Resources: Chemicals

Sustainable Development Sectorial Analysis Framework

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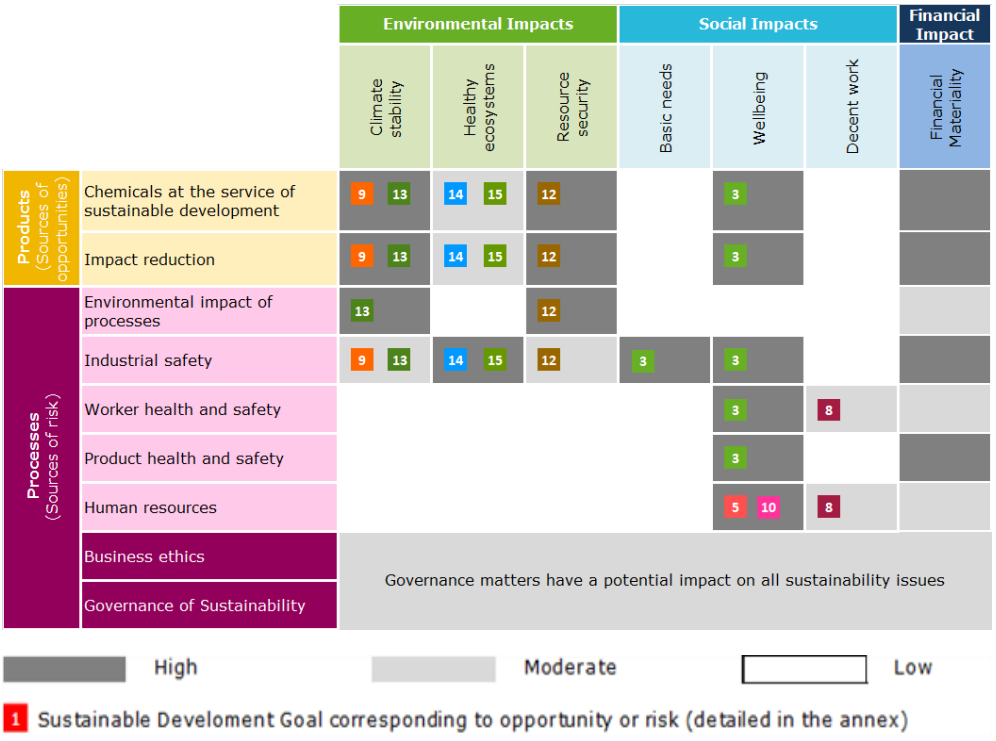
Sectors: Basic and specialty chemicals, industrial gases.

This is a methodological document aimed at clarifying how Mirova takes into account sustainable development issues in the framework of the environmental, social and governance analysis of each sub-sector of activity.

The chemical sector is characterized by its variety of products and applications. Players dedicated to one business (industrial gases, for example) rub shoulders with conglomerates integrating a broad spectrum of basic and specialty chemical products dedicated to various customer industries. Additionally, in a complex market environment, some players choose to change their positioning.

By developing innovative applications, or by changing their production processes (development of catalytic processes, implementation of green chemistry principles, etc.), chemical manufacturers have the opportunity to play a significant role in the fight against environmental degradation. However, the sector remains highly exposed to the risks of product toxicity, both for humans and ecosystems. Companies must therefore integrate these risks into their practices and assess their importance in order to reduce them adequately.

Major sustainability challenges for the sector



Source: Mirova, 2019

Table of contents

Sustainability Opportunities

E Chemicals at the Service of Sustainable Development

95% *of manufactured products include chemical components*

(ICCA, 2015)

The chemical industry – "industry of industries" – has a very wide range of applications and customer sectors. It is a tool at the service of all industries. Chemicals are present in almost every object in our daily lives, often discreetly - from soap to food by way of our smartphones. It can also be used to treat waste water, or to dye clothes.

Basic chemicals are typically simple products, manufactured in large quantities but with low added value. They are rarely associated with very green end uses, as evidenced by the example of plastics for packaging. Conversely, specialty and fine chemicals are driving the development of innovative solutions to meet new challenges.

Today's new environmental transition technologies require innovation from the chemical sector. For example, the development of solar energy requires the treatment of silicone for the production of photovoltaic panels, and that of electric vehicles is highly dependent on the ability of the chemical sector to design solutions to improve the electrochemistry of battery energy storage solutions[1].

On another theme, chemicals also make it possible to develop advanced, more efficient, cleaner water treatment solutions, and therefore serve the companies dedicated to this activity.

Finally, in the field of healthcare, chemicals are at the heart of tomorrow's medical developments: industrial gases are notably used as medical gases in hospitals, but also key in the development of home care.

Therefore, players in the chemical industry can position themselves at the service of the environmental or social transition sectors. As they are key to the development of these sectors and will benefit from their structural growth, companies directing their activities towards these sectors will be favored as part of an SRI impact strategy.

We will value players strongly oriented towards sectors naturally exposed to environmental or social transition: health, water, renewable energies, electric mobility, etc.

Key indicators

- Share of revenue from positively exposed sectors
- CapEx and/or part of the R&D budget dedicated to these sectors

[1]The role of chemistry in the development of electric vehicles is developed in the study "The electrification of transportation: a solution for the ecological transition" published by Mirova in April 2019.

E/S Impact Reduction

A chemical company can also offer sustainable development opportunities by offering products that provide an environmental or social benefit compared to current common practices. In order to identify them, the following question must be asked: compared to a *Business as Usual* situation, does the use of the product provide an environmentally or socially interesting solution? If this is the case, products for a variety of sectors – from automotive to energy, building and consumer goods – will be evaluated favorably.

25% of the emission reduction potential of the 2°C scenario is linked to the chemical and petrochemical sectors

(OECD/IEA, 2015)

Typically, industrial gas companies can use different applications of their products to improve the efficiency of their customers' production processes, like oxy-combustion, which optimizes the combustion processes of heavy industrial sectors such as metallurgy.

A number of players in the chemical industry are also present on the market for materials (e.g. membranes) that improve the insulation of buildings and thus their environmental performance.

In the transportation sector, catalytic converters reduce pollution from internal combustion vehicles, and technologies to reduce SOx emissions from maritime transport are also being developed in response to regulatory changes in the transportation sector. In this case as well, the chemical industry is the one driving these developments, and which will benefit directly from the growth of these markets.

The issue of bioplastics and the value of their development deserves to be addressed. Whether biosourced or biodegradable, bioplastics as a whole still represented only 0.6% of global plastics production in 2017, and their growth, as estimated by the industry association "European Bioplastics"[2], will not be able to cover 1% of plastics production by 2022. Today, the majority of bioplastics are actually plastics made from food resources (mainly sugar cane and corn), which does not seem to be a timely development path given the increasing pressure on food resources. Indeed, population growth, changing diets and climate change will create huge challenges to ensure tomorrow's food security. On the other hand, so-called second-generation bioplastics alternatives, i.e. produced from agricultural waste, or bioplastics produced from other materials such as algae, may present interesting opportunities from an environmental point of view, even if they remain very marginal today and their development in the short and medium term faces technical and economic challenges.

Biochemistry is another high-potential field of innovation. The exploitation of biological resources in chemical processes allows significant optimization of industrial processes. Enzymes, for example, are natural catalysts, which can therefore significantly reduce the consumption of a process (in energy or inputs). Nowadays, they are widely used in products such as laundry detergents, but their field of application is widening thanks to innovation. Other applications of biochemistry will be addressed in the study "Resources - Agriculture and Forestry".

[2] *https://www.european-bioplastics.org/*

The analysis of a chemical company's exposure to sustainable development opportunities therefore requires a detailed understanding and analysis of its product portfolio and associated applications. A company with a significant portion of its activities dedicated to solutions that improve the state of current environmental or social practices will be evaluated favorably.

Key indicators

- Share of revenue from solutions that improve the state of practices
- CapEx and/or part of the R&D budget dedicated to the development of social or environmental solutions

Exposure to Opportunities

	Indicators considered : % of revenue from sectors contributing to sustainable development + % of revenue from products/applications that improve the state of environmental or social practices	
High exposure	>50%	The analysis of the CapEx and the R&D budget dedicated to activities with opportunities allows us to qualitatively nuance the analysis based on revenue
Significant exposure	Between 20 % and 50 %	
Low or no exposure	< 20 %	
Negative exposure	No activity in the Chemistry sector is currently evaluated at this leve	

Environmental and Social Risk

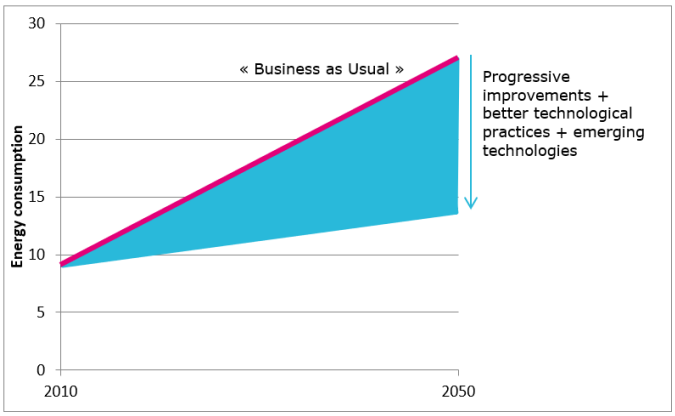
E Environmental Impact of Processes

30% of the industrial energy demand is due to the chemical sector.

(IEA, 2013)

Chemistry is the industry that consumes the most energy, and is distinguished by the large proportion of this energy from oil and gas derivatives that is used as raw materials. While the sector's energy intensity has already been sharply reduced (-60% between 1990 and 2015 in Europe (CEFIC, 2017)), the International Energy Agency [3] considers that it has significant potential for further reducing this impact.

Figure 1: Potential savings in the chemical industry by 2050 for the first 18 chemicals



Source: Mirova / (DECHEMA, ICCA, IEA, 2013)

60%: the reduction of the energy intensity of the European chemical sector between 1990 and 2015, with a significant residual potential.

(CEFIC, 2017)

In the coming decades, the potential for reducing the energy intensity of the sector lies in process improvements, in particular the development of catalytic process solutions, as well as in the deployment of disruptive technologies such as the use of raw materials from biomass or hydrogen produced from renewable sources.

Many production processes also generate air pollution (SOx, NOx, VOCs contributing to atmospheric acidification) or even soil and water pollution. Stricter environmental regulations require companies to monitor their impact to some extent. Typically, between 2001 and 2010 in Europe, SOx and NOx emissions decreased by 54% and 26% respectively. Nevertheless, these constraints are not homogeneous from one country to another and do not necessarily ensure satisfactory control of environmental risks.

[3] *https://www.iea.org/*

We encourage companies in this sector - as in other industrial sectors with a high environmental impact - to work actively to reduce their environmental footprint by optimizing the energy efficiency of processes, the consumption of water and non-renewable inputs, in particular through the development of the use of recycled chemical compounds or renewable inputs (biomass in the case of green chemistry), etc.

Key indicators

- Presence of a formal policy, monitoring indicators, quantified targets on key environmental issues (energy, greenhouse gases, water, raw materials, etc.).
- Performance: evolution of impacts over the last years

E Industrial Safety

Beyond its environmental impacts, the chemical industry is also among those most exposed to the risk of accidents. These accidents can have repercussions on the environment (emissions or discharges of polluting or hazardous materials into the air, water, soil) but also on human health. Some major accidents are infamous for having marked the history of the industry, among them:

- Seveso, Italy, 1976 (which gave its name to the Seveso Directive in 1982): dioxin leaks equivalent to 500,000 fatal doses to humans; 15,000 people evacuated; 110 ha on which all buildings were razed to the ground; traces of dioxins found in local milk and meat 12 years later - it is estimated that dioxins will remain in the soil until around 2040.

- AZF, France, 2001: explosion of a stockpile of 300 tons of ammonium nitrate digging a 70m-long, 40 m-wide and 5 to 6 m-deep crater; detonation heard more than 80 km away; earthquake of a 3.4 magnitude; 30 dead and more than 2,500 injured.

- More recently, Tianjin – quoted on the left.

173 people died and 800 were injured in explosions at a chemical warehouse in Tianjin, China, in August 2015 – equivalent to the explosion of 24 tons of TNT. About 100 tons of cyanide and other pollutants spilled will persist for hundreds of years in land and water in dangerous amounts

(Beijing, 2015)

Players in the chemical industry must therefore strictly ensure the safety of their operations, from the transport of raw materials to their storage and industrial processes.

An analysis of industrial safety management practices makes it possible to favor companies that have implemented robust processes to reduce these material risks. The analysis of the company's history, particularly in cases where accidents have occurred in the past, completes the assessment.

Key indicators

- Company's incidents history
- Formal processes ensuring the deployment of industrial safety procedures on all the company's sites

S Worker Health and Safety

€120M fine paid by Eternit in 2012. They were found guilty of manslaughter related to the exposure of their employees to prohibited asbestos substances.

(Chemsec, s.d.)

The chemical sector is both highly industrial and highly exposed to product toxicity issues. Therefore, worker health and safety are both key issues.

Beyond the risks associated with an on-site accident, exposure to even small amounts of toxic substances can have long-term impacts and cause occupational illnesses.

Companies must implement occupational health and safety policies along with management systems and concrete actions and processes. An increasing performance must reflect the importance attached to this subject. Employee exposure to potentially toxic substances must also be closely monitored.

Key indicators

- Presence of a policy, monitoring indicators for occupational accidents and diseases, quantified objectives on key issues
- Evolution of performance over the last years

S Product Health and Safety

€157bn

This is the estimated annual cost for Europe due to current exposure to endocrine disrupters.

(Trasande, et al., 2015)

There are regulations allowing some control over the production flows of chemical substances, such as REACH[4] in Europe. However, these regulations are very heterogeneous from one country to another and do not necessarily prohibit the production or sale of substances identified as toxic by reference bodies or regulatory authorities. Companies in the sector therefore have a responsibility to make voluntary commitments to reduce the toxicity of their products.

Major regulatory changes are also being considered in different geographical areas, whether in Europe on the subject of endocrine disruptors or in the United States. The implications will be significant for the sector, and lobbying activities on this issue are frequent, with companies advocating methodologies for assessing levels of risk that would be favorable to them.

On these subjects, certain players stand out for their proactive approach: upstream of regulations, the identification of substances at risk in their activities and an appropriate exposure reduction plan demonstrate a responsible commitment on the part of the company, as well as an ability to anticipate and prevent the costs associated with future regulations.

[4] *https://echa.europa.eu/regulations/reach/legislation*

Product risk management processes must be defined and implemented.

In addition, the company must know its level of exposure to substances identified as toxic and be completely transparent on this issue. We also expect the company to define an appropriate strategy to reduce this exposure. This expectation will be reinforced in the case of companies operating on products banned for sale in certain countries.

Key indicators

- Company's exposure level to active substances identified as toxic by reference bodies (WHO, EFSA) and to products banned for sale in at least two countries;
- Response to this exposure (targets to reduce it and to stop using some, etc.)
- Presence of a formal risk management policy for use
- Potential existence of product-related controversies and analysis of company reaction

S Human Resources

Human resources management is an important subject for all sectors. A company's ability to attract and retain talent, provide a professional development framework and a balanced work environment are all aspects to consider.

In the chemical sector, some companies have problems related to difficult working conditions, particularly on production sites. The existence of jobs potentially exposing employees to toxic substances can be properly managed if the company ensures that the employees concerned will benefit from mobility and will not remain in such positions for too long. Nevertheless, this mobility is an additional form of hardship and a possible source of stress for employees.

In recent decades, some segments in the chemical industry with low added-value have suffered from increased competition on their markets and a decline in the profitability of their activities. As a result, many companies have been forced to close certain production lines, sometimes with a significant social impact. In the event of restructurings, the programmes proposed by the company to ensure responsible management of the employees concerned will be carefully analyzed.

When analyzing the human resources practices of a company in the sector, we will pay particular attention to skills management, specific provisions for employees exposed to difficult working conditions and, where applicable, the responsible management of restructurings.

Key indicators

- Restructuring: Presence of plans, percentage of workforce reduction, existence of a responsible management process
- Level of formalization of skills management plans and management of difficult jobs

G Business Ethics

The chemical sector is not exposed to risks that would be specific to it.

The main controversial issues in this industry are related to product safety and environmental impacts (accidents or non-compliance). Nevertheless, more general topics related to business ethics, such as corruption, are subject to in-depth analysis in the context of controversies.

The risk assessment related to business ethics mainly involves a detailed analysis of the controversies that have affected the company, and the company's reactions, whether on the core subjects of the sector (product safety, environmental accidents, etc.) or on more cross-cutting issues such as corruption.

Key indicators

- Ongoing litigation and fines paid
- Severe controversies related to business ethics and company responses
- Tax rate

G Governance of Sustainability

The integration of sustainable development into corporate governance is a vector for a deep transformation of the organization and guarantees the robustness of the overall extra-financial strategy. An advanced sustainable development governance, integrating all stakeholders and mobilizing them as part of a long-term vision of the company’s mission also helps generate more sustainable structural growth.

We encourage companies to set up governance bodies dedicated to corporate responsibility. We also support the establishment of mechanisms for the integration of all stakeholders, as well as the alignment of executive interests with the long-term development of the company.

We are also attentive to the company's effort in order to ensure an equitable distribution of value among all the stakeholders.

Key indicators

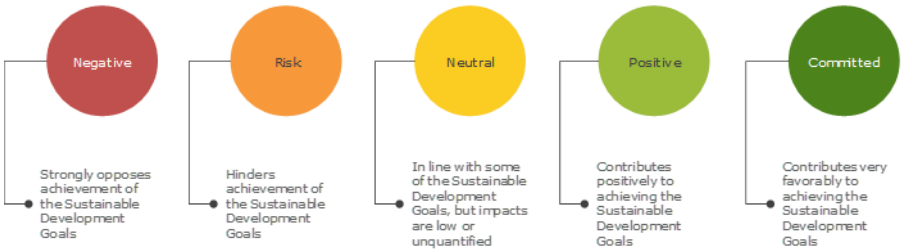
- Quality of the sustainable development approach
- Presence of a director or a committee within the Board specifically in charge of CSR issues
- Integration of extra-financial criteria in variable remuneration schemes
- Equitable distribution of value and tax rate

Risk Assessment

	Criteria
Positive	Does not meet « Risk » criteria AND Absence of exposure to active substances identified as toxic by reference bodies (WHO, EFSA) (or identified target for phase out), absence of exposure to products banned for sale in at least two countries (or identified target for phase out). AND satisfactory management of worker health and safety issues AND satisfactory management of industrial safety risks AND satisfactory management of environmental risks
Neutral	All other cases
Risk	Repeated controversies with insufficient or inadequate company response OR - Lack of satisfactory management of health and safety risks OR - Sale of chemicals banned in certain countries without a 3-year target for phase-out (limit: 2% of sales) OR - Industrial activities with significant direct environmental impact and lack of management of the issue (monitoring of environmental indicators)

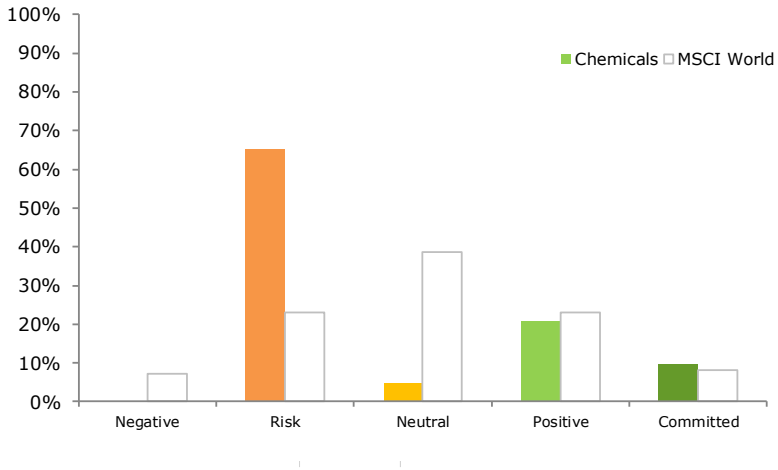
Opinion Breakdown

A "Sustainability Opinion" on a five-level scale is defined for each issuer/project.



The following figure illustrates the distribution of Mirova's Sustainability Opinions for the companies in this sector found in the MSCI World index.

Figure 1 : Sustainability Opinions of the Chemical sub-sector vs. MSCI World Index[5]



Source: Mirova, 2019

The majority of companies in the sector are not exposed to specific sustainable development opportunities, nor do they demonstrate very advanced extra-financial risk management. Given the criticality of risks in the sector, a company will be rated "Risk" by default if it fails to demonstrate the robustness of its management of environmental and social issues. For these reasons, the proportion of companies in the Chemical segment rated 'Risk" is significant.

Conversely, there is a significant correlation between companies whose activities and products are oriented towards sustainable development and companies with a mature understanding of their responsibility for environmental and social issues, i.e. integrating non-financial issues at the heart of their strategy and in the conduct of their business. Thus, few companies are rated "neutral", but a higher proportion of companies are rated "positive" or "committed".

[5] *https://www.msci.com/world*

Conclusion

The chemical sector presents many opportunities. Many product developments enable progress in terms of the environmental footprint of client industries, and in a more disruptive way, whole areas of the environmental transition depend on the chemical sector's ability to innovate (the development of electric vehicles, for example).

However, it is also a highly industrial sector which is strongly exposed to major environmental and social risks, producing numerous potentially toxic compounds or compounds with known dangerousness: therefore, employee health and safety, industrial safety, product safety and environmental impacts represent important issues. The materiality of these risks is proven, and we will therefore favor companies that demonstrate robust risk management.

On the other hand, a company for which we identify risk management shortcomings may be excluded from our investment universe and will be the subject of engagement actions on our part: we will encourage it to initiate or strengthen certain actions or practices in order to meet our expectations as a responsible investor.

Sustainable Development Goals

1. End poverty in all its forms everywhere

2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

3. Ensure healthy lives and promote well-being for all at all ages

4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

5. Achieve gender equality and empower all women and girls

6. Ensure availability and sustainable management of water and sanitation for all

7. Ensure access to affordable, reliable, sustainable and modern energy for all

8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

10. Reduce inequalities within and among countries

11. Make cities and human settlements inclusive, safe, resilient and sustainable

12. Ensure sustainable consumption and production patterns

13. Take urgent action to combat climate change and its impacts

14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

15. Protect, restore and promote sustainable use of territorial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

http://www.un.org/sustainabledevelopment/sustainable-development-goals/

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