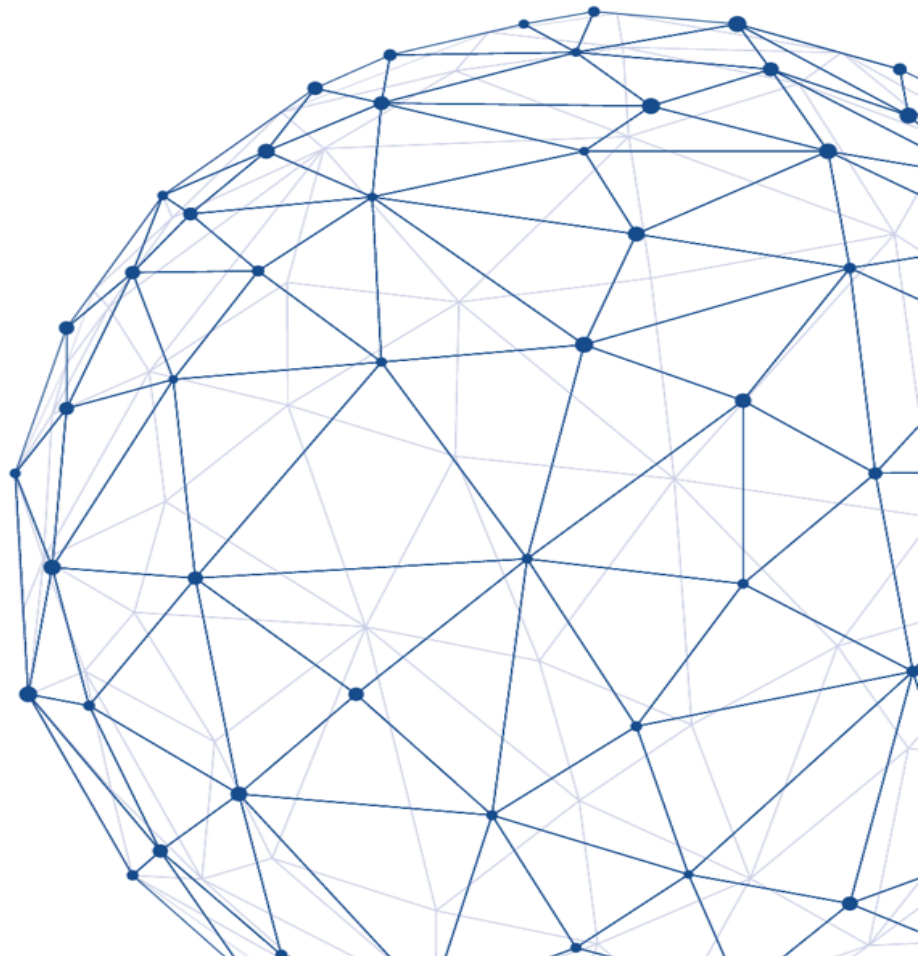


ESG considerations for chemical company credit ratings

Chemical companies face significant ESG challenges throughout the industry value chain. Increasingly intense scrutiny from regulators, policymakers, investors, and customers plus rising costs are making chemical companies monitor the environmental impact of their facilities and products more closely with a view to reducing their harmful effects. Social factors such as health and safety in the production process are gaining further prominence as they can significantly impact corporate performance. In this document, we analyse the ESG factors most relevant for the credit ratings of chemicals suppliers.

Scope Ratings GmbH, 12 July 2023



1. General ESG framework at Scope

Our ESG framework provides insight on the extent of which ESG factors are credit-relevant for different industries. We provide an overview of how ESG factors are typically integrated into our credit analysis. Our evaluations are not mutually exclusive or collectively exhaustive as these factors overlap and evolve. Reporting standards for these non-financial key performance indicators are undergoing major changes, shedding more light on stakeholders' understanding and expectations of ESG. We therefore aim to update the framework on a regular basis.

Our corporate credit rating analysis remains focused on credit quality and credit assessment drivers. We only consider an ESG factor relevant to our credit rating process if it has a ubiquitously discernible and material impact on the rated entity's cash flow profile and, by extension, its overall credit quality. Contrary to ESG ratings, which are largely based on quantitative scores for different rating dimensions, credit relevant ESG drivers are mostly of a qualitative nature. Hence, identified ESG rating factors are based on an opinion in a relative context.

The importance/relevance of certain ESG factors is specific to each rated entity, industry and region, except for the dimension of governance, which is universally applicable across all industries. For example, the risk of pollution and environmental damage is of particular importance in chemicals industry but less relevant to the retail sector, where governance and social factors are more relevant. The same applies to an assessment of ESG-related factors that might have a significant impact on a company located in western Europe but no effect on an eastern Europe corporate despite a similar business model. This reflects that regulatory risks may be significantly greater in some jurisdictions.

Governance is an indication of how well a corporation is controlled and directed and the extent to which the interests of different stakeholders are safeguarded, including the payment of all due amounts on time and in full. Governance is thus relevant to all rated entities. In contrast, environmental and social variables capture risks and opportunities that are often specific to the activities of a company and the industry in which it operates. All such factors may have a direct or indirect impact on a rated entity's market position and its financial performance.

ESG-related factors can directly or indirectly affect all the rating elements which make up our assessment of an issuer's business risk profile, financial risk profile and supplementary rating drivers. In the appendix we provide a list of ESG factors that we normally consider in the rating analysis of chemical corporates, although only some of the factors listed are likely to apply and be relevant to any given company.

ESG rating drivers are part of the rating framework that is outlined in our general rating approach in addition to our specific approach to the sector: see our [rating methodology for Chemical Corporates](#).

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2. Important ESG themes in the chemical industry

Few industries are as integrated into every segment of the economy as the chemical industry. Its complex value chain encompasses not only consumer goods and agriculture, but also energy, transportation, and infrastructure. The chemical sector is also the [third largest source of carbon dioxide \(CO₂\) emissions](#) in the industrial sector after cement and iron and steel manufacturing. In addition, [Chemical companies consume the most energy](#) products among industries globally. Responding to regulatory and public pressure, 90% of the [top 20 global chemical companies, such as Air Liquide SA and BASF SE, have committed to reach net-zero emissions](#), near-zero emissions, or carbon neutrality by 2050.

The industry's main environmental issues, pollution and health and safety risks, are material to their credit ratings. Failure to address them can impair their competitive position and creditworthiness – today or in the future. Conversely, chemical corporates that already made long-term sustainability a priority might be able to strengthen their credit profiles if these efforts result in better profit margins or higher cash flow generation.

Chemical companies are making the transition towards greater green investment, focusing on the long-term sustainability of their operations. Addressing environmental considerations can lead to better material, resource and process efficiency as well as business models better focused on the circular economy.

From a social perspective, chemical manufacturing processes can endanger the health and safety of surrounding stakeholders with air, land or water pollution through chemical leakage and spills. Firms which do not satisfactorily address these issues can put their creditworthiness at risk in ending up with stranded assets, cash outflow and/or fines and penalties related to stricter regulations. Companies whose access capital markets is compromised by their exposure to environmental and social problems can respond with ESG-linked fund-raising if they can convince investors that they are committed to investing in making their business more sustainable.

While the industry is facing these transition risks, demand for chemicals is expected to grow continuously in the years to come. We identify the following interdependent ESG themes most relevant for the chemical industry:

- 1. Air, water, and soil pollution:** Inefficient processes or inappropriate use of chemicals often lead to pollution of natural resources and/or toxic waste. Forced disposals and litigation costs can tie up significant financial resource or result in reputational risk that can drive changes in our business-risk analysis.
- 2. GHG-emissions and climate transition risk:** Regulatory changes and public pressure present transition risks for chemical companies that could impinge on their creditworthiness, most notably in Europe with the introduction of the European Union's Green Deal in 2022 aimed at a carbon-neutral economy by 2050.
- 3. Resource efficiency, innovation, and circular economics:** The chemicals production process often requires large quantities of fossil-fuel-based raw materials, as well as significant amounts of energy and water. Investments to improve the resource efficiency across the value chain can also improve cost efficiency. Furthermore, avoidance or minimisation of single-use plastics contributes to a leaner cost structure in the long term by optimising transportation and storage costs.
- 4. Health and safety of employees:** Safety concerns regarding the production processes of chemical corporates have dramatically increased over recent decades in reaction to chemical accidents (e.g., explosions, fires, spills). Severe reputational damage and its consequences, such as making recruitment harder, can negatively impact a company's credit rating.

2.1 Air, water, and land pollution

The chemical industry faces the double environmental challenge of decarbonising its activities and reducing pollution in areas surrounding manufacturing facilities. Chemical pollutants in water, soil and/or air generated by the production process or by non-biodegradable plastic waste can cause great harm to natural ecosystems and human health while also being responsible for biodiversity loss.

The **chemical industry reports the largest quantities of air releases of toxic chemicals**, such as ammonia, methanol and sulfuric acid. Air pollution not only contaminates the ecosystem but is the world's leading environmental cause of illness and premature death. Human health and ecosystems can also be impacted by chemical leakages and spills into surrounding land and waters. More specifically, the most common contaminants in urban soils are heavy metals (37,3%), mineral oil (33,7%) and polycyclic aromatic hydrocarbons (13,3%). These are mainly by-products of industrial activity, local waste disposal or excessive pesticide or fertilizer use. All substances are toxic to plants and humans and can trickle through the soil to the groundwater. Throughout Europe soil contamination affects almost 25 000 sites and is expected to continue growing. For example, a 3M manufacturing plant in Antwerp accidentally released a quantity of sodium hydroxide into the surrounding soil in 2021. Residents within a perimeter of 15km were immediately affected through vegetables grown and livestock in the area. Clean-up costs for such an incident can be heavy particularly for chemicals companies which fail in the first instance to assess the full damage properly.

Plastic waste is a large cause of biodiversity loss because plastics often degrade very slowly while decomposition creates harmful microplastics. In addition, plastic products contain chemical additives such as flame retardants, UV stabilizers and colorants which are added to the plastics during manufacturing. Affected goods include for example shampoo, sunscreen, or water bottles. The materials can leach into surrounding waters or soil, posing a threat to marine life and other ecosystems. OECD countries are responsible for 14% of overall plastic leakage, which can be directly linked to economic activity. More specifically, one hundred companies produce 90% of global single-use plastic waste. High ranking polluters also include chemical companies such as Dow and Sinopec.

Plastics are also entering food chains, threatening food security and human and animal health. For example, ruminant marine livestock regularly ingest plastic waste, posing a growing threat to human health, particularly in low-income countries. Indigestible plastics has many adverse health effects, including low milk yield, reduced weight gain and draft ability, combined with comorbid diseases and mortality. Humans inhale or ingest around 50.000 microscopic plastic particles a year, which negatively affects the immune systems. More than 127 countries have some form of regulation of single-use plastics, with likely stricter enforcement in coming years.

Increasing regulation regarding a company's full value chain is putting pressure on management to account for environmental impact and protection of human rights not just in terms of a company's suppliers but also the use and disposal of its products, in other words upstream and downstream. Negligence can have severe repercussions for the business and ultimately credit quality, from the loss of licenses and other penalties to expensive litigation, cash outflows and long-term reputational damage.

Relevance to our rating approach:

The impact of pollution from chemical processes is credit relevant because related additional costs, including litigations, fines, and asset remediation, can be considerable.

Causing serious environmental damage – including water, air, and soil contamination – can lead to large fines, compensation paid to local governments/communities or, in the worst case, expensive litigation over corporate responsibility for fatal exposure to toxic substances. These are generally one-time costs which, in the worst instances, can still significantly exceed the cost of continuous compliance with environmental regulations. Such costs can hamper cash conversion and/or lead to large asset impairments which can undermine investor confidence, with consequences for stock-market valuations and funding costs.

Chemical companies also face significant clean-up costs to comply with regulation and/or provide for potential environmental damages, which can lead to recurring expenses and squeeze profitability.

Peer comparisons help identify companies which are falling behind increasingly strict regulations. Non-compliance can hamper a chemical company's production with adverse consequences for market positioning and cashflow.

2.2 GHG-emissions and (climate) transition risk

The chemical industry is the third-largest greenhouse-gas emitting industry, accounting for around 6% of global GHG emissions. Half of the chemical sector's energy input is consumed as feedstock, meaning fuel as raw material input rather than as a source of energy. Total emissions amount to 17% in direct production processes (scope 1), 6.6% from indirect energy use (scope 2), and the rest largely from [emissions in the supply chain \(scope 3\)](#).

[Primary chemical production accounted for about two thirds of all direct \(scope 1\) CO₂ emissions from the industry](#) as a whole. About a quarter is generated by chemical reactions of the materials being produced. Ammonia is the leading source of these emissions, followed by high-value chemicals such as ethylene and propylene in addition to and methanol. That said, the production of base products has a higher carbon footprint compared with specialty chemicals. Reducing emissions in these processes depends on greater material efficiency, e.g., more efficient nutrient use in the case of ammonia fertiliser and better recycling rates in primary production.

Chemical companies will need to diversify and change energy procurement to stabilise scope-2 emissions by increasing the proportion of renewable energy they use in addition to investing in their own renewable energy generation. Two Dutch companies, Nouryon and DSM NV, are for example starting partnerships to secure green hydrogen and bio-based and circular molecules.

More than 75% of emissions in the chemical industry derive from the supply chain (scope 3), mainly from purchased raw materials (44%) and the use of sold products (14%)⁶. Customers, regulators, and investors are all increasingly demanding the industry to reduce its GHG footprint. However, calculation of scope-3 emissions within the chemical industry is no easy task given the range of intermediate products and the multi-layered supply chain. In addition, CO₂ is not the only GHG emitted across the chemicals value chain. Emissions of methane or nitrous oxide (N₂O) occur during production and the transport of feedstock.

Downstream producers of intermediate and final products need to consider the scope-1 and scope-2 emissions from primary chemical suppliers within the boundary of their scope-3 emissions and pass the pressure on them to reduce emissions upstream. Carbon pricing and other environmental policies may limit output of emissions-intensive materials so downstream chemicals companies and their industrial customers need to secure alternatives a timely manner. A high proportion of emissions occurs during the use phase or at the end-of-life through incineration or decomposition. Companies at every level of the chemicals value chain have an incentive to comply with climate change targets/requirements or else they will be falling behind the competition. This movement brings rise to initiatives, such as Together for Sustainability (TfS), which unite chemical companies committed to making sustainability improvements within their own – and their suppliers' – operations.

To meet net zero commitments – fixed in the case of the EU for 2050 – chemicals-industry emissions need to be decoupled from economic growth and reduced significantly. Finding alternatives will likely impose high initial costs on first movers in the industry but, equally, all companies are increasingly held accountable for their scope-3 emissions through regulations such as the EU's the Corporate Sustainability Reporting Directive, the Lieferkettenschutzgesetz in Germany or the Duty of Vigilance Law in France.

Relevance to our rating approach:

We actively monitor chemical companies' progress to manage GHG emissions and assess how actively they try to become climate neutral and lower those emissions. Reducing GHG emissions through targeted capex, especially that aligned with the EU taxonomy, will face a lower risk of shrinking demand and achieve a longer economic life for their production facilities.

In addition, companies actively addressing climate-change risk will produce at lower costs as they will not need to acquire costly emission allowances. To avoid the risk of customers switching to more environmental-friendly competitors, companies will also need to manage their supply chains more actively and to be more transparent particularly in disclosure of scope-3 emissions.

Investment in new facilities, by complementing or replacing older facilities, usually prolongs their economic life in the context of toughening environmental regulation. A company is thereby likely to retain market share. This is particularly important for high-volume commodity chemicals suppliers. At the same time, such upgrades may sometimes lead to significant future clean-up and decommissioning costs which may require additional funding.

A slow transition toward net zero elevates the risk for the sector of further regulation and taxation, which would reduce profit margins and increase pressure on cost of capital and capex if companies are then forced to accelerate investments in greener plants.

We also monitor management incentives to reduce a company's carbon footprint, e.g., by linking management compensation on an GHG reductions. Similarly, we consider the cost and size of funding linked to sustainability goals and emission targets.

2.3 Resource efficiency, innovation, and circularity

The manufacturing process of chemical products requires huge quantities of oil- and gas-based raw materials, as well as energy and water. Life cycle management and resource efficiency therefore is crucial for the chemicals sector. R&D and innovation to enhance efficiency can improve the credit profile of a chemicals company. Companies have various options: increase the lifespan of their products, conserve resources during production, reduce waste, and/or increase recycling to promote the circular economics of their business. According to estimates by the European Commission, only 12% of plastics are recycled in Europe. This compares with recycling quotas for electronic waste of about 40%.

A more circular economy starts with sourcing more sustainable materials. In chemicals, companies need to replace toxic substances with products from green chemistry, such as organic solvents, degradable polymers and water-based coatings. Green production technologies such as ionic liquids or supercritical fluids are also easier to recycle and improve waste management. Biotechnologies and/or chemolysis (the process of depolymerisation) could also play a critical role in the future though these solutions are not yet economically viable.

Chemicals companies will make a successful transition to a more sustainable if enough customers are willing and able to pay for less toxic products or if governments subsidise and incentivise their products and services. . The characteristics of each sub-industry that a chemicals supplier serves play an important role. For example, there are chemical companies that are sustainability enablers) that benefit from the green growth potential of their downstream market even though the products themselves come with sometime high environmental and social costs. The US Inflation Reduction Act (IRA) for example encourages the use of electric vehicles, solar panels, hydrogen and wind turbines. Therefore, companies that operate in the US and supply crucial materials such as lithium, coatings, heat pumps or iridium and platinum will profit from the new legislation. Others focus directly on providing sustainable alternatives in the value chain (e.g., sustainable wood-based construction materials) and rely on the incentives for companies to reduce supply-chain emissions. Such net-zero technologies can benefit from faster access to funding under the European Green Deal and REPowerEU. However, more and more new players, such as recyclers, pre-processors or tech start-ups, are entering the ecosystem. This means that incumbent companies need to reposition themselves to maintain and improve their business risk profile.

Relevance to our rating approach:

Chemical companies that pursue the sustainable use of natural resources will be better positioned to reap the rewards of maintaining, if not gaining, market share, as well having lower costs in the long run, notwithstanding higher initial capital expenditure.

On the demand-side, end-customers may be more willing retain or switch to chemical producers offering sustainable products even at premium prices.

Specialty chemical players regularly investing in innovation to expand their portfolio of sustainable products or applications, will have a better chance of meeting long-term customer needs and so remain competitive.

Companies making more efficient use of resources, including water and energy, and/or recycling more waste will benefit in the long term by lowering their exposure to volatile commodity input prices. In addition, a use of recyclable products will lower waste-disposal costs.

The potential benefits for the business risk profile need to be balanced with the cost of research and development into reusable or biodegradable products, particularly plastics, which could negatively impact the financial risk profile. However, government incentives or subsidies, could alleviate or partially mitigate the R&D burden on the financial risk profile. Also, operating margins might shrink if companies are not able to pass on the costs to customers, more a problem for lower-margin, high-volume producers of commodity chemicals.

2.4 Health and safety of employees

For most chemical companies, preventing physical and health hazards within their production plants is the top priority. To comply with laws and to maintain licences, companies allocate considerable resources to plant maintenance and renovation. Failure to comply with health and safety rules has critical consequences, not just in terms of monetary fines, but production outages, reputational damage, and litigation and compensation costs.

Physical hazards run from flammability, corrosion, and explosions, all potentially putting staff at risk of serious injury or worse. Health risks arise from the toxicity of specific chemicals during the production process, either by inhalation, ingestion or skin contact, with potentially fatal consequences. For example, an explosion in 2021 in a German chemical park in Leverkusen, where companies such as Bayer AG and Lanxess AG operated, killed seven workers at the site and injured several more.

Such incidents expose the offending companies to costly lawsuits, damages claims and a loss of reputation, with an impact on a company's ability to attract and retain staff in addition to its sales. Such health and safety risks can be higher in emerging markets, where regulations are less stringent or not as effectively enforced. The damage from frequent or severe safety incidents can lead to more intensive regulatory scrutiny, pushing up costs.

Relevance to our rating approach:

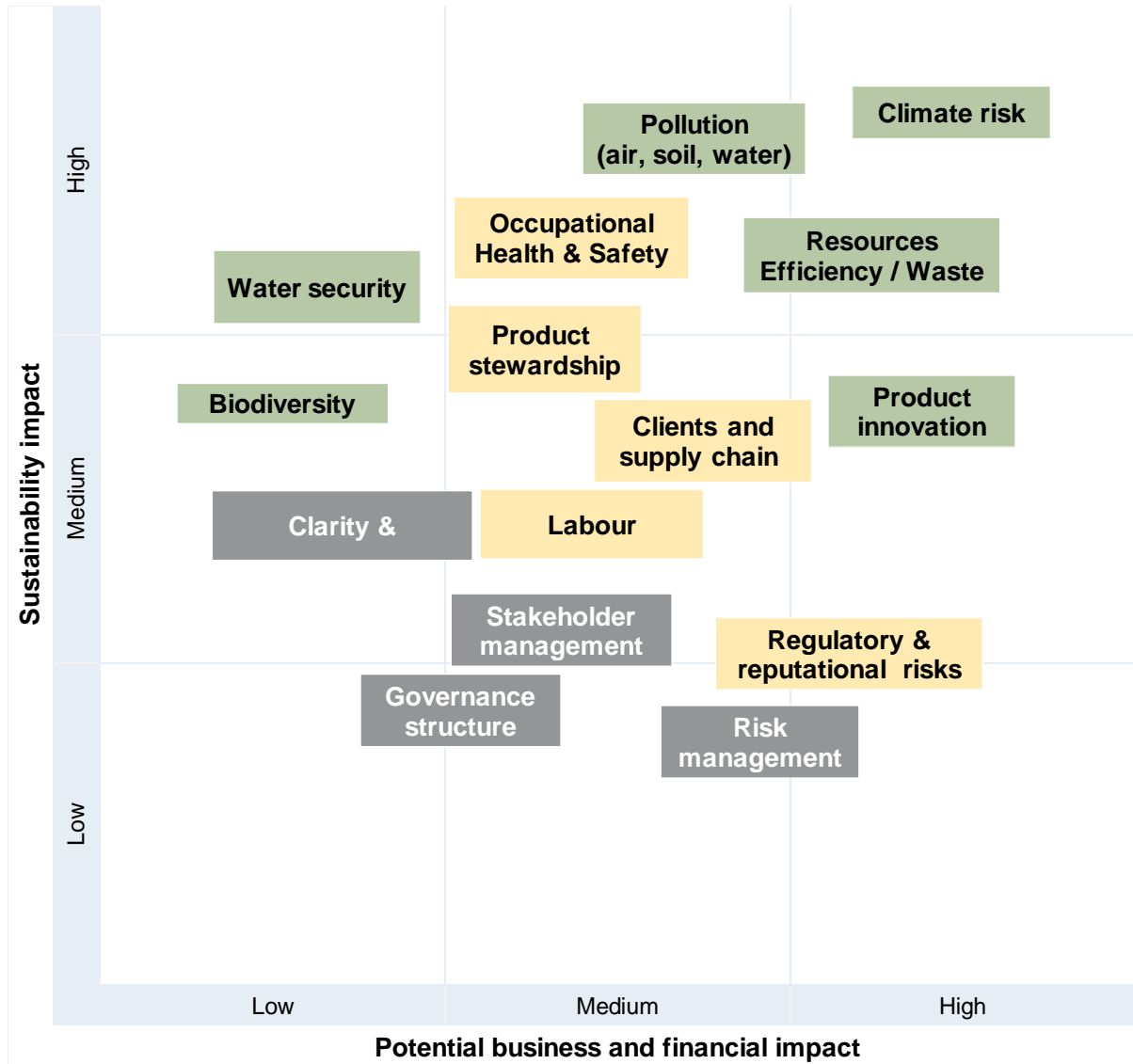
Chemicals production is an inherently dangerous business because of the explosiveness and toxicity of chemical compounds. Accidents and safety lapses during the production process may lead to serious injuries, illnesses, or physical damages (physical asset risk), with financial consequences relevant to a company's credit quality such as fines, litigation and compensation costs. Nevertheless, nowadays occupational safety within chemical plants is subject to stringent regulations, especially in developed markets, usually resulting in few incidents.

Depending on the magnitude of the damages incurred, one-time costs may exceed the costs associated with adhering to safety regulations via recurring expenditures. Although such recurring expenditures may not directly yield substantial profitability advantages, in fact quite the opposite as they will burden the cost structure in the short term.

We aim to benchmark whether a company is allocating sufficient resources to uphold safety standards on a par with industry counterparts and, by doing so, protecting long-term profitability. Lower relative spending might indicate a higher level of contingent risks. Additionally, a poor reputation will also lead to the company struggling to attract the best talent, with an impact on profitability in the long term.

3. Materiality of the ESG factors on the Chemical industry

Within our ESG framework we look at various broader categories related to E, S and G. We seek to differentiate the sustainability impact of the companies' internalities and externalities, between what is considered sustainable (sustainability impact) and the potential business and financial (credit) impact of ESG factors. Not all ESG factors influence an issuer's creditworthiness to the same extent.



4. Typical ESG factors in chemicals

Environmental and social factors listed below provide a reflection of the risks and opportunities that a chemical company might face and how they can impact their credit profile. Governance topics are more generic and typically apply to all industries. The list below is non-exhaustive and expected to evolve over time. Similarly, measurements might evolve considering regulatory developments and enhanced and standardised reporting obligations.

Environment			
	Sub-Indicator	Measurement/Indicator	Credit impact
Climate and resources management	Air pollution	<ul style="list-style-type: none"> • Air releases of toxic chemicals (Ammonia, methanol, and sulfuric acid) • Fine particles (PM) pollution • Non-GHG air pollutant emission, including volatile organic emissions (VOC) • Reduce CO₂ emissions in transportation. • Introduction of relevant treatment techniques which enable emission reduction 	<ul style="list-style-type: none"> • Unprepared companies will risk non-compliance with rising regulation. • Transition risks could hamper production and market position or cash flow profile.
	Chemical leakages and spills	<ul style="list-style-type: none"> • Air releases of toxic chemicals (Ammonia, methanol, and sulfuric acid) • Fine particles (PM) pollution • Non-GHG air pollutant emission, including volatile organic emissions (VOC) 	<ul style="list-style-type: none"> • Litigation, fines and asset remediation are risks. • One-time costs can significantly exceed costs to comply with regulations, hamper cash conversion or lead to large asset impairments. • Remediation costs can lead to recurring expenses and affect profitability.
	GHG emissions	<ul style="list-style-type: none"> • Greenhouse gas (GHG) emissions by unit of production (Scope 1 to 3) • Reduce CO₂ emissions in transportation • Introduction of relevant treatment techniques which enable emission reduction 	<ul style="list-style-type: none"> • Shifting to less GHG-intensive production processes can increase costs in the short-term but improve the business risk portfolio in the long-term. • If not addressed in a timely manner, failure to meet emission targets may lead to financial penalties and potentially to stranded assets.
	Energy and resource consumption	<ul style="list-style-type: none"> • Energy consumption per specific amount (e.g., tons) of production • Portion of power generated from renewable sources of energy • Reduction in the consumption of natural resources in the production process because of cleaner processes, new production techniques or improved capacity utilisation, among others 	<ul style="list-style-type: none"> • Reduced total energy consumption lowers service charges, increasing profitability. • More efficient use of natural resources can lead to significant cost savings given the cost structure of chemical companies. • Low capacity-utilisation results in poor absorption of fixed costs and is a sign of general inefficiency.
	Waste management	<ul style="list-style-type: none"> • Rate of waste recycling • Reduction of plastic waste and non-biodegradable waste in general • Reduction in exposure to hazardous waste 	<ul style="list-style-type: none"> • Reduced waste lowers service charges for treatment/disposal. • High exposure to hazardous and non-hazardous waste adversely affects operating profitability,

		<ul style="list-style-type: none"> • Amount of capex allocated to improve waste management, including waste treatment facilities • Waste monitoring measures 	<p>raises the exposure of debt-like asset retirement obligations, contingencies and increases the risk of reputational damage.</p>
	Water consumption	<ul style="list-style-type: none"> • Water consumption per specific amount (e.g., tons) of production • Rate of recycled water • Wastewater treatments in operations • Amount of capex allocated to improve water management or launch of collaborations for reducing water blueprint 	<ul style="list-style-type: none"> • Reduced water consumption lowers service charges, increasing profitability.
	Circular economy	<ul style="list-style-type: none"> • Share of circular (bio-based) feedstocks in production process • Exposure to recyclable products in portfolio • Efforts on the development and introduction of recyclable products 	<ul style="list-style-type: none"> • Investments to increase recyclability may erode margins in the medium term, longer term shifting to more circular business processes can provide material financial benefits in lower input and service costs for treating waste.
	Protection of the environment and biodiversity	<ul style="list-style-type: none"> • Biodiversity loss in the areas nearby production plants, due to pollution from chemicals and waste 	<ul style="list-style-type: none"> • Limited credit impact in the short term for the company although increasing the risk of reputational damage and asset retirement obligations in the long term.
Process efficiency	Modernization and maintenance of production plants	<ul style="list-style-type: none"> • Aging and technical state of plant and equipment • Inadequate maintenance capex spending can be negatively affected by unfavourable physical hazard-driven explosions/fires or extreme weather events/natural disasters, e.g., storms, wildfires, flooding 	<ul style="list-style-type: none"> • Older plants and equipment are generally less efficient and productive, reflected in higher power, water and chemicals consumption and in lower recovery rates. • A high exposure to regions that suffer from extreme weather events or natural disasters leads to higher insurance premiums, a greater likelihood of under-performing assets and increased capex. • Risk of stranded assets and asset impairments grows.
Product innovation	Research and development	<ul style="list-style-type: none"> • Technological sophistication focused on climate neutral processes and technology • R&D expenditures related to sustainability • Introduction of new products that enable sustainable living, both in terms of biodegradability/recyclability as well as limited toxicity 	<ul style="list-style-type: none"> • New technologies can provide significant productivity and efficiency gains and improve profitability. • Advanced products may be sold at a premium given the increasing consumer awareness of the need for sustainably produced chemicals products.

Social			
	Sub-Indicator	Measurement/Indicator	Credit impact
Labour management	Diversity and equal opportunities	<ul style="list-style-type: none"> Employee engagement measures Employee retention and turnover Gender and diversity ratios and recruitment programs 	<ul style="list-style-type: none"> The higher the employee satisfaction and inclusion, the lower the costs related to staff turnover and training: lower one-off items associated with restructuring and litigation. Reputational damage makes it harder to retain and recruit skilled staff, putting the company at a competitive disadvantage.
	Human rights	<ul style="list-style-type: none"> Number of legal proceedings or amount of fines for non-compliance with state laws regarding human rights in the working environment Traceability and commitments across the supply chain 	<ul style="list-style-type: none"> Failure to comply with minimum requirements may result in lawsuits and increase reputational risk.
	Compensation and social protection	<ul style="list-style-type: none"> Employee retention and turnover Observance of minimum salary and other social protection measures, when these standards are set by law in the country Nature and state of relationship with unions Gender and diversity pay gap 	<ul style="list-style-type: none"> Poor compensation practices may result in a loss of attractiveness as employer, resulting in a competitive disadvantage. Poor relations with unions may lead to strikes, disruptions of operations and protracted wage renegotiations.
	Diversity & equal opportunities	<ul style="list-style-type: none"> Employee engagement measures Employee retention and turnover Gender and diversity ratios 	<ul style="list-style-type: none"> Satisfied staff and inclusive employment practices help reduce turnover and associated costs. They limit restructuring and litigation costs. Neglect of these issues has the opposite effect.
Health and safety	Plant safety	<ul style="list-style-type: none"> Lost Time Injury Frequency Rate Fatalities Frequency of health and safety-related regulatory interventions and fines Frequency and scale of accidents 	<ul style="list-style-type: none"> The inherently dangerous nature of chemicals production (risk of explosion, poisoning etc.) can lead to fatal accidents, hefty reconstruction and compensation costs, lost business and reputation damage. Safety violations can lead to injuries, deaths, regulatory intervention and financial and reputational damage.
	Toxicity in production process	<ul style="list-style-type: none"> Intoxications at plant premises Prevalence of occupational diseases Water/air contamination, leading to intoxications in nearby areas 	<ul style="list-style-type: none"> Failure to address health and safety issues may result in strikes or class-action lawsuits.
	Product safety	<ul style="list-style-type: none"> Cases of intoxications/ lawsuits by customers' adverse effects from coming in contact to (including inhalation, ingestion, skin contact) the final product 	<ul style="list-style-type: none"> Failure to address health and safety issues may result in product litigation and increased reputational damage, leading to loss of customers
Clients and supply chain	Client retention	<ul style="list-style-type: none"> Percentage of new customers as of total customers Average length of time of customer relationship in years 	<ul style="list-style-type: none"> Displaying low churn rates and high customer retention is a good signal of an established market position and recurring cash flow

	Impact on local communities	<ul style="list-style-type: none"> • Volunteer initiatives in the communities around company premises • Investment projects to improve the social/environmental status of neighbouring communities 	<ul style="list-style-type: none"> • Better reputation could result in increased business, improved cashflow.
	Responsible supply chain	<ul style="list-style-type: none"> • Assessment of the sustainability score of suppliers • Use of sustainable raw materials and processes • Use of recyclable packaging • Reduction in CO₂ usage in transportation and distribution 	<ul style="list-style-type: none"> • Reputational risk can stem from working with suppliers scoring poorly on ESG criteria. • Using more sustainable, less hazardous materials can reduced litigation risk.
Regulatory and reputational risk	Regulation	<ul style="list-style-type: none"> • Track record of compliance with laws and regulations 	<ul style="list-style-type: none"> • Compliance failures may result in financial penalties or ultimately the loss of the license to operate and confiscation of assets.
	Reputation	<ul style="list-style-type: none"> • Media sentiment 	<ul style="list-style-type: none"> • A poor safety record can rub off on relations with important stakeholders: customers, suppliers, investors, financiers and staff.

Governance			
	Sub-Indicator	Measurement/Indicator	Credit impact
Company control	Board structure and effectiveness	<ul style="list-style-type: none"> Board independence Competence and diversity of board members Effectiveness of oversight, risk management and internal control mechanisms Sustainability targets at board and top management levels 	<ul style="list-style-type: none"> Ineffective board or lack of controls can result in poor decision-making and failure to achieve strategic goals. Tight controls are vital to minimise fraud, theft and the misuse of company resources.
	Risk management	<ul style="list-style-type: none"> Risk management framework and culture Risk-adjusted return/performance measures 	<ul style="list-style-type: none"> Risk awareness at all levels of an organisation is crucial for effective strategic, operational and financial risk mitigation.
	Bribery and corruption	<ul style="list-style-type: none"> Frequency and magnitude of bribery and corruption incidents. 	<ul style="list-style-type: none"> Adverse reputational consequences can lead to regulatory reprimands, fines, the loss of assets and/or the loss of operating licences.
	Digital transformation & data security	<ul style="list-style-type: none"> Number of projects launched/ amount of capex invested into digitalization Episodes of data breaches, including either industrial secrets or client data 	<ul style="list-style-type: none"> Speeding up the digitalisation process should increase the company's controls of its finances and operations, as well as increasing efficiency. Data breaches may result in financial penalties as well as potential loss of business.
Clarity/ transparency	Financial disclosure	<ul style="list-style-type: none"> Timeliness and quality (GAAP) of disclosures. Comprehensiveness of disclosures (e.g., on terms of loan agreements, contingent liabilities, related-party transactions, ownership structure) Consistent reporting formats 	<ul style="list-style-type: none"> Rapid and comprehensive financial reporting instils confidence and signals strong and effective internal controls. Conversely, slow and incomplete reporting may signal weak controls, incompetence or attempts at concealment ('creative accounting').
	Transparency of communication	<ul style="list-style-type: none"> Earnings calls and investor presentations that help stakeholders understand the company's performance drivers and strategic direction Risk factor (incl. ESG-related risks) and sensitivity analysis 	<ul style="list-style-type: none"> Transparency is often associated with strong governance. Understanding risk factors allows a company to hedge against risks and prepare mitigation strategies.
Corporate structure	Complexity	<ul style="list-style-type: none"> Complex and transparent ownership structure (nominee holdings hiding true owners) Complex group structure Complex debt structure Significant related-party transactions Aggressive tax optimisation strategies History of frequent legal or regulatory infractions 	<ul style="list-style-type: none"> Opaque company ownership, cross holdings, and significant minority interests may hide conflicts of interest. Complex debt structures can result in unexpected events of default and cross-acceleration. Related-party transactions can disguise inappropriate diversion of company assets. Aggressive tax strategies can backfire and result in unexpected tax penalties, negative publicity, and reputational damage.
Stakeholder management	Stakeholder relations	<ul style="list-style-type: none"> Respect and balance of interests of all stakeholders 	<ul style="list-style-type: none"> Stakeholder disputes may have negative reputational and financial consequences.
	Shareholder distributions	<ul style="list-style-type: none"> Financial policy clarity, consistency, credibility and track record Board level endorsement of financial policy 	<ul style="list-style-type: none"> A clear and credible financial policy helps management meet strategic targets and manage stakeholder expectations.

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