from their source (households, storm water, industry and hospitals) through to the natural environment, the programme implemented a social approach to try to understand the practices that lead to micropollutant discharge. Several different solutions were then trialled to assess their feasibility and acceptability.

Forty volunteer families took part in a trial lasting several months, which included keeping an inventory of products used in the home and containing micropollutants (for cleaning purposes, personal hygiene, etc.), raising awareness by explaining what is at stake, and workshops on implementing alternative actions. The families primarily chose to substitute traditional products with eco-labelled, natural or "homemade" products without noticing an impact on their cost or effectiveness

In the hospital environment, the subject is a sensitive one as health is often considered a priority over environmental impact. However, room for manoeuvre was identified in the application of different solutions for different types of building (administration cf. treatment facilities).

For maintenance of parks and cemeteries, "zero pesticide" initiatives should be the subject of visible communication campaigns to ensure their acceptability.

Finally, Bordeaux city centre launched a six-month **mechanical rat extermination trial** in the sewage network. The system proved to be as effective as the use of chemical products and this finding was backed up by the results of a resident satisfaction survey.

Through a methodology that focuses on understanding practices and performing partnership-based trials, Regard has been able to identify the obstacles and opportunities for rolling out action on a wider scale. If impacts on the environment and on public health are to be favourable, a collective awareness on the part of every individual concerned is vital.

2.1.3 Corporate research

Companies often make a significant contribution to scientific knowledge through studies and their ability to detect and assess risks on the ground, listen to employees and carry out health studies, alone or in cooperation with others.

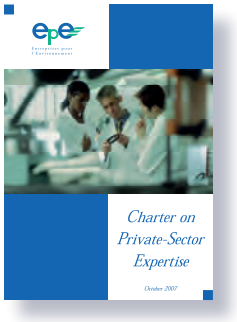
Companies in fact allocate a significant share of their resources to R&D and partner public laboratories which are being encouraged to seek private funding in addition to public funds. Company scientists - or laboratories officially funded by companies - form a reservoir of knowledge on many subjects, especially highly specialized ones. Michelin, for example, has created a tire school in Clermont-Ferrand (France) where young engineers undergo training in the first few years following their recruitment to learn all about specific tire manufacturing processes before joining the company's research and test centres.

Research is, of course, primarily targeted towards product development and performance improvement. Part of it also focuses on the assessment and reduction of risks products may pose for customers, users or after use in the future.

On the other hand, this knowledge is usually confidential, since companies plan to use it to improve their offering in a competitive context. The decision to make it public is a conscious one when the situation calls for it; the basic rule is that the studies are not published, unlike public research whose goal is publication. As a result, corporate expertise in some issues is often overlooked or underestimated.

Studies are also conducted with due regard to corporate interests. Since by nature they are not independent and in any case are perceived as not being so, some stakeholders have reservations about them.

The private sector expertise charter[77] launched by EpE in 2007 was an attempt to voluntarily improve the credibility of corporate entities through the provision of business-financed expertise and studies recognized by stakeholders. The five principles and nine rules underlying the expertise-focused approach are still relevant and could profitably contribute, in relevant public debates, to restoring public trust in the way health issues are studied by companies. However, their reluctance to submit their work to the examination of third parties (other than public authorities) has proved to be a barrier to the conduct of such joint studies.
Nevertheless, some research departments of EpE member companies have used academic research methods to study a number of topics.



2.2. Raising awareness among employees

2.2.1 Embedding health and the environment into corporate values

The maturity of companies on workplace safety issues makes it easier to factor in the impacts of their activities and products on human and ecosystem health.

The vast majority of companies take measures to protect the health of their employees in a wide spectrum of fields, including hygiene, safety, risk detection and prevention, and exposure management.

The onus is on companies and their various partners to take stock of the health risks at the workplace posed by their industrial activities. This includes identifying and assessing risks, implementing appropriate risk reduction actions and measuring results as part of an iterative approach.

To discharge this responsibility, fairly detailed, in-depth knowledge of employee health is essential because it allows pathologies and low risks to be detected before their consequences become too acute. Many EpE member companies adopt such an approach. The best practices described below may be found to be useful sources of inspiration.

(77) http://www.epe-asso.org/en/charter-on-private-sector-expertise-2007/

Protecting people's health

The fair treatment of people working for a global company such as Michelin requires consistent practices on all its sites.

In its commitment to protecting people from occupational risks, the Michelin Group has adopted a health, safety and quality of working life policy.

It is a question of taking into consideration the physical, mental and social aspects of health in accordance with its definition by the World Health Organization[78].

This policy determines the company's long-term ambitions on the basis of the recommendations of international organizations, the new and increasingly demanding expectations of individuals and the group's commitments. The company chooses to respect the most protective standards between its prescriptions and local regulations.

Michelin's commitments are as follows:

- make every effort to protect and enforce respect for the health and safety of its employees, the personnel of outside contractor companies and visitors;

- control the impact of its products and operations on the health of local residents, customers and the public;

- establish working conditions that protect employees' physical and mental health, facilitate a healthy work/life balance and personal well-being, maintain their fitness for work and ensure the broadest possible workstation accessibility.

Compliance with risk control requirements is ensured by Michelin's internal control system. The effectiveness of action plans is measured by means and results indicators and verified by internal and external audit (see the Michelin Group's registration document).

This risk management system is rolled out by an internal multidisciplinary network of specialists (safety, hygiene, ergonomics, health, etc.).

EDF, for its part, has a risk assessment department which makes proposals on what management measures could be implemented to promote health safety across all the company's operations.

Environmental health-dedicated services

The health of workers, local residents and customers is an increasingly important issue for large energy and industrial groups because of a history of health crises (proven and/or publicized); and a growing public concern for the population.

The mission of the Medical Studies Department (Service des Etudes Médicales, SEM) of Electricité de France (EDF) is to assess the public health risks and opportunities related to the Group's activities. It thus contributes to its health security.

One of the originalities of the SEM is to be involved in environmental health research, by designing and carrying out experimental or epidemiological studies with external partners (universities or research organizations). For example, research conducted by the SEM on electric and magnetic fields has led to the publication of over seventy scientific articles in peer-reviewed journals and the publication of reference books.

Moreover, the definition of health risk assessment methodologies has always been at the center of its concerns, for example, in the 1990s, on the question of the reuse of land from former gas plants or more recently on the issue of multiple exposures and that of endocrine disruptors.

Today, the SEM is a service integrated into the EDF Group, and bringing together synergistic expertise in environmental health and working on industry challenges with industrial issues. It enables all EDF Group entities to provide consistent and relevant answers that are useful both in the context of regulatory requirements and in the consideration of stakeholders. The strong medical component of the service increases its legitimacy in this sensitive area of health.

(78) Defined by WHO in 1946, and unchanged since, health is internationally known as "a complete state of physical, mental and social well-being, and not merely the absence of disease or infirmity".

2.2.2 Developing risk reduction tools

The methods for studying the relationship between environment and health have improved significantly and now include assessment of risks from low doses and multiple exposure.

The rapid development of decision-making tools in environmental health is largely thanks to the multi-faceted strategy adopted by professional associations and informal or permanent networks.[79] The diversity of industrial activities implies a diversity of management plans and tools.

Adapting to the specific needs of trades and sectors involves the development of management tools and aids readily comprehensible to all operators, as shown in the example below.

Deploying Quarks tool to identify and assess risks

Chemical risk management is an integral part of Vallourec's Health and Safety policy. Knowing which chemical is used, under what conditions, how to protect the user, allows to put in place appropriate protections. Upstream, the detailed analysis of the Safety Data Sheets in relation to the regulation makes it possible to select or not products for the future developments and thus to anticipate the protection measures to be provided, the necessary budgets and to reduce the risks as much as possible.

Establishing common rules is not enough to manage and monitor changes in local and national regulations as well as multilingual supplier documents. The use of "classic" tools such as an Excel spreadsheet quickly becomes limited.

Quarks Safety is an IT solution that helps with chemical risk management. Improvement work with software developer helps to better adapt it to Vallourec's policies and procedures. It was then deployed on all sites in order to standardize practices and rules. The authorization circuit for new products as well as the risk assessment standard of Vallourec was integrated, which made it possible to implement a real group policy with shared common standards, regardless of the country and the level of local legislation. This online system is not just a database of Safety Data Sheets. Useful and fast, it allows a large amount of information to be disseminated for all concerned personnel. Its user-friendliness and ease to operate make it a very intuitive tool that has been adopted quickly by all sites. Automatic extraction of data, links to legislation, and multi-language make it an advanced tool that greatly assists in the day-to-day management of chemical risk.

(79) Franck Boutaric, « L'appropriation de la méthode de l'évaluation des risques sanitaires en France », *Écologie & politique* 2010/2 (N°40), p. 117-135.

Adopting a simplified method of assessing health risks

The diversity of operational contexts and the growing concerns of populations regarding environmental health have led Total to carry out an inventory of the various chronic health risk assessment methods used within the group.

The review of regulatory requirements in the 130 countries in which Total operates showed that a health impact study was often required but that the associated methodology was not always specified. When it was defined, its implementation could be complicated for the teams: choice of models, Toxicological Reference Values, measurement techniques, etc.

Having carried out an inventory of the health risk assessment methods used internally, it seemed interesting to also carry out a "preliminary" step before the main health risk assessment. A preliminary risk assessment methodology has therefore been developed.

The preliminary analysis of chronic risks makes it possible to present to the parties concerned (managers, employees, partners and other stakeholders), in an explicit, rapid and simple manner, the elements to be studied in more depth and for which risk control actions are to be expected.

This method is based on:

- the source of emission and the quantities of substances emitted,
- the target factors to be considered: the quantity, the danger, for the population the distance and the density, the meteorological parameters simulated by site,
- data from research laboratories on air quality and water / air / soil transfers.

The result obtained is classified according to three risk levels for which a management plan to be implemented is defined.

To validate the methodology created for this preliminary analysis, sites representative of Total's activities were chosen with the aim of comparing the results of the generic calculations obtained with this method and the results of the assessments previously carried out.

The creation of this preliminary health risk assessment method has made it possible to bring simplicity, efficiency and harmonization of practices within the group.

Partial view of solar farm and storage tanks (Mède refinery)

The hazardous character of some chemical substances suggests the need to go beyond the scope of current regulation. Employees' multiple exposures reinforce this need, as exemplified below by Veolia's best practice of engaging beyond regulation.

Tool for assessing and prioritizing chemical risk at the workplace

The treatment and recycling of hazardous industrial waste could result in operatives being exposed to chemical agents that may have adverse effects on their health. The definition of occupational exposure limit values is a big step in employee protection. However, these values can sometimes prove inadequate for employee health protection and may be inappropriate for the purpose of factoring in multiple exposure to mutagenic and carcinogenic agents.

In this context Sarpi, a specialist subsidiary of Veolia Group, has sought to complement the regulatory approach by developing an integrative risk assessment methodology based on toxicological reference values for the population at large which have been adjusted for the professional environment. This methodology uses health data to measure average concentrations of chemical agents detected in the air at a facility's more heavily frequented areas, to factor in the distribution of employee working time in those areas, and to prioritise risks according to the nature of chemical substances and homogeneous exposure groups.

The web interface created in collaboration with Veolia Research & Innovation, or Cheops (chemical risk prioritisation tool based on exposure at workplaces: an occupational prevention system), is accessible to all Sarpi HSE operatives and managers. From concentrations of chemical agents detected in the air at workstations, it assesses operatives' health risks and defines the prevention measures to be implemented by testing different scenarios (type of collective and/or individual protection equipment, work organization) and ensuring exposure traceability required by law. Assessing how prevention measures influence risk levels helps raise awareness among people in charge of preventing[80] chemical risks as well as operatives exposed to those risks.

2.3. Communicating on environmental health

2.3.1 Openness and communication with stakeholders

French people's level of trust on public health issues is among the lowest in Europe[81] The contaminated blood case, growth hormones, Mediator, the Chernobyl cloud, and asbestos are examples of health crises and the politicisation of issues which have strongly eroded French people's trust in the ability of its government or the European Commission to manage health risks and ensure health safety. Scientists and experts are also fallible due to their failure to anticipate or disclose risks[82].

(80) https://www.emploi-environnement.com/fr/dico/fiches/metier_responsable_prevention_preventeur_de_risques.php4
(81) W. Dab, *Santé et environnement*, Presses Universitaires de France, 2012.
(82) M. Goldberg, « Le hasard et la nécessité : le cas de l'amiante », *La revue pour l'histoire du CNRS*, 2007.

More recently, in late 2018 IGAS and CGEDD released two reports on the French government's third National Environmental Health Plan (PNSE 3) in force between 2014 and end-2019[83]. The reports criticise and highlight the climate of mistrust of public and private institutions, a point taken up by the media.

Yet the tools exist to restore trust between health actors and to develop collective solutions, as we have seen throughout this publication. The NanoResp forum created in 2013 is born of this need for reconciliation and to listen.

Feedback from the NanoResp Forum

To manage health and environmental risks, BASF carries out evaluations of its products thanks to experts in toxicology, ecotoxicology, product stewardship and R&D. Relying on these expertise, the group has implemented a proactive approach to systematically evaluate its entire portfolio of solutions through the Sustainable Solution Steering concept, allowing to have a vision as close as possible to its portfolio and to develop it in a constant process of progress.
This panel of technical tools helps the group controlling its risks robustly. However, risk management is not simply limited to scientific criteria.

Consumers are getting increasingly demanding in terms of transparency and traceability, but they build their opinions on a more emotional than scientific base. The multiplication of messages and the spread of information acceleration through different media channels and social networks dig a gap between the experts' community and the general public.

Thereby, companies feel the need to better understand the concerns of the civil society. It is in this context and with this objective that BASF decided to join since 2013 the Nanoresp Forum, a dialogue platform around questions about nanotechnologies.

This dialogue space allows to exchange with the different representatives of environmental organizations, consumers, unions and scientific institutions.

These discussions were useful to identify more precisely the preoccupations of the civil society regarding nanomaterials. These questions are reported internally to the teams in charge who were able to integrate them in their way of managing these products (availability of more data, intensification of the dialogue with the clients ...)
This is particularly important since the teams may be in different regions of the world and then might be far from specific questions raised by stakeholders in France about the use of nanomaterials, in food or cosmetic products for example.

Therefore, this type of approach is useful to anticipate emerging topics as well as to integrate, in the products' management, societal criteria linked to the acceptability of the proposed solutions, the benefit/risk balance, or to other factors.

Note however that the dialogue with the stakeholders is a demanding process, on the long term and requiring a sincere and responsible commitment from everyone. This work is always rewarding, but its benefits are not systematically measurable. It must be adaptable over time, according to the stakeholders' needs and topics of interests; the commitments and benefits must be shared.

To know more on NanoResp:
http://www.nanoresp.fr/

(83) « Santé-environnement : 110 mesures, pas d'effets », *Le Monde*, 9 juillet 2019.

Innovative and collaborative tools, which are the product of dialogue with stakeholders, have been created by companies to address the concerns of people. The example of transparency and educational initiatives conducted by RTE to reveal the health effects of electrical and magnetic fields shows the importance of long-term action, because controversies can be quelled for some time, but can be revived anytime.

a MOOC to answer questions from the public on electromagnetic fields

40 years ago, questions regarding possible health effects of extremely low frequency electromagnetic fields (ELF-EMFs), such as those generated by domestic appliances and electrical grids, were raised by an American study published in 1979.

Since then, a significant amount of scientific research has been carried out in France and abroad by independent bodies, with a continuous improvement of the protocols and methods of experimental and epidemiological studies. At present time, no health effect has been confirmed by health authoritative bodies (national, European, and worldwide) and no causal relationship has been established between the exposure to ELF-EMFS and possible health problems.

For RTE, the French transmission system operator, corporate responsibility is first of all to not overshadow any questioning from the public. Regarding EMFs, RTE's communication policy aims firstly at presenting a transparent and fair information. For instance, in agreement with the Association of Majors of France, RTE is committed to answering to any question on EMFs, this may include field measurements when requested. All measurement results made by independent laboratories are published online on a dedicated website (https://www.cem-mesures.fr/).

However, it is clear that these efforts may be impaired by the technical complexity of the physics and of the biomedical aspects of the issue.

To facilitate comprehension, RTE has developed a Massive Online Open Course (MOOC), which includes a series of short educational videos, each of them dedicated to the understanding of the physics and the biomedical research, the state-of-the-art of the health and EMF issue, and the legislation in France and Europe. The educational content has been discussed with the health authorities and also with a dialogue committee of a local project of grid development.

https://mooc.cem-50hz.info/

2.3.2 Responding to a crisis

In environmental health, despite their alertness many companies have to deal with highly publicised health crises. These crises produce significant costs and strong expectations among the population in general and employees in particular. Some media outlets have made it their vocation to cover such stories and take advantage of a company's image problems by continually replaying witness statements that criticise its products.

"Crisis seems to be the new standard in communication", according to Thierry Libaert[84]. No company is any longer immune to the revelation of proven or misleading facts. It is difficult for a private person and even more for a collective organisation to hope to conduct its activities in secret. All communication runs a strong risk of becoming public, feeding interpretations and controversies. Businesses face a double paradox: the more they remain silent, the greater the risk they face of letting false information spread; the more they delay making a statement, the more their detractors can exploit their justifications a posteriori.

As transparency takes on greater importance in our societies, businesses seek to control as best they can the image they project and their stakeholders relay. Ill-managed environmental health risks are a breeding ground for crises that social media will amplify as never before.

"Most of the time it is the difficulty of properly managing situations of uncertainty that foments a crisis", explains health crises specialist, William Dab[85].

Several business experts have noted how in a crisis communicating relevant information to employees at the right time through the right representatives is paramount[86]. These people are in fact spokespersons close to the public and their families and friends all the way to social media.

Crises can also prove to be opportunities by enabling better management of operations. Prevention is ultimately inseparable from awareness and the building of trust in the activities of businesses.

2.3.3 How far? The constraints of information management

As we have seen, dialogue with stakeholders is essential. It nevertheless raises issues for business, particularly what degree of openness to adopt.

Several considerations impel companies to limit access to their data:

- **competition:** any openness to stakeholders comes with the risk of information being leaked to competitors on the solutions identified by the company; it is for this reason that the dialogue initiated by IDDRI in 2009 on the substitution of products following the adoption of REACH led nowhere[87]. There are solutions to overcome this difficulty, but they reduce the benefits of the exercise. It is possible to get proof-readers to sign confidentiality agreements prohibiting them from disseminating sensitive information which they have accessed, but they are then themselves prevented from communicating on the risks other than with the source company;

- **use-related risks:** some stakeholders may not be especially well-meaning and instead divert the information acquired against the interests of the company. This fear is a huge obstacle to openness. Companies are concerned about losing control over the use of their data, knowing that this area, in our knowledge civilisation, is one of the cornerstones of their economic model.

This issue of managing the use of information sets businesses apart from scientific institutions. Science produces open information, while businesses benefit from the asymmetry of information between one company and another, including in situations of uncertainty. This thinking explains why some attempts at cooperation have been unsuccessful. EpE's private sector expertise charter[88], whose aim was to give full scientific legitimacy to some studies produced by companies, has not been used for that purpose because it required businesses to behave like scientific institutions. The Rovaltain Foundation[89], which specialises in ecotoxicology and environmental health, in the past offered to assemble teams of scholars bound by a confidentiality undertaking to carry out reviews of industrial studies on a voluntary basis. So far, this scheme has not met with success.

"A door must either be open or closed": this proverb is also true for business - one cannot be both a business and a scientific institution.

This defines the boundary between the voluntary action of business and government action: public authorities are the only entity that is both a trusted third party between private actors and civil society and a regulator capable of obtaining access to confidential information in the public interest.

(84) T. Libaert, *Communication de crise*, Pearson, 2018 et son blog https://www.tlibaert.info/
(85) W. Dab « Gestion des crises sanitaires », *Techniques de l'ingénieur*, juillet 2017.
(86) https://www.greenfacts.org/en/index.htm
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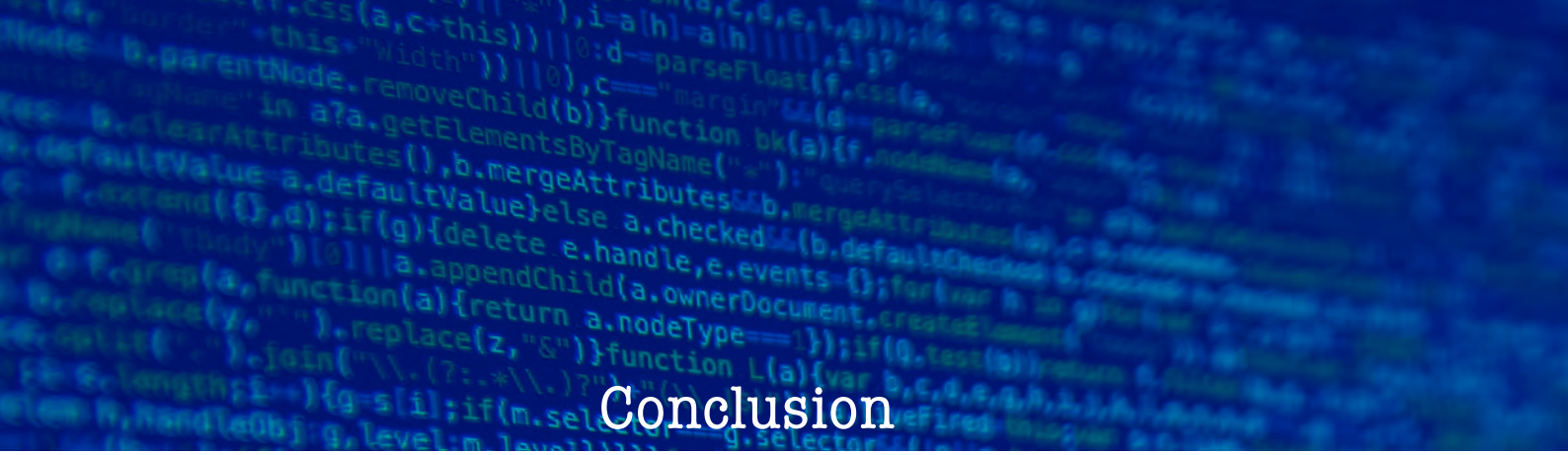
(88) See for more details, 2.1.2 of this publication on company research.
(89) http://www.fcsrovaltain.org/



Conclusion

The world seems more secure: life expectancy has never been greater and diseases are for the most part treated.

Yet, new, increasingly indirect or non-attributable risks are emerging. Longer and more complex causal chains are appearing between types of substances, environment-related exposures and malfunction of one or other natural regulation of our body.

In the face of these diffuse risks, should curative or preventive action be collectively encouraged?
The natural tendency is for customised curative action, funded by social security schemes that provide an immediate response to each individual, while preserving our current economic and regulatory models. However, preventive action could be an economically viable alternative collectively, or at least serve as a significant complement. The precautionary principle undoubtedly calls for more intense preventive action, longer tests and closer monitoring prior to the mass distribution of new technologies. Is the recent release of GMO mosquitoes in Burkina Faso[90] to counter the spread of the tiger mosquito and the diseases of which it is the carrier in line with the precautionary principle? Who decides and within what time-span? If this experiment succeeds, where will the spread of technologies lead our societies, and with what consequences for already endangered biodiversity? Renewed collective governance challenges face humankind.

New risks evoke the image of a globally riskier world, a representation supported by the scientific community, lawmakers, NGOs and the media. This collective pressure encourages citizens to be careful and businesses to strengthen their internal control systems, together with their management of health, legal and reputational risks.

Companies are taking these issues seriously and working to factor them into their operations and product life-cycle analysis. While they still communicate little on the potential risks associated with certain uses of their goods and services, they are making progress by developing them in the direction sought by public opinion, including greater traceability and health safety over time. They are also intensifying dialogue with all their stakeholders and not just governments.

In environmental health, businesses need public authorities to define collective governance and the dynamic balance between preventive and curative approaches, between product risks and benefits, and between innovation and precaution. **NGOs and people create the conditions for the exercise of regulatory public power.** For businesses, watchfulness, humility and openness appear to be three conditions for progress and the achievement of sustainable development goals.

(90) DAFP dispatch, 22 October 2018.

About EpE

Entreprises pour l'Environnement (EpE), a French association set up in 1992, is a forum for dialogue between business leaders and environmental managers and policymakers who share the vision of the environment as a source of progress and opportunity, exchange their best practices and work together to take better account of the environment in their strategies and operations.

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Acknowledgments

This reports is the product of the work carried out by **EpE's Environmental Health Commission** which met between 2016 and 2019, under the chairmanship of Jean-Christophe Bligny, Environment Director at Sanofi Group. Authored by EpE, it collects the experience and best practices of EpE members, along with the insights of many environmental health experts. EpE thanks the representatives of member companies who have shared their experience and participated in work meetings. EpE also thanks the external experts, scientists and representatives of public authorities and associations for their contributions to this publication (some of which have been reproduced), and for their work in the commission: Régine Boutrais (ANSES), Prof Jorge Boczkowski, (INSERM/Pollu-Risk), Anne Dux (FEBEA), Barbara Allen (Fos Epseal), Élodie Brelot (GRAIE), Jacques de Gerlache (Greenfacts), Vivien Mallet (INRIA/Ambiciti), Barbara Demeneix (MNHN) and Raphaël de Thoury (Nano Inspect). Thanks must also be expressed to Annie Aujon-Aleksy (Octobre-Novembre graphic designer agency), Maëlys Bandiziol, David Laurent, Aliénor Martin-Périder and Annabelle Prin-Cojan for their respective contributions, as well as to Govind Bhinder from FEAT for the English translation. EpE thanks Sylvie Gillet, Manager of the Biodiversity and Environmental Health Section, who prepared a summary of the studies.

Claire Tutenuit, General Secretary, EpE

Factoring in environmental health issues facing businesses

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