ESG Industry Report Card: Chemicals

June 3, 2019

(Editor's Note: Our ESG Industry Report Cards include an analysis of ESG factors for a selection of companies. We intend to expand our ESG Industry Report cards to include more companies throughout the year.)

**Key Takeaways**

- The most meaningful risk for chemical companies arises from their environmental exposure. The global trend toward more stringent environmental regulation heightens this risk that virtually all chemical companies around the world face.

- Social factors also pose significant risk, only marginally lesser than environmental issues. Demographic changes and customer preferences and awareness of risks related to the uses of chemicals are key social risks.

- How individual companies deal with these key risks is an important factor in assessing their governance.

**The ESG Risk Atlas**

To calibrate the relative ranking of sectors, we use our environmental, social, and governance (ESG) Risk Atlas (see "The ESG Risk Atlas: Sector And Regional Rationales And Scores," published May 13, 2019). The Risk Atlas provides a relative ranking of industries in terms of exposure to environmental and social risks (and opportunities). The sector risk atlas charts (shown below) combine each sector’s exposure to environmental and social risks, scoring it on a scale of 1 to 6. A score closer to 1 represents a relatively low exposure, while 6 indicates a high sectorwide exposure to environmental and social risk factors (for details see the Appendix). This report card expands further on the Risk Atlas sector analysis by focusing on the credit-specific impacts, which in turn forms the basis for analyzing the exposures and opportunities of individual companies in the sector.

**Environmental Exposure (Risk Atlas: 5)**

Chemical companies, including specialty and commodity chemical producers, face environmental risks arising from their exposure to waste, pollution, and toxicity. Many chemical products, raw materials, and by-products or effluents are polluting and toxic, and as a result several chemical companies face ongoing liabilities or litigation. Controversies related to the use of asbestos and lead paint and related litigation against chemical companies are well illustrate such risks. Several
chemicals are classified as hazardous by institutions such as the United Nations. Such classifications underpin regulation of the manufacture, storage, and transport of these chemicals. Chemical companies also face risks related to water use, scarcity, efficiency, decontamination, and climate impact. For example, an international treaty phased out the production and use of chlorofluorocarbons, used in multiple applications including as a refrigerant. Companies account for some risks as liabilities in their financial statements. Because of the long-term historical exposure of the industry to these issues, there is considerable regulatory focus on chemical companies. The impact on, and costs to, companies from regulatory requirements vary across the globe, but generally speaking, regulatory stringency has increased over time.

**Social Exposure (Risk Atlas: 4)**

The key social risks for chemical companies are demographics, safety management, and the growing influence of consumer behavior. Chemical companies face demographic changes from rising populations, urbanization, and greater economic development in many parts of the world. While the overall continued rising demand for chemical products may provide growth opportunities for well-prepared companies that can innovate, they also amplify risks related to the manufacture, transport, and consumption of chemical products. For example, some chemical companies have faced increasing local resistance to setting up plants in certain locations. We also consider changes in consumer sentiment toward chemicals, plastics, and other products such as seeds and traits. We believe that social awareness about chemical products, particularly with regard to health and environmental issues, is likely to further increase. For example, the willingness of some consumers to pay a premium for farm produce grown without the use of chemical pesticides or fertilizer, or increased customer focus on buying foods produced without chemical preservatives or other substances, could diminish demand for chemical products. Although some of these evolving trends do not meaningfully affect demand, social perception of chemical products and consumer preferences could pose important long-term risks to companies.

Finally, chemical companies face risks from the fallout of accidents in the manufacture or transport of certain hazardous chemicals. Such low-probability but potentially high-impact accidents can jeopardize lives and the environment. In addition, they can result in financial claims, loss of operational licenses, or damage to public perception of chemical companies. The chemical sector is associated with what is considered the worst industrial accident ever--the 1984 release of the chemical methyl isocyanate at Union Carbide Corp.'s then-majority-owned joint venture in Bhopal.

**Governance**

Overall, governance is the most idiosyncratic risk, as it usually reflects a company's particular corporate culture, strategy, geographic footprint, and group complexity. Still, at the sector level, we consider companies' structure in terms of ownership and control. We consider mergers and acquisitions (M&A), growth strategies and their execution, and where relevant, environmental and social risks.
ESG Risks In Chemicals

Table 1

<table>
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<tr>
<th>Company/Issuer</th>
<th>Credit Rating/Comments</th>
<th>Analyst</th>
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<tbody>
<tr>
<td>Akzo Nobel N.V.</td>
<td>(BBB+/Stable/A-2)</td>
<td>Oliver Kroemker</td>
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Environmental and governance factors are material to our credit analysis of Akzo Nobel; social factors less so. Given its global operations, it faces exposure to strict international and domestic environmental regulations particularly with respect to solvent-based coatings and paints. Since its divestiture of its specialty chemicals business, the company has concentrated risk related to regulations and shifting consumer preferences in the paints and coatings industry. Similar to other chemical companies, Akzo Nobel is taking steps to address global GHG emissions and has set a target to reduce carbon emissions by 25%-30% per ton by 2020. In terms of governance, Akzo Nobel is in line with other large international companies.

ALPEK S.A.B. de C.V. (BBB/ Stable/--)  
Fabiola Ortiz

Environmental factors are relevant to our credit analysis of Alpek. The petrochemical industry is subject to increasing regulation as most of the feedstock used in its processes comes from petroleum, a nonrenewable resource. About 74% of Alpek's sales come from polyethylene terephthalate (PET), purified terephthalic acid (PTA), and polyester fibers, used in beverage bottles, food jars, clothing, etc., which are more easily and more commonly recycled, as opposed to harder to recycle polypropylene and polystyrene (26% of total sales). Alpek is exposed to changing
consumption patterns and regulations to reduce the disposal of plastic products such as water bottles. In Mexico and the U.S., for example, some local governments are pushing for regulations to ban the use of certain single-use plastic products. Nevertheless, we do not see an immediate impact on the company’s financials or ratings, as these kind of initiatives tend to take several years to mature. Moreover, we believe the company has taken steps to actively participate in the recycling value chain and, through acquisitions, has become the largest PET recycler in the U.S. We view management and governance as satisfactory, reflecting, in part, management’s broad experience, with senior executives with more than 20 years of experience in the industry, comprehensive internal controls, and transparency, all of which are strongly aligned to that of its parent company, Grupo Alfa.

**BASF SE (A/Stable/A-1)**

We consider BASF’s exposure to ESG-related risks as being on par with that of other chemical companies. The company’s operations are highly energy-intensive, leading the company to focus strongly on the efficiency of its production processes to limit carbon dioxide emissions. Indeed, the company set an ambitious 2030 carbon dioxide-neutral growth target. Although it’s difficult to predict the cost, the target will partly mitigate the risk of seeing CO2 certificates prices rise in the context of the European Emissions Trading Scheme (ETS), which sets tightening targets in terms of emissions rights over time. Despite BASF’s lack of direct exposure to upstream products with a high CO2 footprint, such as polyethylene and polypropylene, its portfolio still includes products we consider to pose environmental risks. BASF estimates 28% of its products, contribute to sustainability initiatives (lightweight, biodegradable, recyclable, or longer life). Safety of the workforce is also a material aspect of our ESG analysis, since BASF’s operations involve handling dangerous products and complex chemical reactions. BASF has notably experienced an explosion incident in Ludwigshafen in 2017 that is still being investigated. We nevertheless consider BASF to be leading sector safety standards in general and an important player in contributing the sector’s safety regulation.

**Braskem S.A. (BBB/Stable/--)**

Governance factors have taken a central role in Braskem’s credit profile. The leniency agreement that followed the Lava Jato corruption investigation resulted in an R$3.1 billion fine to the company in late 2016 (12% of total debt). Even though we included this litigation in our debt figures, the company’s solid operating performance and healthy levels of petrochemicals spreads offset the higher debt position and allowed it to maintain still conservative credit metrics. However, reflecting weak governance standards and internal controls, we assess management and governance as fair. Environmental and social risks are relatively moderate from a rating perspective. We consider Braskem comparable to global peers in its efforts to achieve more sustainable water usage and accommodate changing customer preferences, like an increased demand for reduced solid waste. Even though this shouldn’t affect the company’s results over the following few years, Braskem has demonstrated a focus on innovation in order to maintain its competitive position, including the creation of a green plastic made from sugarcane as raw material (about 6% of total polyethylene production).

**China National Bluestar (Group) Co. Ltd. (BBB/Stable/--)**

In China, tightening environmental regulations are lifting operating costs for chemical companies, which have to invest consistently to comply with the new requirements. These factors and potential exposures could directly affect the company’s operations, impair its ability to obtain licenses, and hinder upcoming expansion projects, with potential financial impact. Bluestar is subject to single-event risks that are inherent in the chemical industry. Although the effect of any such unforeseen event is uncertain, we believe the company’s business diversification and its potential support from parent ChemChina could partially mitigate the impact. Bluestar and its subsidiaries have ongoing investments and initiatives to manage its environmental risks. Adissee, its subsidiary in animal nutrition, increased its investments in health, safety, and the environment by about 10% annually over 2013-2017. Elkem, its subsidiary in silicon materials, increased its transparency by stating its short- and long-term targets in emissions reduction, social impact, and governance. The company targets reducing its carbon dioxide emissions by 20% by 2020 and 40% by 2040 while lowering its nitrogen oxides emission by 1,000 tons from its Norwegian smelters by 2025.

**China National Chemical Corp. Ltd. (BBB/Stable/--)**

We believe the company’s diverse operations and geographic reach partly mitigate single-event ESG-related credit risks. Although the November 2018 explosion of a chemical plant overseen by ChemChina had a limited financial impact, it demonstrates the potential safety risks from its other operations. ChemChina’s energy efficiency and emission reduction targets are guided by the state-owned Assets Supervision and Administration Commission (SASAC). ChemChina also reported safety investments of RMB 320 million in 2017. ChemChina has satisfactory corporate social responsibility practices. As a state-owned enterprise, ChemChina is required to meet high standards of reporting and governance, and the company has shown no major internal control, legal, or transparency deficiencies. The company’s strong strategic execution is demonstrated by the Syngenta acquisition in 2017, the largest ever by a Chinese company to date. ChemChina’s link to the government helps foster strong relationships with regulatory authorities. Its importance to China’s agricultural modernization agenda also supports its credit quality, as we view ChemChina to have a high likelihood of receiving government support if needed.

**The Dow Chemical Co. (BBB/Stable/A-2)**

We view environmental and social risks for The Dow Chemical Co. as being on par with that of the chemical sector. The company has taken some steps to reduce its exposure to the hazardous nature of its product portfolio by shedding many of its chlorine assets. Still, Dow’s financial statements reflect accounting provisions for environmental liabilities, including asbestos-related liabilities, which we view as debt-like. However, the existing liabilities and provisions form only a small portion of our adjusted debt leverage. These liabilities are meaningful for a chemical company in absolute terms, but are in proportion to Dow’s size as one of the largest global chemical companies. Dow’s social risk is likely to increase as end market requirements, consumer consciousness, and consumer preferences evolve with respect to the use of plastics and chemicals in general. In particular, consumer awareness and perceptions of Dow’s impact on environmental, safety, and health issues; and litigations against Dow on these issues, risk creating unexpected new liabilities, increasing costs, and reducing demand for products. On balance we do not expect environmental and social risks to affect current credit quality. Our governance assessment is satisfactory. The company has
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over several decades executed on plans under diverse economic, social, and regulatory environments across the globe. Through M&A, restructurings, and other means, Dow has transformed itself, adapted to changing needs, and remained ahead of its environmental and social challenges.

**DuPont (E.I.) De Nemours & Co. (A-/Stable/A-2)**

We view the environmental risk and social risks for E.I. du Pont de Nemours and Co. as on par with that of the chemical sector in general. These risks are considerations, but not key drivers of our ratings on the company. DuPont has faced meaningful litigation related to environmental issues, but has thus far managed these risks without impairing credit quality, including a recent settlement of about 3,000 lawsuits related to the legacy production of PFOA. Given its long history of operations, the company has significant accounting provisions for environmental liabilities as reflected in its financial statements. Its historical accounting provisions are meaningful for a chemical company, but in proportion to the large size of its global operations. DuPont's social risk is likely to increase as end market requirements and consumer preferences evolve with respect to the use of chemicals, seeds, and traits. The company has exited businesses, including its specialty and commodity businesses, as part of a transformational restructuring. Its agricultural businesses, which it has retained, face similar risks. We expect the company will manage these risks, benefitting from retained research and development strengths and innovation that have created several agricultural and chemical-based products. DuPont's governance risk reflects a successful track record of operations and managing credit risks across a broad portfolio of products and geographic regions. The current transformational restructuring, while unprecedented in scale and scope, reflects, in our opinion, an ongoing willingness to adapt to changing markets.

**Evonik Industries (BBB+/Stable/A-2)**

We consider Evonik's exposure to environmental risk factors as on par with the chemical sector. The company has established an internal groupwide environment, safety, health, and quality (EHSQ) management system based on statutory and normative frameworks, including ISO standards and UN Sustainable Development Goals; as well as internal regulations. Under this, it has already been able to reduce its GHG emissions by about 30% since 2008, and has set a target to reduce emissions by another 20% by 2025. In a bid to reduce emissions, Evonik uses co-generation plants at several of its large sites, and has integrated structures linking chemical production and energy generation. In 2018, Evonik spent €43 million on environmental protection, compared to a total of €340 million since 2012. The company also generates approximately 50% of its sales from products and solutions that help improve resource efficiency in customers' applications. We believe social factors are currently not a material risk for the rating. We view Evonik's governance as a supporting factor for the ratings, reflecting management's experience and expertise, governance fully in line with best practices, and the balance of different stakeholders' interests.

**Formosa Plastics Corp. (A-/Stable/--)**

Government policy and public opinion have become more challenging factors for chemical companies in China and Taiwan over the past several years. Social factors, often combined with environmental factors, are critical in our rating analysis for the four core companies in the Formosa Plastic (FP) group (Formosa Plastics Corp., Formosa Chemicals & Fibre Corp., Formosa Petrochemical Corp., and Nan Ya Plastics Corp.). Governance factors are neutral in impact. Heightened regulatory risk and rising environmental protection pressures have affected the group’s credit protection measures in the past. In 2011, two fires at the group’s Mai-Liao complex, and subsequent inspections and remediation, caused a partial shutdown of the complex for safety inspection and enhancements. FP group still faces persistent pressure from local communities and governments that require better than regulatory standards of managing its air, water, and land pollution that we believe will require continued capital spending. Governance factors, however, are neutral, as the group has satisfactory corporate management and governance supported by its experienced management team. The company also maintains stable relationships with various regulatory authorities with no major internal control, legal, or transparency deficiencies.

**Incitec Pivot Ltd. (BBB/Stable/--)**

Safety, GHG emissions, energy, water consumption, and waste disposal are material issues for Incitec Pivot Ltd.'s (IPL) core explosives and fertilizer manufacturing operations. As an explosives and fertilizer manufacturer, Incitec has to adhere to strict regulations. Safety and environmental issues underpin IPL’s licence to operate and the company explicitly recognizes this in measurable targets that are set and published annually in its sustainability report. We expect IPL’s risk management protocols to mitigate operational disruption. IPL’s markets and manufacturing facilities can be affected by extreme weather events such as droughts, floods, hurricanes, and tropical cyclones. However, the recent Queensland flood was effectively managed, demonstrating what we believe to be strong management contingency plans. IPL has received relatively minor fines in recent years for numerous environmental and workplace health and safety violations. In our view, IPL has maintained strong risk governance on behalf of stakeholders. IPL prioritizes workplace health and safety, product sustainability, and global supply chain management, given its sizable global footprint. There have been no employee or contractor fatalities since 2015.

**Ineos Group Holdings S.A. (BB/Stable/--)**

We view the company's safety record as better than industry average and we are not aware of any significant environmental accidents or liabilities. The group reduced its recordable incident rate to 0.2 per 200,000 hours in 2018 from 1.13 in 2008, which is low compared to industry average. We expect that Ineos group will continue to spend approximately €350 million per year on sustainability capex to support its environmental and safety initiatives. With respect to governance, there are uncertainties related to the overall group’s policies and adherence to environmental and social policies due to the lack of disclosure.

**Koninklijke DSM N.V. (A-/Stable/A-2)**

We consider DSM’s exposure to environmental and social risk factors as moderately high. We believe DSM is taking initiatives to address its ESG exposures and has set ambitious targets compared to its peers. Indeed, DSM is targeting reducing greenhouse gas (GHG) emissions by 30% by...
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2030 and increasing its electricity sourcing to 75% renewables from 41% in 2018. We view governance comparable to that of its peers. We believe DSM is aligning its governance practices with its ESG commitment by linking its executive compensation to the interest rate on its €1.0 billion committed credit facility, which is linked to GHG emission reduction.

### L’Air Liquide S.A. (A-/Stable/A-2)

We consider Air Liquide’s exposure to ESG-related risks as moderately high because industrial gas operations are energy-intensive. Air Liquide’s GHG emissions are linked to the thermal energy used in the group’s large hydrogen and carbon monoxide production units and cogeneration units, using natural gas mostly, and to the carbon content of the electricity production where the group operates. This involves the company’s efforts to maximize efficiency of the production processes, for which the company is recognized—under the European Emissions Trading Scheme—as leading in its sector, and to favor electricity purchase from low-carbon suppliers, representing currently about 70% of its electricity purchases, i.e. from natural gas (methane), renewables, and nuclear. We consider these may involve extra costs associated with cleaner energy, although partly mitigated by potential energy savings, costs pass-through mechanics and savings in terms of emissions quotas. The company targets 30% reduction in its carbon intensity by 2025 from the 2015 level.

### Linde PLC (A/Stable/A-1)

Similar to other multinational chemical companies, Linde has a broad and diverse operating footprint that exposes it to a diverse set of regulatory and ESG requirements. Despite this, we believe Linde, through its core subsidiaries Linde AG and Praxair Inc., has a good safety track record and no history of significant environmental accidents as evidenced by de minimus-associated ESG liabilities. We believe social factors are currently not a material risk for the rating. We view Linde’s governance as a supporting factor for the ratings, reflecting management’s experience and expertise, and governance fully in line with industry best practices.

### LyondellBasell Industries N.V. (BBB+/Stable/A-2)

We believe the company has somewhat meaningful environmental and hazardous chemicals risk, and that its social risk is gaining significance. We consider these risks in our analysis of the company, but do not believe they are material drivers of credit quality. LyondellBasell’s accounting provisions for environmental liabilities as reflected in its financial statements are relatively low for a large chemical company in part because the company emerged from bankruptcy in 2010 with reduced remediation liabilities. LyondellBasell’s social risk is likely to increase as end-market requirements and consumer preferences evolve with respect to the use of plastics and chemicals it produces. Its production sites in the U.S. and Europe are in jurisdictions that typically have more stringent environmental regulations, and generally speaking a high degree of social consciousness of environmental issues. LyondellBasell’s governance risk reflects a successful post-bankruptcy track record of operations in multiple geographic locations.

### Mexichem S.A.B. de C.V. (BBB-/Stable/--)

Environmental factors are material to our credit analysis of Mexichem. While PVC and plastics demand has grown at an accelerated rate and according to the U.S Energy Information Administration could grow by more than 50% by 2050, Mexichem generates about 40% of its EBITDA through its vinyl business group. Rising concerns about the impact of plastic waste, exposure to chemical additives in consumer products posing dangers to health, and the fact that the petrochemical industry has become the largest industrial consumer of energy could bring further regulations in several countries where the company operates and impair the business. In 2016, Mexichem was heavily scrutinized for a tragic accident at one of the plants of Petroquímica Mexicana de Vinilo (a 60/40 joint venture with PEMEX that was dissolved in July 2018) that killed 32 people and injured 136 others. It did not affect the ratings, as PMV represented about 5% of Mexichem’s total EBITDA in 2015, thereby limiting operating and financial impact, and as investigations concluded the company was found not responsible and began receiving insurance payments in 2017. We assess Mexichem’s management and governance as satisfactory, given that its senior directors set clear and strategic planning processes and control guidelines. The company has also shown a good track record of successfully integrating and operating new acquisitions yielding significant synergies across its business units whilst bolstering its profitability.

### Nutrien Ltd. (BBB/Stable/A-2)

As an industry-leading producer of crop nutrients and services, Nutrien is subject to various environmental regulations focused on air emissions, wastewater discharges, land use and reclamation, groundwater quality, and solid and hazardous waste management. The cost of complying with these regulations is included in the company’s reported production and operating costs. In Canada, there are well-defined environmental regulations governing GHG emissions, emissions intensity reduction requirements, and the investigation and remediation of contaminated properties. Canada’s instituted federal carbon taxes are designed to give the industry participants an incentive to conform with emissions reduction targets. In addition, there are initiatives under way that may result in new regulatory restrictions on the use of nutrients in order to reduce environmental impacts on water quality and other areas. Although there remains some uncertainty surrounding the likelihood of new or amended federal GHG regulations that could affect the company in the future, we at this point don’t view this as having an impact on credit quality.

### OCI N.V. (BBB-/Stable/--)

OCI, like all nitrogen-based fertilizer producers, faces long-term risks from environmental factors, notably tightening regulation of GHG emissions, even if these are currently not a material rating factor. That said, OCI’s asset base is younger than that of global peers, with 46% of production capacity under five years old. Since 2010, OCI has invested more than $5 billion into new production facilities, and upgraded and modernized existing plants, targeting to reduce CO2 and nitrous oxide emissions and increase energy efficiency. As a result, OCI’s global NOx emissions are 55% lower than the global average for nitric acids plants. In addition, OCI’s diesel exhaust fluid and methanol capacity, especially the capacity for bio-methanol, can be used to significantly reduce GHG emissions. These applications can also result in additional demand...
growth for its industrial chemicals in the future, which we view as credit positive. Our view of OCI’s governance as fair takes into account its plausible strategic planning process, standard framework for risk management, management’s sufficient expertise and experience, and an effective board composition with a majority of non-executive directors.

Orica Ltd. (BBB/Stable/A-2)  
Minh Hoang

As a global market leader in commercial explosives and explosives-related services with multinational operations, Orica’s commitment to safety and the environment underpin its licence to operate. The company explicitly recognizes these risks and discloses its governance, risk-management approach, resourcing, and targets annually in its sustainability report. Orica has experienced two separate employee incidents, resulting in two fatalities in 2017 and another two in 2016 following an explosion at its manufacturing plant in Chile. The 2016 incident triggered a major company initiative to manage hazards and implement verification of key controls. We believe safety is a high priority as evidenced by its meeting internal targets of annual zero fatalities since these incidents. Other environmental risks facing Orica’s operations include the management of waste and the protection of the environment and water resources at its manufacturing sites, which could affect the company’s operating licence and sustainability of cash flows and profitability. In the past, Orica has incurred penalties due to safety breaches and environmental incidents, namely the leakage of hexavalent chromium near Newcastle, New South Wales in 2011. Orica has received only minor fines in recent years for numerous environmental and workplace health and safety violations in the ordinary course of business. We consider Orica’s corporate governance to be satisfactory, which is partly reflected by the company’s effective strategic planning, good record of internal control, independent board, and transparent financial reporting.

PPG Industries Inc. (A-/Stable/A-2)  
Danny Krauss

Environmental, social and governance factors do not have a meaningful impact on credit quality. In our view, the company has benefitted from being one of the first companies to transition from solvent-borne to more environmentally friendly water-borne coatings. Companies have been required to shift away from traditional solvent-based paints in certain regions, as they were viewed as a source of potentially hazardous emissions due to the release of VOCs into the atmosphere. We view the company’s governance assessment as satisfactory. However, the presence of activist investor, Trian Fund Management LP, provides a degree of credit uncertainty as it relates to PPG’s future governance structure. Indeed, Trian publicly recommended that the board change its CEO and enhance its ESG profile. As part of improving the governance profile, Trian is looking to enhance shareholder rights by eliminating the company’s staggered board structure to enable shareholders to call a special meeting and remove directors with a majority vote. In the past, the company has attempted to remove the staggered board structure, but hasn’t received the necessary shareholder votes. This measure is on the current 2019 proxy, and the company has engaged a third party for assistance in achieving the necessary shareholder support.

Sasol Ltd. (BBB/Stable/A-3)  
Omega Collocott

Environmental and social factors are relevant to Sasol, and we incorporate them into our risk management processes, but they are not currently material rating factors. The company has a good safety track record and no history of significant environmental accidents, and we view governance as a supporting factor for the ratings, reflecting management’s experience and expertise, governance in line with best practices, and the balance of different stakeholders’ interests. As a chemicals and oil and gas producer, Sasol’s regulatory and social licenses to operate depend on strict management of multiple environmental risk factors. Sasol has reduced its GHG emissions by 6%–7% over the past five years. In South Africa, it faces potential challenges linked to recent regulatory changes and its level of sulphur dioxide emissions (in particular, after 2025) in its Secunda plant. Sasol is among the 27 global producers of plastics and consumer goods that founded the Alliance to End Plastic Waste (AEPW) in January 2019, which have collectively committed over $1 billion to advance solutions to eliminate plastic waste from the environment, especially in the ocean. Sasol makes provisions for environmentally neutral dismantling of plants. These costs stood at ZAR10.7 billion ($760 million) at fiscal year-end 2018, which we add to the company’s adjusted debt. We believe that social factors are currently not a material risk for the rating given the company’s track record.

Saudi Basic Industries Corp. (A-/Stable/A-2)  
Tommy Trask

Environmental and social factors are relevant to our analysis of Saudi Basic Industries Corp. (SABIC), but are not currently a material ratings factor. SABIC has a comprehensive sustainability strategy aligned with the United Nations’ Sustainable Development Goals (SDG). Through various initiatives, the company has achieved GHG intensity reduction of 9.3%, energy intensity reduction of 7.6%, water intensity reduction of 8.8%, and material loss intensity reduction of 35.2% in the period from 2010 to 2017. Its target is to achieve a reduction of 25% in the first three factors and 50% in material loss intensity by 2025 from 2010 levels. The company has reached a relatively high number of Saudi nationals in its domestic operations (90%), above the target set by the government, but a relatively low number of female employees in its global workforce (7%). The company is majority (70%) owned by the Public Investment Fund of Saudi Arabia and the majority (five out of nine) of board members are appointed by the fund as per the company bylaws and board charter. As a listed entity, however, the company is subject to capital market laws and regulations, including corporate governance regulations.

Sherwin-Williams Co. (BBB/Stable/A-2)  
Allison Schroeder

We view environmental and social risks for Sherwin-Williams as on par with that of the chemical sector. Our governance assessment is strong. Although we incorporate these assessments into our rating, they do not have a material impact on credit quality at this time. Sherwin is exposed to environmental risk and pending legal liabilities particularly to lead paint exposure. Indeed, the Supreme Court left a court ruling in place that would require Sherwin (and one additional company) to pay more than $400 million for the remediation of lead-based paint in California. We believe that the risks related to these issues are contained. Highlighting product risk and Sherwin’s global exposure, paint and coatings companies have been required to shift away from traditional solvent-based paints to water-based paints in certain regions, as they were viewed as a source of potentially hazardous emissions due to the release of volatile organic compounds (VOCs) into the atmosphere. However, the credit
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Impact is negligible given its broad product offering. Due to its direct exposure to consumers, Sherwin is exposed to changing demographic and consumer preferences.

Solvay S.A. (BBB/ Stable/A-2)  
Renato Panichi

Due to the deconsolidation of the Performance Polyamides business, Solvay materially reduced hazardous industrial waste by almost 50%, from 194,600 metric tons in 2014 to 94,300 metric tons in 2018. As of year-end 2018, Solvay environmental provisions, mainly related to soil contamination, stood at €691 million, marginally lower than in 2017. We believe Solvay has a strong safety record. Indeed, its medical treatment accident rate (MTAR) of 0.54 (number of work accidents leading to medical treatment other than first aid per million working hours) in 2018 was down from 0.65 in 2017 and 0.77 in 2016 and 2015. The group’s aim is to reach an MTAR of 0.5 by 2025. Solvay has entered into a corporate social responsibility framework agreement with IndustriALL Global Union to reinforce the company commitments on health and safety at work, anti-discrimination, diversity, and environmental protection. From a governance standpoint, Solvay is fully in line with best practices and our assessment is neutral to the rating.

Syngenta AG (BBB-/ Stable/A-3)  
Renato Panichi

As with peers, Syngenta can be subject to lawsuits, personal injury complaints, and changing views of crop protection products on human health and the environment. We note that Syngenta is focused on mitigating its product risks, notably through extensive research on their safety, collaboration with the authorities through provision of data on the impact on human health and the environment, and internal audits and self-reporting processes to ensure compliance with strict and extensive regulatory standards. This is illustrated by an average of $185 million per year spent on safety research for the product portfolio, and about $55 million per new active ingredient over its development time. The company also supports growers in understanding the correct use and application of its products through clear labels and market communication. Still, in late 2017, Syngenta reached a $1.5 billion settlement related to commercialization of Viptera and Duracade insecticides. Litigation payments of such magnitude can have an important impact on the company’s finances, reputation, and ultimately the rating. We view governance as a neutral factor for the ratings, reflecting management’s longstanding experience and expertise in the industry, balanced by our view of certain limitations with regard to transparency and timeliness of communications with investors.

Xinjiang Zhongtai (Group) Co. Ltd. (BB+/ Stable/--)  
Christine Li

Tightening environmental regulations are lifting operating costs for chemical companies in China that have to invest consistently to comply with these new requirements. We incorporate these factors in our credit analysis for Xinjiang Zhongtai in terms of its capital expenditure and profitability. Xinjiang Zhongtai is subject to single-event risk that is inherent in the chemicals industry. However, we believe the company’s various product offerings and its potential support from the government could partially mitigate these risks. Xinjiang Zhongtai has proactively adhered to the Chinese government’s environment protection requirements through ongoing investment. It spent around 30%-40% of its capex on safety and pollution reduction-related facilities and technology upgrades in the past few years to manage its exposure to environmental risks. It has realized reduction of pollution emission by 15% annually for five years consecutively.

Appendix: Components In The Sector ES Risk Atlas

Here is a list of examples of factors we consider in evaluating sector-specific environmental exposure. For example, we examine to what extent each sector is relatively exposed to:

- **Greenhouse gas emissions (GHG):** actual or potential regulations such as carbon taxes, emissions trading schemes, and other direct or indirect costs. The GHG emissions under the Kyoto climate change agreement are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6).

- **Sensitivity to extreme weather events:** incremental costs or the potential physical impact on assets associated with recurring (for example, hurricanes) or infrequent (droughts) severe weather events.

- **Sensitivity to water scarcity:** potential costs related to the need for extracting or sourcing large quantities of water, or requiring on-site water treatment, in comparison to other water users of the same water basins or utilities.

- **Waste, pollution, and toxicity:** potential fines or rising costs associated with prevention and treatment of waste and pollution, including hazardous waste and air pollution.

Ratings as of May 31, 2019.

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Land use and biodiversity: asset retirement obligations, developing natural land or potential operating constraints, or increased costs associated with protecting plant and animal life.

The following is a list of examples of factors we consider in evaluating sector-specific social exposure. For example, we analyze to what extent each sector is relatively exposed to:

Human capital management: a sector’s capacity to develop a long-lasting productive workforce while reducing potential operational disruptions from workforce mismanagement; diversity and inclusion attributes; exposure to strikes and the sector’s general exposure to dealing with emerging skills scarcity or surplus labor.

Changing consumer or user preferences: We recognize that changes in consumer behavior are often the result of complex dynamics, such as changes in technology or fashion or other disruptive business trends. Therefore, we treat a change in consumer preferences as a social factor related to sustainability, health, safety, the environment, privacy, financial mis-selling, or community and human rights, particularly when an entity has triggered the change.

Demographic changes: potential costs or opportunities related to population growth and composition, such as an aging population, urbanization, changing living standards, or a growing middle class.

Safety management: potential direct or indirect costs resulting from problems related to the safety of a sector’s production processes and final customer products.

Social cohesion: potential or actual costs in direct operations or in the supply chain resulting from geopolitical or community-related events such as conflicts, community unrest, and terror attacks.

This report does not constitute a rating action.
## Contact List

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