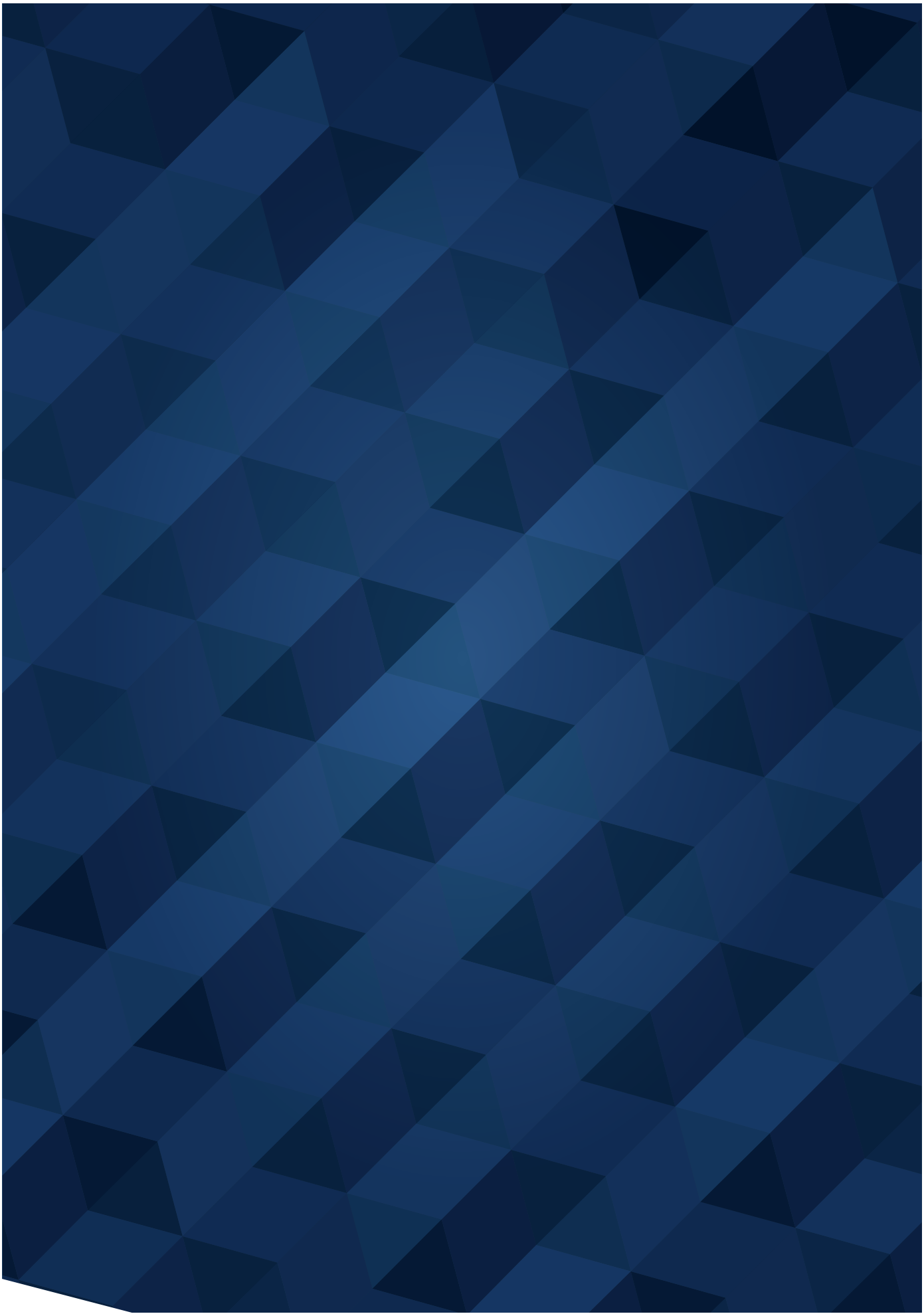
COLUMBIA THREADNEEDLE INVESTMENTS

Responsible Investment Quarterly

Q4 2022



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Foreword: virtuous circles and safeguarding ecosystems

Roger Wilkinson
Head of EMEA Equity and Responsible Investment Research

2022 was a difficult year with multiple crises, most of which have had both short- and long-term implications for our responsible investment themes: a geopolitical conflict, hyperinflation in energy prices, the lingering effects of the pandemic, and talent turnover.

The energy crisis bolstered new climate policy initiatives in the world's largest economies to spur the growth of clean energy technologies, as we discussed in our Responsible Investment Q3 publication. The tax incentives included in the US IRA are material and are already starting to encourage green investments towards the US. I believe other regions will likely be forced to match the incentives or risk green investments moving out of their region – which in turn will threaten the energy security they seek. This should provide a virtuous circle of accelerating investment in the energy transition which should drive down prices and lead to an abundance of cheap renewable energy globally.

In the last quarter of 2022 we saw various climate change action and policies. While COP 27 yielded little progress on climate change action, there were positive signposts elsewhere as Indonesia and other Asian countries announced international climate finance deals. As Natalia Luna explores in the Climate Change article in this report, while the effort by large economies to reduce emissions that cause global warming remains critical, COP 27 emphasised that more needs to be done for adaptation and to address the risks climate change

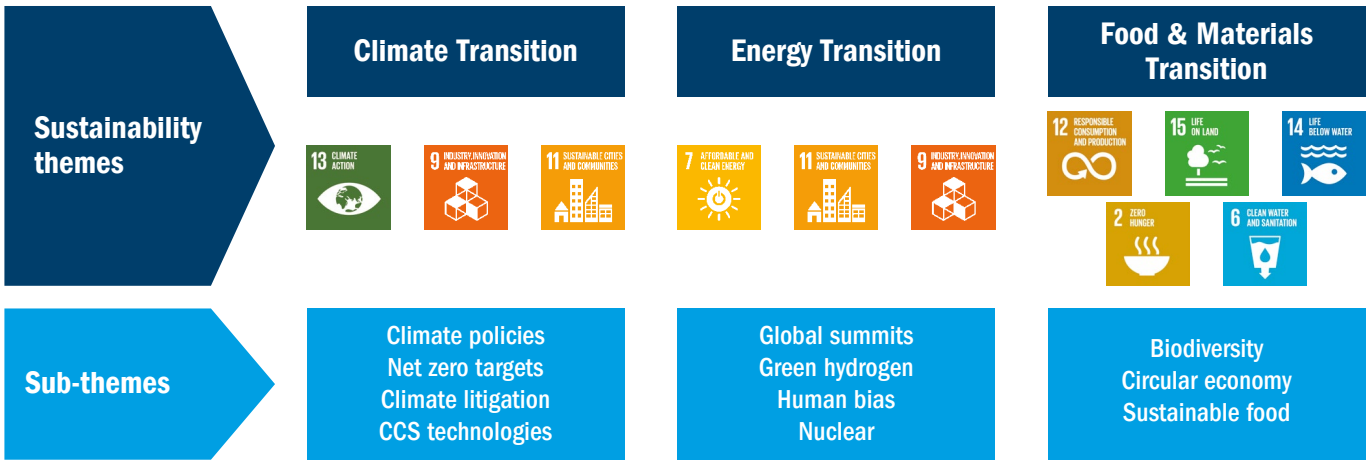
RI research team philosophy[1]

We believe responsible investment (RI) research is fundamental research, so our RI analysts are embedded within the global research team. The team's philosophy reflects this integration with its mantra: "Educate, Collaborate, Engage".

Our RI analysts educate portfolio managers and fundamental industry analysts on RI themes and developments based on our intense research in three overarching sustainability themes: climate transition, energy transition, and food and materials transition. We then collaborate with our portfolio managers and industry specialists to highlight risks and opportunities within industries and sectors. Through this collaboration we pinpoint companies we want to engage with on the risks and opportunities we have identified linked to that particular RI theme. Finally, we integrate these learnings into our investment selections and decisions.

This approach allows us to support and provide actionable investment insights. Our overarching sustainability themes are linked to the UN Sustainable Development Goals, which we believe increasingly shape the economic and investment landscape, and our RI thematic research focuses on investment-relevant sub-themes within these.

Our RI themes and sub-themes



poses for livelihoods and activities. This is of critical importance for emerging markets, particularly where we expect increasing investor interest and investment opportunities to arise. Elsewhere in the world, Japan approved a plan to revive its use of nuclear energy, redrafting an energy policy that was paralysed since the 2011 Fukushima crisis to address a serious electricity shortage in the country. In Brazil, Lula's return as president is raising hopes for environmental action, particularly on deforestation in the Amazon.

Arguably, the most important milestone this quarter came from the recent COP 15 United Nations Biodiversity Conference where 195 countries agreed to protect and restore at least 30% of the earth's land and water by 2030. Rich nations also committed to paying an estimated $30 billion a year by 2030 to poorer nations. This is clearly a positive breakthrough for biodiversity and will rightly help raise the topic's profile as we believe it has material investment risk and opportunity implications.

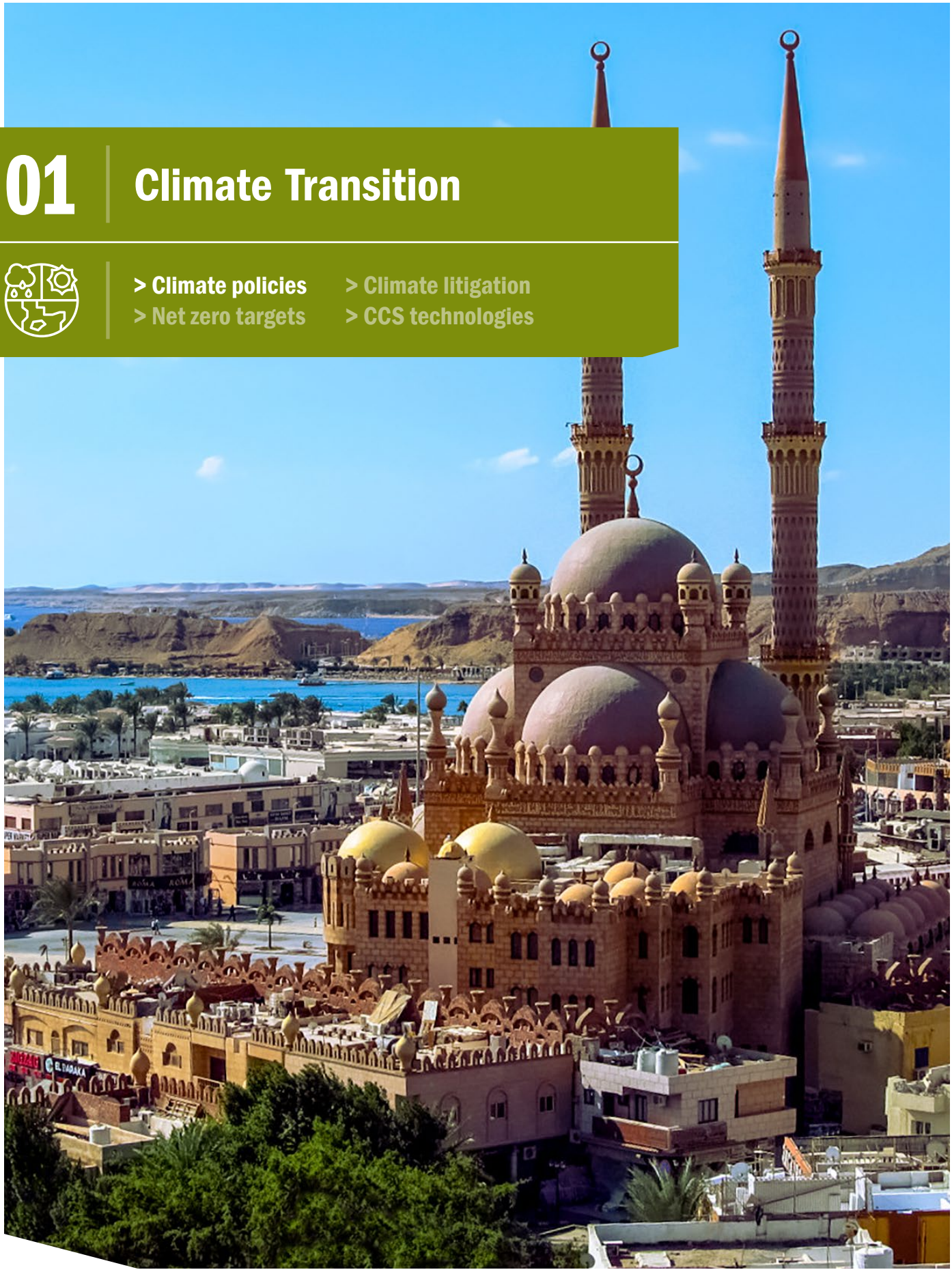
The World Economic Forum has estimated that $44 trillion[2] – the equivalent of about half of global GDP – is generated in industries dependent on nature, led by construction, agriculture and food. Furthermore, according to the World Bank,[3] collapsing ecosystems could take 2.3% – about $2.7 trillion – off global GDP by 2030, underscoring the significant financial cost from nature loss and highlighting that the long-term resilience of companies hinges on maintaining a balance within nature. Recent research[4] highlights that business investments in nature could create $10 trillion of opportunities.

In this issue Olivia Watson expands on this sub theme in her article on biodiversity as she looks at the outcomes from COP 15 on biodiversity, the goals agreed at the conference and what they might mean for investors.

Finally, Natalia, in collaboration with Fixed Income analysts Sharon Vieten and Gregory Turnbull Schwartz, has written a follow-up article to her analysis on the state of the hydrogen theme from our Q3 publication. This focuses on the challenges of bringing the market to scale as well as the investment opportunities we see in the hydrogen value chain, particularly in utilities and industrial gas companies.

We hope you enjoy reading our analysts' viewpoints.

1 Responsible investment research may not be conducted on every security and, when conducted, may be in varying degrees. Although RI research is made available to all portfolio managers, each portfolio management team within our firm makes its own investment decisions and certain teams may place more, less or no emphasis on ESG factors in any given investment decision.
2 World Economic Forum, Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy, 19 January 2020.
3 World Bank, The Economic Case for Nature : A Global Earth-Economy Model to Assess Development Policy Pathways, 29 June 2021.
4 Jefferies, The Convention on Biological Diversity—What to Watch For at COP 15, December 2022.



01 Climate Transition

> Climate policies
> Net zero targets
> Climate litigation
> CCS technologies

COP 27: outcomes, opportunities and emerging markets

Natalia Luna
Senior Thematic Investment Analyst, Responsible Investment

The expectations for COP 27 in Sharm el-Sheikh, Egypt, were lower than for the landmark COP 26 in Glasgow in late 2021. And although world leaders at COP 27 reaffirmed their commitments to expanding clean energy deployment – despite the near-term energy crisis caused by the Ukraine conflict – they did not deliver much action on climate change.

Currently, the combined climate pledges of the 193 countries puts the world on around a 2.5C pathway and will see emissions increase by 10.6% by 2030.[1] COP 27's final declaration reaffirmed the 2015 Paris goal of keeping global warming below 1.5C, but no new stringent targets for emission cuts were announced. It was interesting to see India lead a coalition of 80 countries calling for the phase out of all fossil fuels, not just coal, which is remarkable considering around 80% of its energy mix comes from fossil fuels.[2]

Indeed, ahead of COP 27 India released its long-term strategy to meet its goal of achieving climate neutrality by 2070. It focuses on six key areas to reduce net emissions including electricity, urbanisation, transport, forests, finance and industry. The strategy also emphasises reducing consumption at the individual or household level, and the use of carbon capture use and storage. It also highlights specific interim targets to lower the emission intensity of its GDP by 45% (below 2005 levels) by 2030 and to achieve around 50% of installed electric power to come from non-fossil fuel sources by 2030.

Although Climate Action Tracker considers India's net zero plans to still be "highly insufficient",[3] there is no question about the country's pivotal role on net zero given it is the third largest emitter. As such, India's energy transition represents a significant investment opportunity and the country can become a very sizeable renewables market. Morgan Stanley expects India's fossil fuel share will decline from 83% to 67%,[4] implying that two-thirds of its new energy availability will come from sources like solar, biofuels and hydrogen – an estimated total investment of $726 billion over the next decade.

There were other notable carbon reduction policies from Asia, with Japan, Indonesia and Thailand all increasing their Nationally Determined Contributions (NDCs) regarding the Paris Agreement. Singapore also meaningfully increased its carbon tax to $36-$68/tCO2 by 2030, marking a 10 times increase from current levels. Higher carbon prices over time could help incentivise the energy transition.

Loss and damages and future funding

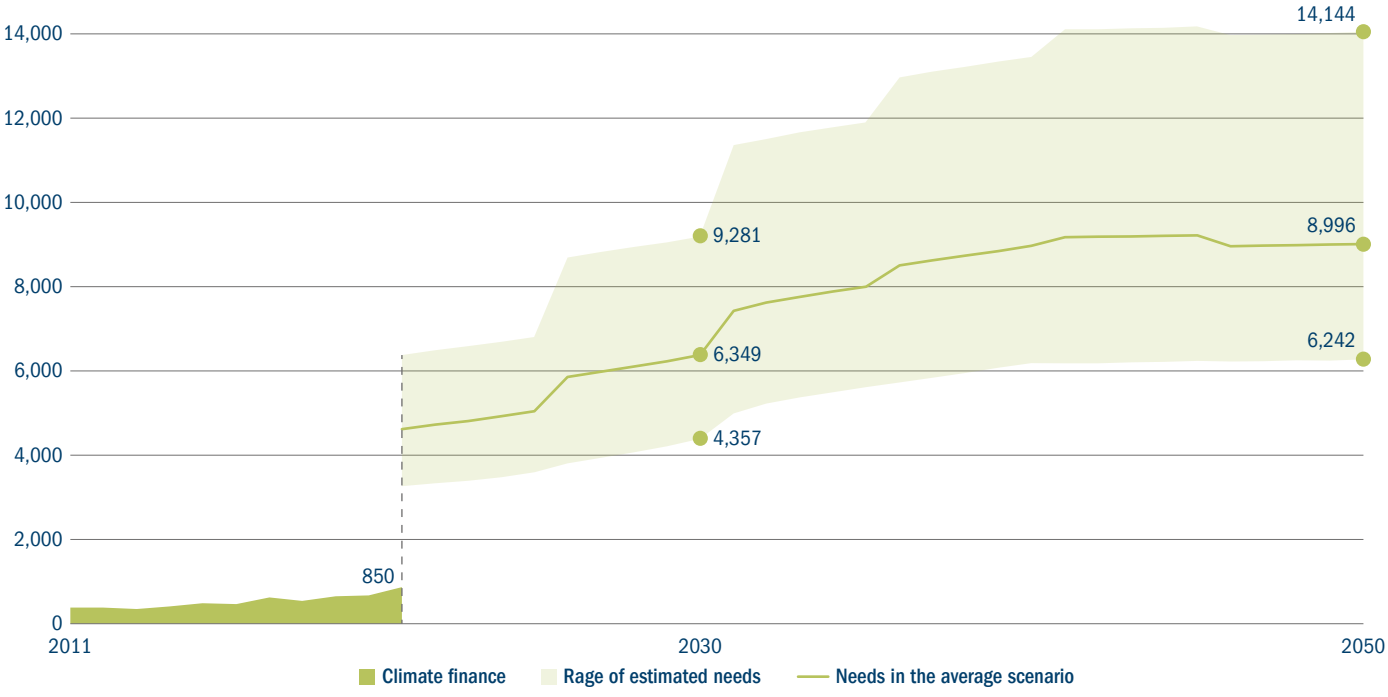
A lot was written around the political agreement on loss and damages in relation to wealthier nations helping to shoulder the transition bill for developing nations. Agreement was reached to establish a fund to support vulnerable countries and make them more resilient to the adverse effects of climate change on nature and people. However, money is yet to be allocated, with COP 27 simply establishing the

Transitional Committee working group with the intention of finalising an agreement ahead of COP 28 next year.

However, one example of this was the pledge of $20 billion of public and private financing over three to five years for Indonesia. This targets peaking emissions and acceleration of clean energy deployment, but is only a small part of the estimated $600 billion it needs to phase out coal-generated electricity and reach net-zero emissions.[5] As with the 2021 agreement for South Africa to receive $8.5 billion to transition away from coal,[6] this is a tangible example of funding being channelled to emerging markets. We expect more of this to happen, which should throw up interesting investment opportunities within clean energy in emerging markets.

COP 27 served as a reminder that $4 trillion per annum needs to be invested in renewable energy up until 2030 in order to reach net zero emissions by 2050. For developing countries, the estimated amount required is $6 trillion. As per Figure 1, aligning finance to a 1.5C pathway requires a dramatic and rapid increase in investments compared to historical levels. As discussed

Figure 1: required finance for a 1.5C transition



Source: Climate Policy Initiative, Global Landscape of Climate Finance, 2022.

in other Responsible Investment Quarterly articles,[7/8] we believe policies developed through the REPower EU plan and the US Inflation Reduction Act will help support and accelerate investments in clean energy technologies.

In addition, COP 27 saw the development of other initiatives that have fallen under the radar, with more than 60 resources and announcements made on climate funding, committees and work programs.[9] These include:

- US climate envoy, John Kerry, launched the Energy Transition Accelerator to assist with the financing of renewable energy construction in developing countries by private entities. Though still in its infancy, the goal is to produce verified greenhouse gas emission reductions that corporations aligned with Science Based Targets initiatives could buy as credits. These would effectively pay for the decarbonisation that will occur as a result in developing countries.
- The private sector deepened its collaboration on innovative solutions. Under the Breakthrough Agenda, 25 actions were developed to speed up decarbonisation across power, road transport, steel, hydrogen and agriculture sectors by COP 28, with the buildings and cement sectors added next year.[10] These initiatives are of critical importance because they allow data sharing, the setting of standardised frameworks, and the financing of pilot projects and tools that will accelerate the learning curves of sectoral decarbonisation technologies which will ultimately see cost declines and spur investment.
- We expect the resumption of China/US climate talks after their suspension last summer. This could help ease supply chain issues on renewables components and get China on board with more climate actions – for example by signing up for the Global Methane Pledge. The Methane Alert and Response System (MARS) was unveiled which will help drive progress on the methane pledge made at COP 26 to reduce methane emissions by 30% by 2030. Methane emissions are responsible for 40% of climate warming[11] and the system will use satellite imagery to quickly detect methane leaks, notify the relevant party and track the subsequent mitigation process. We expect increasing focus and pressure on those sectors generating most methane leakage, namely oil and gas and agriculture.

Conclusion

We are not seeing sufficient investment to be on track for net zero. To narrow the investment gap, lower costs and increased policy support will be needed. McKinsey[12] estimates that growing demand for net zero offerings could generate more than $12 trillion of annual sales by 2030 across decarbonisation solutions in transport, power and hydrogen, illustrating how the transition to net zero represents a remarkable market opportunity.

We expect developing nations to continue working with developed countries to secure financing for their own energy transitions. Asia and Africa are among those most affected by climate change, so countries on those continents will increasingly attract more funding which will further enable clean energy projects. This could translate into greater investor attention within emerging markets, and particularly India.

India's renewable energy industry has come a long way in a very short time, with its renewable power capacity now making up about 30% of the country's total power capacity,[13] up from 13% five years ago. The government's target is for renewable energy to contribute 50% of India's total energy supply, making it increasingly attractive to overseas investors.

A focus on climate adaptation in addition to climate mitigation and greater awareness of loss and damage will see a shift towards companies providing solutions around this. According to the UN, a $1.8 trillion investment in early warning systems, climate-resilient infrastructure, and improved agriculture etc could generate $7.1 trillion through a combination of avoided costs and numerous social and environmental benefits.[14] Some of the solutions to tackle adaptation include solar-powered irrigation, new crop varieties and improved water sanitation. Thus, we expect companies in these value chains to benefit from rising demand and investor interest.

1 UNEP, Emissions Gap Report, October 2022.
2 Morgan Stanley, Why this is India's decade, October 2022.
3 Climate Action Tracker, https://climateactiontracker.org/countries/india/
4 Morgan Stanley, Why this is India's decade, October 2022.
5 Reuters, US, Japan and partners mobilise $20 billion to move Indonesia away from coal, 15 November 2022.
6 Reuters, South Africa to get $8.5 bln from U.S., EU and UK to speed up shift from coal, 2 November 2021.
7 Responsible Investment Quarterly Q3 2022, US Inflation Reduction Act: a strong force to accelerate energy transition technologies, November 2022.
8 Responsible Investment Quarterly Q1 2022, Energy crisis response: repowering Europe, June 2022.
9 https://unfccc.int/cop27
10 Race to Zero Climate Champions, November 2022.
11 Climate & Clean Air Coalition, Methane, 2022.
12 McKinsey, The net-zero transition, 2022.
13 HSBC, India Renewables, July 2022.
14 Climate Adaptation | United Nations

Climate transition engagement:
Climate policies

Company

Sector and country

Utilities, Brazil

Why we engaged

WEG is a global industrial company offering solutions for solar and wind power deployments and for the electrification of mobility. Given its range of decarbonisation offerings across the US, Europe, South Africa and India we wanted a better insight on the strategy and business trends across these markets, as well as on the company's own plans to decarbonise.

How we engaged

A call was organised with the Head of Investor Relations by a Columbia Threadneedle portfolio manager on the emerging markets desk and a Responsible Investing thematic analyst. It was attended by other portfolio managers.

What we learnt

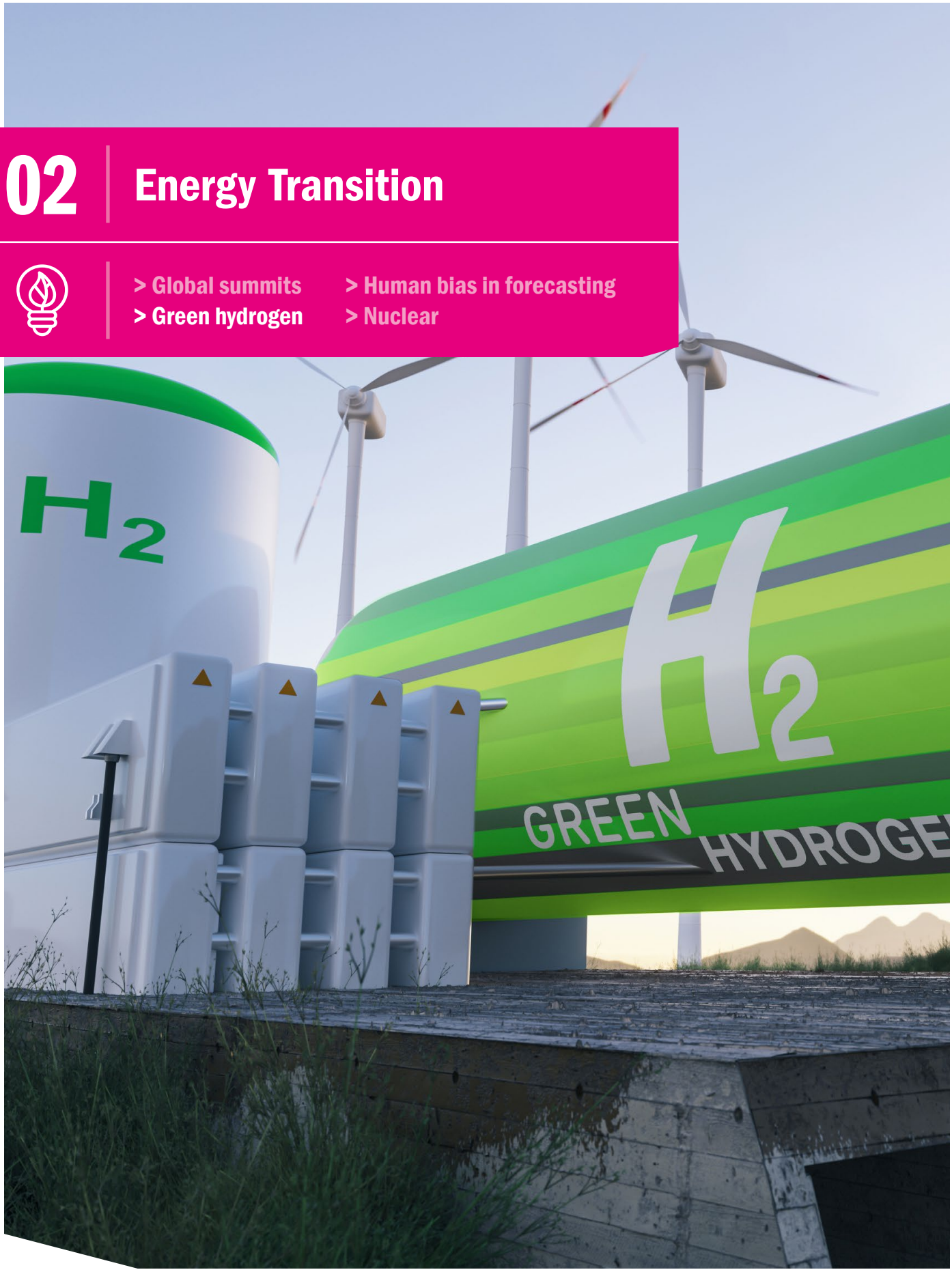
The call provided valuable insight into WEG's unique business versus its peers and its wide range of offerings in electric mobility and solar and wind deployments. The meeting also provided visibility on the company's own approach and plans towards net zero through it naming a new director on ESG (environmental, social and governance) strategy.

Outcome

We took a positive view on the competitive advantage of the company and the strong growth potential of its decarbonisation offerings. In addition, its global presence provides robust diversification and growth potential. We confirmed the company is aware of the steps needed on its ESG journey and on setting net zero targets. We encouraged the company to continue making progress on emissions measurement and decarbonisation planning and agreed to follow up with the new ESG director to monitor progress.

02 Energy Transition

> Global summits
> Green hydrogen
> Human bias in forecasting
> Nuclear



Green hydrogen: the investment perspective

Natalia Luna
Senior Thematic Investment Analyst, Responsible Investment

Gregory Turnbull Schwartz
Senior Analyst, Fixed Income

Sharon Vieten
Investment Grade Credit Analyst, Fixed Income

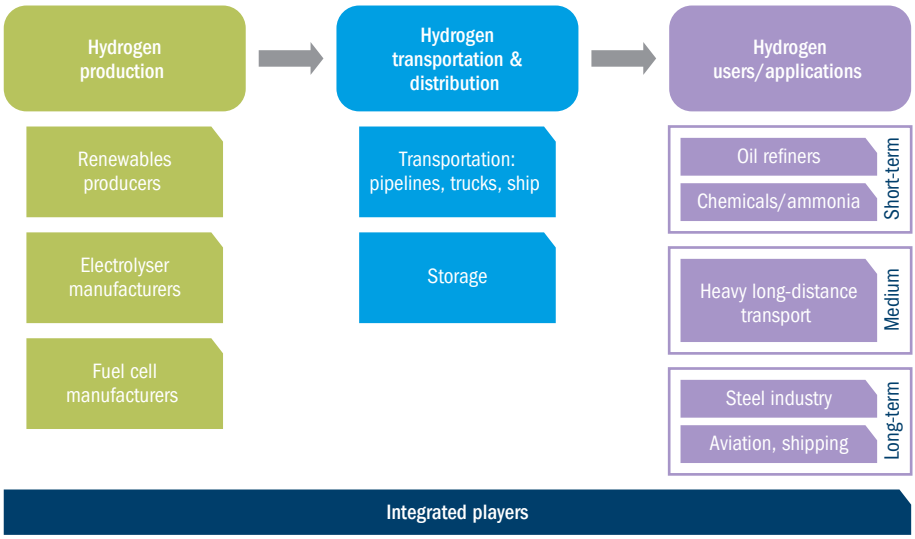
In the Q3 issue of Responsible Investment Quarterly we discussed how hydrogen remains a critical part of the decarbonisation puzzle, and the current energy crisis and abnormally high gas prices have provided a new impetus within this theme. We saw how supportive policies such as the REPower EU plan and particularly the US Inflation Reduction Act could spur significant cost reductions and accelerate investment in this market.

So where will the opportunities arise and what challenges will the market need to overcome? Green hydrogen is a theme that provides investment opportunities in the near, medium and long term. In the near term – the next three years – hydrogen production will need to ramp up greatly to enable its use by different industries. We therefore believe companies in this segment will benefit the most from policy support and investments. Once hydrogen scales up (the medium term) we expect opportunities in other parts of the value chain to materialise as investments in infrastructure increase, and then in the long term in end-user sectors (Figure 1). In this viewpoint, however, our focus is on the near term and the opportunities and challenges for utilities and industrial gas companies.

Industrial gas companies and hydrogen

The market for industrial gases such as hydrogen is dominated by three companies: Linde, Air Liquide and Air Products.[1] There is an ongoing discussion over how the hydrogen market may develop: green, blue or grey. Whatever happens, however, these three companies are likely to benefit. Their typical business models largely insulate them from market risks as they receive contracted payments regardless of whether the gas they provide is used, and the terms of these contracts insulate them from

Figure 1: near-, medium- and long-term hydrogen players



Source: Columbia Threadneedle, 2022.

input price movements. Each of them have been providing hydrogen to their customer bases for a very long time and are well-placed to influence and be knowledgeable of the regulatory landscape and technological progress.

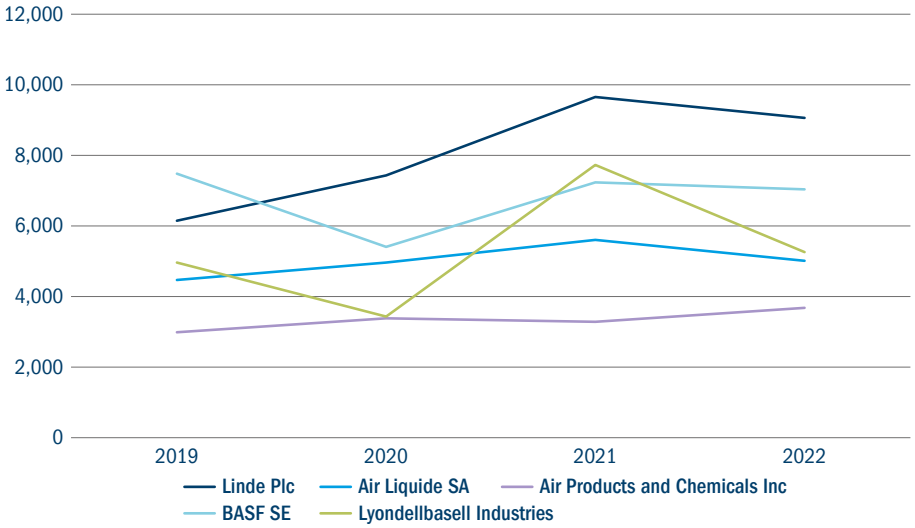
Although it is too early to tell precisely how the market for hydrogen will develop, it would be surprising if it did not grow from current levels. If it increases dramatically in scale, these operators should benefit by designing, building and operating hydrogen-producing facilities. That could be a significant growth area for a sector that is otherwise considered to be more or less tied to rates of global GDP growth. One risk would be misjudging the regulatory backdrop. However, a take-or-pay contractual structure is common in the industrial gases market, and this would likely mitigate the risk of material losses. Perhaps a more significant risk would be a lack of policy stability, making customers of Air Liquide, Linde and Air Products reluctant to commit capital, leaving the businesses reliant on other sources of growth. Overall, though, the development of the hydrogen market is a potential opportunity with little downside to the big three industrial gas producers.

Many investors and bond traders will see Linde, Air Liquide and Air Products as part of the broader chemicals industry. But the business models of the big three are more stable than that of the bulk commodity chemical companies such as Lyondell Basel and Dow Chemical. Firstly, the aforementioned take-or-pay contracts, particularly given that they tend to have some degree of pass-through of energy costs. Secondly, the industrial gas companies' products are often essential inputs that form a relatively small part of the total cost of production within a customers' manufacturing process. For non-industrial end-markets such as healthcare, for example, the gases are essential, providing a significant source of stability to the business. This difference is apparent in Figure 2 which shows the cash generated from operations.

Utilities and hydrogen

The utilities sector largely presents the production and transport of hydrogen as an opportunity and a future growth area. The regulated gas transmission and distribution utilities firms are keen to reduce the perceived risk of stranded assets as the EU gradually weans itself off natural gas, such efforts having been accelerated by the shutdown of

Figure 2: snapshot of company cash from operations, 2019-2021



Source: Company accounts and Columbia Threadneedle Investments analysis, 2022. This is a single measure of stability within the business. The units on the y-axis combine USD (LIN, APD, LYB) and Euros (BAS GR and AI FP) and are meant to compare change within firms rather than be a comparison of absolute levels. The mention of specific companies is not a recommendation to deal.

the Nord Stream pipelines. Windfarm developers are keen to establish offtake arrangements – which is an agreement between a producer and a buyer to purchase or sell some of the producer's goods – by connecting production to hydrogen electrolysers.

The European Hydrogen Backbone plan, set out by a group of gas transmission system operators (TSOs) in 2021, envisages a 53,000km infrastructure network across 31 European network operators with infrastructure in 25 countries. This requires an estimated total investment of €80-€143 billion, 60% of which will be allocated to repurposed natural gas pipelines and 40% to new pipelines. It aims to accelerate decarbonisation of the energy sector, connect supply to centres of demand and support industrial development – all while increasing energy independence and security of supply. Five corridors are emerging: Southern Europe (Tunisia, Algeria, Italy); the Iberian Corridor (Portugal, Spain, France); the North Sea; Nordics-Baltics; and an East/South-east Corridor (Central Europe to Romania, Greece, Ukraine).[2] In our view, the growth of hydrogen is dependent on a couple of trends: the direction of heating and the demand for electrolysis capacity. The latter has been compared by one TSO to a "chicken and egg" situation between industrials and gas players. In terms of cost, Bloomberg estimated in December 2022 that due to the war in Ukraine and high natural gas prices, renewable hydrogen in Europe actually cost less than natural gas. The cost of producing green hydrogen in France, Germany, Italy, Poland, Spain, Sweden and the UK currently stands at $26.78-$47.34 per MMBtu (million British thermal units) depending on the type of electrolyser, versus the cost of European natural gas which stands at an average of $41.15 per MMBtu.[3]

There are numerous factors that support the growth of hydrogen in the utilities sector:

- It is cheaper and faster to retrofit existing gas pipes versus building new hydrogen-ready pipes – two to three years rather than five
- Not much modification or investment is required to carry up to 10% of volumes in hydrogen blends
- A large part of Europe's gas distribution pipeline is considered hydrogen ready, with Ireland,

Portugal and Denmark at 100%, France, Spain and Italy at 98%, and Germany at 96%

- The REPowerEU plan is focused on using renewable gas to support security of supply and is ready to subsidise the production of renewable hydrogen
- The European Commission's Third Gas Package plans to introduce hydrogen regulation from 2031. It is crucial from an investment perspective that hydrogen investments count towards the regulatory asset base and therefore earn a regulatory return on investment

There are also challenges, although not all are insurmountable:

- Green hydrogen production remains low and uncompetitive relative to natural gas and will require subsidies in the early stages
- Depends on direction of heating for households – at present, demand is likely to be driven by industrial rather than domestic users
- Fast development of expensive and energy-intensive electrolysis capacity is needed to justify significant hydrogen-related investments in gas networks
- Unbundling risks under current EU laws. These will require separate asset bases and accounting for gas, electricity or hydrogen with service revenues only used to recover capex and opex in relation to the underlying assets of the asset base
- A lot of industrial sites in Europe have only just switched from high to low calorific gas due to the switch from Dutch to Russian gas (Groningen gas field shut in 2022 due to earthquakes)
- Existing industrial consumers and power plants need to become hydrogen compatible
- New storage systems will be required, different pipe degradation processes are yet to be discovered and the impact of different energy density to be tested
- Hydrogen import targets under REePowerEU assume other countries will also fund large-scale electrolyser capacity
- The impact of chemical interactions with other organic molecules are still being tested on storage sites
- Possible higher demand for biomethane over hydrogen at the distribution level

Conclusion

The supportive policy environment, as well as better economics, should accelerate the development of the hydrogen market over the next decades. Companies that enable its production are likely to benefit the most in the near term. Thus, utilities are well exposed to capture strong renewable growth prospects, while industrial gas companies are well placed to be key enablers around the scale of the hydrogen market. They will leverage their existing expertise in the production, transportation and transmission of hydrogen – whatever colour is produced.

Energy transition engagement:
Green hydrogen

Company

Sector and country

Industrial Gas, US

Why we engaged

We wanted to get better insight on Linde's views on the current power market situation and its strategy and plans towards green hydrogen.

How we engaged

A call with the CFO was organised by a Senior Fixed Income Analyst, and attended by a Responsible Investment Analyst, Fundamental Analysts and Portfolio Managers.

What we learnt

The company is committed to capital discipline and applies this approach to a selection of hydrogen projects where they expect double-digit premiums over the weighted average cost of capital. In the near term the company is focused on blue hydrogen projects in the US where it sees strong interest from industrials. Linde believes there will be regional and sectoral differences in the adoption of green hydrogen.

Outcome

The call provided valuable insight on how the company views the broad development of the hydrogen market globally and the challenges there are to overcome.

1 The mention of specific companies is not a recommendation.
2 European Hydrogen Backbone: https://www.ehb.eu/
3 Bloomberg, BNEF 16 December 2022.

03 Food & Materials Transition

> Biodiversity
> Sustainable food
> Circular economy

COP 15: Global Biodiversity Framework elevates nature-related risks and opportunities

Olivia Watson
Senior Thematic Investment Analyst, Responsible Investment

In December 2022, after multiple Covid-19-related delays, the conclusion of the COP 15 conference in Kunming, China, saw the agreement of a 2030 Global Biodiversity Framework which aims to halt and reverse nature loss by 2030.[1]

Given the complexity of biodiversity, the agreement lacks an overarching rallying point equivalent to the 1.5C target of the 2015 Paris Agreement. However, it does include 23 goals addressing the five drivers of biodiversity loss identified by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES): land-use change, pollution, over-exploitation of resources, invasive species, and climate change. Among the goals are protecting 30% of global land and sea areas by 2030, reducing pollution from fertilisers and pesticides, halving food waste and reforming harmful subsidies.

Countries will now develop and implement biodiversity action plans to respond to these goals prior to the next COP in 2024. While the 23 goals have varying degrees of potential materiality for companies and investors (Figure 1), we anticipate that the overall impacts from the agreement will materialise in three ways. First, it will increase attention on companies' negative impacts on nature, whether through waste, plastics, chemicals, deforestation or otherwise. Second, it will increase national-level regulation, subsidies and programs in support of COP 15 goals. And third, it will ramp up the focus on new financing and investment mechanisms for biodiversity and conservation.

Given the close inter-relationship between nature and food production, we believe some of the most material impacts from COP 15 will be around the food system. A drive to restore degraded land and nearly double the area under conservation, while reducing negative impacts from harmful pesticides and fertiliser pollution should impact the sustainable food transition, as outlined in our Responsible Investment Q3 2022 article.[2] This could be a catalyst for companies involved in research and development (R&D) on products that can increase resilience to climate and water stress, improve productivity and efficiency in food systems, and decarbonise food production.

However, as with any global non-binding agreement, the proof will lie in its implementation. We note that many of the goals are yet to define the data, baselines and definitions that will be used. The outcome of these and the subsequent implementation at a national level will ultimately determine the ambition and impact of the COP 15 framework.

Highlights of some of the goals and our initial assessment of the potential implications for investment are included in Figure 1.

Figure 1: implications of select key targets in the 2030 Global Biodiversity Framework[3]

Target	Detail	Proposed indicators	Potential implications and company relevance
Target 2 **Restoration of 30% of degraded land and marine area by 2030**		Area under restoration (methodology to be decided).	While definitions are still required, this goal should support the adoption of approaches such as regenerative agriculture and nature restoration in company supply chains. Extractive companies will increasingly need to focus not only on reducing current and future impacts but on restoration efforts, while companies sourcing food or textiles will have opportunities for "insetting" projects aimed at nature recovery within supply chains.
Target 3 **Conservation of 30% of land and sea areas by 2030**	To ensure at least 30% of terrestrial, inland water, coastal and marine areas – especially areas of particular importance for biodiversity and ecosystem functions and services – are effectively conserved and managed.	Coverage of protected areas and other effective area-based conservation measures (OECMs).	The current global figure is 17%-18%. For Europe, North America, Asia and Africa to meet the target it would require a near doubling of protected areas. Latin America is nearer to the goal at 24%. The goal creates the potential for stranded assets within extractive industries, real estate and infrastructure companies where assets, operations or reserves are near biologically sensitive areas. However, language around "sustainable use where appropriate" implies that some economic activities may continue in these areas. Impacts will depend on definitions of protected areas and how this is implemented across jurisdictions.
Target 7 **Reduce pollution**	■ Reduce excess nutrients lost to the environment by at least half ■ Reduce the overall risk from pesticides and highly hazardous chemicals by at least half ■ Prevent, reduce and work towards eliminating plastic pollution	The coastal eutrophication index. Pesticide concentration in the environment (methodology TBD).	This is among the most quantified goals in the framework and we anticipate it will be supportive of the transition to more sustainable food production, including: ■ Biological fertilisers, eg Bayer[4] ■ Biological pest control and new-generation pesticides, eg FMC ■ Precision agriculture to reduce fertiliser and pesticide volumes, eg Deere, CNH Industrial ■ Waste management (we note the plastic goals are not quantifiable but overall this aim is supportive to global recycling infrastructure), eg Veolia On the negative side, this may be harmful to companies exposed to fertiliser volumes (where it is overused and lost to waterways, particularly nitrogen), and hazardous/broad spectrum pesticides. This goal appears likely to focus on highest hazard of products as opposed to pesticide volumes.

Target	Detail	Proposed indicators	Potential implications and company relevance
Target 10 **Increase sustainable food and materials production**	■ Ensure that agriculture, aquaculture, fisheries and forestry areas are managed sustainably ■ Increase sustainable intensification, agroecological and innovative approaches contributing to resilience, productivity and food security	Proportion of agricultural area under productive and sustainable agriculture. Progress towards sustainable forest management, referencing Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) certification.	Forestry, fisheries and aquaculture companies with sustainable management practices may benefit from increased demand; those that do not have sustainable management plans in place could come under regulatory pressure and face higher costs.
Target 13 **Sharing of benefits derived from genetic information and digital sequencing**	Increase in benefit sharing by 2030 (instruments TBD in future negotiations).	Monetary benefits received (methodology TBD). Non-monetary benefits (methodology TBD).	Where genetic information is commercialised, royalties or licensing fees must be paid. This could apply to pharmaceutical and medical research, R&D on new food and consumer products, biochemicals and agricultural R&D.
Target 15 **Corporates and investors to report on nature**	■ Companies and financial institutions to assess and disclose risks and impacts on biodiversity in operations, value chains and portfolios ■ Provide information to consumers to promote sustainable consumption	Number of companies disclosing risks, dependencies and impacts on biodiversity.	This target will encourage reporting by investors and companies against the forthcoming Taskforce for Nature-related Financial Disclosures (TNFD) framework, and/or disclosure requirements such as France's Article 29 or the EU Sustainable Finance Disclosure Regulation's (SFDR) Principal Adverse Impacts. Improved disclosure will enable both companies and investors to better understand impacts and risks. More sustainable consumer products can benefit from increased demand if efforts such as environmental labelling are adopted. Labelling could also reduce demand for products with worse sustainability characteristics, eg meat and dairy.

Target	Detail	Proposed indicators	Potential implications and company relevance
Target 16 **Reduce consumption footprint**	■ Reduce the global footprint of consumption including halving global food waste ■ Significantly reduce overconsumption and waste generation	Y/N indicator is proposed.	Food, retail, restaurants and the catering industry will need to adapt their business practices to support reduced waste – eg by switching to suppliers that can measure and reduce food waste; shifting to smaller package sizes; improving demand forecasting and fostering closer customer relationships.
Target 18 **Reform harmful subsidies**	■ Identify subsidies and incentives harmful to biodiversity by 2025, and eliminate, phase out or reform them by more than $500 billion a year by 2030 ■ Scale up positive incentives for the conservation and sustainable use of biodiversity	Measure value of subsidies and other incentives harmful to biodiversity that have been eliminated, phased out or reformed. Put positive incentives in place to promote biodiversity conservation and sustainable use.	Although this goal is quantified, much will depend on the definition of "harmful". Many of the relevant subsidies are politically sensitive given food and energy inflation. Trade associations can also be expected to lobby for the status quo. ■ Alternative meat and dairy (plant-based, fermentation and cultivated meat) where redirection of subsidies could accelerate cost parity ■ Clean energy tech where subsidies shift away from fossil fuels ■ Fossil fuels, meat and dairy, construction, where subsidy dependent ■ Wood pellet industry if subsidies for biomass are reviewed

1 UN Environment Programme, COP 15 ends with landmark biodiversity agreement, 20 December 2022.
2 Responsible Investment Quarterly Q3 2022, Food security challenges put spotlight on sustainable transition, November 2022.
3 All data in the table: https://www.unep.org/events/conference/un-biodiversity-conference-cop-15
4 The mention of specific firms is not a recommendation to deal.

Food & Materials transition engagement: Food security and biodiversity

Company

Sector and country

Retail, United Kingdom

Why we engaged?

Tesco is a significant holding and we have had an ongoing engagement with the company on a range of sustainability issues. Earlier in 2022 we identified Tesco as having relatively weak disclosure on nature relative to its risk exposure on the theme.

How we engaged?

We had a small group meeting with the Head of Environment and Sustainable Agriculture in December 2022 on developments related to Tesco's nature strategy.

What we learnt?

- Nature and biodiversity are emerging themes and although Tesco's work in this area is under development, its efforts to-date are promising. In particular, Tesco is funding and piloting a location-based mapping tool with World Wide Fund for Nature (WWF) that will provide an insight into nature risk among suppliers (eg vulnerability to water scarcity, soil degradation, or pollinator decline). Innovatively, this exposure data can be overlaid with environmental impact data and with suppliers' scope 3 emissions. Considering risk and impact together will enable Tesco to identify "hotspots" where it can focus its efforts. Roll out will start with dairy, then fresh produce, and eventually grains and commodities.
- Commodity traceability on deforestation is a work in progress. Despite putting a lot of resource towards traceability, Tesco underlined the scope of the challenge given its vast supplier network, different regulatory approaches being taken between the UK and Europe and systemic issues with opaque commodity supply chains.
- Soy is the company's biggest exposure to deforestation risk. Currently, there is only a small volume of fully traceable soy and it is pursuing multiple avenues to try and improve supply. Collaboration on a pre-competitive basis is key and Tesco has been involved in leading several initiatives.
- Tesco will be among the first to pilot reporting on the Taskforce on Nature-related Financial Disclosures.

Outcome

We were reassured as to the depth of Tesco's approach to nature in operations and in its supply chain, including the innovative supplier mapping work with WWF. In our view, further effort to reduce sourcing impacts will build on Tesco's leadership on demand-related aspects such as food waste and sales of plant-based products. Traceability remains a challenge, particularly for key commodities such as soy. We will continue to monitor progress on this at Tesco and across the sector in light of the incoming EU legislation.

Stewardship in action

Our stewardship activities are integral to our investment process, helping us to detect inflection points and long-term trends, and influence companies' standards around ESG risk management and sustainable outcomes. A key focus our investment research so that we can make informed capital allocation decisions as active investors.

The ultimate goal of our stewardship approach is to enhance our understanding of risks and opportunities, strengthening our ability to deliver sustainable long-term value for clients. In approaching these responsibilities we are mindful of market trends; company, local market and industry-specific issues; and relevant best-practice standards – but we will ultimately be guided by what we consider is in the best long-term economic interests of our clients.

The research and analysis emerging from this, and the ongoing engagement with companies, is disseminated globally throughout the firm as part of our culture of research intensity and helps us identify potential issues at an early stage. In prioritising our engagement work, we focus our efforts on the more financially material or contentious issues and themes, and the issuers in which we have large holdings. There are many companies with which we have ongoing engagements, as well as a number that we speak to on a more ad hoc basis, as concerns or issues arise. We vote actively at company meetings.

We view this as one of the most effective ways to signal approval (or otherwise) of a company's governance, management, board and strategy, or standards of operating practice. While analysing meeting agendas and is making voting decisions, we use a range of research sources and consider various ESG issues, including companies' risk management practices and evidence of any controversies.

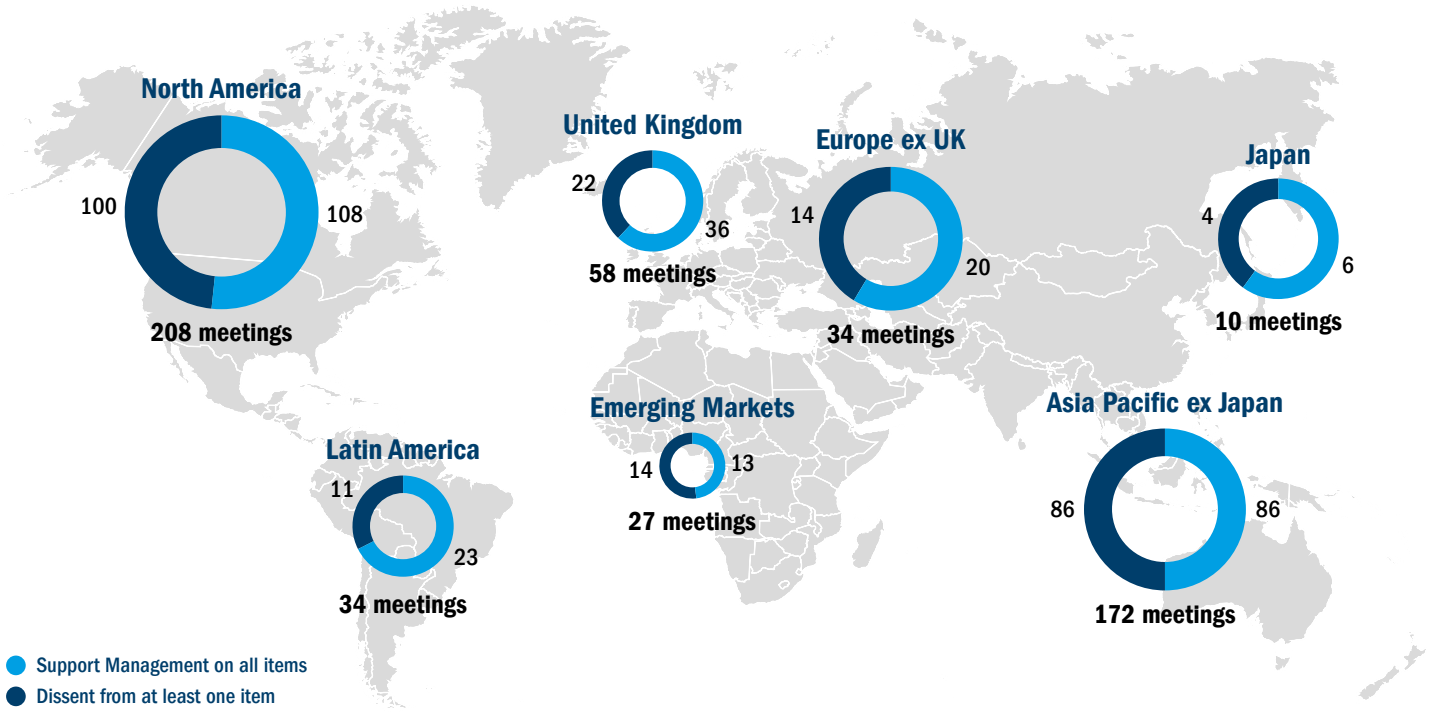
Our final voting decisions take account of research issued by proxy advisory organisations such as ISS, IVIS and Glass Lewis, as well as MSCI ESG Research. Although we subscribe to proxy advisors' research, votes are determined under our own custom voting policy. Within this, material or controversial proposals receive enhanced due diligence and are voted on by the investment team, with support from the RI team. Votes are cast identically across all mandates for which we have voting authority. All our voting decisions are available for inspection on our website seven days after each company meeting in EMEA/APAC, and are updated annually in September in the US.

Voting Q4

Between October and December 2022 we voted at 543 meetings across 46 global markets. This compares to 628 meetings voted across 46 global markets in the previous quarter. Of the 543 meetings, 335 were annual general meetings, 187 special meetings, 13 court, six combined annual/special meetings, three proxy contests and one written consent. We cast at least one dissenting vote in 262 meetings (47%).

We voted in 46 separate markets in the fourth quarter. Most meetings were voted in the United States (205), followed by Australia (69) and the United Kingdom (47). The majority of the voting items that we did not support throughout the quarter continue to be related to directors (61%, followed by remuneration (23%), capitalization (6%) and other business and social-related proposals (5%).

Figure 1: Meetings voted by region



Source: Columbia Threadneedle Investments, ISS ProxyExchange, 31 December 2022.

Engagement highlights

Between October and December we conducted ESG-focused engagements with 28 issuers, some on multiple occasions. Meetings with a sustainability focus concern the impact of a company's products and services, while meetings with an ESG focus concern how well companies manage their internal non-financial risks. The mention of specific companies is not a recommendation to deal.

Environmental

Kingspan Group plc
Moncler
Pearson plc
Smiths Group plc
Tesco plc

ESG

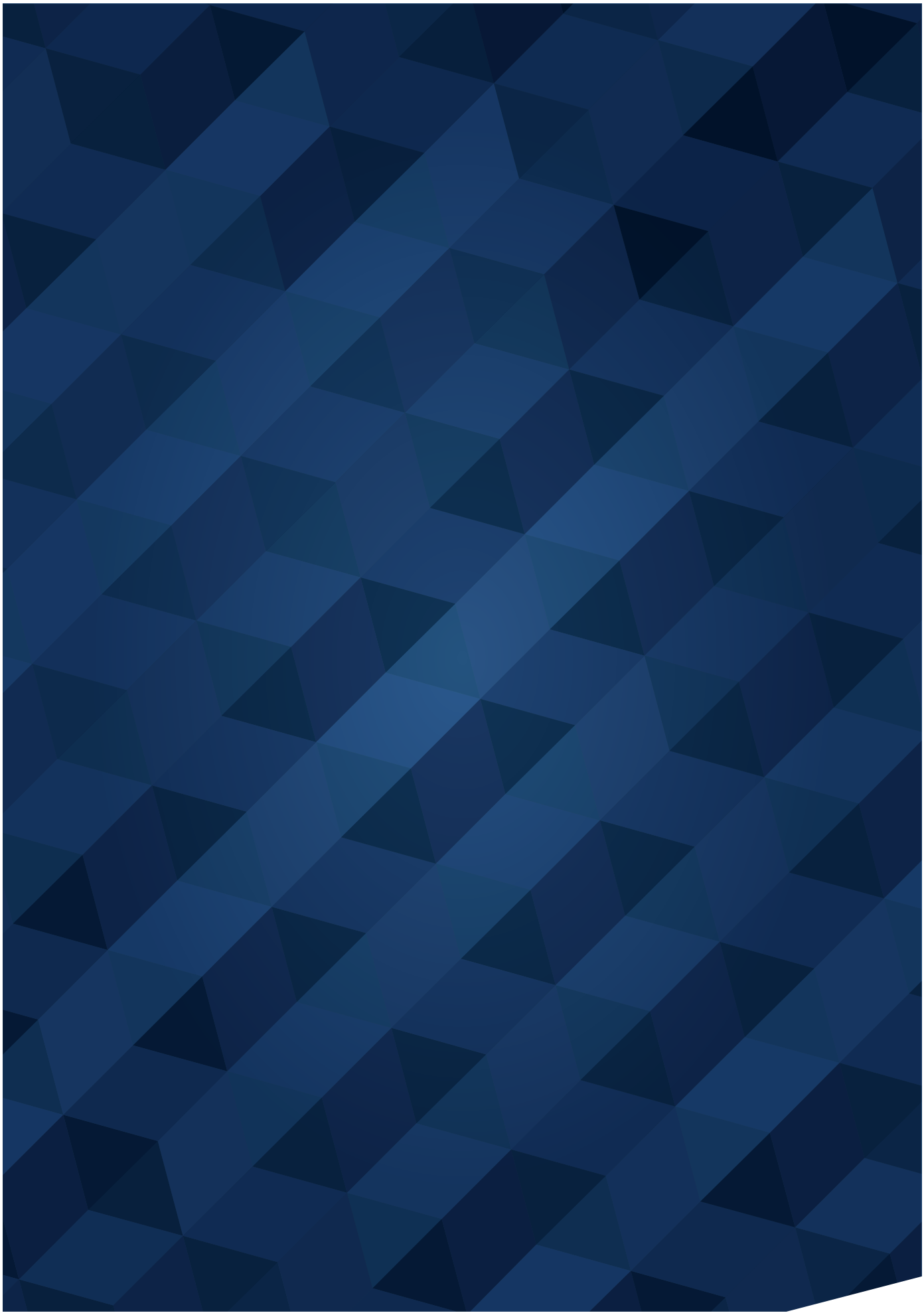
Breedon Group plc
Centrica plc
Compass Group plc
Cummins
Diageo plc
Engie
Gasunie
GSK plc
Linde
Livent
Reliance Industries
RWE
Total Energies
WEG

Governance

Burberry Group plc
GSK plc
Haleon plc
Hays plc
International Distributions plc
Kingspan Group plc
LVMH Moët Hennessy Louis Vuitton
Restaurant Group plc
RS Group PLC
Secure Trust Bank plc

Social

Hays plc
International Distributions plc
Moncler
Reckitt Benckiser Group plc



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