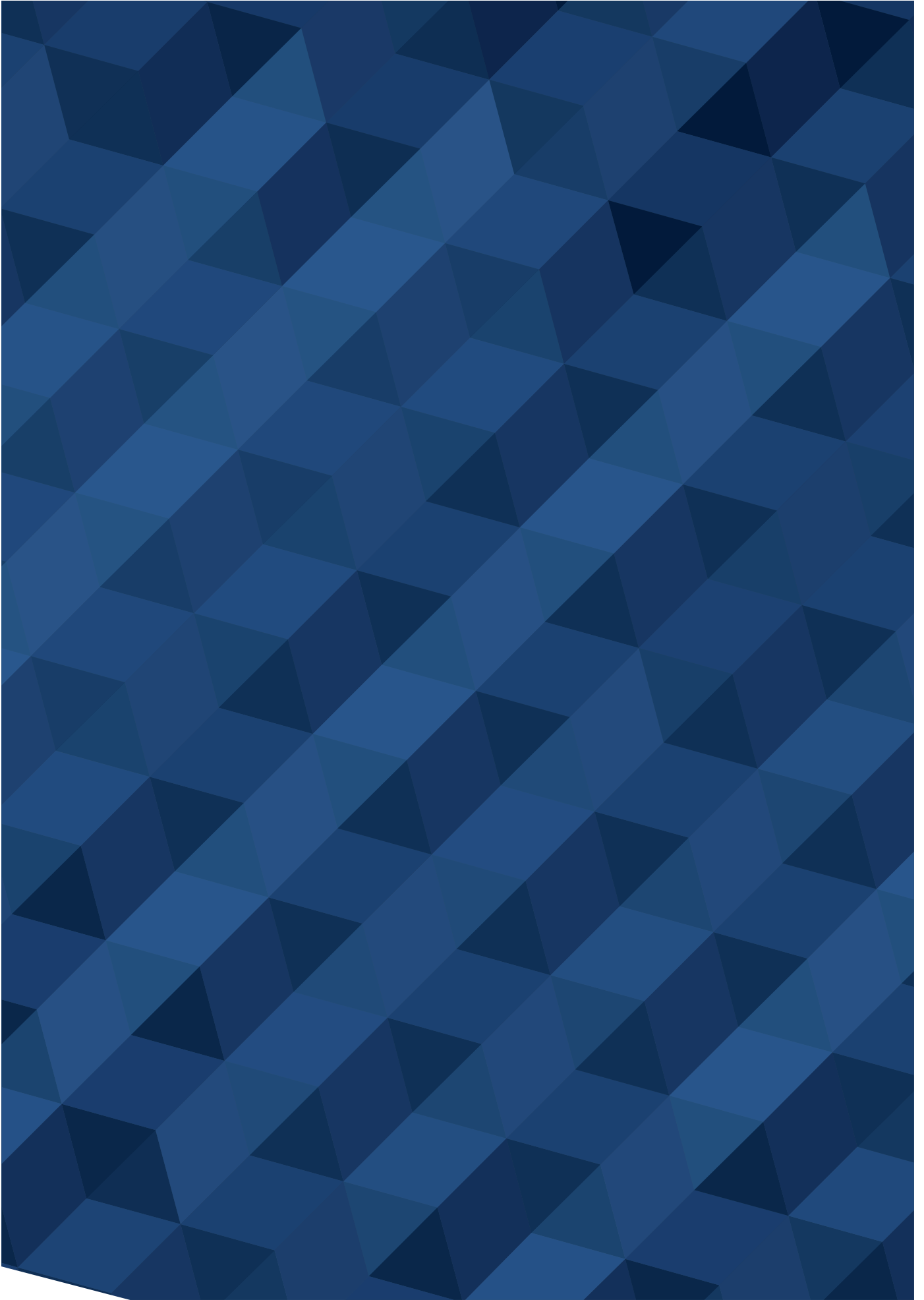


Responsible Investment Quarterly

Q1 2022





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Foreword: responsible investment research philosophy



Roger Wilkinson
Head of EMEA Equity and
Responsible Investment Research

Welcome to the newly designed Responsible Investment Quarterly. Over a number of years we have developed the publication to showcase Columbia Threadneedle Investment's responsible investment (RI) capabilities across Europe, Asia and the US. In this new incarnation we wanted to focus more on the RI research embedded within our investment process, and how it supports and furthers our investment approach across the globe.

The research culture at Columbia Threadneedle is characterised by our "research intensity" approach – a team of more than 200 investment

professionals, including more than 130 analysts, dedicated to original, independent research that drives long-term consistent returns for our clients. We believe RI research is fundamental in this, 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

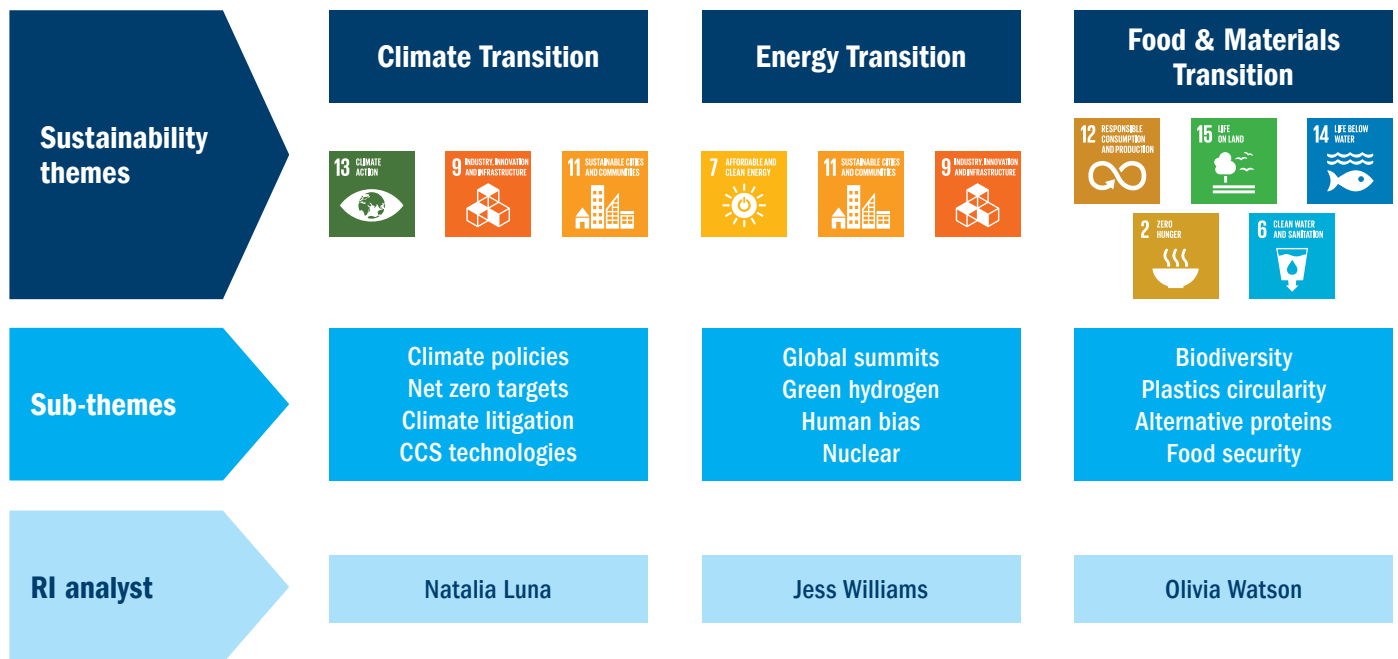
managers and industry specialists to highlight risks and opportunities within industries and sectors. Through this collaboration we identify companies we want to **engage** with on the risks and opportunities we have identified linked to that particular RI theme. Finally, we integrate these learnings into our investment selections and decisions. This approach therefore 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.

RI Research Team philosophy: Educate, Collaborate, Engage



Our RI themes and sub-themes



In this quarter's issue Natalia Luna looks at the European Union's energy crisis response to the awful conflict in Ukraine, and highlights that it will likely accelerate the shift to renewables. Jess Williams educates us on the technological advancements in nuclear power, which are overcoming some of the barriers to what has the potential to be a very complementary, clean and reliable power source to renewables. Olivia Watson explains why she believes we will see an acceleration to more

circular plastics, and discusses the risks and opportunities this will bring for different industries.

We hope you enjoy the new format and reading our analysts' latest viewpoints.

01

Climate Transition



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



Energy crisis response: repowering Europe



Natalia Luna
Senior Thematic Investment Analyst,
Responsible Investment

The conflict between Russia and Ukraine exposed Europe to an energy shock without precedent, exacerbating an environment of already high energy prices and creating an energy supply crisis. The EU receives around 40% of its gas from Russia, so in response to this crisis it unveiled in March an energy plan called “RePowerEU”. Its aim is to reduce Europe’s gas dependence on Russia by two thirds by the end of 2022 and to zero by 2030.¹

The plan aims to ensure energy security while moving forward on decarbonisation, primarily from a material acceleration of renewables

and energy efficiency measures. The plan, therefore, is aligned with the European Green Deal and the goal is to achieve both objectives in parallel with measures to allow faster permitting for renewables which we see as a key catalyst to achieving the expansion of clean energy. RePowerEU could, therefore, bring forward investment in additional renewables capacity as well an increased focus on energy efficiency.

What’s the plan about?

The plan sets out a combination of objectives and measures for the short, medium and long term:

- In order to reduce dependency on Russian gas by two thirds, the EU is looking to diversify gas imports, particularly via higher LNG imports from the US. Late in March, the EU and US announced a task force which will see the US strive to ensure additional LNG volumes for the EU market of at least 15 billion cubic meters (bcm) in 2022² – although specifics on how they will do this were not provided. Considering that US LNG is already at full production and increasing production will take a few years to build out, the announcement is perhaps more of a strategic agreement to ensure the US/

EU natural gas relationship and the long-term growth of exports to Europe, rather than a concrete plan.

Thus, to ensure the short-term security of supply we can expect to see the use of more traditional sources of energy such as coal and fossil fuels. In practice, all energy sources will be used in tandem so we can think there will be an uptick in coal, oil and gas imported from non-Russian sources, as well as a push to expand solar, wind and nuclear. As such, traditional and alternative energy sources will coexist.

EU member states could also use temporary short-term regulatory measures to counteract rising power prices, such as windfall payments. However, the most significant development in this space so far is the announcement that Spain and Portugal will be allowed to temporarily decouple electricity prices from that of gas.³ Both countries already have very high renewable electricity generation and are almost completely detached from the rest of the EU energy market due to few interconnections, and both only import around 10% of gas from Russia (versus around 55% for Germany, for example).⁴



As such the EU Commission has agreed a temporary special treatment for Iberia. In the medium and long term, RePowerEU has three levers with which to entirely remove Europe’s dependence on Russian gas by 2030: speed-up the use of renewables; accelerate the use of heat pumps; and the development of green hydrogen.

Renewables: RePowerEU aims to double current national plans on new wind and solar PV additions by 2030. The EU acknowledges the need to simplify and shorten the permitting process as a precondition to accelerating this rollout and in May unveiled legislative recommendations for EU countries to reduce this process⁵. We see this as a necessary and significant catalyst for a renewables boost given the current approval process takes around two to four years. Goldman Sachs estimates this would allow 150GW of installations per annum versus around 20GW-30GW a year in the recent past.⁶

Heat pumps: the aim is to more than double current installation rates to around 40 million electric heat pumps by 2030 to reduce energy demand and replace gas boilers. However, the funding, reskilling and upskilling of the

current workforce still needs to be further enhanced in order to support rapid deployments.

Green hydrogen: RePowerEU targets a 4x upgrade to previous green hydrogen production targets by 2030 – from 5.6 million tons to 20 million tons.⁷ To achieve this the EU will create a Hydrogen Accelerator programme which will help develop integrated infrastructure, storage facilities and port capacities. We see the investment case for hydrogen materially changing as the RePowerEU plan shortens the timeline to make it economical and viable.

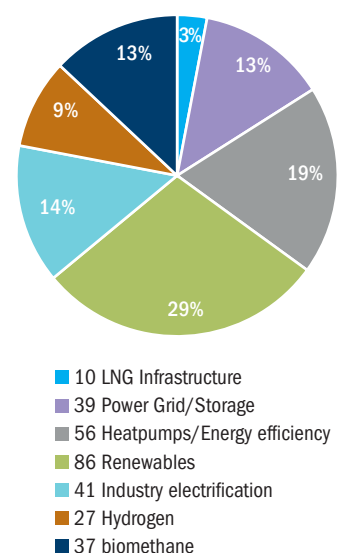
Following the announcement of the plan, in May the EU outlined concrete targets and measures on renewables, hydrogen and energy efficiency across industry and buildings. Furthermore, additional investments of €300 billion were unveiled, of which around 40% will be devoted to renewables and grid and storage infrastructure (Figure 1)⁸. At country level we have also seen EU governments announce individual energy packages. For example, Germany, which relies on around 55% of gas from Russia, is targeting at least 80% of electricity consumption to come from renewables by 2030, versus around 40% today. It also aims to more than triple the development of onshore wind from 3GW a year now to around 10GW

a year from 2025, and solar from 7GW a year now to 22GW a year from 2026.⁷

Risks, opportunities and uncertainties

The funding and economics of energy-efficiency upgrades remain a key risk, as well as human capital constraints around the implementation of these measures. For example, heat pumps are still expensive and, as discussed, their installation faces limitations due to a lack of skilled labour. Energy prices will now remain higher for longer, which will create margin pressures across industries, particularly in energy-intensive sectors.

Figure 1: RePowerEU funding (€bn)





Clean energy stocks will prove the most likely long-term beneficiaries of the situation, as well as companies exposed to the electricity network, grid infrastructure and storage needed to support the expansion of renewables and hydrogen, as well as energy renovation, heat pumps and electrification.

In addition, the hydrogen upgrade will provide upside for European electrolyser OEMs (original equipment manufacturers), while an acceleration of US shale and global LNG construction will benefit companies in the LNG gas supply chain.

Companies that contribute to energy efficiency, such as those involved in heat pumps and buildings energy renovation, as well as electrification, such as electric vehicle batteries and electrical equipment, will be long-term beneficiaries. Overall, this development is positive for climate change, carbon capture and storage developments.

Climate transition engagement: net zero targets

Company	VAT
Sector and country	Manufacturing, Switzerland
Why we engaged	We identified VAT as a company with limited public disclosure around the issue of net zero, and we wanted to gain better insight on its strategy on this and its approach to sustainability.
How we engaged	The portfolio manager and the RI analyst both led on this engagement. There were two meetings, one via a video conference call with the Head of Investor Relations, and the other an in-person meeting in London with the CEO and CFO. This was followed by a request from the company to provide it with guidance and views on best standards on ESG and net zero, which we provided via email to the company.
What we learnt	The company is at the beginning of its ESG journey and is working thoroughly to implement a strategy. Despite a lack of public ESG disclosure the company is addressing sustainability in the material aspects of its business, including energy management, water and waste.
Outcome	The engagement served to create a strong relationship with the company with respect to ESG and for Columbia Threadneedle to be taken by the company as a reference on this matter. The call provided reassurance that VAT is committed to implementing ESG plans and providing ESG disclosure. It further strengthened our conviction in the company and our belief that improvement in climate disclosure will positively affect its ratings.

Source

- <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A108%3AFIN>
- <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/25/fact-sheet-united-states-and-european-commission-announce-task-force-to-reduce-europes-dependence-on-russian-fossil-fuels/>
- <https://www.energymonitor.ai/policy/market-design/opinion-eu-leaders-need-to-be-ready-to-rethink-electricity-market-design>
- <https://www.energymonitor.ai/policy/market-design/opinion-eu-leaders-need-to-be-ready-to-rethink-electricity-market-design>
- European Commission, REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition, 18 May 2022
- Goldman Sachs, Electrify Now: REPowerEU - Stress-testing the EU gas system, 1 April 2022
- <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A108%3AFIN>
- <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483>
- <https://www.bmwk.de/Redaktion/EN/Pressemitteilungen/2022/04/20220406-federal-minister-robert-habeck-says-easter-package-is-accelerator-for-renewable-energy.html>

02

Energy Transition



- > Global summits
- > Green hydrogen

- > Human bias in forecasting
- > Nuclear



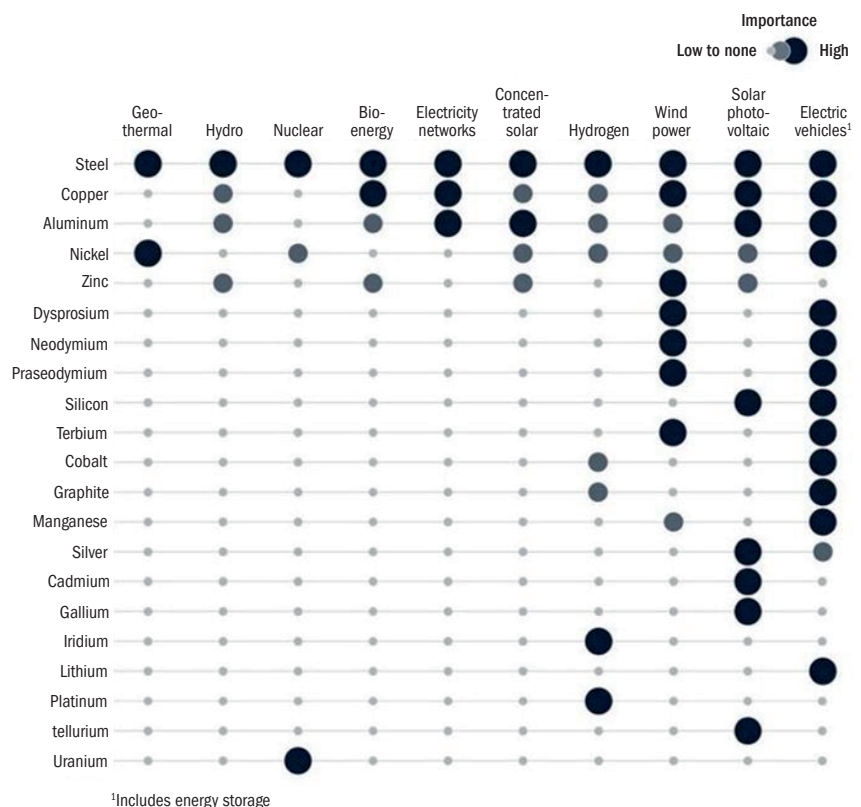
Nuclear poised to reverse negative perceptions



Jess Williams
Portfolio Analyst,
Responsible Investment

Nuclear power offers a number of advantages over other clean energy technologies: it provides clean and reliable baseload power, which is the minimum level of demand on an electrical grid over a period of time, which less reliable renewable sources can struggle to offer; it is able to provide energy reliably no matter the time of day and regardless of weather; and it requires fewer materials compared with other transition technologies (Figure 1). Such qualities are key to being able to fully transform our energy systems to zero carbon power.

Figure 1: materials critical for transition to a low-carbon economy by technology type



Source: European Commission, Critical raw materials for strategic technologies and sectors in the EU, a foresight study, 9 March 2020; IEA, The role of critical minerals in clean energy transitions, May 2021; McKinsey analysis

However, nuclear is also controversial. Radioactive waste and incidents such as the 2011 Fukushima disaster have made the public wary of the technology. Enriched uranium also has applications in nuclear weapons, which is why nuclear programs led by countries such as North

Korea, Iran and of course Russia are such a concern for western governments. On top of these substantial worries, the cost of nuclear is high and projects are often delivered late and over budget – although some Asian regions appear to have bucked this trend.

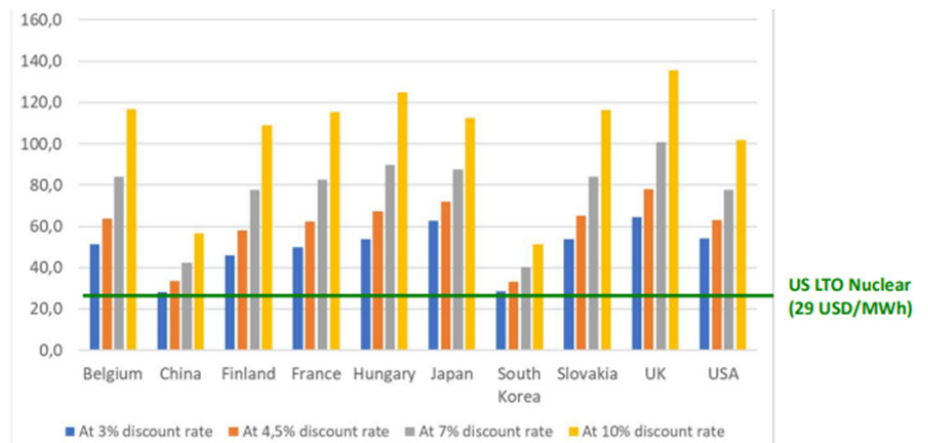


But the positives seemingly outweigh the negatives, with nuclear energy coming back into focus – particularly in the UK and Europe – as governments look for ways to improve energy security and achieve ambitious emissions reduction goals. Most nuclear power plants in existence today are third generation plants which mostly use pressurised water reactor technology. These are relatively inefficient at utilising the energy stored in raw materials, typically using only 5%-8% of available energy, which consequently generates a lot of waste. Fourth generation nuclear reactors, however, are made up of a group of different technologies such as advanced heavy water reactors and molten salt reactors and can utilise 95%-98% of energy available in the fuel – although they remain a long way off commercialisation. Small modular reactors (SMRs) which take up much less space than conventional plants and can be built much more quickly and in a standardised fashion, are a nearer-term prospect. In addition, nuclear fusion has also been in the headlines due to recent breakthroughs in the space.

How to bring costs down?

As Figure 2 shows, countries like South Korea and China have been successful

Figure 2: nuclear levelised costs per unit of output (\$/mwh)



Source: Jan Emblemsvag, Safe, clean, proliferation resistant and cost-effective Thorium-based Molten Salt Reactors for sustainable development, February 2021

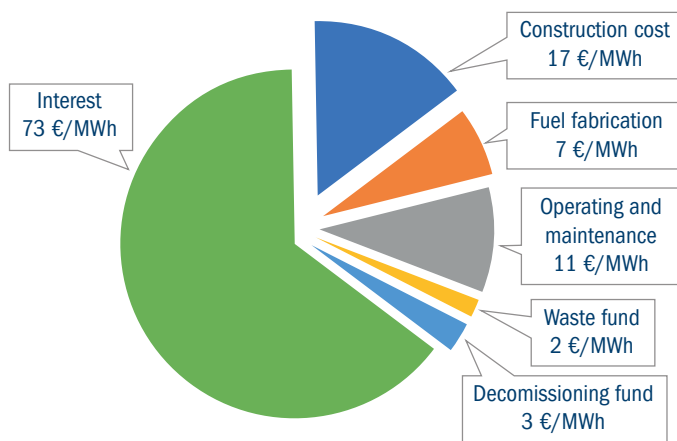
at reducing the cost of nuclear. A lot of this is due to construction practices. Both countries replicate the same plant design repeatedly rather than approaching each project in a bespoke manner, as happens elsewhere. This significantly reduces costs and delays. Another difference is that due to the regularity of such projects occurring, the workforce has the necessary skills. In regions where plants are built infrequently, reskilling of the workforce is required which takes time.

Looking at the costs of Hinkley Point C, a plant under construction in the UK which is scheduled to be finished later this year, the largest share is the financing (Figure 3). This is because

European nuclear projects tend to be relatively risky for banks – political will tends to be divided and changeable, and projects are often much delayed and over budget. If countries like the UK could adopt South Korea’s approach to building more standardised plants, avoiding some of the delays and overruns, it could help bring financing costs down. However, if these standardisation benefits were to be achieved they would be set against the current background of low but increasing interest rates, which long lived infrastructure projects like nuclear are particularly sensitive to.



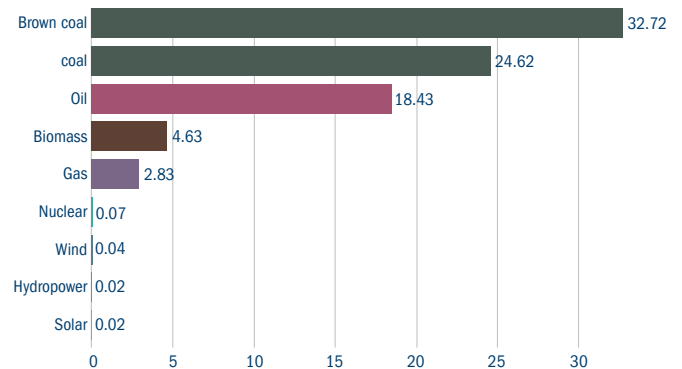
Figure 3: Hinkley Point C price breakdown



Price paid per MWh for power generated during first 60 years is assumed equal to the CfD Strike Price (113 €/MWh in 2019 prices).

Source: Generation Atomic, The Hinkley Point C case: is nuclear energy expensive?, 23 December 2019.

Figure 4: death rates from energy production per TWh



Source: Markandya & Wilkinson, 2007; Sovacool et al. 2016; Our World in Data.

What about safety?

Safety is a common concern with Nuclear technologies, due in large part to historical accidents like Fukushima and Chernobyl. However, both these examples are somewhat site specific and unlikely to reoccur at other nuclear facilities. Chernobyl, for example, had a RBMK reactor which was never used by any country outside the USSR due to concerns over a number of its characteristics. Fukushima, meanwhile, is on the fault line of two tectonic plates, which makes the site prone to

earthquakes and their knock-on effects such as tsunamis. The Fukushima plant was not designed appropriately for its location, so when a major earthquake occurred disaster ensued. Despite the site-specific circumstances of these incidents, concerns around waste and potentially unforeseen future accidents will remain.

The Joint Research Centre (JRC), the European Commission's science and knowledge service, recently fed into a review on the decision on whether nuclear should be included in the

EU's sustainable finance taxonomy. It concluded that there is not any "science-based evidence that nuclear energy does more harm to human health, or to the environment, than other electricity production technologies [ie wind and solar] already included in the taxonomy as activities supporting climate change mitigation". Indeed, as Figure 4 shows, when factoring deaths from air pollution, nuclear appears in a very favourable light relative to fossil fuels and biomass, and is quite comparable to wind, hydropower and solar.



What the future holds

In the short term we are likely to see more third-generation pressurised water reactors commissioned. Indeed, French president Emmanuel Macron recently announced at least six new reactors with the potential to increase this to 14.

Following this, next-generation SMRs should start to come online towards the end of the decade. China hopes to have its first SMR online by 2026 and the British government hopes to have SMRs (manufactured by Rolls Royce) supplying energy to the grid by the early 2030s.

In the longer term, fourth generation technologies could become a commercial reality. A lot of these technologies have been around for decades, and some have been tested, but no one has succeeded in bringing them to market. For example, a number of government-funded research initiatives and some start-ups have recently begun working in the molten salt reactor space.

Finally, nuclear fusion is also a consideration. All the above technologies are nuclear fission, which involves splitting large atoms (usually Uranium). Nuclear fusion, however, focuses instead on merging light elements (like hydrogen). There is a long-standing

Figure 5: Technology comparison table

	Hinkley Point C (Pressurised water reactor)	Small Modular Reactor (Pressurised water reactor)	Molten Salt Reactor¹
Size	3,200MW	300-470MW	2,500MW (based on the Moltex proposal)
Cost	Around £23bn (\$30bn)	£1.8bn (\$2.4bn) based on the 470MW size	£3.25bn-£6.5bn (\$4.3bn-\$8.5bn) – figures based on unproven estimates
Construction time	6 years (if it opens in 2026 as planned)	4 years	Unknown
Other considerations			MSRs can use spent PWR “waste” as the input material

joke that nuclear fusion is always 40 years away, but recent breakthroughs combined with a significant increase in research funding – from the order of hundreds of millions of dollars to billions of dollars – mean we are including it in our long-term prospects. Fusion companies estimate that it will still take five years to get more energy out of a fusion reaction than goes in, but they think we could see pilot plants in 10 years. By 2050 they think nuclear fusion could be providing a single-digit percentage of the global energy mix. Fusion has additional benefits in that it produces waste that is less radioactive than during fission and has limited military use, which would likely mean greater acceptance by the public.

Source

1 <https://www.neimagazine.com/features/featurethe-stable-salt-reactor-5773898/>



Energy transition engagement: nuclear

Company Devon Energy Corporation

Sector & country Energy, USA

Why we engaged Devon Energy is a CA100+ company. While it seems to exhibit positive corporate governance, compensation and ESG performance, we wanted the opportunity to discuss its approach to the energy transition.

How we engaged Devon Energy contacted Columbia Threadneedle to engage prior to its AGM. We held a video conference attended by the stewardship team, the thematic RI analyst covering energy topics, and a senior equity analyst. Personnel from the investor relations, sustainability and total rewards teams joined from the Devon side.

What we learnt Devon exhibits strong ESG performance relative to US peers, but the company lags its European peers. Areas for improvement are clear, such as the absence of a target relating to scope 3 emissions. In terms of the energy transition, low breakeven, short-cycle assets will be the most resilient under low carbon scenarios.

Outcome Devon exhibits positive corporate governance, with which we have few concerns. It has developed a well-constructed compensation structure and we will monitor its proxy statement for an increased portion of performance-based incentives in its long-term plan. We will monitor its updates to see whether it has joined the Oil & Gas Methane Partnership and will continue the conversation around Paris-aligned targets.

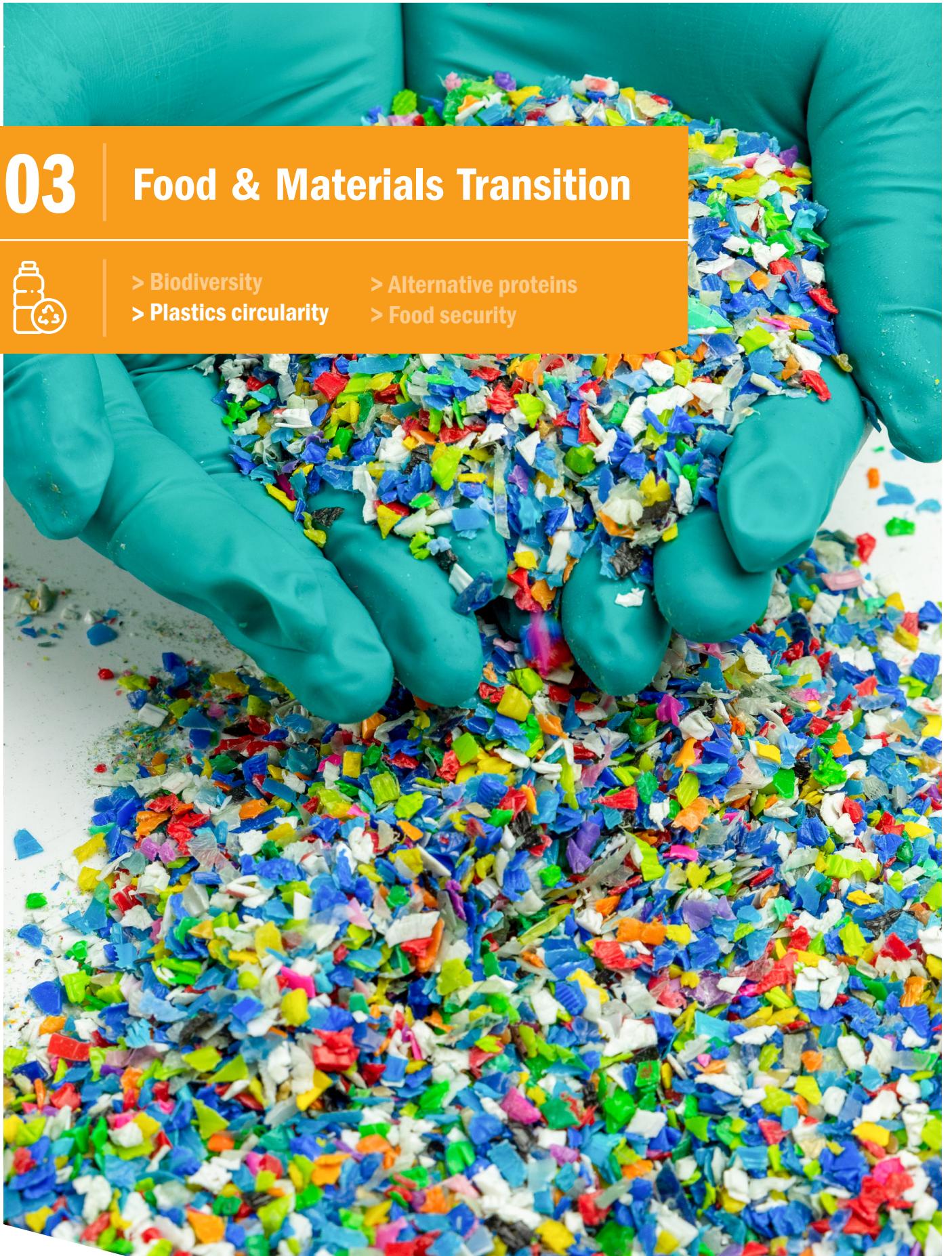
03

Food & Materials Transition



- > Biodiversity
- > Plastics circularity

- > Alternative proteins
- > Food security



A circular transition for plastics



Olivia Watson
Senior Thematic Investment Analyst,
Responsible Investment

Plastics are a growing environmental problem and increasingly a focal point for policy at national and international level. In recent months, the UN has agreed to develop a global treaty on plastics which could include cuts in virgin plastic production, as well as increasing collection and recycling infrastructure. At a national level, in April the UK implemented a plastics tax which will apply charges of £200 a tonne to plastic packaging that contains less than 30% recycled plastic.

Plastic pollution is also increasingly recognised as interdependent with other environmental themes.

For example, the draft text for the upcoming UN COP (Conference of the Parties) on biodiversity includes a goal to “eliminate loss of plastic waste” as part of the 2030 global biodiversity framework. In the context of net-zero goals, NGOs and stakeholders also continue to draw attention to the contribution of plastic production, use, waste and recycling to global greenhouse gas (GHG) emissions.

We expect these drivers will continue to create momentum towards a transition to more circular plastics. This will include: reducing the use of virgin plastics; increasing the use of recycled plastics and alternative materials; creating different product delivery models; and scaling up plastic collection infrastructure and recycling technologies. Following earlier research we undertook on consumer goods and packagers, we expanded our focus to plastic producers and waste companies via a roundtable with fundamental equity and credit analysts to discuss the risks and opportunities of these developments.

Plastic producers

Most plastics are produced by a handful of global petrochemical companies. The development of the industry has provided benefits to

society via improving food preservation and introducing lightweight products, among other things, but in doing so it has also introduced a reliance on low-cost virgin plastic into everyday life for people around the world through our clothing, cars, electronics and food packaging – with much of this material ultimately destined to become waste.

Plastic producers now find themselves at the early stages of a structural shift that will increase demand for recycled plastic – most notably for single-use packaging, but also for more durable products – as companies such as Renault, LG, Vestas, Inditex, Adidas and many others establish targets for the use of recycled plastic. These are in addition to the regulatory requirements and pledges already made by consumer goods and packaging companies around increasing the use of recycled plastic by 2025.

Taken together, our analysis of corporate targets across sectors suggests that recycled plastic could account for up to 8% of plastics demand by 2025, and up to 15% of global demand by 2030. In this scenario, demand growth for virgin plastic could shift from the GDP+ growth rates previously seen to less than 1.7%. Currently, however, recycled plastic production is not sufficient



to meet this demand, and chemical recycling technologies, which could increase volumes of material, are unlikely to do so before the latter half of this decade, based on capacity announcements made to-date.

In this context, a shift of this scale will require big changes for plastic producers. Companies that will be most resilient to these changes are likely to be those that have well developed circular strategies, as well as other advantages including: lower revenue dependence on non-recyclable plastic; a strategy and related targets for recycled production that is meaningful relative to the company's production volumes; evidence of multiple partnerships and efforts to pilot and scale new technologies, such as chemical recycling, that can enable the company to adapt and nimbly respond to technical or other challenges; the ability to maintain and grow customer relationships through the transition, by working with customers to develop new and possibly higher-value products and forms of packaging; and access to low-cost virgin plastic feedstocks that will remain economically competitive in a scenario of slowing demand growth for virgin plastic.

Our analysis of several plastic producers against these criteria shows a mixed picture, with companies' plans

for increasing recycled production accounting for anywhere between 1% and 22% of their estimated 2030 production. The range and depth of company partnerships in relation to new technologies such as chemical recycling also varies significantly.

Waste and recycling

This shift to recycled plastic will also present big changes for the waste and recycling sector. The landscape of risks and opportunities across countries is variable given the different degree of recycling infrastructure, public education and collection rates. However, with rapidly growing regulatory changes and demand for recycled plastic, waste companies that are well positioned can reap the benefit of investment in new technologies, including advanced sorting technologies that can increase automation in facilities and recovery rates for materials, capturing the most value from waste plastic. Some waste companies may also benefit where they have opportunities to vertically integrate, increasing the degree of recycling and processing carried out on plastic collections.

To match increased demand, however, the scale of investments required will be vast: including improved collection and processing infrastructure, not just in developed markets with low

recovery rates (for example the US), but in emerging markets with less developed infrastructure. As with plastic producers, a review of companies' capital expenditure plans and future targets for increasing material recovery provides an indication of their plans and positioning for this transition.

Conclusion

Our analysis concluded with the recognition that there is a need for ongoing monitoring given the rapid developments on this theme. Continued research, collaboration and engagement across the fundamental and responsible investment thematic teams will help us to identify possible winners and losers and to encourage companies to continue to develop their circularity strategies.

Source

- <https://www.unep.org/news-and-stories/press-release/historic-day-campaign-beat-plastic-pollution-nations-commit-develop>
- Columbia Threadneedle analysis of company disclosures. Plastic volumes by end use derived from Geyer, et al, 2017.

Food & Materials transition engagement: plastics circularity

Company	KBR
Sector & country	Industrials, USA

Why we engaged To learn more about potential opportunities related to KBR's equity investment and joint venture with Mura, a provider of chemical recycling technology for mixed plastic waste.

How we engaged Columbia Threadneedle representatives from fundamental equity and responsible investment research met with KBR's President of Technology.

What we learnt Mura's chemical recycling technology uses supercritical water and is done at a lower temperature than traditional pyrolysis, resulting in lower energy intensity while achieving higher yields. This reduces the greenhouse gas emissions associated with chemical recycling. The first facility is being developed in 2022 in the UK, with active discussions with petrochemical companies on potential opportunities to co-locate future plants at their facilities. This would provide recycled feedstocks to existing petrochemical infrastructure, enabling more recycled plastic production.

Outcome We evaluated the new joint venture as part of the investment case and are monitoring developments and the possible upside the recycling technology may provide.

Food & Materials transition engagement: plastics circularity

Company	Biffa
Sector & country	Industrials, UK

Why we engaged We wanted to better understand the competitive positioning of the company's plastic recycling business, and future opportunities.

How we engaged We held multiple discussions on strategy and visited a materials recovery facility to see first-hand its processing and recovery technology.

What we learnt We better understood the company's vertical integration approach for processing collections and recycled production, the benefits of its technology investments in sorting and materials recovery, and the opportunities and challenges the company faces in the context of the rapidly changing UK regulatory environment related to recycling and recycled content requirements for packagers.

Outcome We gained insights on the investment case linked to recycling opportunities.

Food & Materials transition engagement: plastics circularity

Company	Dow Inc.
Sector & country	Chemicals, USA

Why we engaged Dow has significant revenues from durable and single-use plastic. We wanted to better understand the company's ambition on plastic circularity, and potential challenges in its product line up and approach.

How we engaged Multiple meetings with Dow representatives from investor relations, sustainability, climate change and managing counsel departments. Columbia Threadneedle representatives were from equity, credit, responsible investment research and stewardship teams.

What we learnt Dow's production of multi-layer, non-recyclable plastic packaging (19% of production) will not be straightforward to transition to recyclable alternatives as per the 2025 recyclability commitments. However, it is working on potential solutions which in the long run may provide higher margin opportunities. Even if full technical recyclability is achieved, however, it estimates the percentage of products actually recycled will be in line with the global average of circa 9%. This will present regulatory risks and costs as more taxes and extended producer responsibility schemes are likely to be brought in. The company did not disagree with Columbia Threadneedle's estimate of future demand for recycled plastic, but pointed to hurdles in growing the stream of waste plastic which can be used as feedstock, which will be a prerequisite to meeting this demand.

Outcome We were able to better quantify the company's long-term target for recycled plastic production. We think this will need to be strengthened over time to demonstrate a clearer pathway to circularity. Dialogue will continue, and we will continue to monitor Dow's progress.

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 of 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 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 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

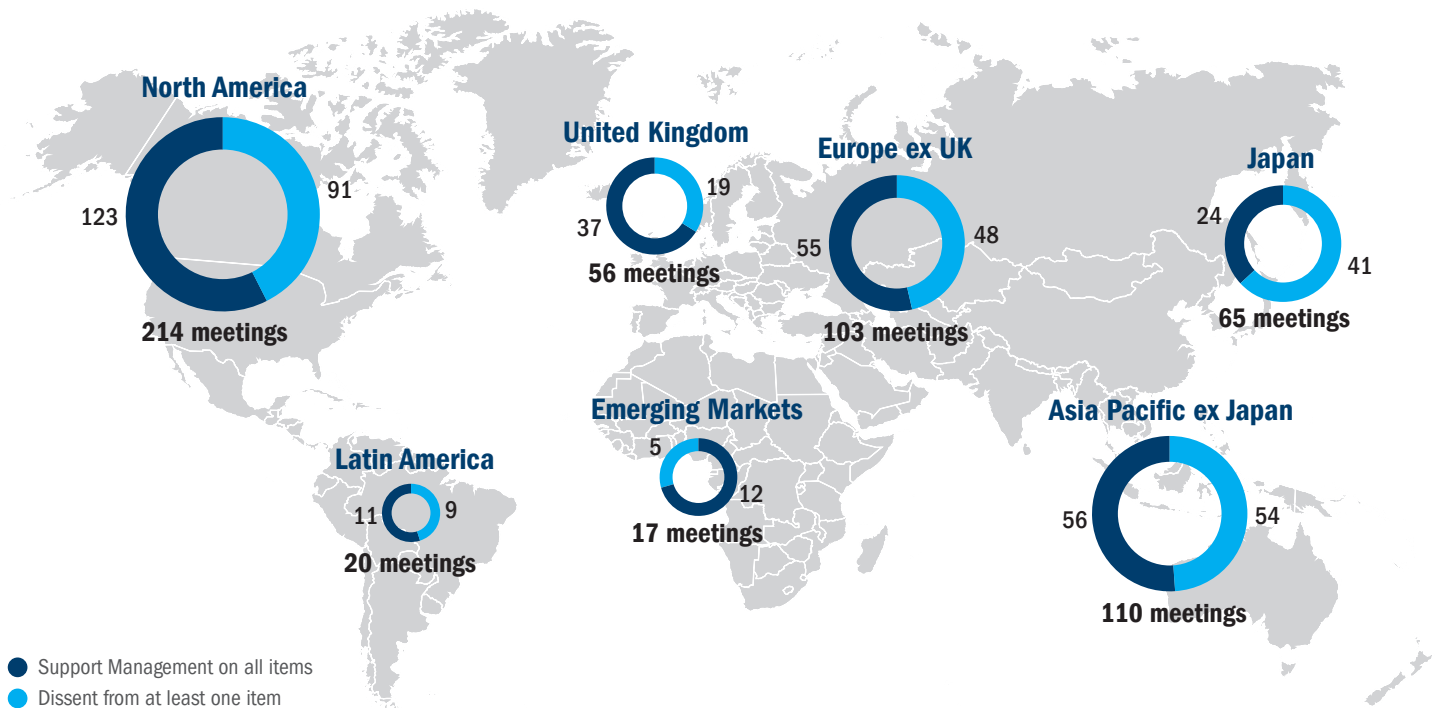
organisations such as ISS, IVIS and Glass Lewis, as well as MSCI ESG Research. Although we subscribe to proxy advisors' research, votes are determined under our own custom voting policy. Within this, material or controversial proposals receive enhanced due diligence and are voted on by the investment 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 Q1

Between January and March 2022 we voted at 585 meetings across 43 global markets. This compares to 690 meetings voted across 54 global markets in the previous quarter. Of the 585 meetings, 414 were annual general meetings, 153 special, 10 court, five combined annual/special and three proxy contests meetings. We cast at least one dissenting vote in 274 meetings (46%).

We voted in 43 separate markets in the first quarter. Most meetings were voted in the United States (208), followed by Japan (65), United Kingdom (51) and South Korea (46). The majority of the voting items that we did not support throughout the quarter continue to be related to directors (57%), followed by remuneration (20%) and other business-related proposals (9%).

Figure 1: Meetings voted by region



Source: Columbia Threadneedle Investments, ISS ProxyExchange, 31 December 2021.

Engagement highlights

Between January and March we conducted ESG-focused engagements with 307 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.

Sustainability-focused

10x Genomics, Inc.
 1Spatial PLC
 3M
 Air Liquide
 Akzo Nobel
 Albemarle Corp
 Amazon.com, Inc.
 Arcelormittal
 ASML
 Associated British Foods PLC
 Atlas Copco
 Aveva Group PLC
 Axa Group
 BAE Systems PLC
 Barclays PLC
 Baxter International, Inc.
 Bayer AG
 BHP Group PLC
 Biffa PLC
 Blancco Technology Group PLC
 Bluebird Bio, Inc.
 Bodycote PLC
 BP PLC
 Breedon Group PLC
 British American Tobacco
 BT Group PLC
 Burberry Group PLC
 Centrica PLC
 Ceres Power Holdings PLC
 Cisco Systems, Inc.
 Coats Group PLC
 Coca-Cola European Partners
 Compass Group PLC
 CRH
 Croda International PLC
 Daimler AG
 Derwent London Reit PLC
 Deutsche Bahn
 Domino's Pizza Group

Dow, Inc.
 DS Smith
 DSM
 DTE Energy, Inc.
 Eastman Chemical
 Electrocomponents PLC
 Epiroc
 Equals Group PLC
 Equinix, Inc.
 Essentra PLC
 Essity
 FDM Group Holdings PLC
 Ferrari
 Future PLC
 Genus PLC
 GlaxoSmithKline PLC
 Global Fashion Group
 Grainger PLC
 Hershey
 Hexagon
 Hiscox Ltd
 Hitachi Ltd
 Horizon Therapeutics PLC
 Hyundai Motor
 Iberdrola
 Ilika PLC
 Imi PLC
 Imperial Brands PLC
 Infineon Technologies AG
 Intercontinental Hotels Group
 ITV
 Johnson Matthey PLC
 Johnson Service Group PLC
 John Wood Group PLC
 Just Group PLC
 KBC
 KBR, Inc.
 Legrand SA
 LG Chem
 Lindt & Sprungli
 Livent, Inc.

Marel
 Marlowe PLC
 Marshalls PLC
 Mass Mutual Global Funding
 Moncler
 Morgan Sindall Group PLC
 National Express Group PLC
 NatWest Group PLC
 Nemetschek
 Northwestern Mutual
 Nucor Corp
 NX Filtration
 Oxford Instruments PLC
 Pennon Group PLC
 Posco
 Premier Oil
 Puma SE
 Rank Group PLC
 Reckitt Benckiser Group PLC
 Renewcell
 Rentokil Initial PLC
 Rio Tinto PLC
 Royal Dutch Shell PLC
 Saint-Gobain
 SAP SE
 Shell PLC
 Sherwin-Williams Co.
 SIG Combibloc
 SIKA
 Smiths Group PLC
 Spectris PLC
 SSE PLC
 SSP
 Standard Chartered PLC
 Stock Spirits PLC
 Target Corp
 Ted Baker PLC
 Teleperformance
 Tesco PLC
 The Gym Group PLC
 TJX Companies, Inc.

Tongwei
Total SA
Totally PLC
Uber Technologies, Inc.
Umicore
Unicredit
Unilever PLC
United Utilities Group PLC
VAT
Verallia Group
Vixtrex PLC
Volkswagen
Volution Group PLC
Weir
Zalando

ESG discussions

10X Genomics, Inc
3i group
Abbott Laboratories
Activision Blizzard, Inc
Albemarle Corp
Alibaba Group Holding Ltd
Amazon.com, Inc.
Anheuser Busch Inbev
Anhui Conch Cement Ltd
Apple, Inc.
Argo Group International Holdings, Ltd
AT&T, Inc.
Barco
Barrick Gold Corp
Baxter International, Inc.
Berkeley Group Holdings PLC
BNP Paribas
Boparan Holdings Ltd
BP PLC
Brown-Forman Corp
Burlington Stores, Inc.
Canadian Natural Resources Ltd
Carnival
Caterpillar, Inc.
Centene Corporation
Centrica PLC
Chemring Group PLC
Chevron Corp
CNOOC Ltd
Compass Group
Deere
Devon Energy
Dow, Inc.
Eastman Chemical

Endo Pharmaceuticals
Freeport McMoRan, Inc.
Godaddy, Inc.
Helios Technologies, Inc.
Heritage Insurance Holdings, Inc.
Honeywell International, Inc.
Hunting PLC
Intermediate Capital Group PLC
IQVIA Holdings, Inc.
Jardine Matheson
JD Sports Fashion PLC
Keyence Corp
Kingspan Group
Korn Ferry
Legal and General Group PLC
Lem Holding SA
Lowe's Companies, Inc.
Lyondell Basell Industries
Marathon Petroleum Corp
Marel
Marvell Technology Group Ltd
MassMutual Global Funding II
McKesson Corp
Mondelez International, Inc.
Naver Corp
Nestle
New York Life Insurance Company
Nexstar Media Group, Inc.
Olympus Corp
Oxford Biomedica PLC
Pearson PLC
Pepsico, Inc.
Pernod Ricard
Raytheon Technologies
Rentokil Initial PLC
Royal Dutch Shell PLC
Royal Mail PLC
Samsung Electronics Co Ltd
Schnitzer Steel Industries, Inc.
Serco Group PLC
Smith and Nephew PLC
Spirent Communications PLC
Square, Inc.
Stanley Black & Decker, Inc.
Takeda Pharmaceutical Ltd
Teleperformance
Tesco PLC
Toyota Motor Corporation
Twitter, Inc.
Tyson Foods, Inc.
Uber Technologies, Inc.
Ubisoft Entertainment

Union Pacific Corporation
Vale
Valero Energy Corp
Visa, Inc.
Vishay Precision Group, Inc.
Walmart, Inc.
Waste Connections
Wells Fargo & Co.
Zuken

Social discussions

British Retail Consortium
Burberry Group PLC
Hotel Chocolat Group PLC

Governance-focused

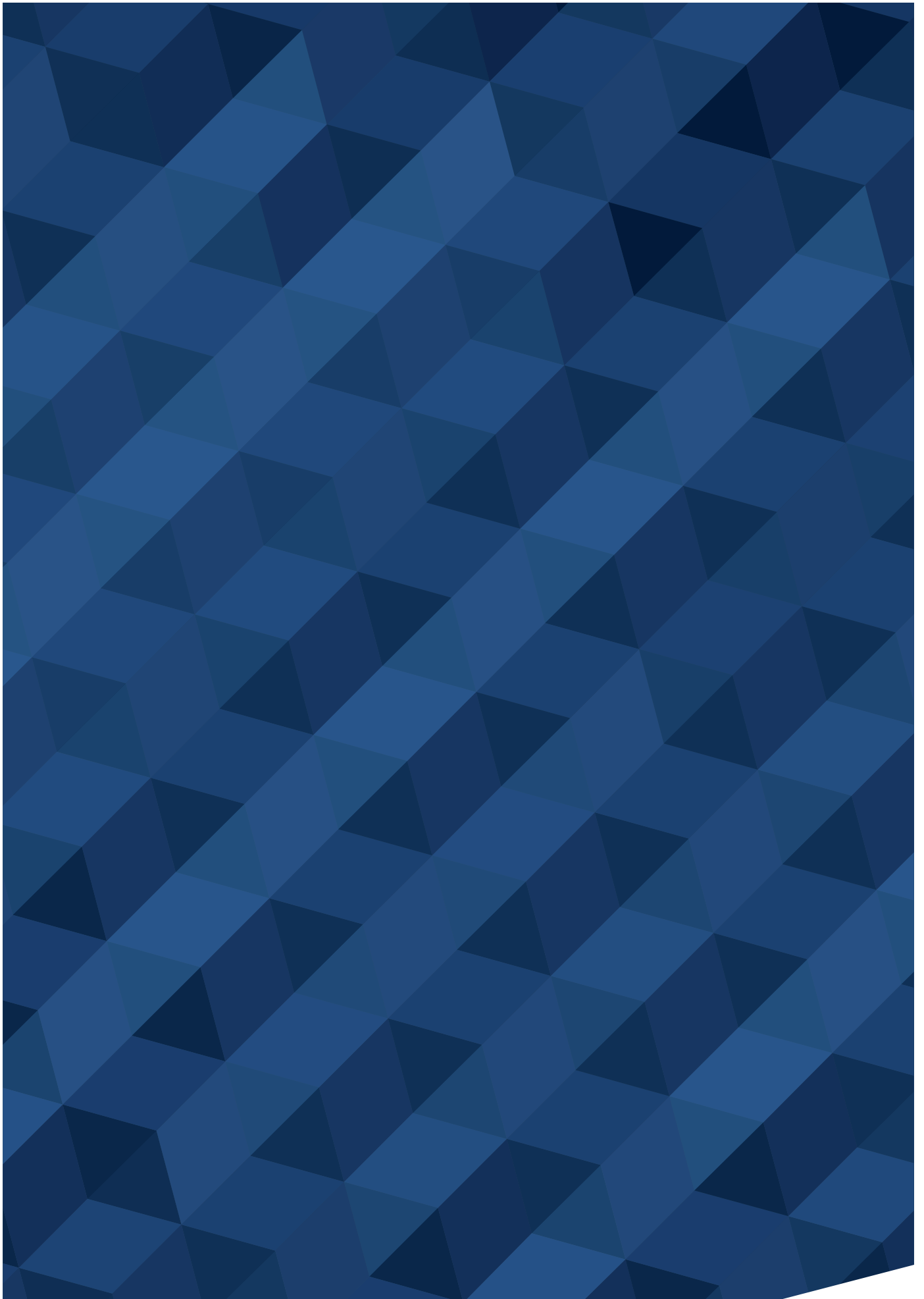
Advanced Micro Devices, Inc
Agco Corp
Aggreko PLC
AIA Group Ltd
Alexion Pharmaceuticals, Inc.
Amundi
Applus Services
Ascential PLC
AstraZeneca PLC
Avery Dennison Corporation
Aveva Group PLC
Aviva PLC
Avon Rubber PLC
AXA
BAE Systems PLC
Bancfirst Corporation
Belimo Holding
Bloom Energy Corp
Britvic PLC
Broadcom, Inc.
BT Group PLC
Burberry Group PLC
Cardinal Health, Inc.
Cineworld Group PLC
Compugroup Medical
CRH
Diasorin Spa
Dr. Martens PLC
DS Smith
DXC Technology Company
easyJet PLC
Ebay, Inc.
Electrocomponents PLC
Electronic Arts, Inc.

Elementis
Elis SA
Equals Group PLC
Eurofins Scientific
Exterran Corp
Exxon Mobil Corp
FDM Group Holdings PLC
Fidelity National Information Services, Inc.
FirstGroup
Fuller Smith and Turner PLC
GlaxoSmithKline
Grenke
Hays PLC
Hiscox Ltd
Howmet Aerospace, Inc.
Huhtamaki
Imperial Brands
Informa PLC
IQGeo Group PLC
Irish Continental Group PLC
ITV PLC
JD Wetherspoon PLC
Knights Group Holdings PLC
Knorr-Bremse
Lair Liquide
Lincoln National Corporation
London Stock Exchange Group PLC
M&G PLC
Mack-Cali Realty Corporation
Marks and Spencer Group PLC
Mears Group PLC
Melrose Industries PLC
Morgan Advanced Materials PLC
Nevro Corp
Newpark Resources, Inc.
Orpea
Palo Alto Networks, Inc.
Phoenix Group Holdings PLC
Piper Sandler
Prudential PLC
Qualcomm, Inc.
Rank Group PLC
Reckitt Benckiser Group PLC
Rentokil Initial PLC
Restaurant Group PLC
Rotork PLC
Royal Dutch Shell
RSA
Sage Group PLC
SAP

Shell PLC
Sherborne Investors
Smiths Group PLC
SSP Group PLC
St.James Place PLC
Stagecoach Group PLC
Standard Chartered PLC
Stillfront Group
Tate and Lyle PLC
Ted Baker PLC
The AES Corporation
The Children's Place, Inc.
The Restaurant Ggroup
Thule Group
Unilever PLC
Varta
Victrex PLC
VZ Holding
Whitbread PLC
Wincanton PLC
WM Morrison
Worldline

Other

AkzoNobel
Cubic Corp
Dassault Systemes
Future PLC
Northrop Grumman Corporation
Takeaway.com
VAT



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