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INVESTORS SERVICE

OUTLOOK
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Analyst Contacts

Rebecca Karnovitz +1.212.553.1054
VP-Senior Credit Officer
rebecca.karnovitz@moodys.com

Erika Bruce +1.212.553.4341
Associate Analyst
erika.bruce@moodys.com

Rahul Ghosh +44.20.7772.1059
MD-Sustainable Finance
rahul.ghosh@moodys.com

Atsi Sheth +1.212.553.7825
Managing Director - Credit Strategy
atsi.sheth@moodys.com

Brian Cahill +61.2.9270.8105
MD-MIS Env Social & Governance
brian.cahill@moodys.com

» Contacts continued on last page

ESG – Global

2023 Outlook – Macroeconomic challenges to exacerbate ESG credit risks

Summary

» **Four ESG trends that will shape credit quality in 2023.** The macroeconomic, financial and geopolitical fallout of the pandemic and Russia-Ukraine conflict will continue to exacerbate ESG risks. Access and affordability risks will remain elevated, corporate decarbonization pledges will face greater scrutiny, companies will face a complex regulatory landscape and the credit cycle will test issuers' governance capabilities.

» **Corporate emissions reduction efforts will come under greater scrutiny.** Companies in sectors with high exposure to transition risk will face rising pressure to set ambitious emission reduction targets and follow through with transparent and credible implementation plans, despite short-term energy security concerns. Those that do not meet stakeholder expectations will be exposed to growing policy and market risks. At the same time, high project costs will raise execution risks for transition plans.

» **Social risks related to high cost of living will have broad credit impact.** Elevated costs of daily necessities will continue to squeeze consumers, forcing governments to make trade-offs between supporting vulnerable households and restoring fiscal positions. Slower consumer spending and elevated input costs will dampen profitability for many consumer-facing sectors. Worker wage demands will likely result in escalating labor costs and potential operational disruptions in sectors such as transportation and healthcare.

» **Credit cycle will put governance to the test for some entities.** Speculative-grade nonfinancial companies in consumer-facing sectors and lower-rated sovereigns are most likely to face governance challenges that reduce their resilience to external shocks.

» **Complex ESG regulatory and political landscape will heighten regulatory and reputational risks.** Companies (particularly financial institutions) and investors will continue to face a complicated and sometimes conflicting patchwork of regulations and views related to ESG disclosures and investing practices

» **Credit implications of other ESG risks will become clearer.** Enhanced understanding of physical climate risks will increase investor focus on the most exposed entities. Just transition considerations are likely to become more embedded in energy transition plans. As focus on biodiversity intensifies, companies in high-risk sectors face the likelihood of greater regulatory and investor scrutiny. The prominence of circular economy solutions will rise as companies face mounting pressure to reduce waste and reuse content.

Four ESG trends that will shape credit quality in 2023 and four more to watch

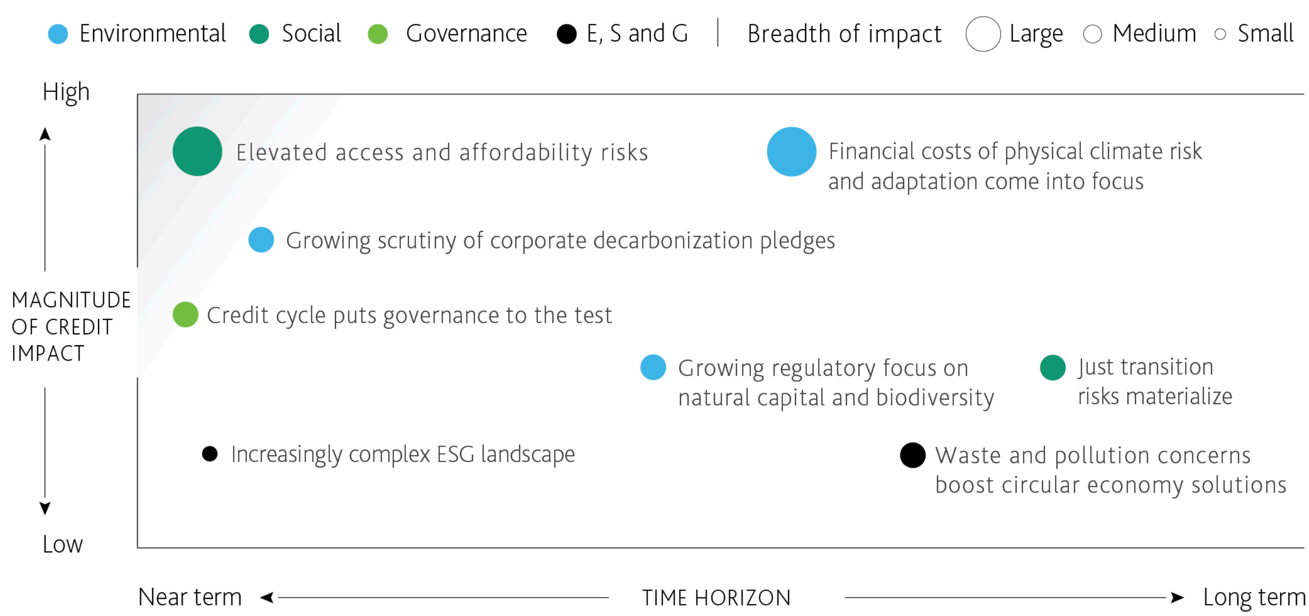
Heightened macroeconomic, financial and geopolitical risks stemming from the fallout of the COVID-19 pandemic and the Russia-Ukraine conflict will likely continue to exacerbate ESG risks in 2023. Meanwhile, the rapid crystallization of climate change-related risks have highlighted the need for rapid decarbonization and scaling up of adaptation finance, bringing longer-term environmental risks into sharper relief.

To place these developments in context, we have identified four ESG trends that will shape credit quality in 2023: growing scrutiny of corporate decarbonization plans amid heightened execution risks for green investments, which will heighten policy and market risks for companies highly exposed to carbon transition risks; elevated social risks for a range of public and private sector entities due to high cost of living concerns; heightened refinancing risks for lower-rated issuers for which governance attributes tend to weaken resilience to external shocks; an increasingly complex ESG regulatory landscape that is raising reputational and financial risks for financial companies in particular.

We have also identified four ESG trends to watch as we expect their credit implications to become clearer over the course of 2023: a greater understanding of the financial costs of physical climate risks and adaptation will increase investor focus on the most exposed entities, raising credit risks; "just transition" considerations will start to become more embedded in energy transition plans as governments aim to balance environmental goals with social objectives; natural capital and biodiversity issues will attract more regulatory attention, heightening credit risks for certain sectors; and circular economy solutions will rise in prominence as companies face mounting pressure to reduce waste and reuse content.

The relative time horizons of these trends will vary, as will their breadth and severity, as illustrated in Exhibit 1. For example, elevated access and affordability risks – social risks related to the high costs of living – could have negative credit implications for a much broader range of issuers than other ESG trends that will affect credit quality this year. On the other hand, a growing regulatory focus on natural capital and biodiversity is likely to affect the credit quality of a narrower range of entities over a longer time horizon.

Exhibit 1
Challenging operating environment exacerbates near-term ESG risks
ESG trends that will shape credit quality in 2023 and beyond



Time horizon refers to our expectation of when risks are likely to materialize.
Source: Moody's Investors Service

Quantifying the impact of ESG on credit quality

ESG considerations already have a significant impact on a large number of debt issuers today and are likely to have a growing influence on credit over time. Our analysis of the more than 10,000 entities for which we have assigned ESG scores shows that ESG attributes have a very high negative impact on credit ratings for 4% of issuers, a discernible negative impact on the rating for 18% of entities and a positive impact for 3% of entities. For another 27% of scored issuers, ESG factors have a limited negative impact on the rating today, but the potential for greater impact over time. For example, exposure to climate-change related risks will increasingly translate into financial impact absent offsetting mitigation or adaptation measures.

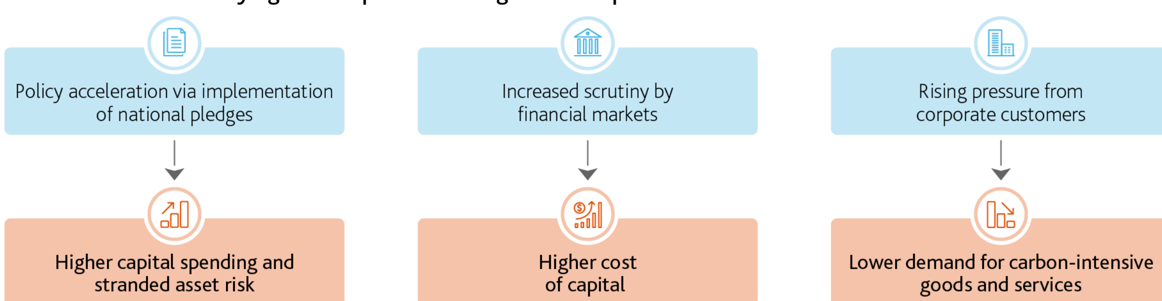
Corporate emissions reduction efforts will come under greater scrutiny

As governments, corporations and financial institutions progress from making decarbonization commitments to implementing their pledges, companies in sectors highly exposed to carbon transition risk will face increasing pressure this year to not only set their own ambitious emissions' reduction targets, but also follow through with credible implementation plans. Companies that fail to set targets or clearly articulate how they intend to reorient their business models and balance sheets are likely to face rising policy and market risks (see Exhibit 2).

In particular, companies could see their cost of capital increase if investors lose confidence in their ability to manage the transition to a low-carbon economy. The trend will likely accelerate as large financial institutions start taking actions on their own net-zero pledges, supported by improvements in data availability and disclosures. And with more companies committing to reduce their indirect (scope 3) emissions as part of their own carbon transition plans, entities that supply these companies could see demand for their goods and services decline if they fail to demonstrate that they are taking action to decarbonize their operations. Moreover, despite the lack of new major commitments at last November's United Nations Climate Change Conference (COP27) in Egypt (B2 negative), policy momentum is building in major economies to make progress on existing net-zero national pledges, with the EU (Aaa stable) leading the charge on mandating emissions' reductions in certain sectors. The EU's carbon border adjustment mechanism, if implemented, will further pressure non-EU companies that export carbon-intensive goods to the trading bloc to reduce their carbon footprint in order to avoid high tariffs.

Exhibit 2

Policy and market risks are intensifying for companies with significant exposure to carbon transition risk



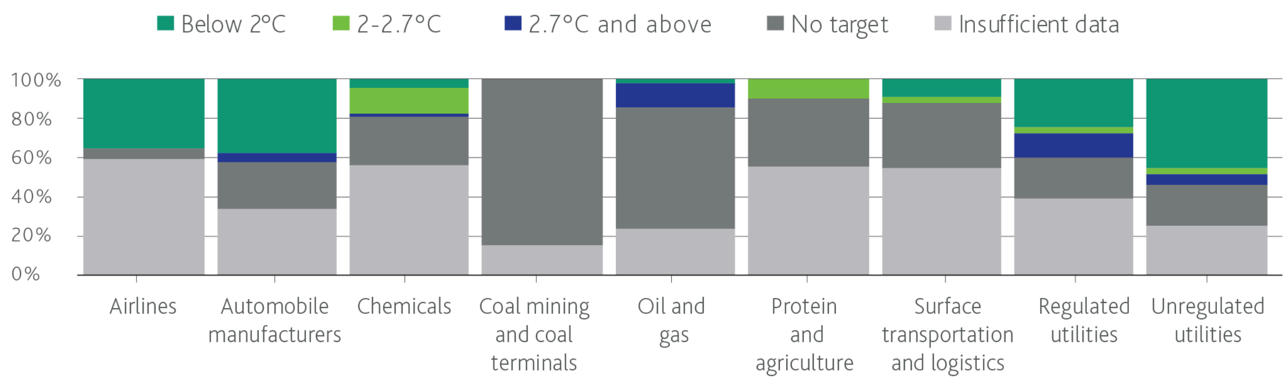
Source: Moody's Investors Service

However, our analysis of transition plans of a sample of rated nonfinancial companies suggests that companies most exposed to carbon transition risks are least likely to disclose ambitious and detailed transition plans, making them least prepared for increased scrutiny of corporate transition plans and the associated credit implications. Using Moody's Analytics' Temperature Alignment Data, we find that few rated companies in sectors such as oil and gas, mining and agriculture are disclosing ambitious and detailed carbon transition plans (see Exhibit 3). This may, in part, reflect the financial and technological challenges that entities in these sectors face in cutting their emissions and the legal actions they may expose themselves to if they set ambitious targets that they cannot meet (see Decarbonization plans mitigate transition risk; limited disclosures inhibit assessment).

Exhibit 3

Prevalence and ambition of company decarbonization targets vary widely by sector

Temperature alignment of company targets by sector for a sample of 1,962 rated publicly listed nonfinancial companies



Temperature Alignment Data as of September 2022. Insufficient data refers to companies with targets that cannot be quantified or do not extend to 2030.
Sources: Moody's Analytics and Moody's Investors Service

According to our latest environmental risk heat map, 16 sectors with $4.9 trillion of debt have high or very high inherent exposure to carbon transition risk, up 55% since 2015 amid stricter emissions regulation and the expanding availability of low-carbon alternatives. These sectors include oil and gas, regulated and unregulated electric utilities, automotive manufacturers, chemicals, steel, shipping and airlines (see Sectors with heightened credit risk account for twice as much debt as in 2015).

Policy support for green capital spending has strengthened in many countries, particularly in the US (Aaa stable) with the passage of the Inflation Reduction Act, which included major incentives for clean energy investments. Still, the challenging macroeconomic environment will raise short-term execution risks for corporate carbon transition plans. In particular, high interest rates, elevated cost of labor and materials and weak global demand will raise project costs and uncertainty around returns (see Governments have made policy progress toward net zero, but energy crisis will complicate implementation).

For example, prices for critical metals such as copper, nickel and cobalt remain above their long-term averages, even as they have come down since surging in the wake of the Russia-Ukraine conflict. These elevated prices threaten to reverse the cost declines of certain clean-energy technologies such as solar photovoltaics, wind and batteries. For utilities, higher costs of materials, as well as labor and capital will raise costs of planned investments in renewables. In Europe, we expect utilities to continue investing in renewables and network expansion, even as they focus on short-term energy security. In the US, we expect public power utilities to make capital investments toward owning renewable resources to benefit from federal subsidies. However, rising costs mean that higher capital outlays may be needed to meet decarbonization objectives.

To the extent that companies delay or scale back their investments in green technologies because of high costs or energy security concerns, they are likely to face even more acute policy and market risks in the future. Meanwhile, moving forward with costly investments that do not perform as intended could result in lengthened payback periods and financial losses.

Social risks related to high cost of living will have broad credit impact

Social risks related to access and affordability of basic services will intensify in 2023, raising credit risks across a range of sectors. Even as inflation moderates in most countries, it will remain significantly above central banks' targets. Cost of energy and food will remain high and volatile, due in part to enduring supply-side challenges caused by the Russia-Ukraine conflict. The broadening of inflationary pressures to housing and other services will also contribute to keeping prices elevated in many countries.

These dynamics will erode consumer purchasing power and exacerbate social inequities. Lower-income households will continue to be hurt most by high living costs because they tend to spend a larger share of their income on food and energy than wealthier households. In advanced economies, lower-income households are also more likely to enter 2023 less financially secure than a year ago, having drawn down on savings accumulated during the pandemic (see The State of the US Consumer: December 2022 and The State of the European Consumer: December 2022).

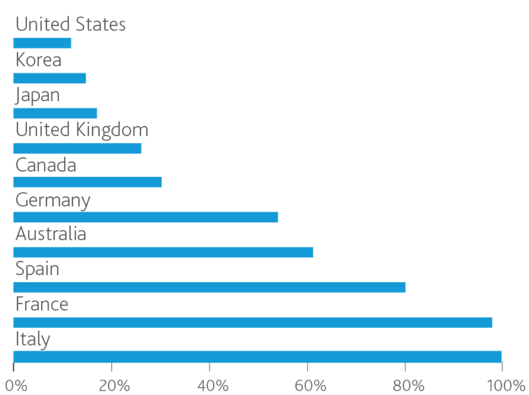
While governments globally provided fiscal support in 2022 to cushion the impact of the rising cost of living, policymakers will face increasingly difficult trade-offs between supporting vulnerable households and restoring fiscal positions that have yet to fully recover from the impact of the pandemic. Certain emerging and frontier markets in Latin America, the Middle East and Africa will be particularly exposed to the risk of social unrest because food and energy comprise a large share of consumer budgets, while tight financing conditions and high debt burdens will constrain the ability of governments to provide sustained fiscal support. However, advanced economies will not be immune to these risks. For instance, Europe's energy crisis will keep social and fiscal risks elevated in that region (see Higher energy costs and slowing growth elevate social and fiscal risks across the region).

In this context, state intervention to address affordability concerns will continue, with potential ramifications for profitability in such sectors as energy and power. In Europe, governments will continue to use windfall taxes to finance support for households and businesses. The credit implications for electric and gas utilities will depend on how such taxes are designed. In Latin America, fuel producers – especially state-owned companies – may also face political pressure to limit price increases for consumers, thereby constraining their ability to pass on higher input costs.

Consumers' reduced purchasing power and willingness to accept higher prices, combined with still-elevated costs of labor, materials and borrowing, will cut into revenue and operating margins for many consumer-facing sectors, with spillovers to certain industrial sectors and securitized products. Retail and apparel will be especially hurt as households continue to shift spending away from nonessential goods and into services, including travel. Slowdowns in housing markets in many advanced economies will also weigh on the financial performance of homebuilders, building products companies and real estate-related services, as well as mortgage backed securities and covered bonds (see Housing booms are over, with some markets at risk of large price corrections).

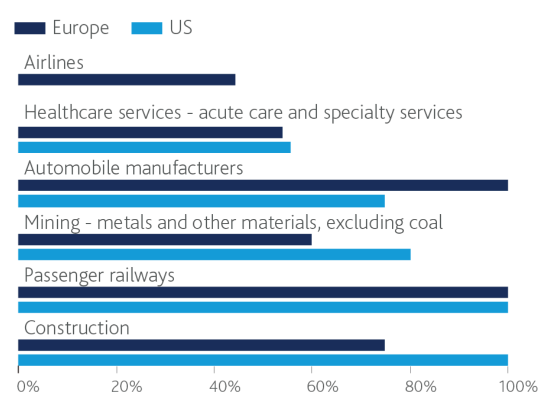
Worker scarcity and rising labor costs will remain a pressure point this year for governments and companies in the transportation, manufacturing, healthcare and construction sectors. In Europe and the US in particular, worker demands for higher pay could result in labor actions, leading to business disruptions and escalating labor costs for some companies. The most vulnerable sectors include those with strong unionization rates, such as transportation, or acute labor shortages, such as healthcare. Even though unionization rates are relatively low and collective bargaining agreements less prevalent in the US than in other major advanced economies (see Exhibit 4), unionization rates are much higher in sectors such as government, transportation and utilities. Structural labor shortages in the healthcare industry, which were exacerbated by the pandemic, are resulting in acute wage pressures and underpin the sector's high exposure to human capital risks (see Exhibit 5).

Exhibit 4
Collective bargaining less prevalent in the US than other advanced economies
Share of workers covered by a collective bargaining agreement, 2018



Source: Organization for Economic Cooperation and Development

Exhibit 5
Percentage of entities with very highly negative or highly negative exposure to human capital risk, by sector



Data as of 28 December 2022
Source: Moody's Investors Service

Credit cycle will put governance to test for some entities

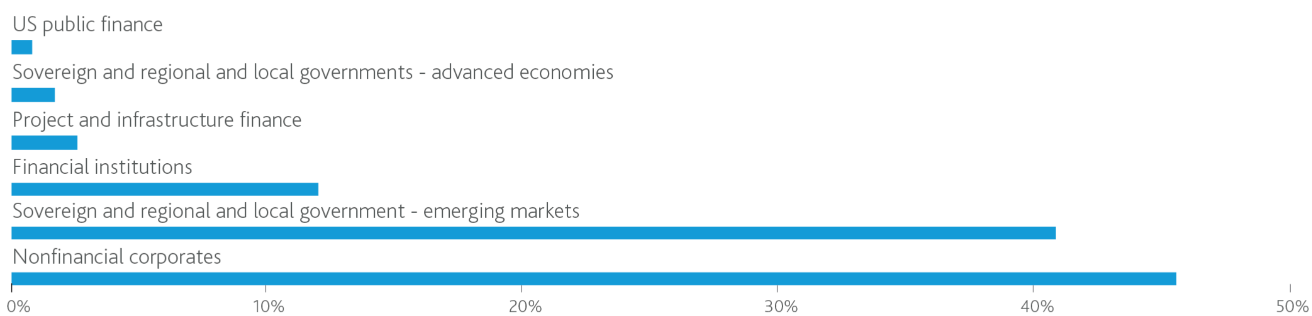
Debt issuers' governance attributes will influence their ability to navigate challenging macroeconomic and financial conditions, as well as rising social risks. Slowing demand, high input costs, volatile financial markets and heightened geopolitical risks will test companies' financial policies and risk management capabilities. Meanwhile, governments will face difficult policy trade-offs. For example, easing the pain of high cost of living for households could undermine monetary policy efforts to tame inflation and add to government debt levels that have ballooned in the wake of the pandemic.

In this context, credit risks will rise most for lower-rated entities, particularly those rated B3 and below, which will face the highest liquidity and refinancing risks. Lower-rated entities tend to exhibit governance attributes that heighten credit risk and reduce their resilience to external shocks, such as leveraged capital structures and weak risk management policies in the case of companies or limited institutional capacity and policy effectiveness in the case of governments. Governance considerations tend to be most negative for nonfinancial companies and emerging market governments (see Exhibit 6).

Exhibit 6

Governance attributes most negative for nonfinancial companies and emerging market governments

Percentage of issuers with very highly negative or highly negative exposure to governance considerations



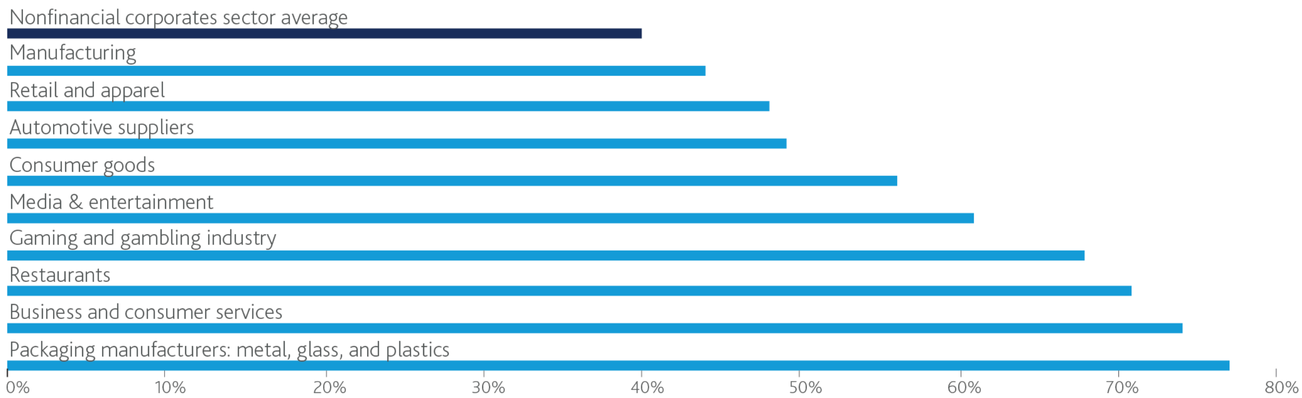
Data as of 28 December 2022

Source: Moody's Investors Service

Governance challenges are significant for many speculative-grade nonfinancial companies in such sectors as consumer products, restaurants and retail (see Exhibit 7), which face heightened default risk as slowing global demand and rising costs weigh on earnings. Overall, we expect the global speculative-grade corporate default rate to rise to 4.9% by November 2023, from 2.6% as of the end of November 2022 (see November 2022 Default Report).

With private equity-owned companies accounting for a majority of companies rated B3 negative and below (80% in the US, nearly two-thirds in EMEA), we expect private equity-backed companies to make up the lion's share of defaults, mostly through the use of distressed exchanges. Many private equity-backed companies exhibit negative governance attributes that weigh on credit strength, including a shareholder-oriented financial strategy and high risk tolerance (see Governance attributes are credit negative for most private equity-owned companies).

Exhibit 7
Governance challenges high for many companies in consumer-related sectors
Percentage of issuers with very highly negative or highly negative exposure to governance considerations



Data as of 28 December 2022
Source: Moody's Investors Service

Among lower-rated sovereigns, emerging markets with limited buffers and large maturities in 2023 will be particularly exposed to liquidity and external pressures. For those sovereigns, higher borrowing costs may reduce countercyclical spending, exacerbating the social risks outlined above. Sovereigns most at risk include Tunisia (Caa1 review for downgrade), Mongolia (B3 stable), El Salvador (Caa3 negative) and Pakistan (Caa1 negative) (see Sovereigns – Global: 2023 credit outlook is negative as high prices, slow growth intensify social risks).

Complex ESG policy and political landscape will heighten regulatory and reputational risks

Companies and investors will continue to face a complicated and sometimes conflicting patchwork of regulations and views related to ESG disclosures and investing practices. On the one hand, more jurisdictions will propose or start to enforce ESG-related disclosure requirements, raising regulatory and market scrutiny into companies' practices. On the other hand, companies in the US in particular will face growing pressure in some quarters to exclude or minimize the integration of ESG considerations in business and investment decisions if they are perceived to come at the expense of shareholder returns. In 2022, several states passed laws blocking financial institutions that incorporate ESG considerations into their decision-making from participating in the management of state pension funds or doing business with the state altogether, heightening reputational and financial risks for affected companies.

With more jurisdictions proposing or enforcing ESG related disclosure requirements in 2023, legal, regulatory and reputational risks stemming from ESG positioning and potential misrepresentation will rise. For example, the 2022 rollout of Europe's Sustainable Finance Disclosure Regulation (SFDR), which requires asset managers to provide standardized disclosures on how they integrate ESG factors into investment decisions, resulted in many asset managers reclassifying funds, leading to allegations of greenwashing. Regulators in the US also took regulatory actions against banks and asset managers, such as fining The Bank of New York Mellon (Aa2 stable) for misrepresenting the ESG credentials of some investment funds and The Goldman Sachs Group Inc. (A2 stable) for failing to follow its ESG investment policies and procedures (see: SEC fines BNY Mellon Investment Advisors Inc., highlighting rising scrutiny of ESG disclosures). However, penalties to date have been small relative to the earnings of the fined institutions, limiting credit impact.

We expect ESG disclosure requirements and oversight of sustainable investing practices to continue to dominate the agenda of financial regulators in 2023. For example, in the US, the Securities and Exchange Commission's will finalize a proposed rule requiring ESG funds to disclose goals, strategies and key progress indicators, although potential legal challenges could delay its implementation (see Exhibit 8). In the short term, increased regulatory activity will raise compliance costs and potential reputational risks for asset managers and could dampen growth in sustainable funds. Over the longer term, regulatory developments that add transparency and boost investor confidence will help support market growth.

Exhibit 8

Financial regulators are increasing ESG disclosure requirements and oversight of investing practices

Forthcoming sustainability-related disclosure requirements

Type of regulation	Jurisdictional authority	Affected sectors and implementation dates
Sustainability reporting	■ Chile CMF ■ European Commission ■ (CSRD/ESRS/NFRD) ■ South Korea FSC ■ Japan FSA ■ UK FCA IFRS ISSB	■ Banks, asset managers, insurers, listed companies (Q2 2023) ■ Financial institutions, listed corporates, large non-listed corporates, listed small-medium enterprises, large non-EU companies ■ Listed companies (2025, 2030) ■ Listed companies, financial institutions (Q2 2022, 2024) ■ Asset managers, asset owners, listed and large non-listed companies (H2 2024, to be confirmed) To be determined by implementing jurisdictions (Q4 2022)
Sustainability reporting and investment fund classification	■ US SEC ■ EU ESMA (SFDR) ■ UK FCA	■ Asset managers and investment advisers (Q3 2023) ■ Banks, asset managers, insurers (Q1 2023) ■ Asset manager, asset owners, listed and large non-listed companies (H2 2024, to be confirmed)
Mandatory Taskforce for Climate-related Financial Disclosures (TCFD) reporting	■ Brazil BCB ■ Canada CSA ■ UK FCA ■ Switzerland SFC ■ Singapore MAS ■ Hong Kong SFC ■ Malaysia SC ■ New Zealand ■ India SEBI	■ Banks (Q4 2022) ■ Banks, insurers, private pension plans and listed companies (2024) ■ Largest UK-registered companies and financial institutions (Q2 2022, Q3 2023) ■ Listed companies, financial institutions (Q1 2024) ■ Banks, asset managers, insurers, listed companies (2023 - 2024) ■ Banks, asset managers, listed companies (Q4 2022 - 2025) ■ Banks, insurers (Q1 2024) ■ Banks, asset managers, insurers, listed companies (2023) ■ Listed companies (2023)
Taxonomy alignment	■ EU ESMA ■ UK FCA ■ South Africa Treasury	■ Banks, asset managers, insurers, listed companies (with 500+ employees) (Q1 2022, Q1 2023 and Q1 2024) ■ Banks, asset managers, insurers, listed companies (2024, to be confirmed) ■ Banks, asset managers, asset owners, insurers, issuers and other financial sector participants (2023)
Climate disclosures	■ US SEC ■ IFRS ISSB	■ Listed companies (2024, to be confirmed) ■ To be determined by implementing jurisdictions (Q4 2022)

Sources: Moody's Analytics and Moody's Investors Service

Credit implications of other ESG risks will become clearer

Enhanced understanding of physical climate risks heightens focus on most exposed entities

Investments in climate adaptation and resilience will become more urgent as the adverse physical effects of climate change exact a financial toll on public and private sector entities, particularly in the most exposed regions. Without significant and effective adaptation, emerging market sovereigns in particular will face significant economic and fiscal losses stemming from climate change. Emerging-market sovereigns tend to be more exposed to physical climate risks than advanced economies and face greater challenges in developing effective plans and securing funding (see Climate-adaptation plans are critical, but demonstrating effectiveness and accessing funding are key barriers).

While countries globally are likely to make increasing use of labeled sustainable bonds to finance adaptation projects, meeting the financing needs of many emerging markets will require increased coordination between the private and public sectors. The United Nations' 2022 Adaptation Gap Report estimates annual adaptation costs for developing countries of $160 billion to $430 billion by 2030, which is five to 10 times higher than current international adaptation finance flows.

Various initiatives launched at COP27, including the establishment of a loss and damage fund, and increasing emphasis in blended finance, could help unlock investment for the most climate-vulnerable countries. However, the ultimate credit impact of these announcements will be determined by how and when policymakers and market participants translate them into action. Governments will meet this year to discuss how to operationalize the loss and damage fund (see Climate finance tops COP27 agenda as talks focus on implementation of pledges).

Beyond emerging markets, exposure to physical climate risks is high across a number of industries (see Exhibit 9). These sectors generally rely on fixed assets with exposure to climate-change-related risks, which can lead to operational and supply chain disruptions and hurt asset values. As shown in the exhibit below, a number of these sectors are also highly exposed to other environmental risks that are becoming more acute because of climate change, such as water management. Six sectors accounting for over $1.1 trillion in outstanding rated debt have high risk exposure to both physical climate risk and water management. These include protein and agriculture, coal mining and coal terminals, and certain segments of the oil and gas industry.

Exhibit 9

Inherent exposure to physical climate risk is high across multiple industries

Environmental risk categories scores for sectors with high exposure to physical climate risk

KEY: Very High Risk, High Risk, Moderate Risk, Low Risk

Sector	Overall Sector Risk Score	Carbon transition	Physical climate risks	Water management	Waste and pollution	Natural capital
Chemicals	Very High	High	High	Moderate	Very High	Moderate
Coal Mining and Coal Terminals	Very High	Very High	High	High	Very High	High
Environmental Services and Waste Management	Moderate	Moderate	High	Moderate	Moderate	High
Mining - Metals and Other Materials, excluding Coal	Very High	Moderate	High	High	High	Very High
Oil & Gas - Integrated Oil Companies	Very High	Very High	High	High	High	High
Oil & Gas - Refining & Marketing	Very High	Very High	High	High	Very High	Moderate
Ports	Moderate	Moderate	High	Low	Moderate	Moderate
Power Generation Projects	Moderate	Moderate	High	Moderate	Moderate	Moderate
Property, Casualty and Reinsurance	Moderate	Low	High	Low	Low	Low
Protein and Agriculture	High	High	High	High	Moderate	High
Regional and Local Governments - Emerging Markets	Moderate	Low	High	High	Low	Low
Regulated and Self-Regulated Utilities with Generation	Moderate	High	High	Moderate	High	Moderate
Sovereigns - Emerging Markets	Moderate	Moderate	High	Moderate	Low	Moderate
Unregulated Utilities and Power Companies	High	High	High	Moderate	High	Moderate

Source: Moody's Investors Service

Just transition considerations become more embedded in energy transition plans

The transition to a low-carbon economy will increasingly reshape economies and labor markets worldwide, especially as major economies make progress on reducing their reliance on fossil fuels. Moreover, expanding access to reliable energy in countries where it is still far from universal will require balancing social objectives with environmental ones.

Governments that do not take into account the social implications of carbon transition face the risk of exacerbating social inequities and unemployment. This may ultimately undermine trust in institutions and support for decarbonization policies, weakening the capacity of sovereigns to adjust and ultimately aggravating the credit implications of carbon transition (see: Sovereigns' readiness for a "just transition" varies, as does associated credit impact).

Emerging markets are particularly vulnerable to social risks associated with the transition, even though strong governance and diversification of income and revenue from sources other than hydrocarbons can provide important buffers. However, the ongoing energy crisis in Europe illustrates that countries at all income levels will increasingly contend with just considerations, such as ensuring universal access to affordable and clean energy.

Initiatives such as the Just Energy Transition Partnerships (JETP), could provide a roadmap for how emerging markets can balance economic and social development goals with decarbonization targets. Two new JETPs were announced at the end of 2022 for Indonesia (Baa2 stable) and Vietnam (Ba2 stable), following the launch of the first JETP for South Africa (Ba2 stable) during COP26 in Glasgow in 2021. Successful implementation of such initiatives will rest on a credible policy plan that draws adherence from all stakeholders despite its nonbinding nature (see Carbon Transition – Indonesia: JETP provides framework to kick-start decarbonization, but hurdles abound).

Growing focus on natural capital and biodiversity presages increased regulatory and market scrutiny into corporate practices

As biodiversity loss intensifies, an expanding understanding of the social and economic impact of nature-related risks, including potential threats to food supplies and livelihoods, will present a range of risks and opportunities for some sectors. In the latest version of our environmental heat map, we identify nine sectors with $1.7 trillion in rated debt facing high or very high inherent exposure to natural capital, including building materials, mining and protein and agriculture.

At last month's UN Biodiversity Conference (COP 15), 195 countries agreed to a global biodiversity framework that aims to put biodiversity on a path to recovery by 2030. Signatories agreed to protect and restore at least 30% of the Earth's land and water, and halt human-caused extinctions of species as well as promote their recovery. The agreement also included the reduction of environmentally damaging subsidies by at least $500 billion per year by 2030, measures related to the monitoring and disclosure of nature-related risks for large and transnational companies and financial institutions, and the full integration of biodiversity in regulatory frameworks and policies. Signatories also agreed to funding provisions, such as the mobilization of at least $200 billion per year by 2030 to implement national biodiversity strategies and action plans.

The ambitious targets signal the increasing importance of biodiversity at a global level, as well as the deepening understanding of its links with climate change. Globally agreed policy targets will put more pressure on companies to disclose and reduce their natural capital risk exposures - potentially similar to the effect of the Paris agreement on corporate net zero pledges. However, the success of these targets relies on their prompt implementation at the national level. The limited progress on biodiversity targets agreed in Japan in 2010 and sluggish implementation of some of the COP26 targets, including provisions related to funding, evidence some of the challenges faced by the COP 15 targets.

The focus on nature-based solutions for climate change will also continue to rise, particularly as they are specifically mentioned in some the COP 15 targets. Deforestation remains a prominent topic, with more countries making pledges to increase or preserve their existing resources, such as Kenya (B2 negative), Gabon (Caa1 stable) and Brazil (Ba2 stable) at COP27. Brazil, Indonesia and the Democratic Republic of Congo (B3 stable), which are home to some of the world's largest tropical rainforests, also signed the Rainforest Protection Pact at the UN climate summit, committing to work together to establish a funding mechanism to help preserve the forests.

Recycling and circular economy solutions gain momentum

Amid growing recognition from policymakers, investors and consumers that more effective waste management and recycling solutions are key elements of a transition to a low-carbon economy, companies will face mounting pressure to reduce waste and reuse content.

The focus to date has been on recycling plastics and increasing the durability of packaging materials. Many jurisdictions have committed to aggressive plastic reduction and recycling standards and have banned the use of single-use plastics. For example, the US Plastics Pact calls for at least 26% of plastic products to be made with post-consumer resin (PCR) by 2025. However, lack of availability of PCR is a major challenge in increasing the use of recycled material.

Looking ahead, apparel, agriculture, automotive manufacturing and mining are just a few of the sectors could face increasing pressure to reduce waste and recycle. For example, the ability to recycle components of the lithium-ion batteries of electric vehicles (EV) would significantly reduce the environmental impact of electric vehicle production and disposal as well as help support rising demand for commodities needed for clean energy technologies. Policymakers in the largest EV markets, China (A1 stable) and the EU have already enacted or proposed regulations to increase EV battery recycling.

The spectrum of substances deemed to harmful to human health and the environment will also likely continue to expand, with more chemicals coming under regulatory scrutiny. For example, producers and commercial users of the family of chemicals known as per- and polyfluoroalkyl substances (PFAs) are facing increasing regulatory and legal risks in the US and EU due to their long-lasting negative impact on human health and the environment.

Moody's related publications

Sector research

- Carbon Transition – Indonesia: JETP provides framework to kick-start decarbonization, but hurdles abound, 15 December 2022
- Sovereigns – Asia-Pacific: Scarring in economies with large informal sectors to drive social, growth, fiscal risks, 14 December 2022
- ESG – Global: ESG considerations have significant credit impact on large number of debt issuers, 23 November 2022
- Carbon Transition – Global: Climate finance tops COP27 agenda as talks focus on implementation of pledges, 20 November 2022
- Just Transition: Are emerging market entities prepared to manage the social implications of global decarbonization?, 14 November 2022
- Banks – Cross-Region: Net zero financed emissions plans show progress but underscore challenges, 10 November 2022
- Leveraged Finance – Global: Governance attributes are credit negative for most private equity-owned companies, 8 November 2022
- Carbon Transition – Global: Decarbonization plans mitigate transition risk; limited disclosures inhibit assessment, 8 November 2022
- Sustainable Finance – Global: Sustainable bonds fare better than broader market, despite third quarter decline, 2 November 2022
- Carbon Transition – China, EU and US: Governments have made policy progress toward net zero, but energy crisis will complicate implementation, 1 November 2022
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Assessment Frameworks

- Request for Feedback: Proposed Framework for Net Zero Assessments, 7 November 2022
- Framework to Provide Second Party Opinions on Sustainable Debt, 3 October 2022
- For a complete list of our carbon transition assessment frameworks and scoring reports, click here.

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Contacts

Jennifer Chang +1.212.553.3842
VP-Senior Analyst
jennifer.chang@moodys.com

Ana Rayes +1.212.553.5862
VP-Senior Analyst
ana.rayes@moodys.com

Rocio Nunez +1.212.553.2850
Analyst
rocio.nunez@moodys.com

Ram Sri-Saravanapavaan +44.20.7772.5492
VP-Senior Analyst
ram.sri@moodys.com

Frank Medrisch, CFA +44.20.7772.5618
VP-Senior Analyst
frank.medrisch@moodys.com

Lucia Lopez +44.20.7772.8750
VP-Senior Credit Officer
lucia.lopez@moodys.com

Brendan Sheehan +1.212.553.0402
VP-Sr Credit Officer
brendan.sheehan@moodys.com

Sarah Conner +44.20.7772.1496
Analyst
sarah.conner@moodys.com

John Wang +65 8876.6914
VP-Senior Analyst
john.wang@moodys.com

Swami Venkataraman, CFA +1.212.553.7950
Associate Managing Director
swami.venkat@moodys.com

CLIENT SERVICES

Americas	1-212-553-1653
Asia Pacific	852-3551-3077
Japan	81-3-5408-4100
EMEA	44-20-7772-5454

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