VESUVIUS PLC

Think beyond.
Shape the future.

Annual Report
2022

Strategic report

Contents

Financial highlights

Revenue
£m

£2,047m

22	2,047
21	1,643
20	1,458

Trading profit[1]
£m

£227m

22	227
21	142
20	101

Operating profit
£m

£217m

22	217
21	133
20	74

Headline earnings[1,2]
£m

£152m

22	152
21	96
20	63

Statutory EPS
p

67.2p

22	67.2
21	37.7
20	15.3

Free cash flow[1]
£m

£123m

22	123
21	-0.3
20	114

1. For definitions of alternative performance measures, refer to Note 4 of the Group Financial Statements.
2. Headline results refer to continuing operations and exclude separately reported items.

Non-financial highlights

Lost Time Injury Frequency Rate

1.08

22	1.08
21	1.06
20	1.16

Total R&D spend*
£m

£36m

22	36
21	31
20	28

* At constant 2022 currency.

Forward-looking statements

This Annual Report contains certain forward-looking statements with respect to the operations, strategy, performance, financial condition and growth opportunities of the Vesuvius Group. By their nature, these statements involve uncertainty and are based on assumptions and involve risks, uncertainties and other factors that could cause actual results and developments to differ materially from those anticipated.

The forward-looking statements reflect knowledge and information available at the date of preparation of this Annual Report and, other than in accordance with its legal and regulatory obligations, the Company undertakes no obligation to update these forward-looking statements. Nothing in this Annual Report should be construed as a profit forecast.

We think beyond today's solutions and shape the future through innovation.

Our purpose

Vesuvius is a global leader in molten metal flow engineering and technology, serving process industries operating in challenging high-temperature conditions.

We think beyond today to create the innovative solutions that will shape the future, delivering products and services that help our customers make their industrial processes safer, more efficient and more sustainable.

In turn, we provide our employees with a safe workplace where they are recognised, developed and properly rewarded, and aim to deliver sustainable, profitable growth to provide our shareholders with a superior return on their investment.

Name: Efren Evangelista
Role: Ferrous Metallurgist & Foundry Development Expert
Location: Suzhou

Our business

We're harnessing technology to create solutions that drive our customers' success

In 2022 we spent £36m on R&D, developing innovative products and solutions in our six R&D centres that will enable our customers to optimise their efficiency.

Name: Ertan Eser
Role: Group Leader Sedex
Location: Borken

Name: Kritika Raman
Role: Trainee Engineer
Location: Kolkata

Name: Tiago Dos Santos
Role: Research Engineer – VISO
Location: Ghlin

At a glance

We are a global group providing products and solutions to industrial customers who manage the flow of molten metal. Our technology-led solutions allow our customers to tackle complex problems in their production. Our customers are predominantly in the steel and foundry industries and we serve them from two Divisions.

Steel

Revenue **£1,496m**

Our customers are steel producers and other high-temperature industries. Vesuvius is a world leader in the supply of refractory products, systems and solutions. These help our customers increase their efficiency and productivity, enhance quality, improve safety and reduce their costs and their environmental impact.

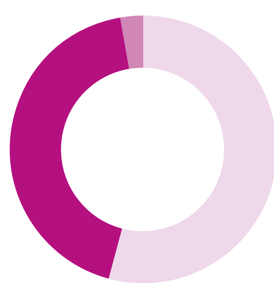
Business Units

Flow Control
Steel production volume is the primary driver of demand for Flow Control's products, whilst the trend for 'high-technology steel' allows us to leverage our advanced solutions and achieve above-market growth rates.

Sensors & Probes
Steel production volume and the need to increase the quality and consistency of cast steel drives demand for our Sensors & Probes business.

Advanced Refractories
Steel production volume and certain other high-temperature industries, such as aluminium, copper, cement, petrochemical and energy from waste, are the drivers for the Advanced Refractories Business Unit's product demand.

Revenue breakdown by Business Unit

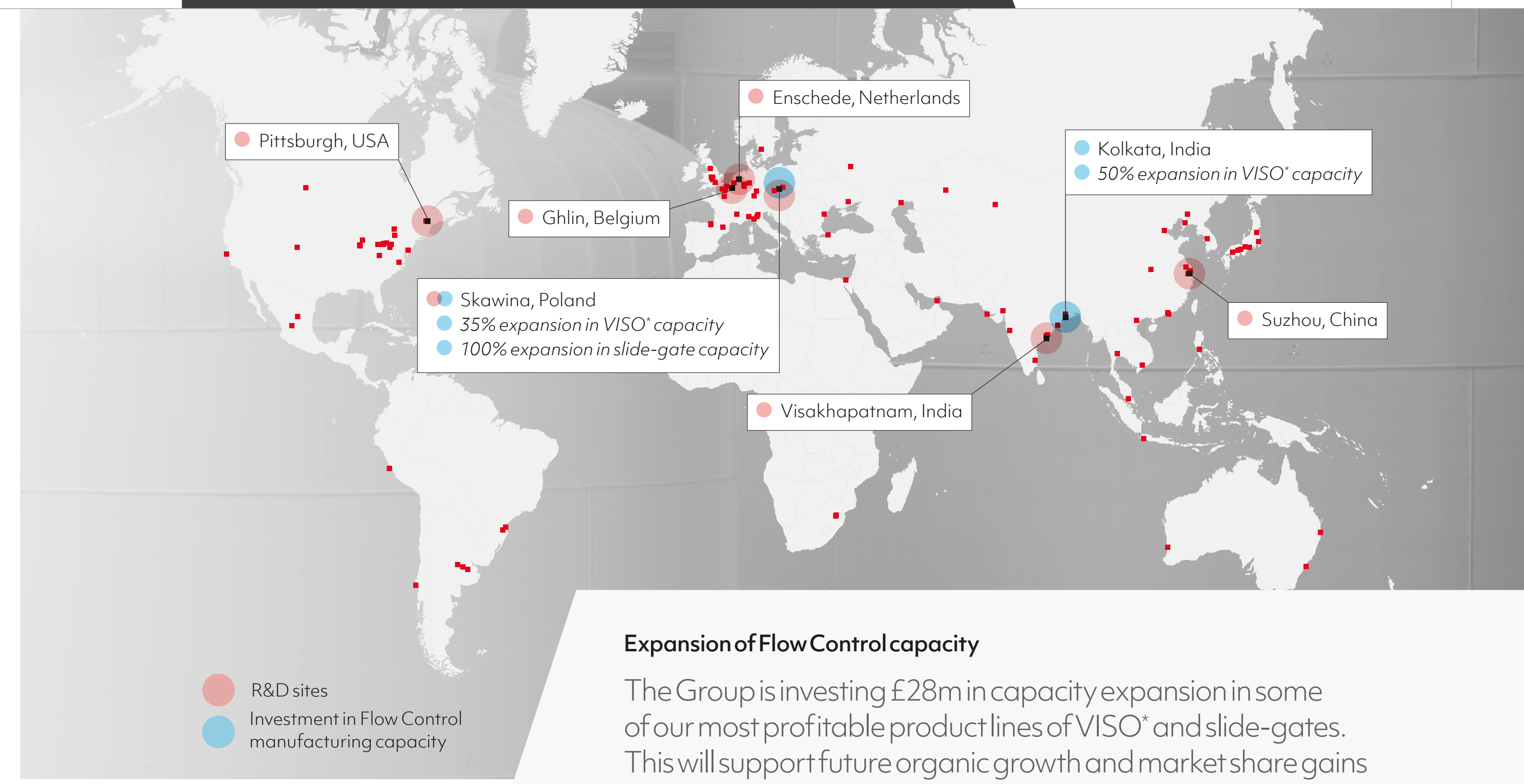


Foundry

Revenue **£551m**

We are a world leader in the supply of consumable products, technical advice and application support to the global foundry industry, improving casting quality and foundry efficiency. Our primary customers are ferrous and non-ferrous foundries serving various end-markets, from large bespoke castings to high-volume automotive pieces. We operate in the foundry sector under the Foseco brand. Product demand in our Foundry Division is driven by higher sophistication, demanding higher quality metal and increasingly more complex castings.

Our production, R&D and commercial sites worldwide



Expansion of Flow Control capacity

The Group is investing £28m in capacity expansion in some of our most profitable product lines of VISO* and slide-gates. This will support future organic growth and market share gains in the fast-growing markets in EEMEA, India and South East Asia.

Breakdown by region

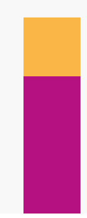
Americas
3,343 employees

20% Foundry
80% Steel

£741m
Revenue

EMEA
4,242 employees

30% Foundry
70% Steel



£742m
Revenue

Asia-Pacific
3,549 employees

32% Foundry
68% Steel

£565m
Revenue

Our global presence

6	40	68	6	55
Continents	Countries	Sales offices	R&D centres of excellence	Production sites

* Trademark of the Vesuvius Group of companies, unregistered or registered in certain countries, used under licence.

What we do

We draw on years of technical expertise and investment in innovation, to provide solutions, products and services that are critical to the success of our customers in the steel , foundry and other high-temperature industries.

What we do for our Steel customers

We supply refractory products, flow control systems and process measurement solutions to our Steel Division customers

We combine these with robotics and mechatronic installations to lower cost, and improve safety and consistency

Our solutions address the key challenges of our customers in the steel industry, such as maintaining steel quality and reducing energy usage during the casting process

Our products and their applications preserve the purity of the steel as it moves through the production process, from initial refining to the cast steel slab, bar or ingot

Our solutions help to improve safety, quality and consistency. They reduce energy usage, and lessen the environmental impact of the steel-making process

What is a refractory?

Refractories are ceramic materials designed to withstand the very high temperatures encountered in modern manufacturing. More heat-resistant than metals, they are used to line the hot surfaces found inside many industrial processes.

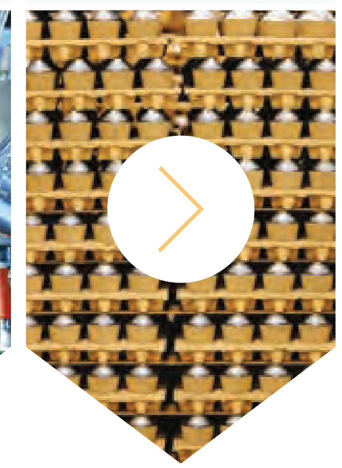
What we do for our Foundry customers

We provide customisable products and process technology to foundries that improve the quality of their castings

We combine this with technical advice, application engineering and computer modelling to improve process outcomes

Our solutions address the key challenges of our foundry customers of casting quality and production efficiency

Our products and solutions clean the molten metal, improve the solidification of that metal, and reduce wastage in the final casting



Our castings contribute to the improvement of product quality and manufacturing efficiency, whilst reducing the environmental impact of the casting process

Our investment proposition

We believe that Vesuvius offers a compelling opportunity for investors. As a global business with industry-leading R&D and a strong focus on growing economies we offer a unique proposition with exciting potential for profit generation.

Name: Maike Frericks
Role: Team Leader Delivery Management/SCM
Location: Borken

Each of these elements enables us to drive profitable growth with a cash-generative model.

Statutory EPS

67.2p

22	67.2p
21	37.7p
20	15.3p

Sales generated by market-leading sustainable products[1]

17.9%

22	17.9%
21	17.5%
20	16.0%

1. Using Vesuvius' internal scorecard.

Principal reasons to invest

1 We operate in long-term growth markets

- Demographic growth, urbanisation and sustainability needs are driving the growth of steel and foundry markets globally
- Growing green energy infrastructure is increasing demand for steel
- Demand for high-tech steel and high complexity castings are growing ahead of the market

2 We are an industry leader

- We are a global leader where our products are primarily focused – in flow control and foundry solutions
- We provide technology-based solutions which help our customers improve their sustainability, safety, quality and cost performance
- We have a worldwide presence, and are especially strong in the fastest growing regions of India, South-East Asia, Middle East, Africa and Latin America whilst maintaining leadership in Europe and North America

3 We are leading the technology race

- We spend twice as much on R&D as a percentage of sales than our closest competitors
- This investment enables us to maintain and even increase 'clear blue water' between us and competitors
- 16% of our sales are in products launched in the last five years. Our objective is for this to reach 20%

4 Technology leadership gives us pricing flexibility and market opportunities

- We can compensate for cost increases
- We gain market share in Flow Control and Foundry through superior technology
- Our solutions are a very small part of the cost structure of our customers. This cost is outweighed by the benefits of our technological differentiation

5 We have a strong sustainability strategy

- We have reduced our carbon footprint by more than 18% since 2019
- We plan to reduce it by 50% by 2035, so that we will be net zero by 2050
- Our products enable our customers to improve their own carbon footprint
- 75% of our R&D pipeline is dedicated to products with superior sustainability characteristics

6 Sustained free cash flow generation and a strong balance sheet pave the way for growth

- We have made the strategic choice not to be integrated upstream in mining. This reduces our need for maintenance capex and enables us to be free cash flow generative at every point of the market cycle
- We maintain strong and prudent balance sheet management
- Solid free cash flow and a strong balance sheet allow us to seize organic and non-organic growth opportunities

Chairman's statement

The people, products and expertise in place for long-term sustainable growth

Carl-Peter Forster
Chairman

Dear Shareholder,

I am delighted to be reporting to you for the first time as Chairman of Vesuvius, having joined the Board at the end of 2022. Vesuvius has delivered a stand-out performance in 2022, with financial results significantly ahead of the Group's expectations at the beginning of the year. This has been achieved through a keen focus on commercial excellence and demonstrates the agility of our business, and the ability of our people, to respond to economic challenges. I would like to thank all of my Vesuvius colleagues for the professionalism and dedication they showed during 2022 and for their steadfast contribution to these excellent results.

Safety

The number one priority at Vesuvius is to provide our employees with a safe workplace, so that they return home safely to their families at the end of each working day. Therefore, only the highest levels of safety performance can be accepted. Vesuvius believes that all work-related injuries or ill health are preventable, making safety the responsibility of every Vesuvius employee. There is an understanding that working safely is a clear condition of employment. Against this background, it is deeply regrettable that we suffered a fatality at our joint venture site in Wuhan, China during 2022. We are determined to ensure that lessons learnt from this accident are shared across the Group to prevent further incidents. Our thoughts remain with the family and friends of the colleague we lost.

Initial impressions

I have received a warm welcome to Vesuvius over the past few months. I have visited our sites in Borken, Germany; Skawina, Poland and Ghlin, Belgium; and been impressed by the depth of knowledge and expertise that exists in our operations. My first interactions with the business tell me that Vesuvius' CORE values of Courage, Ownership, Respect and Energy are clearly alive and well, and embedded in the organisation.

It is already clear to me that R&D is a core component to our success and the delivery of our strategy. There is deep technical expertise in the organisation and the spark of innovation is truly alight across all Business Units. I am looking forward to increasing the breadth and depth of my technical understanding of our products and solutions as I continue to visit our sites in the year ahead.

Strategy

I believe that Vesuvius' key strength is its ability to add value to our customers, by driving efficiency and productivity improvements in their processes, as well as providing support to make their operations safer and more environmentally friendly. We are passionate about our products and solutions, which help our customers deliver consistently higher quality finished products, with an improved metallurgical structure and using fewer resources. In this way, Vesuvius plays an important role in improving our customers' commercial, quality and environmental outcomes. Our extensive R&D capability, deep product knowledge, and long-standing steel and foundry process expertise enable us to partner with them to innovate and adapt to their changing needs.

During the year the Board conducted its annual review of the strategy for each Business Unit. Each has a tailored plan for profitable growth and higher profit margins, focused on innovation, quality and long-term sustainability. Against this background, the Board reaffirmed its support for a significant investment programme in the Group – particularly focusing on our growth markets across the world.

People

People are clearly at the heart of Vesuvius, and understanding the work undertaken to ensure we have the right people in the right places in the business remained a key focus for the Board in 2022. During further COVID-19 disruption in China in 2022, our people once again excelled in their dedication, maintaining operations at our sites despite further lockdowns. I give my thanks to those teams. Likewise, when the conflict broke out in Ukraine, our colleagues continued to support the organisation, despite immense personal challenges. We are thankful that our people there remain safe, and on behalf of the Board I thank them for the work they continue to do in extremely difficult circumstances.

The recent cyber security incident has demonstrated the depth of our organisational resilience and culture. We are responding to the considerable challenges this has posed and at every site our people have worked incredibly hard to restore production, reinstate systems and serve our customers, demonstrating our core values to the full.

> "R&D is a core component to our success and the delivery of our strategy"

Members of the Board made visits to sites in Belgium, Brazil, Germany, India, Japan, Mexico and the Netherlands during the year. It is during these visits that the Directors can speak first-hand with our people, holding 'town hall' meetings, listening to their questions and feedback, and taking the temperature of the organisation. An employee engagement survey was again conducted in 2022. In its fourth year, participation remained high at 92%, and team feedback reports were provided to more than 700 managers. It is in the action planning that will come from the reports that the real value to the business will be delivered. The information we receive from the engagement survey and the face-to-face interactions at sites support the Board in understanding and assessing the health and consistency of the Group's culture.

Sustainability

The Group has set clear internal operational targets around sustainability performance, particularly in relation to our CO_2 emissions and energy consumption. Our focus on sustainability is increasingly entwined with our R&D capabilities, where our research enables us to continue to bring innovative, more efficient solutions to our customers. We also see ongoing commercial opportunities for the business as the energy transition accelerates, with renewable energy production plants (such as wind or solar) requiring significantly more high-quality steel than those powered by fossil fuels, and as such, driving growth in the steel industry. We have set the target of reaching a net zero carbon footprint at the latest by 2050. This will require capital investment in our operations, and the development and adoption of new production technologies. We have clear priorities, targets and milestones identified as we progress on this journey.

The Board and governance

I would like to thank John McDonough for the depth and dedication of his service in his ten years as Chairman of Vesuvius, steering the Group from its establishment as an independent public company. Whilst John leaves Vesuvius a thriving Company, in his words, and in my view, there is more to come.

In line with our plans for Board succession, we welcomed Carla Bailo to the Board as a Non-executive Director last month. Jane Hinkley, who has served the Group diligently for ten years will step down at the 2023 AGM. Jane leaves us with very many thanks for her service.

In 2023, we will also welcome Mark Collis to the Board as the successor to Guy Young, our departing CFO. Mark brings a wealth of operational finance experience to us, having worked in a number of international businesses, both inside and outside the UK. We keenly anticipate his integration into our Board and management team. We must, of course, thank Guy for his leadership of the finance function, and the considerable expertise he has brought over the past seven years in its development and operation.

The Board conducted an evaluation of its performance in 2022. This indicates that I have joined a Board that is open in its deliberations and is clear about the key strategic and operational drivers of the business. The output of this 2022 process will be used to help set priorities for the Board's activities in 2023.

Dividend

The Vesuvius dividend policy aims to deliver long-term dividend growth, provided this is supported by cash flow and underlying earnings, and is justified in the context of our capital expenditure requirements and the prevailing market outlook. The Board has recommended a final dividend of 15.75 pence per share (2021: 15.0 pence per share) for the year ended 31 December 2022. If approved at the Annual General Meeting, this final dividend will be paid on 31 May 2023 to shareholders on the register at 21 April 2023.

Annual General Meeting

The Annual General Meeting will be held on 18 May 2023. The Notice of Meeting and explanatory notes containing details of the resolutions to be put to the meeting accompany this Annual Report and are available on our website: www.vesuvius.com.

Looking ahead

As an incoming Chairman I am provided with a good opportunity to assess the Board's priorities. I believe that Vesuvius has a clear strategy for growth, and for delivering superior returns to our shareholders. In the months and years ahead we will deliver on our strategy. We will maintain our primary focus on safety, drive innovation through our dedicated R&D capabilities, deliver market-leading quality products and solutions, and maintain robust financial management to support investment in the business, and where appropriate, acquisitions. The year ahead will present economic, commercial and operational challenges. I am confident that we have the people, products and expertise to face them and continue on our path of long-term sustainable growth.

Carl-Peter Forster
Chairman
2 March 2023

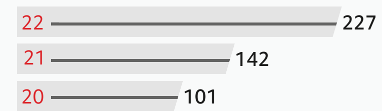
Chief Executive's strategic review

Record profitability despite a challenging trading environment

Patrick André
Chief Executive

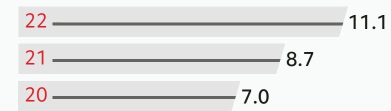
Trading profit
£m

£227m



Return on sales
%

11.1%



In 2022, we delivered record results and profitability, despite a difficult environment in both our Steel and Foundry markets and challenging inflationary cost pressure.

A difficult market environment

Steel markets, after a promising start to the year, weakened significantly during the second half. This decline was exacerbated in EMEA by the consequences of the Ukrainian conflict. India was the only major region in the world to exhibit a positive growth in 2022. Overall, steel production in the world excluding China declined by 6.5% in 2022. In China, steel production also declined, for the second year in a row, by 2.1%.

In 2022, foundry markets remained well below their pre-pandemic level, both in China and in the world excluding China. In particular, various supply chain bottlenecks continued to limit the recovery of the automotive sector. In EMEA, other foundry sectors were also affected by the conflict in Ukraine.

Challenging inflationary cost pressure

The cost of most raw materials used for the manufacture of refractories remained at a high level in 2022, above their long-term average. At the same time, energy costs increased very significantly, especially in Europe, as a consequence of the Ukrainian conflict. Most other cost inputs also registered abnormally high increases, due to the general inflationary environment. The only significant exception to this inflationary trend was sea freight, which declined progressively during the second half of the year, after the peak in 2021.

Strong market share gains and pricing performance leading to record results and profitability

Both the Steel and Foundry Divisions achieved a strong commercial performance in 2022, gaining market share in most regions and in doing so partially mitigated the volume decline in end-markets. The main exception was Russia, due to the cessation of sales to sanctioned customers.

We were particularly pleased with the performance of our Flow Control Business Unit, which continued to expand its market share in volume in all regions.

At the same time as we grew market share, we successfully increased our prices in all Business Units, fully compensating for the increase in our cost base. This ability to simultaneously improve market share and prices is made possible by the technological differentiation in our products and solutions driven by our continual investment in research and development.

Thanks to this market share and pricing performance in 2022 we delivered our best results and profitability ever. Our revenue reached £2,047m (an increase of 25% compared to 2021), our trading profit reached £227m (an increase of 60%) and our return on sales was 11.1%. These results far exceeded those of our previous record year pre-pandemic in 2018, despite significantly lower sales volumes due to the persisting market weakness in 2022. Assuming similar volumes as 2018, our return on sales would have been very close to our objective of 12.5%, demonstrating the impact of the cost competitiveness and technology strategy we have engaged in over the past five years and the profitability potential of the Group once its Steel and Foundry end-markets fully recover.

Strong free cash flow generation despite record growth in investments and safety stock rebuild

Our growth-generating investment programme continued apace in 2022 and will support the progression of our results and profitability in years to come. The expansion of our VISO* and slide-gate production capacity in Flow Control, launched in 2021, is proceeding as planned and will enable us to benefit from the upcoming market growth in India, South East Asia and EEMEA from 2024.

In 2022, we also initiated the construction of a new Flow Control flux plant in India, which will become operational in 2024, and Advanced Refractories began the construction of a new state-of-the-art basic monolithics plant in India. This will enable us to introduce our latest technological innovations and increase our presence in this fast-growing market in the coming years.

In the Foundry Division, construction of a new flux production line in China has commenced. This will enable us to increase our presence in the growing aluminium foundry market in the country.

At the same time as investing in capacity expansion, we also took the decision to increase our safety stock of products and raw materials, to protect our customers. This followed on from the two force majeure incidents we experienced at the end of 2021, which resulted from the lack of reliability in the freight and logistics market. We successfully accomplished this in 2022 and re-established full security of supply for our customers in spite of ongoing reliability issues in the logistics market during the year.

Despite these significant cash investments in growth-generating capital expenditure and working capital for our customers, our strong financial results, coupled with stringent cash management discipline, enabled us to generate a significantly positive free cash flow and further reduce our level of debt in 2022. Our leverage ratio also declined during the year from 1.4x at 31 December 2021 to 0.9x at 31 December 2022.

Increased R&D investment, laying the foundation for future growth

We significantly increased our investment in research and development in 2022, spending £36m, an increase of 18% over 2021. This was fully expensed in our profit and loss statement. Our main focus areas remain innovation in materials science, with the objective to continuously improve the performance of our consumables, and the development of mechatronics solutions enabling our customers to substitute operators to manipulate our consumables and, by doing so, improve their safety, reliability, cost and quality performance.

We successfully launched 15 new products in 2022 in our three Business Units. Our New Product Sales ratio, defined as the percentage of our sales realised with products which didn't exist five years ago, reached 16.2% in 2022, up from 15.3% in 2021.

In June 2022, we formally opened our Ghlin centre of excellence for R&D and Mechatronics, which focuses on developing new products and showcasing them to customers. I'm delighted with the impact the site is having. We have welcomed 25 customer delegations to the Ghlin centre in the first six months of opening.

We intend to continue to reinforce our research and development effort in the coming years and accelerate the launch of new innovative products to support our growth and market share gain ambitions.

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> "Our growth-generating investment programme continued apace in 2022"

Stable safety performance

After the significant improvement registered in 2021, we stabilised our safety results in 2022 with a Lost Time Incident Frequency Rate of 1.08 vs 1.06 in 2021. We remain, however, unsatisfied with this level and are intensifying our efforts to progress rapidly towards our objective of zero incidents. Despite much good work at many sites, I am profoundly sorry to report that in 2022 there was a fatality at our joint-venture manufacturing site in Wuhan, China. The incident was investigated fully, in conjunction with the local Chinese authorities, and we will ensure that we learn the necessary lessons to prevent this tragedy ever being repeated.

A new Sustainability ambition. Significant progress in our journey to net zero

In 2022, we continued to implement our action plan to decarbonise our activities. In particular, we reinforced our energy savings initiatives and accelerated our programme to shift our electricity consumption worldwide to non-carbon emitting sources. Thanks to these efforts, we reduced our carbon footprint by 18.8% as compared with our 2019 reference year (versus 15.5% in 2021).

To progress faster towards our goal of having a net zero carbon footprint by 2050 at the latest, we also set ourselves a new intermediary target to reduce our CO_2 footprint by 50% before 2035, as compared with our 2019 reference year. To achieve this objective, we have defined a detailed capital expenditure programme of c.£60m which will be gradually implemented over the next 12 years.

Successful integration of acquisitions

In 2022 we continued with the integration of Universal Refractories ('Universal'), the specialty refractory business in the United States, which we acquired in December 2021. The integration has involved the regional consolidation of the manufacturing of advanced refractory and foundry products of Vesuvius and those acquired from Universal, to create centres of excellence and more efficient operations.

We also acquired Bayuquan Magnesium Co (BMC) in October 2022, a world-class basic monolithic refractory plant in China and a long-standing manufacturing partner of ours. The acquisition secures strategically valuable basic monolithic volumes at a plant which benefits from very competitive local raw material access. This acquisition will support our further development in the fast-growing Asia-Pacific region.

Board Chairman

As communicated last year, John McDonough stood down from the Board, as planned, in December 2022, and leaves with our sincere thanks. I'm delighted to welcome Carl-Peter Forster to the Board as Chairman and look forward to working with him in the coming months and years to build on the success achieved to date.

Chief Financial Officer

Guy Young chose to leave Vesuvius, having worked as CFO for seven years, concluding his work with us in mid-February 2023. I would like to thank him once again for his support and service to the business. We announced in January that Mark Collis will be joining Vesuvius as CFO, by July this year. Mark has a wealth of experience in international finance roles in John Wood Group plc and other quoted businesses, and I'm looking forward to him joining the team. In the intervening time, I am grateful to my colleague Richard Sykes, who has worked at Vesuvius in numerous operational and finance roles, for taking on the position of interim CFO.

Cyber update

On 6 February 2023, we announced that we had suffered a cyber security incident. In order to contain the threat, we voluntarily shutdown our systems on a precautionary basis. During this period our sites instigated manual procedures and work arounds to maintain production, shipping and invoicing. We have since worked tirelessly on the reinstatement of our systems, and I am pleased to report that the initial period of major disruption has been short, and all sites and significant systems are now operational. As such we expect the impact on trading to be modest, limited to one-off costs of between £3m and £5m.

Outlook

Looking forward, we expect to continue to successfully achieve market share gains through technological differentiation and new product launches. We are also confident in our ability to cover cost increases with pricing. Accordingly, we are confident that our 2023 results will be in-line with our expectations, despite several headwinds:

- As anticipated, the Steel and Foundry markets remain weak, and we anticipate the rate of recovery to be slow and only improve later in the year
- The planned reduction in our own inventory to normalised levels, which is a drag on fixed cost absorption, will continue throughout the first half of 2023
- The negative impact of the cyber security incident incurred at the beginning of the year

Looking beyond 2023, we expect the positive impact of our investment in R&D, long-term growth initiatives, and development of our capacity in fast growing regions, will result in accelerated growth and profitability.

Patrick André
Chief Executive
2 March 2023

Our external environment

Solutions for the changing demands of business

Changes in our markets present both challenges and opportunities. We have responded to long-term trends by positioning ourselves for growth.

BASILITE QuickStart* is a tundish working lining spray mass to be used on a single, combined, drying and preheating cycle using less energy, less water and delivering higher quality.

Helping our customers tackle climate change

What's happening

The pressure on the Steel and Foundry industries to reduce greenhouse gas (GHG) emissions, particularly CO_2, is increasing significantly as governments are enforcing stricter regulations, especially in the EU, the US and China.

Our customers are focusing on reducing absolute energy consumption and GHG emissions through technological changes away from higher emission processes, as well as reducing energy consumption and GHG emissions via increased efficiency. In the steel industry the rise of scrap availability and of its recycling, is supporting a shift to electric arc furnaces away from blast furnaces to produce steel. Alongside this, the use of direct-reduced iron in combination with green hydrogen in steel production to manufacture 'Green Steel' (where hydrogen itself is made using sustainable energy) is gaining traction.

Our Foundry customers are experiencing a drastic change in their end-markets as parts of the world shift towards hybrid and electric vehicles, which alongside, the significant movement towards green electricity generation, is accelerating a transition away from traditional ferrous casting into non-ferrous casting.

How we are responding

We work closely with our customers to develop new products and technologies to meet these challenges with sustainability being a critical focus in new product development.

Our Steel Division is partnering with customers to develop refractory solutions for next-generation steel-making processes. Additionally, we continue to develop new products with superior sustainability characteristics.

Our Foundry Division teams are developing new filtration, feeding, mould coating and molten metal treatment products to support the availability of higher-performance metal and the manufacture of lighter-weight components for the automotive industry. They are also developing new products for aluminium foundries to support the fast-growing market in electric vehicles.

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Responding to the demand for higher quality steel and foundry products

What's happening

The importance of technology to differentiate steel and foundry producers continues to grow, supported by the development of more demanding product applications.

Steel producers are increasingly focused on supplying higher-quality steel grades for automotive and power generation, where the consistency of the finished steel is fundamental. This is driving an above-market growth forecast for high-technology steel in all regions.

In foundries, there continues to be a trend towards higher metal and process quality, as they focus on a greater number of applications that require castings to combine high strength with thinner, lighter profiles and greater complexity.

How we are responding

Vesuvius is strongly positioned to facilitate these upgrades and to benefit from these trends. We have a wide product and service offering designed to support the production of high-technology steel and complex cast components across our broad, global manufacturing base.

We continue to invest heavily in R&D with dedicated centres of excellence to think beyond what exists today.

Vesuvius' innovative portfolio of products and services, together with its global footprint, enable us to provide high-technology solutions to our worldwide customers.

Harnessing automation

What's happening

Our customers face ever-increasing regulation and scrutiny to ensure the safety of their workforce in all parts of their operations, as well as continuously improving their process efficiency.

Advancements in automation can transform production, bringing greater consistency whilst lowering cost. At the same time, robots can support or even substitute operators in hazardous production areas, significantly improving safety performance.

With labour shortages a growing challenge in some markets, automation can create more flexible operations and reduce reliance on manual operators.

How we are responding

Vesuvius has the global and in-depth capability to combine know-how in steel mills and foundries with robotic capabilities to deliver superior safety performance in hazardous areas of production.

We provide laser technology to assess refractory wear, allowing targeted repair with our broad range of refractory consumables and application solutions – for efficient and safe operation. We have invested significant resources in the development of our mechatronics capabilities to shape the future operations of steel and foundry plants with our current robotics offering (e.g. tundish, continuous casting) as well as with new automation capabilities in other areas. We are also exploring new ways to integrate continuous data capture into our solutions to give our customers further insights into the use of consumables in their production processes.

Robotics R&D centre of excellence in Ghlin

Vesuvius' Smart Tundish Spray Robot (TSR), is known for its safe, consistent and reliable performance. In 2022, Vesuvius launched the next generation TSR in our Mechatronics centre of excellence in Ghlin, Belgium; building on this success to deliver further innovations to improve the user interface and enhance the ease of its operation.

Our markets

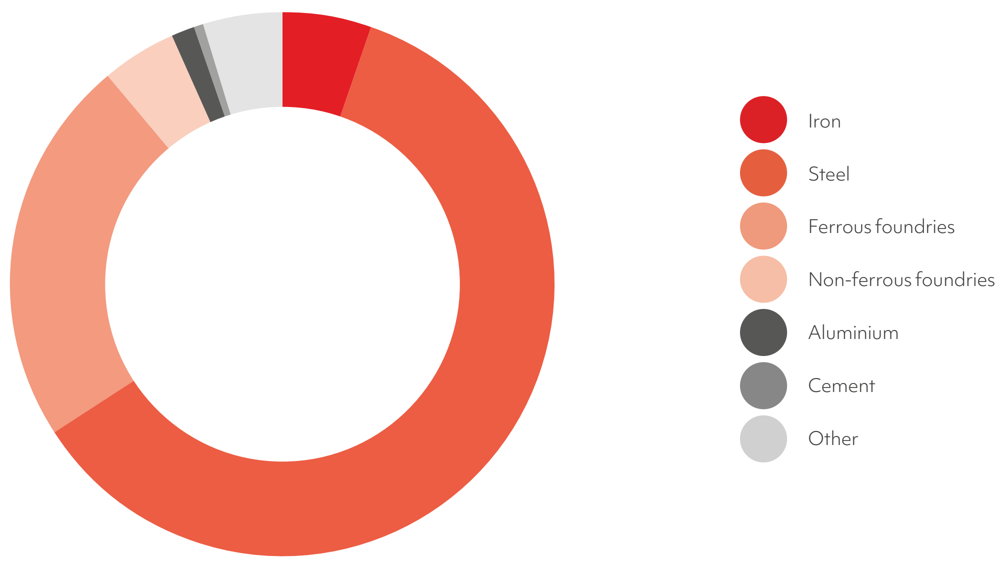
We have core end-markets in steel-making and ferrous foundry with an increasing focus on aluminium, cement and non-ferrous foundries.

We develop long-term working relationships with our customers to understand their needs and develop tailored solutions that meet them.

Vesuvius sales by customer activity

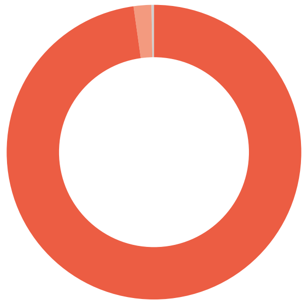
Vesuvius' key customers continue to be steel producers and ferrous foundries, with the strategic ambition to further grow in non-ferrous foundries and other high temperature industrial processes such as aluminium and cement.

Breakdown by customer activity

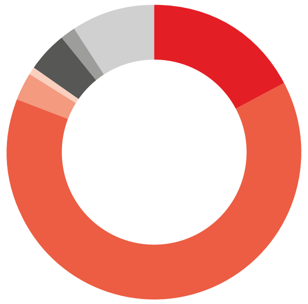


Business Unit breakdown

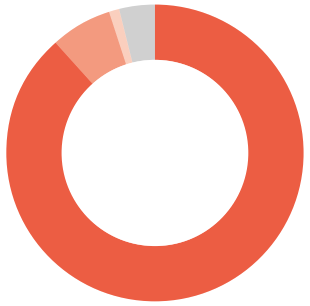
Flow Control



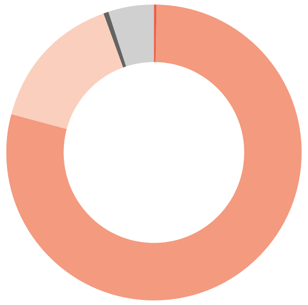
Advanced Refractories



Sensors & Probes



Foundry



Our strategy

What we want to achieve
Our Strategic Objectives

Our purpose is to be a global leader in molten metal flow engineering and technology. We think beyond today to create the innovative solutions that will shape the future, delivering this through our Strategic Objectives.

We achieve profitable growth by focusing our efforts on the high-quality, high-technology segments of the steel and foundry markets, and concentrate on increasing the automation and efficiency of our manufacturing base.

Objectives	Measurements	
Always put safety first	Lost Time Injury Frequency Rate	
Deliver profitable growth	Underlying revenue growth	
Generate value for our shareholders	Trading profit Return on sales Headline profit before tax	Headline EPS Return on invested capital
Maintain an efficient capital structure	Free cash flow Average working capital to sales	Interest cover Net debt to EBITDA
Deliver industry-leading sustainable operations and solutions	Energy intensity CO_2e emission intensity Wastewater Solid waste	Recycled material Compliance training Supply chain
Think beyond in innovation	Total R&D spend New product sales	
Foster talent, skill and motivation in our people	Gender diversity	

We measure and monitor our performance against these Strategic Objectives through our Key Performance Indicators (KPIs).

See our **Key Performance Indicators** on p36 and 37

How we are doing it
Our execution priorities

How we are progressing
Performance in 2022

Reinforcing our technology leadership

Vesuvius was built and grew through technology breakthroughs. We focus on delivering market-leading technology which continues to drive our unique value proposition and underpins our ability to deliver ongoing value enhancement to our customers.

During 2022, we invested £36m in R&D, 1.8% of revenue. We remain committed to spend c.2% of sales on innovation every year. We invest throughout the product cycle from front-end innovation to existing product development, focusing on the projects that deliver the highest impact to our customers.

Developing our technical service offering and increasing penetration of value-creating solutions

As steel and foundry markets in developing economies become more quality focused, we have the opportunity to significantly increase our penetration of these markets through the value delivered by our solutions.

In 2022, we continued our drive to bring new products to the market, with a number of significant launches. Triad Z Bond* is a new Advanced Refractories mix which is five times stronger than bricks, with better carbon retention. ACTICOTE TS* is a new Foundry insulating coating for sand cores that slows down the heat extraction from the liquid metal, improving its metallurgical structure.

Capturing growth in developing markets

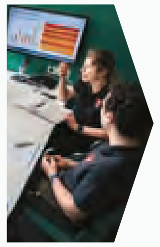
Building on our long-standing presence in all markets, we can leverage the high growth enjoyed by our customers' industries in emerging markets, which are large consumers of steel goods and foundry castings.

Major acceleration of expansion capex in 2022 with £53m of total capex (c.60%) spent on growth projects, particularly in Flow Control, to serve fast growing developing markets in Asia.

In 2022 we outperformed the market in developing market regions: Flow Control outperformed in India, South-East Asia and Latin America, and Foundry also performed well in Asia-Pacific and South America.

Improving cost leadership and margins

We continuously pursue initiatives to adapt our business and our cost base to the changing trading environment.



We were successful in recovering input cost increases through pricing in 2022. At the same time, our volumes grew ahead of market growth, demonstrating the value of our products to our customers.

Driving sustainability within Vesuvius and for customers

We develop products that seek to help our customers drive efficiency and reduce their environmental footprint, and we are focusing on reducing the environmental impact of our own operations. See our Sustainability section on p50-85.

In 2022, we made excellent progress on our carbon reduction target, such that, in June, we decided to increase our ambition from a 10% reduction by 2025 to a 20% reduction.

We continue to develop our plans to reach a net zero carbon footprint by 2050 at the latest.

* Trademark of the Vesuvius Group of companies, unregistered or registered in certain countries, used under licence.

Business model

A profitable, flexible, cash-generative model focused on sustainable growth

Our key resources

Financial capital

We use the cash generated by our business to invest in innovation, people, operating assets, technology and sales to generate further growth.

Manufacturing capital

We have a global footprint, with 55 production sites on six continents, giving us proximity to our customers.

Intellectual capital

We have six R&D centres of excellence, together with dedicated R&D staff worldwide, generating innovative products and services that help our customers make their industrial processes safer, more efficient and more sustainable.

Human capital

We invest in developing our skilled and motivated workforce of more than 11,000 people and provide them with a safe environment in which to work.

Social capital

We champion our Values and our ethical conduct. We maintain strong relationships with customers and our wider stakeholder groups.

Natural capital

We utilise high-quality raw materials, secured through reliable, and well developed sustainable supply chains.

R&D centres of excellence	6
Employees	11, 134
Production sites	55

What we do

We develop and manufacture high-technology products and solutions to assist our customers in the management of molten metal. We operate a profitable, flexible, cash-generative and growth-building business model. Over many years, we have built the brand equity of our Vesuvius and Foseco products through technology leadership, reliability and service.

Our sustainable competitive advantages

Global presence

Our local manufacturing, local expertise and global knowledge of customers' processes give us a special relationship with our customers.

Read more about Our global presence on p4 and 5

Optimised manufacturing

Low-cost lean manufacturing provides reliable 'just-in-time' products.

Read more about Our operations on p42-47

Advanced technology

Our continuing investment in Vesuvius' R&D centres of excellence is reflected in all areas of our offering. We are therefore able to provide our customers with sophisticated, innovative, custom designed solutions.

Read more about our Value-added solutions on p14 and 15

Service and consistency

Our knowledge of end-market processes, specifications and techniques around the world gives our experts an unparalleled ability to support our customers.

Read more about Our operations on p42-47

How we deliver

- Our industry experts are embedded at many customer locations and are therefore ideally placed to collaborate with customers to identify potential service and process improvements. This also enables us to grow our solutions and service portfolio.
- We develop high-technology products that deliver quality enhancement, efficiency gains and energy savings to our customers. We focus on environmental sustainability in our own business through the efficient use of energy and natural resources.
- Our model is profitable by allowing value pricing for bespoke products and services. It generates growth as we enlarge our market with additional innovative products and solutions.
- Our model is resilient to end-market volatility due to the flexibility of our diversified manufacturing footprint and adjustable cost base, increasingly supported by automation.
- Our commitment to ethical business delivers strong, long-term, sustainable commercial relationships.

The value we create

Our investors

Strategic alignment

Our cash-generative and low capital intensity business provides returns to our shareholders and underpins sustainable growth.

Our customers

Strategic alignment

Our investment in innovation creates cutting-edge products and solutions delivering enhanced value for our customers. Our technology solutions improve customer safety and remove operators from the most dangerous parts of our customers' processes.

Our people

Strategic alignment

We focus on the health and safety of all our staff. We engage with our people, encouraging and rewarding high performance to create an environment where all can realise their individual potential.

Our communities

Strategic alignment

We are committed to maintaining positive relationships with the communities in which we operate. Our social responsibility activities complement our Values and we encourage our employees to engage with communities and groups local to our operations.

Name: Paulina Kołodziejczyk
Role: Production Manager
Location: Skawina

Section 172(1) Statement – Stakeholders

Effective engagement with stakeholders promotes the long-term sustainability of the Group

Strategic alignment

- Always put safety first
- Deliver profitable growth
- Generate value for our shareholders
- Maintain an efficient capital structure
- Deliver industry-leading sustainable operations and solutions
- Think beyond in innovation
- Foster talent, skill and motivation in our people

See more about **Our strategy** on p18 and 19

Vesuvius is required to provide information on how the Directors have performed their duties under Section 172 of the Companies Act 2006 during the year. This requires the Board to promote the success of the Company over the long term for the benefit of shareholders as a whole, whilst having regard to a range of other key stakeholders and interests.

The Board recognises the need for the Group to have effective engagement with, and encourage participation from, all key stakeholders to promote these long-term interests. The Group's key stakeholder groups, reflecting those who have the biggest impact on the business, and our modes of engagement are outlined in the tables on pages 25 and 26.

The Board confirms that it has acted in accordance with the Section 172 requirements throughout the year, considering the impact of its decisions on shareholders and other stakeholders, and taking into account their differing views and requirements.

The likely consequences of any decision in the long term

The Board is responsible for the overall direction of the Group. It sets the Group's strategy, oversees the allocation of resources and monitors the performance of the Group, to ensure that the Group is structured appropriately for the challenges and opportunities of the future. In performing these duties, the Board is focused on the sustainable success of the Group in the long term, and the existence of a culture that supports this success. Throughout the year, the Board considered the long-term consequences of the decisions it made, focusing on the interests of relevant stakeholders as appropriate. Examples of how the Board considered Stakeholders' interests in some of the key decisions it took during the year are given opposite. Further information on the Group's strategy can be found in Our strategy on pages 18 and 19.

Acquisition of Bayuquan Magnesium Co

Stakeholder alignment

- Shareholders
- Employees
- Customers

Strategic alignment

The Board approved the acquisition of Bayuquan Magnesium Co (BMC) in October 2022. BMC has been a long-standing toll manufacturing partner of the Advanced Refractories Business Unit. The acquisition secures strategically valuable basic monolithic volumes at a plant which benefits from competitive local raw material access.

The transaction helps our overall goal of improving the profitability of Vesuvius, by capturing the full end-to-end margin of BMC's production. This allows us to enhance our customer offering. It also strengthens our supply chain in this critical product for our Advanced Refractories strategy. We are delighted to welcome BMC's 285 employees to the Group.

Ongoing operational response to cost of living pressures

Stakeholder alignment

- Employees

Strategic alignment

The Board was cognisant of the impact of the global macroeconomic environment on employees during the year, with increases in prices and interest rates causing cost of living pressures in many countries. The very significant inflationary pressures in a small number of our jurisdictions were also considered.

The Board reflected on these pressures when setting salary merit increase budgets for the year. As a result, the 2023 weighted average salary increase budget for the wider global workforce was c.9%, and in Europe the budget was c.12%. In some jurisdictions part of the 2023 budget was applied early to address the particularly significant issues faced by the workforce.

Reaction to conflict in Ukraine and Russian sanctions

Stakeholder alignment

- Shareholders
- Employees
- Customers
- Suppliers

Strategic alignment

Following the commencement of hostilities in Ukraine, the Board was kept briefed on the safety and whereabouts of our colleagues in Ukraine, and of the efforts being made throughout the Group to support Ukraine.

At the start of the conflict in Ukraine, the Board took the decision to suspend deliveries to all Russian customers. Having considered the potential impact of this decision on our employees, customers, suppliers and wider stakeholders, as well as reflecting on the approach taken by the majority of our peers and the effectiveness of stopping all trade with Russia, the Board subsequently resolved to continue to supply non-sanctioned customers in Russia.

Capex Approval of India Flux Plant

Stakeholder alignment

- Customers
- Employees
- Shareholders

Strategic alignment

The Board reviewed a proposal for the construction of a manufacturing site for fluxes on the freehold land in Visakhapatnam, India, acquired by the Group during the year. This investment will provide locally manufactured flux, which is a complementary offering to our other Flow Control product lines.

The construction of the flux facility on the new freehold land provides a further base for the expansion of our manufacturing to support the fast-growing market in India and South-East Asia, shortening supply chains and driving efficiency for our customers. It builds on the existing manufacturing and R&D presence of Vesuvius in Visakhapatnam, India.

Section 172(1) Statement continued

The interests of the company's employees

The Board takes the health and safety of the Group's employees as its primary responsibility. Following the fatal incident at a joint venture site in Wuhan, China in 2022, the Board received regular briefings on the investigations into the root cause of the event, and the actions being taken throughout the business to apply lessons learned.

At each Board meeting the Board received a report on the Group's performance against health and safety KPIs and reviewed, in detail, the circumstances of any Lost Time Injuries that had been reported.

During the year, the Board also reviewed progress against the specific HR objectives for each Business Unit and monitored the initiatives being implemented to develop, retain and motivate employees, and improve succession planning.

Jane Hinkley serves as the designated Non-executive Director responsible for workforce engagement and she oversaw the Board's engagement activities during the year. This included a review of the results of the global employee engagement survey and a series of site visits by Board members.

Further information about the Group's approach to health and safety and employment matters can be found on pages 74-80, including details of the engagement survey results. Information about the work of the Board's Committees in considering and supporting the interests of the Company's employees can be found in the Nomination and Remuneration Committees' Reports on pages 110–143.

The need to foster the company's business relationships with suppliers, customers and others

During 2022, the Board received presentations on end-markets, the dynamics of the Group's relationships with customers and suppliers, and key matters of concern to them. It discussed the steps being taken by the Group to respond to customers' ongoing requirements, and the research and development, marketing and new product launch strategies being actioned to respond to these. The Board reviewed information on the Group's performance against key manufacturing quality targets and was updated at Board meetings on actions undertaken to rectify any significant quality issues or customer complaints, particularly if these indicated repeat issues that required investigation. Further information on the Board's focus on suppliers, customers and others can be found in the Corporate Governance Statement on page 95.

The impact of the company's operations on the community and the environment

Supporting our customers' efforts to reduce their own environmental footprint and improve safety on the shop floor is a key element of the Group's strategy. Throughout 2022, the Board discussed each Business Unit's progress with this strategy. It also received biannual presentations from the VP Sustainability on the work of the Sustainability Council and the Group's progress against its sustainability targets. In addition, the Board and Audit Committee monitored the Group's progress with TCFD compliance. Further details of the Board's oversight of sustainability can be found in the Sustainability section on pages 50–85. The Board recognises that the success of the Group's operations is dependent on maintaining positive relations with the communities in which we operate. During 2022, the Board continued to encourage Vesuvius' sites to support their local communities through charitable activities and community events. Examples of which can be found in the Our Communities section on page 83.

The desirability of the company maintaining a reputation for high standards of business conduct

The Board takes seriously the Group's obligation to maintain a high standard of business conduct and assessed compliance with this requirement through a variety of mechanisms during 2022, including reports from Internal and External Audit, along with feedback from the Group's employee engagement survey. The Board received formal reports during 2022 on the Group's compliance activities, including the Group's risk assessment programme and training practices, and specific issues raised through the Group's Speak Up helpline and internal reporting processes. Further details of the Group's compliance activities can be found in the Our communities section on pages 81-85.

The need to act fairly as between members of the company

The primary focus of the Board's business decisions is on ensuring the long-term sustainability of the Group. The Board recognises that, in seeking to maintain long-term profitability, the Group is reliant on the support of all of its stakeholders, including the Group's workforce, its customers, suppliers and the communities in which its businesses operate. In taking capital allocation decisions during 2022, the Board was cognisant of the need to balance the interests of different stakeholders. Decisions on the Group's approach to investment opportunities, working capital, capex, R&D, investment in people, dividend policy and pension contributions were all considered against this backdrop.

Our stakeholders

Why this stakeholder is important to us	Issues that matter to them	Our response and engagement
Our people With our decentralised management model, the dedication and professionalism of our people, their capacity to own their roles and their drive for results are the most significant contributors to Vesuvius' success. We focus on the health and safety of all our staff, and operate with a clear set of CORE Values that are embedded across the business. We engage with our people, encouraging and rewarding high performance to create an environment where all can realise their individual potential.	Health and safety Diversity and inclusion Remuneration evolution International mobility Employee engagement Development and retention Career opportunities Sustainability performance	We have a fundamental focus on health and safety and the care of all employees There is continuing dialogue between employees and their managers, including the conduct of regular performance reviews We operate a competitive remuneration and benefits strategy, emphasising talent development with tailored career-stage programmes Living the Values and other award schemes celebrate individual achievements in the demonstration of our values Our global communication mechanisms include an intranet, global email communications and a Vesuvius news app, alongside forums such as local 'town hall' meetings The Group operates local works councils, recognises trade unions and is negotiating the re-establishment of its European Works Council Wide-ranging internal training is offered on key job-related issues, with programmes such as the Vesuvius University – HeaTt – and the Foseco University
Customers Engaging with, and listening to, our customers helps us to understand their needs and identify opportunities and challenges. Collaborating with our customers enables us to drive value for them, using our expertise to improve the safety and efficiency of their manufacturing processes, enhancing their end-product quality and reducing their costs.	Health and safety Production efficiency Product quality and performance Innovation and provision of solutions Environmental performance	We employ highly skilled technical experts to help us understand our customers' needs, and to identify opportunities and solutions for them We engage with customers on safety leadership and support their training requirements Our extensive R&D capability, deep product knowledge and long-standing steel and foundry process expertise enable us to partner with them to innovate and adapt to their changing needs We maintain senior-level dialogue with all key customers, including Directors' visits to customers' sites, as appropriate We establish customer relationships on a global basis as required, complemented by diverse local servicing capability Our business model focuses on collaboration with customers, to provide customised solutions. Our technical solutions enable customers to drive production efficiency, improving value creation and environmental outcomes We provide technical customer training, including operating the Foseco University, and participate in industry forums and events
Suppliers and contractors Maintaining a flexible workforce through the use of contractors and cost-effective access to high-quality raw materials is vital to our success. Our suppliers and contractors are critical to our business.	Operational performance Responsible procurement Trust and ethics Payment practices	Vesuvius conducts regular visits to key suppliers Senior-level relationships are built with large suppliers All suppliers/brokers for major raw materials have regular interaction with the Global Purchasing Team Dedicated category directors build long-term relationships and product expertise for key raw materials Vesuvius conducts a rigorous and consistent supplier accreditation procedure Effective working protocols, including work risk assessments, are established with contractors

Section 172(1) Statement continued

Our stakeholders continued

Why this stakeholder is important to us	Issues that matter to them	Our response and engagement
Investors The support of our equity and debt investors, and continued access to funding, is vital to the performance of our business. We work to ensure that our investors and lenders have a clear understanding of our strategy, performance and objectives, recognising that supportive investors are more likely to provide the Company with funds for expansion. We engage with lenders to fulfil our compliance obligations and to ensure that we have clear knowledge and awareness of market sensitivities and trends.	Shareholder value Financial and operational performance Strategy and business development Dividend and gearing policy Sustainability strategy and performance Governance Transparency and ethical behaviour	Vesuvius' Investor Relations strategy is managed by our Head of Investor Relations. She, along with the Chief Financial Officer and Chief Executive, hold regular meetings with key and prospective investors The Group Treasurer and CFO hold regular meetings with key personnel from banks and other lenders who provide the Group's debt funding. The Group Treasury function also maintains an ongoing dialogue with key relationship banks and other local banks in the countries in which Vesuvius operates The Group's Annual Report provides an overview of the Group's activities. Regular announcements and press releases are published to provide updates on the Group's performance and progress The AGM provides all shareholders with an opportunity to directly engage with the Board There is ongoing dialogue with the Company's analysts to address enquiries and promote the business The Chair of the Remuneration Committee consults with our largest shareholders on significant remuneration matters
Communities We are committed to maintaining positive relationships with the communities in which we operate. Our social responsibility activities complement our Values and we encourage our employees to engage with communities and groups local to our operations.	Career opportunities Operational performance Transparency and ethical behaviour Environmental performance	We provide work experience and internships to local university students and school children We maintain contact with universities to identify local talent and our businesses attend careers fairs and provide student work placements and internships Many of our sites sponsor local charitable activities and participate in local volunteering initiatives We maintain clear oversight and control of the environmental impact of our production sites We have a clear strategy for carbon reduction in our manufacturing process
Environmental agencies and organisations Good environmental management is aligned with our focus on cost optimisation, operational excellence and long-term business sustainability. We engage with appropriate organisations to ensure that we are complying with regulatory requirements, and to publicise our performance.	Governance and transparency Operational performance Reporting on performance metrics Environmental performance	Vesuvius is a signatory to the UN Global Compact We publish a full Sustainability Report online which can be accessed via the Vesuvius website We regularly engage with government agencies who visit our sites and carry out inspections We respond to environmental research as part of customer and supplier due diligence We participate in environmental and social responsibility research and questionnaires

Risk, viability and going concern

The Board continually monitors the internal and external risks that could significantly impact the Group's long-term performance

The Group undertakes a continuous process to review and understand existing and emerging risks.

Risk management in 2022

Each year, the Board exercises oversight of the Group's principal risks, undertaking a specific review of the way in which the Group manages those risks. This process provides the Board with a clear understanding of the individuals within the business responsible for the management of each of its principal risks and the mitigation in place to address it. The Board also reviews and, where appropriate, updates the Group's risk appetite for those issues identified as principal risks and the associated adequacy of the steps being taken to mitigate them.

The Board has overall responsibility for establishing and maintaining a system of risk management and internal control and for reviewing its effectiveness. The Group undertakes a continuous process to identify and review risk. This assessment undergoes a formal review at half-year and at year end. The risks identified by the business are compiled centrally to deliver a coordinated picture of the Group's key operational risks. These risks are then reviewed by the Group Executive Committee.

As part of this review, each Non-executive Director contributes their individual view of the top-down strategic risks facing the Group – drawing on the broad commercial and financial experience they have gained both inside and outside the Group – as well as their views on the Group's risk appetite. The results of this assessment are then overlaid on the internal assessment of risks to build a comprehensive analysis of existing and emerging risk. In this way, the Directors' views on each of the principal risks and on emerging risks in general, are independently gathered and integrated into the management discussions and actions taken on risk.

The process covers both financial and non-financial risks, and considers the risks associated with the impact of the Group's activities on employees, customers, suppliers, the environment, local communities and society more generally.

As in previous years, in 2022, the Group's assessment of principal risks was reviewed and considered against any emerging risks and uncertainties that were identified through this internal review process. Alongside this, the Board continued to monitor the implications of emerging macro trends on the business. These trends included automation in manufacturing, business digitalisation, automotive electrification, geopolitical tension and in particular the significant steps being taken in our end-markets to combat climate change as businesses commit to future net zero emissions targets. All of these could act as disruptors to our business. Commentary on some of these areas is contained in the Our external environment section on pages 14 and 15 of this Report. No additional critical macro trends were identified in 2022.

The Board also conducted further physical site visits in 2022. The Directors believe that this direct engagement with staff is the most effective way to assess the 'temperature' of the organisation – hearing first-hand about issues, concerns and potential risks that might impact the Group. More details on the site visits conducted can be found on page 95.

Risk remains an integrated part of all Business Unit presentations to the Board, informing the Board of the operational approach taken to risk management on a day-to-day basis.

Changes to risk in 2022

In 2022, the Board continued to focus on the Group's existing risks, and the processes to mitigate and manage them, whilst remaining alert to the potential for there to be other emerging risks. The risks posed by the COVID-19 pandemic broadly receded during 2022, other than in China, where we continued to be alert to the potential for disruptions to our operations and limitations on movement around the country. Ahead of the recent cyber incident, the Board had noted the developing trends in cyber threats to business in general, and had reflected this in the principal risks of the business in terms of business continuity.

Other emerging risks were assessed, with the Board considering the pressures on the business from inflation and interest rates, and the effects of the increasingly difficult environment for energy pricing and supply, which deteriorated further during the year as a result of the conflict in Ukraine.

The Board also considered the continuing work required to ensure that the Group's decentralised management and talent pipeline delivers the Group's profitable growth ambitions, whilst also consistently displaying behaviours in line with the Group's values in the conduct of all business.

Against the more uncertain economic backdrop, broader business continuity risks were highlighted by the Board. With job markets in some jurisdictions becoming increasingly difficult post-pandemic, these focused on people and the need to ensure that the business has the right management with the rights skills in the right places. This has to be coupled with the ability to retain and develop these people and a bench of talent lower down the business to support succession planning.

The Board also considered security of supply of raw materials and the geopolitical trends potentially moving away from the drive for globalisation.

It was noted that a number of these and other issues were already addressed in the Group's principal risks and by related mitigation activities.

Risk, viability and going concern continued

Issues identified in certain of the Group's principal risks materialised during 2022. The Group's existing measures in mitigation were initiated and reviewed to ensure their continuing effectiveness. These were most notably:

Business interruption: In the first half of the year, considerable work was done on security of energy resources in the light of the disruption of the Russian gas supply to Europe. This focused on plans to ensure that our European facilities could continue to operate, and the ability to transfer production in the event of an interruption in gas supply. Our business in Ukraine suffered very significant challenges but continued to operate to the extent possible, with the exceptional support of our people based there. In addition, our business in China continued to experience lockdowns related to the COVID-19 pandemic, and addressing these risks was a clear focus for our regional management in China.

In January this year, we also suffered an explosion at our site in South Africa, which damaged some equipment and required the instigation of our business continuity plan to mitigate the impact on our customers.

End-market risk: The global economic outlook deteriorated significantly in the second half of 2022, with particular concern indicated for the mature European economies. The effects of this did not have a significant impact in 2022 given the sharp focus on the commercial performance of our Steel and Foundry Divisions. Whilst the geographic diversity of our business and our presence in developing markets stand as robust mitigation to any regional disruptions or economic decline, the effects of this projected global decline continue to be carefully monitored.

Complex and changing regulatory environment: The conflict in Ukraine led to a significant increase in sanctions and restrictions relating predominantly to Russia, imposed by the United Kingdom, the European Union and the United States. The Group monitored these developments closely and using our established internal team and processes, took steps to assess and respond to each iteration of these restrictions as they were imposed.

People, culture and performance: The shift in working patterns to more remote working that come about as a result of the COVID-19 pandemic continues to be in place in the majority of our geographies. Whilst Vesuvius does not have a global policy in this regard, enabling our businesses to tailor their approach as necessary, a concerted effort has been made to bring our people back to the physical workplace where possible. This is considered to be particularly important in the context of instilling new joiners with a sense of the culture and values of Vesuvius, which we believe cannot be adequately transmitted in fully remote working structures.

Despite the aforementioned challenges, the Board did not identify any new principal risks during 2022 or any overall material change to the Group's identified principal risks and uncertainties, albeit that within those risks a number of issues manifested themselves during the year. As such, the Group's statement of principal risks and uncertainties was unchanged in 2022 from 2021.

Cyber security

The Audit Committee and Board receive regular updates on the Group's activities in regard to cyber security, including general developments and specific actions and activities within the Vesuvius business. A comprehensive plan was established in 2020 to further strengthen Vesuvius' overall IT security. This was progressed in 2021 and continued to be the focus in 2022, with a number of activities undertaken to strengthen and refine our systems and controls during the year. A holistic approach is taken to addressing cyber challenges, focusing on the improvement of the Group's overall IT infrastructure, procedures and framework. The Group continues to run regular training programmes on cyber/IT security. See page 105 in the Audit Committee report for further information on the Group's approach to cyber security.

2023 cyber incident

In February, the Group was the subject of a cyber incident involving unauthorised access to our IT systems. This required the instigation of the Group's Cyber Incident Plan. Our systems were shut down to contain the incident on a precautionary basis, and our sites implemented their business continuity plans to maintain their operations. The investigation is still ongoing and the Board continues to monitor the impact of the incident and receives regular updates on progress to address it, including the actions being taken to mitigate the immediate risk of further incidents. Going forward, consideration will be given to any additional strategic or operational improvements required to the Group's systems and processes, to further reduce the potential for future attacks and further improve the Group's resilience for dealing with such incidents.

Climate change

The Group's overall risk management processes also incorporate consideration of the potential impact of climate-related risks on the Group. The Group does not regard climate change itself to represent a material stand-alone risk for the Group's operations.

Whilst a significant proportion of the Group's revenue is generated from steel manufacture and automotive castings, industries that are under transition as a result of their focus on improving environmental performance, we believe these changes will be positive for the Group. The opportunities in the Group's business strategy, which is founded on helping our customers to improve their manufacturing efficiency and the quality of their products – and therefore reduce their climate impact – will play a critical part in the development of the Group going forward. We also see potential benefits for the Group from the acceleration of the energy transition, as this will create continued demand for the high-quality steel produced using Vesuvius' products and solutions.

The Group continues to recognise that climate change could present further uncertainty for the Group in terms of increased regulation, the evolution of the geographical distribution of our customer base and the costs of meeting more onerous disclosure requirements. Further information about the Group's consideration of climate-related risks and opportunities can be found in the Our planet section on pages 57-65.

The risks we associate with our sustainability performance and our end-customers' sustainability transition – badged as ESG – are identified as a separate element of the Group risk register, recognising the work Vesuvius can do to mitigate the environmental impact of our customers' processes. Other elements of this risk are incorporated into the appropriate principal risk and uncertainty that the Group has identified. The Group continues to focus internally on the action we can take to drive our business' sustainability. In 2022, the Group continued its focus on the identified environmental sustainability KPIs, with a particular focus on reducing energy consumption and CO_2e emissions, recycling and waste disposal. Under the Group's Sustainability initiative we seek to drive a lower CO_2e emission intensity, reduce normalised energy usage, and take the steps necessary to meet the target set of being absolute CO_2e emissions net zero by 2050 at the latest. Further information can be found in the Our planet section on pages 57–70.

Risk mitigation

The principal risks identified are actively managed in order to mitigate exposure. Senior management 'owners' have been identified for each principal risk, and they manage the mitigations of that specific risk and contribute to the analysis of its likelihood and materiality. This analysis is reported to the Board. The risks are analysed in the context of our business structure which gives protection against a number of principal risks we face with diversified currencies, a widespread customer base, local production matching the diversity of our markets and intensive training of our employees. Additionally, we seek to mitigate risk through contractual measures. Where cost-effective, the risk is transferred to insurers. Our processes are not designed to eliminate risk, but to identify our principal risks and seek to reduce them to a reasonable level in the context of the delivery of the Group's strategy.

Business continuity

In partnership with our risk management advisers and our insurers, we seek to identify the most effective means of reducing or eliminating insurable risks, through a combination of risk management and the placing of insurance cover.

Our insurer property loss control programme is based upon insurer loss modelling and focuses on insured losses. The insurer's loss control engineers undertake a series of on-site inspections focused on machinery breakdown, fire, natural catastrophe and other property damage and business interruption risks. These surveys yield a series of loss-reduction recommendations. The execution of these recommendations is agreed with site management and then followed through to completion.

In parallel, Vesuvius' own loss management programme focuses on strategic sites and sites that are not routinely covered by the insurer programme. Assisted by an independent consultant, we undertake property loss control and business continuity surveys using Vesuvius' bespoke risk and exposure-based protocol.

These reports yield further risk reduction recommendations, and improvement actions and timescales are agreed and followed through by site management. To support the Group's loss control activities, risk management workshops are conducted covering loss prevention, emergency planning, crisis management and business recovery. As the footprint of the Group develops and, in certain cases, production concentrates in a smaller number of flagship sites, business continuity planning is conducted to ensure that sufficient resilience remains in the manufacturing network to address projected supply interruptions.

With regard to fire safety, the Group monitors all fire-related near misses or minor dangerous occurrences. Any fires, including overheating, are reported and analysed both locally and by senior HSE management in order that safety improvement initiatives can be prioritised and communicated throughout the Group. Underlying causes are established with detailed analysis undertaken as a means of proposing improvement priorities in order that safety and process safety initiatives can be targeted on a risk-assessed basis.

Internal control

The Group's internal control system is designed to manage, rather than eliminate, the financial risks facing the Group and safeguard its assets. No system of internal control can provide absolute assurance against material misstatement or loss. The Group's system is designed to provide the Directors with reasonable assurance that problems are identified on a timely basis and are dealt with appropriately.

The Audit Committee assists the Board in reviewing the effectiveness of the Group's system of internal control, including financial, operational and compliance controls, and risk management systems. The key features of the Group's system of internal control are set out in the table overleaf.

Reviewing the effectiveness of risk management and internal control

The internal control system covers the Group as a whole and is monitored and supported by the Group's Internal Audit function, which conducts reviews of Vesuvius' businesses and reports objectively both on the adequacy and effectiveness of the system of internal control and on those businesses' compliance with Group policies and procedures. The Audit Committee receives reports from the Group Head of Internal Audit and reports to the Board on the results of its review.

The Group also conducts a self certification exercise by which senior financial, operational and functional management certify the compliance, throughout the year, of the areas under their responsibility with the Group's policies and procedures and highlight any material issues that have occurred during the year.

As part of the Board's process for reviewing the effectiveness of the system of internal control, it delegates certain matters to the Audit Committee. Following the Audit Committee's review of internal financial controls and of the processes covering other controls, the Board annually evaluates the results of the internal control and risk management procedures conducted by senior management. Since the date of this evaluation, there have been no significant changes in internal controls or other matters identified which could significantly affect them.

In accordance with the provisions of the UK Corporate Governance Code, the Directors confirm that they have carried out a robust assessment of the principal and emerging risks facing the Company, including those that threaten its business model, future performance, solvency or liquidity. They have also reviewed the effectiveness of the Group's system of internal control and confirm that the necessary actions have been taken to remedy any control weaknesses identified during the year and to the date of this report.

Further detail regarding the Audit Committee's review of the effectiveness of the Group's risk management and internal control systems is contained in the Audit Committee report on pages 104-106.

Risk, viability and going concern continued

Key features of risk management and internal control

Strategy and financial reporting	Comprehensive strategic planning and forecasting process Annual budget approved by the Board Monthly operating financial information reported against budget Key trends and variances analysed and action taken as appropriate
Vesuvius GAAP	Accounting policies and procedures formulated and disseminated to all Group operations Covers the application of accounting standards, the maintenance of accounting records and key financial control procedures
Operational controls	Operating companies and corporate offices maintain internal controls and procedures appropriate to their structure and business environment Compliance with Group policies on items such as authorisation of capital expenditure, treasury transactions, the management of intellectual property and legal/regulatory issues Use of common accounting policies and procedures, and financial reporting software used in financial reporting and consolidation Significant financing and investment decisions reserved to the Board Monitoring of policy and control mechanisms for managing treasury risk by the Board Clearly delegated authority for capital expenditure, purchasing, customer contracts and hiring
Risk assessment and management	Continuous process for identifying, evaluating and managing any significant risks Risk management process designed to identify the key risks facing each business Reports made to the Board on how those risks are managed Each major Group Business Unit produces a risk map to identify key risks, and assess the likelihood of risks occurring, as well as their impact and mitigating actions Top-down risk identification undertaken at Group Executive Committee and Board meetings Board review of insurance and other measures used in managing risks across the Group The Board is notified of major issues and makes an annual assessment of whether risks have changed Ongoing assurance processes by the legal function and Internal Audit including the annual self-certification process Externally supported Speak Up whistleblowing line
Internal Audit	Reviews Vesuvius' businesses and reports on the adequacy and effectiveness of their systems of internal control and compliance with Group policies and procedures Agrees action plans for the resolution of any improvement actions identified by their audits, and monitors with local management and the Business Unit Presidents, progression with their completion Reports to the Audit Committee on the results of each audit and provides regular updates on high-priority action items The Audit Committee discusses the key risks identified by Internal Audit

Principal risks

The risks identified on pages 32 and 33 are those the Board considers to be the most relevant to the Group in relation to their potential impact on the achievement of its Strategic Objectives. All of the risks set out on these pages could materially affect the Group, its businesses, future operations and financial condition, and could cause actual results to differ materially from expected or historical results. The Group continues to focus on risk mitigation, and whilst, as identified above, certain elements of the Group's risks have manifested in 2022 and 2023, the principal risks of the Group remain the same. These risks are not the only ones that the Group faces or will face. Some risks are not yet known and some currently not deemed to be material could become so.

Viability Statement

In accordance with the UK Corporate Governance Code, the Directors have assessed the viability of the Group over a three-year period to 31 December 2025, taking into account the Group's current position and the potential impact of the principal risks and uncertainties. The Directors have determined that three years is an appropriate period over which to provide the Viability Statement because this is the Company's planning cycle and it is sufficiently funded by financing facilities with average maturity terms of approximately six years. The projected cash flows for the next three years have been based on the latest Board-approved budgets and strategic plans.

In making this statement, the Directors have carried out a robust assessment of the principal risks that may threaten the business model, future performance, solvency and liquidity of the Group. This is embodied in annual review of a three-year business plan which includes a review of sensitivity to 'business as usual' risks, such as profit growth and working capital variances, severe but plausible events and the impact these could have on the Group's debt covenants and available liquidity. The results take account of the availability and likely effectiveness of the mitigating actions that could be taken to avoid or reduce the impact or occurrence of the underlying risks. Whilst the review has considered all the principal risks identified by the Group, the following were selected for enhanced stress testing: an unplanned drop in customer demand; debt recovery risk due to customer default; business interruption due to the unplanned closure of several key plants; and raw material price inflation. The Group's prudent balance sheet management, flexible cost base able to react quickly to end-market conditions, access to long-term capital at acceptable financing costs and well geographically diversified international businesses leave it well placed to manage these principal risks. In performing the stress testing, certain assumptions were made, including that: customer failures result in write-offs of the full value of the receivables with no lost revenue replacement; and cash flow is supported by working capital releases, restricted capital expenditure and operating cost reductions. Under the enhanced stress testing described above, a potential breach of a covenant would only occur in the event of an unforeseen reduction in revenue of greater than 30%. Accordingly, the Directors confirm that they have a reasonable expectation that the Group will be able to continue in operation and meet its liabilities as they fall due over the three-year period to 31 December 2025. Furthermore, the Board believes that the Group continues to be well positioned for success in the longer term because of: our exposure to long-term growing end-markets; our market-leading position that is supported by ongoing investment in innovation and R&D; our strong degree of customer intimacy with around a third of our employees working at customer facilities; and the focus we have on building quality teams with clear organisational responsibility.

Going concern statement

The Group's available committed liquidity stood at £494m at year-end 2022, up from £456m at year-end 2021, as a result of lower borrowings under the Group's committed facilities and an increase in recorded cash balances. The Directors have prepared cash flow forecasts for the Group for the period to 30 June 2024. These forecasts reflect an assessment of current and future end-market conditions, which are expected to be challenging in 2023 and to recover thereafter (as set out in the 'outlook' statement in the Chief Executive's Strategic Review in this document), and their impact on the Group's future trading performance.

The Directors have also considered a severe but plausible downside scenario, based on an assumed protracted COVID-19-related demand impact, despite emerging confidence that the worst of the pandemic may be behind us. This downside scenario assumes: a decline in business activity and profitability in 2023 and 2024 to the level achieved in H2 2020, the period most severely impacted by COVID-19; working capital as a percentage of sales in the downside case consistent with that in the base case; and dividends not paid in 2023 then reinstated.

On a full-year basis relative to 2022, this implies a 30% decline in sales and a c.57% decline in Trading Profit.

The Group has two covenants; net debt/EBITDA (under 3.25x) and an interest cover requirement of at least 4.0x. In this downside scenario, the forecasts show that the Group's maximum net debt/EBITDA (pre-IFRS 16 in-line with the covenant calculation) does not exceed 1.0x, compared to a leverage covenant of 3.25x, and the minimum interest cover reached is 9x compared to a covenant minimum of 4x.

The forecasts show that the Group will be able to operate within the current committed debt facilities and show continued compliance with the Company's financial covenants. On the basis of the exercise described above and the Group's available committed debt facilities, the Directors consider that the Group and the Company have adequate resources to continue in operational existence for a period of at least 12 months from the date of signing of these financial statements and that there is no material uncertainty in respect of going concern. Accordingly, they continue to adopt a going concern basis in preparing the financial statements of the Group and the Company.

Viability process

Identify
Viability time horizon and risk analysis framework

Assess
Principal risks and stress scenarios

Model
Viability against risk scenarios, examining probabilities and impacts

Report
See Viability Statement

Principal risks and uncertainties

Risk	Potential impact	Mitigation
End-market risks Vesuvius suffers an unplanned drop in demand, revenue and/or margin because of market volatility beyond its control. Strategic alignment	Unplanned drop in demand and/or revenue due to reduced production by our customers Margin reduction Customer failure leading to increased bad debts Loss of market share to competition Cost pressures at customers leading to use of cheaper solutions	Geographic diversification of revenues Product innovation and service offerings securing long-term revenue streams and maintaining performance differential Increase in service and product lines by the development of the Technical Services offering R&D includes assessment of emerging technologies Manufacturing capacity rationalisation and flexible cost base Diversified customer base: no customer is greater than 10% of revenue Robust credit and working capital control to mitigate the risk of default by counterparties
Protectionism and globalisation The Vesuvius business model cannot adapt or respond quickly enough to threats from protectionism and globalisation. Strategic alignment	Restricted access to market due to enforced preference of local suppliers Increased barriers to entry for new businesses or expansion Increased costs from import duties, taxation or tariffs Loss of market share	Highly diversified manufacturing footprint with manufacturing sites located in 26 countries Strong local management with delegated authority to run their businesses and manage customer relationships Cost flexibility Tax risk management and control framework together with a strong control of inter-company trading
Product quality failure Vesuvius staff/contractors are injured at work or customers, staff or third parties suffer physical injury or financial loss because of failures in Vesuvius products. Strategic alignment	Injury to staff and contractors Product or application failures lead to adverse financial impact or loss of reputation as technology leader Incident at customer plant causes manufacturing downtime or damage to infrastructure Customer claims from product quality issues	Quality management programmes including stringent quality control standards, monitoring and reporting Experienced technical staff knowledgeable in the application of our products and technology Targeted global insurance programme Experienced internal legal function overseeing third-party contracting
Complex and changing regulatory environment Vesuvius experiences a contracting customer base or increased transaction and administrative costs due to compliance with changing regulatory requirements. Strategic alignment	Revenue reduction from reduced end-market access Disruption of supply chain and route to market Increased internal control processes Increased frequency of regulatory investigations Reputational damage Trade restrictions	Compliance programmes and training across the Group Independent Internal Audit function Experienced internal legal function including dedicated compliance specialists Global procurement category management of strategic raw materials
Failure to secure innovation Vesuvius fails to achieve continuous improvement in its products, systems and services. Strategic alignment	Product substitution by customers Increased competitive pressure through lack of differentiation of Vesuvius offering Commoditisation of product portfolio through lack of development Lack of response to changing customer needs Loss of intellectual property protection	Enduring and significant investment in R&D, with market-leading research A shared strategy for innovation throughout the Group, deployed via our R&D centres Stage gate process from innovation to commercialisation to foster innovation and increase alignment with strategy Programme of manufacturing and process excellence Quality programme, focused on quality and consistency Stringent intellectual property registration and defence

Risk	Potential impact	Mitigation
Business interruption Vesuvius loses production capacity or experiences supply chain disruption due to physical site damage (accident, fire, natural disaster, terrorism), or other events such as industrial action, cyber attack or global health crises. Strategic alignment	Loss/closure of a major plant temporarily or permanently impairing our ability to serve our customers Damage to or restriction in our ability to use assets Denial of access to critical systems or control processes Disruption of manufacturing processes Inability to source critical raw materials	Diversified manufacturing footprint Disaster recovery planning Business continuity planning with strategic maintenance of excess capacity Physical and IT access controls, security systems and training Cyber risks integrated into wider risk-management structure Well-established global insurance programme Group-wide safety management programmes Dual sourcing strategy and development of substitutes
People, culture and performance Vesuvius is unable to attract and retain the right calibre of staff, fails to instil an appropriate culture or fails to embed the right systems to drive personal performance in pursuit of the Group's long-term growth. Strategic alignment	Organisational culture of high performance is not achieved Staff turnover in growing economies and regions Stagnation of ideas and development opportunities Loss of expertise and critical business knowledge Reduced management pipeline for succession to senior positions	Internal focus on talent development and training, with tailored career-stage programmes and clear performance management strategies Contacts with universities to identify and develop talent Career path planning and global opportunities for high-potential staff Internal programmes for the structured transfer of technical and other knowledge Clearly defined Values underpin business culture Group focus on enhancing gender diversity
Health and safety Vesuvius staff or contractors are injured at work because of failures in Vesuvius' operations, equipment or processes. Strategic alignment	Injury to staff and contractors Health and safety breaches Manufacturing downtime or damage to infrastructure from incident at plant Inability to attract the necessary workforce Reputational damage	Active safety programmes, with ongoing wide-ranging monitoring and safety training Independent safety audit team Quality management programmes including stringent manufacturing process control standards, monitoring and reporting
Environmental, Social and Governance criteria Vesuvius fails to capitalise on the opportunity to help its customers significantly reduce their carbon emissions as environmental pressure grows on the steel industry or Vesuvius fails to meet the expectations of its various stakeholders including employees and investors. Strategic alignment	Loss of opportunity to grow sales Loss of opportunity to increase margin Loss of stakeholder confidence including investors Reputational damage	Development and implementation of a new Sustainability initiative, which includes stretching targets focused on reducing the Group's energy usage, CO_2 emissions, waste and recycled materials R&D focus on products that assist customers to reduce carbon emissions and improve their own sustainability measures Skilled technical sales force to develop efficient solutions for our customers Globally disseminated Code of Conduct sets out standards of conduct expected and ABC Policy adopted with zero tolerance regarding bribery and corruption Internal Speak Up mechanisms to allow reporting of concerns Extensive use of due diligence to assess existing and potential business partners and customers

Strategic alignment

- Always put safety first
- Deliver profitable growth
- Generate value for our shareholders
- Maintain an efficient capital structure
- Deliver industry-leading sustainable operations and solutions
- Think beyond in innovation
- Foster talent, skill and motivation in our people

See more about **Our strategy** on p18 and 19

Our performance

Name: Jefferson Correa Dos Santos
Role: Production Process Leader
Location: Rio de Janeiro

Name: Phelipe Oliveira Dias De Abreu
Role: Quality Inspector
Location: Rio de Janeiro

We're optimising efficiency through our innovative products

We develop high-technology products that deliver quality enhancement, efficiency gains and energy savings to our customers. Our solutions help our customers to lower their production costs and improve efficiency, by improving product yield.

Name: Teresa Tondera
Role: Laboratory Manager
Location: Skawina

Name: Joe Yi
Role: M&T Director – Steel China & North Asia
Location: Suzhou

Key Performance Indicators

Financial KPIs[1]

Strategic alignment	KPI	Purpose	Link to remuneration
Deliver profitable growth	**Underlying revenue growth** % 22: 18 21: 18 20: -13	Provides an important indicator of organic (like-for-like) growth of Group businesses between reporting periods. This measure eliminates the impact of exchange rates, acquisitions, disposals and significant business closures	
Generate value for our shareholders	**Trading profit** £m 22: 227 21: 142 20: 101	Used to assess the trading performance of Group businesses	
	Return on sales % 22: 11.1 21: 8.7 20: 7.0		
	Headline profit before tax £m 22: 217 21: 137 20: 92	Used to assess the financial performance of the Group as a whole	
	Headline EPS p 22: 56.5 21: 35.3 20: 23.2	Used to assess the underlying earnings performance of the Group as a whole	**Annual Incentive Plan and Vesuvius Share Plan** – Read more about these on p133-137
	Return on invested capital % 22: 10.7 21: 7.5 20: 4.9	Used to assess the financial performance of the Group	**Annual Incentive Plan and Vesuvius Share Plan** – Read more about these on p133-137
Maintain an efficient capital structure	**Free cash flow** £m 22: 123 21: -0.3 20: 114	Used to assess the underlying cash generation of the Group	
	Average working capital to sales % 22: 23.8 21: 20.9 20: 23.2	One of the factors driving the generation of free cash flow is the average working capital to sales ratio, which indicates the level of working capital used in the business	**Annual Incentive Plan** – Read more about this on p133, 135 and 136
	Interest cover 22: 29.8x 21: 30.5x 20: 14.5x	Interest cover and net debt to EBITDA are used to assess the financial position of the Group and its ability to fund future growth	
	Net debt to EBITDA 22: 0.9 21: 1.4 20: 1.2		

1. For definitions of alternative performance measures, refer to Note 4 of the Group Financial Statements.

Non-financial KPIs

Strategic alignment	KPI	Target/description	Link to remuneration
Always put safety first	**Lost Time Injury Frequency Rate** 22: 1.08 21: 1.06 20: 1.16	LTIFR of below 1 Work-related illness or injuries which resulted in an employee being absent for at least one day – measured per million hours worked	**Vesuvius Share Plan** – Read more about this on p133 -137
Think beyond in innovation	**Total R&D spend** £m 22: 36 21: 31 20: 28	At constant 2022 currency	
	New product sales % 22: 16 21: 15 20: 12	Sales of products launched within the last five years as a % of total revenue	
Deliver industry-leading sustainable operations and solutions	**Energy intensity** kWh per metric tonne of product packed for shipment -6.0%[2]	10% reduction in energy intensity by 2025 (vs 2019)	
	CO_2e emission intensity -18.8%[2,3]	20% reduction of Scope 1 and Scope 2 CO_2e emission intensity per metric tonne of product packed for shipment by 2025 (vs 2019)	**Annual Incentive Plan and Vesuvius Share Plan** – Read more about these on p133-137
	Wastewater -9.0%	25% reduction of wastewater per metric tonne of product packed for shipment by 2025 (vs 2019)	
	Solid waste -13.8%	25% reduction of solid waste (hazardous and sent to landfill) per metric tonne of product packed for shipment by 2025 (vs 2019)	
	Recycled material 6.0%	7% of raw materials used in production to be recycled materials from external sources by 2025	
	Compliance training 99%	At least 90% of targeted staff to complete Anti-Bribery and Corruption training annually	
	Supply chain 48%	By the end of 2023, conduct sustainability assessments of raw material suppliers covering at least 50% of Group spend	
Foster talent, skill and motivation in our people	**Gender diversity** 20%	25% female representation in the Senior Leadership Group (approximately 160 top management) by 2025	**Annual Incentive Plan and Vesuvius Share Plan** – Read more about these on p133-137

2. Re-baselined using pre-acquisition data for the business acquired from Universal Refractories, Inc.
3. Does not include fugitive emissions (de minimis).

Financial review

Strong commercial performance to counteract challenging markets

The following review considers a number of our financial KPIs and sets out other relevant financial information.

Revenue
£2,047m
Reported change 25%
Underlying[1] change 18%

Trading profit[2]
£227m
Reported change 60%
Underlying[1] change 50%

Statutory EPS
67.2p
Reported change 78%

Return on sales[2]
11.1%
Reported change 240bps
Underlying[1] change 240bps

1. Underlying basis is at constant currency and excludes separately reported items and the impact of acquisitions and disposals.
2. For definitions of alternative performance measures, refer to Note 4 of the Group Financial Statements.

Basis of preparation

All references in this financial review are to headline performance unless stated otherwise. See Note 4.1 to the Group Financial Statements for the definition of headline performance.

Introduction

The year 2022 was a record year for the Group in terms of trading profit and return on sales, despite the depressed underlying markets, driven mainly by price increases to recover cost inflation. This has allowed us to pay an attractive dividend to our shareholders, while increasing investments in strategic areas.

2022 performance overview

We are pleased with the performance of the Group in 2022; the Business Units had good success in recovering cost increases on a timely basis whilst gaining market share in most regions, demonstrating the strength of the Group positioning in the market driven by the technological differentiation of our products and solutions. Reported revenue increased by £404m over the prior year (+25%) and by £300m on an underlying basis (+18%).

On a reported basis, the Steel and Foundry Division revenue increased by 28% and 17% respectively in the year.

Our volume performance in the Steel Division was broadly flat, compared to a c.7.0% decline in steel production in the world excluding China and Iran. Our resilient performance was driven by market share gains in Flow Control everywhere in the World and market share gains in Advanced Refractories in most regions. Our Foundry Division experienced a low single digit volume decline due primarily to still very depressed underlying markets and some limited market share losses due to priority given to pricing.

Thanks to our efficient price increases, a resilient commercial performance and a product mix benefit, we have achieved a record trading profit of £227m, 50% higher than prior year on an underlying basis; and a record return on sales of 11.1%, higher than the prior year by 240 bps on an underlying basis.

Our cash management performance was robust, achieving an 82% cash conversion, thanks to a strong operational performance partially offset by an investment in trade working capital and a continuous investment in strategic capacity expansion. As a result, we have decreased our net debt position and improved our leverage ratio of net debt to EBITDA to 0.9x from 1.4x in December 2021.

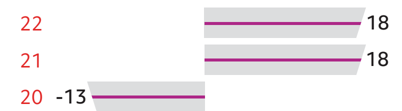
Revenue

£m	2022 Revenue As reported	2022 Revenue Acquisitions/ (disposals)	2022 Revenue Underlying	2021 Revenue As reported	2021 Revenue Currency	2021 Revenue Acquisitions/ (disposals)	2021 Revenue Underlying	% change Reported	% change Underlying
Steel	1,496	(34)	1,462	1,172	58	(2)	1,227	28%	19%
Foundry	551	(3)	548	471	12	–	483	17%	13%
Total Group	2,047	(37)	2,010	1,643	70	(2)	1,710	25%	18%

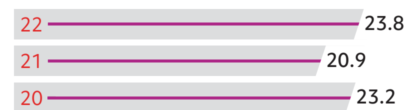
Trading profit

£m	2022 Trading profit As reported	2022 Trading profit Acquisitions/ (disposals)	2022 Trading profit Underlying	2021 Trading profit As reported	2021 Trading profit Currency	2021 Trading profit Acquisitions/ (disposals)	2021 Trading profit Underlying	% change Reported	% change Underlying
Steel	173	(5)	167	102	5	0.2	107	69%	56%
Foundry	54	(1)	54	40	0	–	41	35%	32%
Total Group	227	(6)	221	142	5	0.2	148	60%	50%

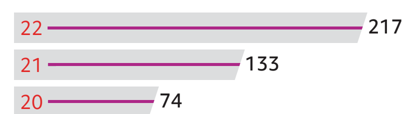
Underlying revenue growth* %
18%



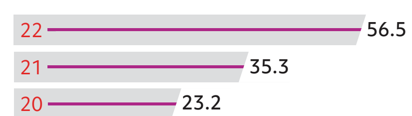
Average working capital to sales* %
23.8%



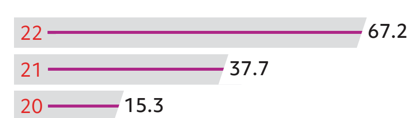
Operating profit £m
£217m



Headline earnings per share* pence
56.5p



Statutory earnings per share pence
67.2p



* For definitions of alternative performance measures, refer to Note 4 of the Group Financial Statements.

Dividend

The Board has recommended a final dividend of 15.75 pence per share to be paid, subject to shareholder approval, on 31 May 2023 to shareholders on the register at 21 April 2023. When added to the 2022 interim dividend of 6.5 pence per share paid on 16 September 2022, this represents a full-year dividend of 22.25 pence per share.

It remains the Board's intention to deliver long-term dividend growth, provided this is supported by underlying earnings, cash flows, capital expenditure requirements and the prevailing market outlook.

Key Performance Indicators

We have identified a number of KPIs against which we have consistently reported. As with prior years, we measure our results on an underlying basis, where we adjust to ensure appropriate comparability between periods, irrespective of currency fluctuations and any business acquisitions and disposals.

This is done by:

- Restating the previous period's results at the same foreign exchange (FX) rates used in the current period
- Removing the results of disposed businesses in both the current and prior years
- Removing the results of acquired businesses in both the current and prior years

Therefore, for 2022, we have:

- Retranslated 2021 results at the FX rates used in calculating the 2022 results
- Removed the results of the refractories business acquired from Universal during 2021

Objective: Deliver growth

KPI: Underlying revenue growth

Reported revenue for 2022 was £2,047m, which equated to £2,010m on an underlying basis. Reported revenue for 2021 was £1,643m, which equated to £1,710m on an underlying basis. 2022 underlying revenue increased by 18% year-on-year. The increase in revenue in Steel and Foundry has mainly been driven by price increases to compensate for cost inflation.

Objective: Generate sustainable profitability and create shareholder value

KPI: Trading profit and Return on Sales

We continue to measure underlying trading profit of the Group as well as trading profit as a percentage of sales, which we refer to as our Return on Sales or RoS.

Trading profit for 2022 was £227m and Return on Sales was 11.1%. On an underlying basis, trading profit increased by 50% and Return on Sales by 240 bps. The increase in trading profit and Return on Sales is primarily due to product mix, price increases and recovery of the 2021 input cost headwind.

The Steel Division recorded Return on Sales of 11.5%, a 270 bps underlying improvement from 2021. Trading profit increased by 56% on an underlying basis, to £173m during the period. Return on Sales in the Foundry Division increased by 140 bps year-on-year on an underlying basis, to 9.9% in 2022. Trading profit was £54m, representing a 32% increase on an underlying basis versus prior year.

Financial review continued

Return on invested capital* %

10.7%

22	10.7
21	7.5
20	4.9

Net debt* £m

£255m

22	255
21	277
20	175

Unutilised committed debt facilities £m

£323m

22	323
21	308
20	247

Total R&D spend** £m

£36m

22	36
21	31
20	28

Net defined benefit pension deficit £m

£56m

22	56
21	77
20	2

* For definitions of alternative performance measures, refer to Note 4 of the Group Financial Statements.

** At constant 2022 currency.

KPI: Headline PBT and headline EPS

Headline profit before tax (PBT) and headline earnings per share (EPS) are used to measure the underlying financial performance of the Group. The main difference between trading profit and PBT is net finance costs which were £11m in 2022, £5m higher than 2021.

Our Headline PBT was £217m, 58% higher than last year on a reported basis. Including amortisation (£10m) our PBT of £207m was 62% higher than last year. Headline EPS from continuing operations at 56.5p was 60% higher than 2021.

KPI: Return on invested capital (ROIC)

The Group has adopted ROIC as its key measure of return from the Group's invested capital. The RONA performance measure has been replaced with ROIC, which provides a more complete measure of Vesuvius' returns. ROIC is calculated as trading profit less amortisation of acquired intangibles plus share of post-tax profit of joint ventures and associates for the previous 12 months after tax, divided by the average (being the average of the opening and closing balance sheet) invested capital (defined as: total assets excluding cash plus non-interest-bearing liabilities), at the average foreign exchange rate for the year.

Our ROIC for 2022 was 10.7% (2021: 7.5%).

Objective: Maintain strong cash generation and an efficient capital structure

KPI: Free cash flow and working capital

Fundamental to ensuring that we have adequate capital to execute our corporate strategy is converting our profits into cash, partly through strict management of our working capital. The Group generated adjusted operating cash flows of £186m, representing a 307% increase versus 2021. This implies a cash conversion rate in 2022 of 82% (2021: 32%). 2022 cash conversion was driven by strong operational performance partially offset by an investment in trade working capital and an investment in capital expenditure of which c.60% is in growth capex. The majority of the growth capex has been invested in expanding Flow Control capacity in our Poland and India plants. Free cash flow from continuing operations was £123m in 2022 (2021: £(0.3)m).

We measure working capital both in terms of actual cash flow movements, and as a percentage of sales revenue. Trade working capital as a percentage of sales in 2022 was 23.8% (2021: 20.9%), measured on a 12-month moving average basis. In absolute terms on a constant currency basis, trade working capital increased by £35m in 2022.

The decrease in inventory on a constant currency basis versus December 2021 (£2m) was offset by increased debtors (£9m) and reduced creditors (£28m).

KPI: Net debt and interest cover

The Group had committed borrowing facilities of £722m as of 31 December 2022 (2021: £706m), of which £323m was undrawn (2021: £308m).

Net debt on 31 December 2022 was £255m, a £22m decrease from 31 December 2021, as significantly higher free cash flow of £123m was offset by a foreign exchange adjustment of £21m, a £58m dividend payment to shareholders, an increase in leases of £11m, ESOP share purchases of £7m and the acquisition of Bayuquan Magnesium Co for £4m.

At the end of 2022, the net debt to EBITDA ratio was 0.9x (2021: 1.4x) and EBITDA to interest was 29.8x (2021: 30.5x). These ratios are monitored regularly to ensure that the Group has sufficient financing available to run the business and fund future growth.

The Group's debt facilities have two financial covenants: the ratios of net debt to EBITDA (maximum 3.25x limit) and EBITDA to interest (minimum 4x limit). Certain adjustments are made to the net debt calculations for bank covenant purposes, the most significant of which is to exclude the impact of IFRS 16.

KPI: R&D Spend

We believe that our market-leading product technology and services deliver fundamental value to our customers and that the primary mechanism to deliver that value is to invest significantly in research and development. In 2022 we spent £36m on R&D activities (2021: £31m at constant 2022 currency), which represents 1.8% of our revenue (2021: 1.8%).

Financial risk factors

The Group undertakes regular risk reviews and, as a minimum, a full risk assessment process twice a year. As in previous years this included input from the Board in both the assessment of risk and the proposed mitigation. We consider the main financial risks faced by the Group as being those posed by a decline in our end-markets, leading to reduced revenue and profit as well as potential customer default. We also monitor carefully the challenges that come from broader financial uncertainty, which could bring lack of liquidity and market volatility. Important but lesser risk exists in interest rate movements, foreign exchange rate movements and cost inflation, but these are not expected to have a material impact on the business after considering the controls we have in place. See Note 25 to the Group Financial Statements.

Our key mitigation of end-market risk is to manage the Group's exposure through balancing our portfolio of businesses geographically and to invest in product innovation. We do so through targeted capital investment in new and growing businesses and a combination of capital and human resource in emerging markets. When considering other financial risks, we mitigate liquidity concerns by financing, using both the bank and private placement markets. The Group also seeks to avoid a concentration of debt maturities in any one period to spread its refinancing risk. The Group's liquidity stood at £494m at 31 December 2022. We define liquidity as undrawn committed debt facilities plus our cash on balance sheet, less the cash in China which is used as collateral against an equivalent loan from Standard Chartered.

Taxation

A key measure of tax performance is the headline effective tax rate (ETR), which is calculated on the income tax associated with headline performance, divided by the headline profit before tax and before the Group's share of post-tax profit of joint ventures. The Group's headline ETR, based on the income tax costs associated with headline performance of £57m (2021: £36m), was 26.5% (2021: 26.4%).

The Group's total income tax costs for the period include a credit within separately reported items of £39m (2021: £16m) which primarily relates to a credit of £38m (2021: £16m) following the recognition of certain deferred tax assets.

A tax charge reflected in the Group Statement of Comprehensive Income in the year amounted to £8m (2021: £13m credit) which primarily comprises a £7m charge (2021: £13m credit) in respect of tax on net actuarial gains and losses on employee benefits, inclusive of the buy-in of the UK pension scheme.

We expect the Group's headline effective tax rate on headline profit before tax and before the share of post-tax profits from joint ventures to be between 27% and 28% in 2023.

Capital expenditure

Capital expenditure in 2022 was £104m (2021: £67m) of which £85m was in the Steel Division (2021: £47m) and £19m in the Foundry Division (2021: £20m). Capital expenditure on revenue-generating customer installation assets, primarily in Steel, was £8m (2021: £6m).

Pensions

The Group has a limited number of historical defined benefit plans located mainly in the UK, USA, Germany and Belgium. The main plans in the UK are closed, and those in the USA largely closed to further benefits accrual. All of the liabilities in the UK were insured following a buy-in agreement with Pension Insurance Corporation plc (PIC) in 2021. This buy-in agreement secured an insurance asset from PIC that matches the remaining pension liabilities of the UK Plan, with the result that the Company no longer bears any investment, longevity, interest rate or inflation risks in respect of the UK Plan.

The Group's net pension liability at 31 December 2022 was £56m (2021 full year: £77m liability). There has been a decrease in the liabilities of German and Belgian plans due to an increase in bond yields.

Corporate activity

On 8 October 2022, the Group acquired Bayuquan Magnesium Co (BMC), a world-class basic monolithic refractory plant in China with revenues of RMB 120 million (c.£14 million) in 2021. BMC has been a long-standing manufacturing partner of Vesuvius Advanced Refractories and in recent years has supplied us with 100% of its production volumes. The acquisition secures strategically valuable basic monolithic volumes at a plant which benefits from very competitive local raw material access. It will support our further development in China, South-East Asia and North Asia.

Operating review

Steel Division

Revenue
£m
£1,496m

Trading profit
£m
£173m

Vesuvius comprises two Divisions, Steel and Foundry. The Steel Division operates as three Business Units, Flow Control, Advanced Refractories and Sensors & Probes.

Changes described are versus 2021 on an underlying basis, excluding the impact of foreign exchange and acquisitions and disposals, unless otherwise noted.

Vesuvius' Steel Division reported revenues of £1,496m in 2022, an increase of 28% compared to 2021 and 19% on an underlying basis, reflecting the benefits of the business acquired from Universal Refractories for the first full year and a particularly strong performance in the key markets of NAFTA, India and South America, where revenue grew by 33%, 31% and 30%, respectively.

These revenue increases were achieved in the context of a declining market. Steel production in the world excluding China and Iran, which accounts for approximately 90% of Vesuvius' sales, declined by 7.0% year-on-year with India the only country among the top-15 global producers to grow year-on-year. Vesuvius also ceased sales to sanctioned customers in Russia in compliance with the sanctions regimes imposed in response to the Ukrainian conflict.

Flow Control significantly outperformed the steel market in all major regions, with overall flat volumes despite the market contraction. In Advanced Refractories, underlying volumes modestly declined, still outperforming the market despite price increases.

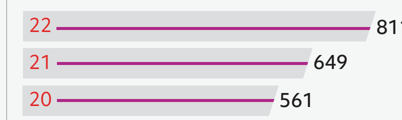
Steel Division trading profit improved 69% to £173m (+56% on an underlying basis), with return on sales expanding 280bps to 11.5%, reflecting excellent recovery of input cost rises, product mix benefits and the margin accretion of the acquisition.

Steel Division	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Flow Control revenue	811	649	25%	20%
Advanced Refractories revenue	645	489	32%	19%
Sensors & Probes revenue	40	34	19%	11%
Total Steel Revenue	**1,496**	1,172	28%	19%
Total Steel Trading Profit	**173**	102	69%	56%
Total Steel Return on Sales	**11.5%**	8.7%	+280bps	+270bps

Crude steel production year-on-year change	2021/2022
China	-2.1%
India	5.5%
NAFTA	-5.5%
South America	-5.2%
EMEA	-11.4%
EMEA ex. Iran	-13.1%
EU 27+UK	-10.8%
World	-4.2%
World ex. China and Iran	-7.0%

Source: World Steel Association.

Revenue
£m
£811m



Pascal Genest
President, Flow Control

Flow Control

The Flow Control Business Unit supplies the global steel industry with consumable ceramic products, systems, robotics, digital services and technical services. These products are used to contain, control and monitor the flow of molten steel in the continuous casting process. The consumable ceramic products that Vesuvius supplies have a short service life (often a matter of a few hours) due to the significant wear caused by the extremely demanding environment in which they are used. Our colleagues work alongside customers in steel plants to ensure that our products are correctly utilised. The quality, reliability and consistency of these products and services and the associated robotic solutions and digital services we provide are therefore critical to the quality of the finished metal being produced and the productivity, profitability and safety of our customers' processes.

In 2022, revenues in the Group's Flow Control business increased by 20% year-on-year to £811m, driven by price increases to recover input costs and market share gains in a declining market.

In EMEA, revenues grew 12% compared to 2021, versus declines in steel production of 11.4%, reflecting significant price increases while volume reduced, still outperforming the market by several percent. Turkey was a stand-out performer in the period, continuing to show very substantial volume growth. In the Americas, underlying revenues grew 34%; this outperformance was driven by growth in volumes in both regions, outperforming steel production declines of 5.5% and 5.2% in NAFTA and South America respectively, as well as pricing. In Asia-Pacific, revenues grew 11%, versus steel production growth of 5.5% in India, and declines of 2.1% and 8.1% in China and South-East Asia, respectively. Our volumes in India grew double-digit and South-East Asia grew c.3%.

Strategic highlights from the year

The focus during 2022 was on commercial excellence, including improving lead times, and on major investments in capacity in our fastest growing regions, for our key product ranges.

At our plant in Skawina, Poland, we are part way through a major expansion programme to increase EMEA capacity in VISO* products by 35% and slide-gates by 100%. The programme spans two years, with key milestones achieved in 2022, and the VISO* presses now operational. At our plant in Kolkata, India, we are increasing capacity in VISO* products by 50%. This will enable us to better serve the fast-growing markets of both India and South-East Asia.

Looking forward

The completion of the expansion project at Skawina will be the key focus this year, and we anticipate that the new slide-gate capacity will be operational by the end of the year. This expansion will support our strategic market objectives. In addition, we are progressing work on additional flux capacity in India, which is expected to become operational in 2024.

We are also continuing our efforts to develop new products with superior sustainability characteristics, to help our customers drive efficiency and reduce their environmental footprint.

Flow Control Revenue	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Americas	321	217	48%	34%
Europe, Middle East & Africa (EMEA)	275	248	11%	12%
Asia-Pacific	214	184	16%	11%
Total Flow Control Revenue	**811**	649	25%	20%

* Trademark of the Vesuvius Group of companies, unregistered or registered in certain countries, used under licence.

Steel Division continued

Revenue
£m

£645m

22	645
21	489
20	459

Revenue
£m

£40m

22	40
21	34
20	26

Davide Guarnieri
Director, Sensors & Probes

Advanced Refractories

The Advanced Refractories Business Unit supplies specialist refractory materials designed to protect the steel-making plant and equipment such as the ladle or tundish from the molten metal. In order to maximise their effectiveness, we offer advanced installation technologies which harness mechatronic solutions, computational fluid dynamics capabilities and lasers. The specialist refractory materials are subject to extreme temperatures, corrosion and abrasion; they are in the form of powder mixes (which are spray-applied or cast onto the vessel to be lined) and refractory shapes (e.g. bricks and other larger precast shapes). The service life of the products that Advanced Refractories supplies can vary (some a matter of hours and others for a period of years) based upon the type of refractory and the level of wear. An integral part of our success depends upon our best-in-class installation technologies which improve the consistency and performance of installed Vesuvius refractories as well as the high level of collaboration with our customers.

Advanced Refractories reported revenues of £645m in 2022, an increase of 19%. Overall, we outperformed the market, with a significant price rise to cover costs, and volumes that were only modestly negative excluding the benefit of the business acquired from Universal Refractories. The business outperformed a market that declined 7.0% overall, regaining some market share lost in 2021 when we prioritised pricing over volume.

Revenues grew 17% in the Americas, with good performance in South America which grew volumes 19%, versus steel production declines of 5.2%. Including the benefit of the business acquired from Universal Refractories (for which this was the first full year of ownership) and other underlying adjustments, revenues in that region grew 48%. In EMEA, revenues grew by 21% during the period reflecting significantly positive pricing, offset by mid-single-digit volume declines, compared to market production declines of 13.1% (EMEA excluding Iran, Source: WSA). In Asia-Pacific, revenues grew 19% driven by double-digit pricing increases and a strong outperformance in India (+13% volume growth).

Strategic highlights from the year

In 2022, we completed a number of key milestones in the integration of the specialty refractory business based in Pennsylvania, USA, which we acquired from Universal Refractories, Inc. in December 2021. This business is focused on tundish (steel continuous casting) applications as well as consumable products for the foundry industry. The acquisition was strategically important, for our core tundish business and expanding our North American presence among electric arc furnace (EAF) steel producers. In the year, we have successfully consolidated certain manufacturing activities into our NAFTA manufacturing footprint, facilitated by an IT system integration, which lays the groundwork for further efficiencies.

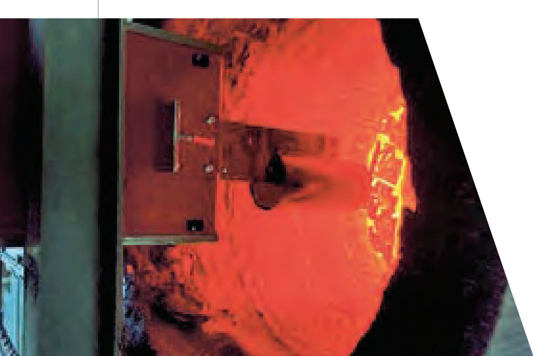
In June 2022, we opened our mechatronic centre of excellence in Ghlin, Belgium, alongside R&D on the same site. The upgrade to our R&D facilities generates economies of scale benefits, increasing collaboration and offers improved proximity to production. The site now regularly welcomes customer groups to see and learn about the benefits our solutions offer, as well as being our centre for the development of these products.

Finally, in October 2022, we acquired Bayuquan Magnesium Co (BMC), a world-class monolithic factory in China. BMC has been a long-standing manufacturing partner for Vesuvius and its acquisition strengthens our supply chain for this strategic product.

Looking forward to 2023

In 2023, we will build on the foundations laid in 2022, to develop our mechatronic technology. This new capability creates the opportunity for a material step-up in customer installations of robotic solutions.

In addition, we will continue the process of integrating the business acquired from Universal Refractories into our NAFTA operations. In R&D, we will increase the focus on delivering new products that improve our customers' environmental footprint.



Advanced Refractories Revenue	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Americas	245	165	48%	17%
Europe, Middle East & Africa (EMEA)	231	188	23%	21%
Asia-Pacific	170	136	25%	19%
Total Advanced Refractories Revenue	645	489	32%	19%

Steel Sensors & Probes

The Steel Sensors & Probes Business Unit offers products to our customers to enable them to make their underlying processes more efficient and reliable. The Business Unit focuses on providing a range of products that enhance the control and monitoring of our customers' production processes, complementing Vesuvius' strong presence and expertise in molten metal engineering. This aims to create new technologies that can be integrated into expert process management systems. By using these technologies, customers can focus on critical parameters within their processes, enabling them to refine their production methods to improve quality, lower production costs and maximise efficiency.

Revenues in Steel Sensors & Probes were £40m in 2022, representing an underlying increase of 11% year-on-year, reflecting a strong performance in the Americas, in particular South America.

Looking forward to 2023

In 2023, we will continue to execute our revenue growth and market share gain strategy, in all regions. Thanks to our manufacturing and commercial footprint, we believe that we are well placed to serve our customers and to seek to expand our sales in Asia, further consolidating our strength in the global marketplace. Finally, we will continue to invest in the development of innovative products to support our customers on their journey towards greener, safer and more profitable steel production.

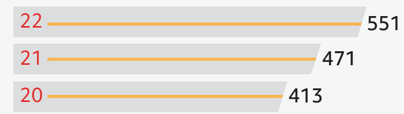
Steel Sensors & Probes Revenue	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Americas	29	23	25%	13%
Europe, Middle East & Africa (EMEA)	11	10	6%	8%
Asia-Pacific	0.4	0.4	(0.2%)	(3%)
Total Steel Sensors & Probes Revenue	40	34	19%	11%

Foundry Division

Revenue
£m
£551m

Trading profit
£m
£54m

Revenue
£m
£551m



Karena Cancilleri
President, Foundry

The Foundry Division is a world leader in the supply of consumable products, technical advice and application support to the global foundry industry to improve the performance and quality of ferrous and non-ferrous castings. Vesuvius operates under the brand Foseco in the foundry market. The foundry process is highly sequential and is critically dependent on consistency of product quality and productivity optimisation. Working alongside customers at their sites, our engineers provide on-site technical expertise in addition to advanced computational fluid dynamics capabilities to develop the best customised solutions. The conditioning of molten metal, the nature of the mould used and, especially, the design of the way metal flows into the mould are key parameters in a foundry, determining both the quality of the finished castings and the labour, energy and metal usage efficiency of the foundry. Vesuvius' products and associated services to foundries improve all of these parameters.

The end-markets for Foundry remained weak, with growth in the Americas, a broadly flat market in Europe and a mixed picture in Asia, with China impacted by declines in the heavy vehicle market.

Vesuvius' Foundry Division reported revenues of £551m in 2022, an increase of 13%. On a reported basis, including some benefit from the business acquired from Universal Refractories, the Foundry Division revenue was up 17%. The increase in sales reflects pricing increases which successfully offset cost inflation. We also achieved market share gains in most core regions and products, the only significant exception being Western Europe where we lost some market share due to priority being given to price increases.

The Foundry Division also achieved meaningful margin recovery, with trading profit growing 32% to £54m, as Return on Sales increased 140bps to 9.9%.

The Foundry Division grew revenues in all major regions. Foundry revenues in the Americas grew 27% year-on-year, driven by a strong commercial performance and market share gains. In EMEA, underlying revenues increased by 16%, with particularly strong revenue growth in Germany, Spain, France and Turkey, driven primarily by price increases to offset inflation, as well as market share gains in Turkey. In Asia-Pacific, our businesses grew in revenue in all major countries except China, reflecting our excellent commercial delivery. Trading profit and return on sales increased substantially, demonstrating our overall strong performance.

Foundry Division	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Foundry revenue	**551**	471	17%	13%
Foundry trading profit	**54**	40	35%	32%
Foundry Return on Sales	**9.9%**	8.6%	+130bps	+140bps

Foundry revenue	2022 (£m)	2021 (£m)	Change (%)	Underlying change (%)
Americas	**145**	100	45%	27%
Europe, Middle East & Africa (EMEA)	**225**	199	13%	16%
Asia-Pacific	**181**	172	5%	3%
Total Foundry Revenue	**551**	471	17%	13%
Total Foundry Trading Profit	**54**	40	35%	32%
Total Foundry Return on Sales	**9.9%**	8.6%	+130bps	+140bps

Strategic highlights from the year

In 2022, the two most significant new product launches were Rotoclene* and Acticote TS*.

Rotoclene* is a revolutionary molten metal treatment technology for steel foundries, which delivers a significant improvement in melt and casting quality, reducing the amount of rework of the casting post its solidification and the associated labour costs. A reduction of the amount of waste also leads to a reduction in the energy consumption and CO_2 footprint of a foundry as it achieves a better ratio of weight of finished castings to metal melted.

Acticote TS* is a coating which enables foundries to produce iron castings with thinner sections than previously achievable. This enables the weight of key automotive components to be reduced, reducing costs for foundries and delivering fuel efficiency benefits for the ultimate end-customers.

We also continue to make significant progress in our strategy of growing in non-ferrous end-markets with the commercial team now largely in place and sales increasing by >30% during the year.

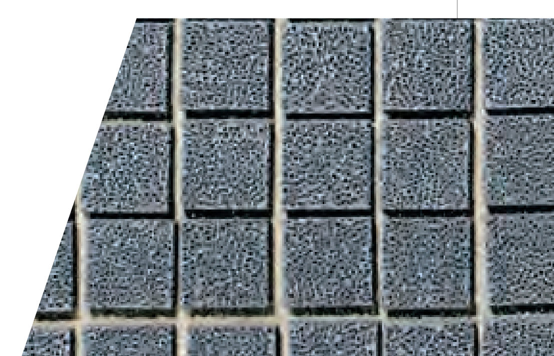
Looking forward to 2023

2023 has the potential to be a record year for new product launches in Foundry with a significant number of products in the final stages of development. These innovative products will support the manufacture of lighter-weight, high-performance components. We are also focusing on developing products for high growth end-markets such as wind turbines and electric vehicles.

Amongst these is Duratek Supermelt*, a next generation clay-graphite crucible which outperforms the competition with superior fracture toughness, high-temperature strength and oxidation resistance to ensure longer life in its use in demanding aluminium melting operations.

We are also developing WASCO*, a water-soluble binder which will enable the use of sand cores for high pressure die casting applications. This is because of its ability to achieve the required strengths in this demanding process whilst being easy to remove from the finished casting. This gives greater design flexibility to foundries, weight saving benefits for the finished casting and reduces downstream processing costs.

We continue to develop value-added ancillary services for our customers such as our crucible management application, which will help our customers more effectively monitor the performance of this critical product in their production process.



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Sustainability

Name: Leandro Cesar
Role: Senior Development Associate
Location: Pittsburgh

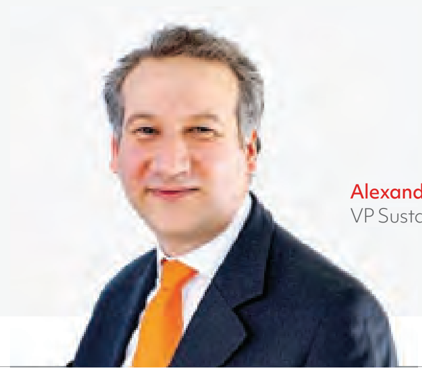
Name: Agnes Hessling
Role: Executive Assistant Foundry Europe
Location: Borken

We're helping our customers reduce their environmental impact

The pressure on industry to reduce greenhouse gas emissions is increasing. We work closely with our customers to develop new products and technologies to meet these challenges, with sustainability being a critical focus in new product development.

Name: Song Li
Role: Senior R&D Engineer
Location: Suzhou

Progress on our Sustainability roadmap



Alexander Laugier-Werth
VP Sustainability, HSE & Quality

Non-financial and Sustainability Information Statement

This Non-Financial and Sustainability Information Statement provides information on the Group's activities and policies in respect of:

Environmental matters Our planet	p57-70
Climate-related reporting TCFD	p54
The Company's employees Our people	p74-80
Social matters Our communities	p81-85
Respect for human rights Our communities	p81
Anti-corruption and anti-bribery matters Our communities	p82

This statement also details, where relevant, the due diligence processes implemented by the Company in pursuance of these policies.

Further information, disclosed in other sections of the Strategic Report is incorporated into this statement by reference including:

Information on the Group's principal risks Details of the Group's principal risks relating to these non-financial and sustainability matters are detailed in the Group's schedule of principal risks and uncertainties.	p32-33
Risk, viability and going concern	p27-31
Details of the Group's business model	p20-21
Details of the Group's non-financial KPIs	p37

The fight against climate change continues to require higher-technology steel and larger, more complex castings. Wind and solar energy production capacity are both considerably more steel-intensive than fossil fuel power stations, and these are both set to grow considerably. Allied to this, the steel-making process is itself decarbonising thanks to efforts to improve the performance of existing assets, and the shift from blast furnaces to electric arc furnaces.

Vesuvius supplies consumable refractory products and engineering solutions that are critical to the performance of metal casting processes. Every day, we help our customers improve the safety, energy efficiency, yield and reliability of their processes, and every day, we work in close partnership with the most advanced steelmakers to develop the refractory products for the green steel-making and casting processes of the future.

Vesuvius' Sustainability strategy, formally launched at the end of 2020, brings together all our environmental, social and governance initiatives into one coordinated programme. The strategy is built on four pillars: our planet, our customers, our people and our communities.

We have set out four key sustainability strategic priorities. Targets for three of these are embedded into our management incentive arrangements.

- Becoming a zero accident company
- Reducing our Scope 1 and Scope 2 CO_2 emissions to reach net zero by 2050 at the latest
- Helping our customers reduce their own CO_2 emissions
- Increasing gender diversity in the Senior Leadership Group and at every level of the Company

We are signatories to the UN Global Compact and report annually on our sustainability activities, commitments and progress. We also prepare a separate Sustainability Report each year, which gives a more in-depth overview of our sustainability activities. This can be accessed via our website: www.vesuvius.com.

We are very proud of our progress to date, as exemplified by the external recognition of the rating agencies. Since 2020, our MSCI ESG rating has progressed from BBB to AA, and our EcoVadis rating from Silver to Gold. In 2022 we submitted our first CDP questionnaire, which received a B grade.

We are committed to transparent and thorough reporting on our sustainability performance. We would welcome any input or feedback to: sustainability@vesuvius.com.

Alexander Laugier-Werth
VP Sustainability, HSE & Quality

Note: Waste and recycling data contained in this report does not include the two sites acquired from Universal Refractories at the end of 2021, nor the site acquired in October 2022 with the acquisition of BMC. The energy and emissions data also doesn't include BMC, whilst the safety data for BMC has been included from the date of acquisition.

Our Sustainability journey

Areas of Sustainability focus

- Reducing Scope 1 and 2 emissions, evaluating Scope 3 emissions with our suppliers
- Determining CO_2 emissions avoided by customers, and creating further action plans to maximise this
- Switching to carbon-free electricity on our sites wherever possible
- Assessing new product developments and technologies based on their safety and environmental benefits
- Supporting education for women in scientific fields
- Increasing gender diversity in the Senior Leadership Group and at every level of the Company
- Increasing employee engagement
- Undertaking environmental impact analysis of capital expenditure; with the internal price of CO_2 emissions reviewed every year
- Seeking ISO 14001 certification of manufacturing sites not already certified
- Undertaking sustainability assessments and audits of suppliers

Our Sustainability journey

	2020	2021	2022
	– Sustainability Charter – Sustainability Council – Vesuvius adheres to the UN Global Compact – Internal Price of Carbon – Supplier assessment programme	– Scope 1 and Scope 2 emissions externally verified – Scope 3 emissions evaluated – Sustainable procurement policy – Sustainability scorecard – First Sustainability Report – TCFD disclosures	– Roadmap to net zero – CDP questionnaire – Sustainability Report GRI aligned
MSCI	BBB	A	AA
ecovadis			
CDP			B

Vesuvius' Environmental Policy

We commit to:

- Minimise direct and indirect CO_2 and other greenhouse gas emissions, by reducing the energy intensity of our business and using cleaner energy sources
- Minimise the consumption of water and other resources
- Reduce waste at source and during production
- Increase the usage of recycled materials and promote the development of the circular economy
- Minimise any pollution or releases of substances which could adversely affect humans or the environment
- Avoid negative impacts on biodiversity

See the full policy on www.vesuvius.com for further details.

Our Sustainability strategy and objectives

Creating a better tomorrow for our planet, our customers, our people and our communities

We create innovative solutions that enable our customers to improve their safety and quality performance, reduce their environmental footprint, become more efficient in their processes, and reduce costs.

We aim to deliver sustainable, profitable growth to provide our shareholders with a superior return on their investment, whilst providing our employees with a safe workplace where they are recognised, developed and properly rewarded.

Our Sustainability initiative embodies this purpose. It sets out the Group's formal objectives and targets for supporting our customers, our employees and our communities, and for protecting our planet for future generations. It is embedded in the Group's overall strategy and informs how we deliver on the Group's execution priorities.

The key objectives and priorities of our Sustainability initiative are outlined here. They were defined following the identification and analysis of the Group's most important and material sustainability risks and opportunities.

Our planet

- To tackle climate change by reducing our CO_2 emissions and helping our customers reduce theirs with our products and services. We are committed to reaching a net zero carbon footprint at the latest by 2050
- To engage in the circular economy by reducing our waste, recovering more of our products after they have been used and increasing the usage of recycled materials

p57

Our customers

- To support our customers' efforts to improve safety on the shop floor, especially exposure to hot metal
- To help customers improve their operational performance and thereby reduce their environmental footprint, and especially their CO_2 emissions

p71

Our people

- To ensure the safety of our people and everyone else who accesses our sites. This is our first priority. We take safety very seriously and are constantly striving to improve
- To offer growth opportunities to all our employees through training and career progression to develop diverse, engaged and high-performing teams

p74

Our communities

- To support the communities in which we operate, with a focus on promoting and supporting women's education in scientific fields
- To ensure ethical business conduct both internally and with our trading partners
- To extend our sustainability commitment to our suppliers and encourage them to progress

p81

Progress on our Sustainability targets

The Board has identified 11 significant non-financial KPIs for the business and its strategy. Two KPIs relate to innovation (Total R&D spend and percentage of new product sales), while the remaining nine cover the Group's main Sustainability objectives.

We have set stretching targets for the Group's sustainability KPIs to reach within set time frames, these are set out in the table below. In view of the progress made, the reduction of Scope 1 and Scope 2 CO_2e emissions target was increased in 2022 from 10% to 20% and its coverage increased from Energy CO_2e to all CO_2e emissions.

KPI	Measure	Target	2022 progress vs plan[1]	2022 progress	Main domain	UN Sustainable Development Goals
Safety	Lost Time Injury Frequency Rate below 1	<1		1.08		3, 8
Energy intensity	By 2025, reduce energy intensity per metric tonne of product packed for shipment (vs 2019)	-10%		-6.0%[1]		9, 13
CO_2e emission intensity	By 2025, reduce Scope 1 and Scope 2 CO_2e emission intensity per metric tonne of product packed for shipment (vs 2019)	-20%		-18.8%[1,2]		9, 12, 13
Wastewater	By 2025, reduce wastewater per metric tonne of product packed for shipment (vs 2019)	-25%		-9.0%		6, 9, 12
Solid waste	By 2025, reduce solid waste (hazardous and sent to landfill) per metric tonne of product packed for shipment (vs 2019)	-25%		-13.8%		9, 12
Recycled material	By 2025, increase the proportion of recycled materials from external sources used in production	7%		6.0%		9, 12
Gender diversity	By 2025, increase female representation in the Senior Leadership Group (approx. 160 top managers)	25%		20%		5
Compliance training	Increase the percentage of targeted staff who complete anti-bribery and corruption training annually	90%		99%		16
Supply chain	By the end of 2023, conduct sustainability assessments of our raw materials suppliers covering at least 50% of Group raw material spend	50%		48%		8, 10, 17

Progress key

Behind plan — On plan — Ahead of schedule — Target achieved

Vesuvius' contribution to the UN Sustainable Development Goals

1. Re-baselined using pre-acquisition data for the business acquired from Universal Refractories, Inc.
2. Does not include fugitive emissions (de minimis).

Task Force on Climate-related Financial Disclosures

The Task Force on Climate-related Financial Disclosures (TCFD) has developed a disclosure framework to help companies improve and increase the understanding of their reporting of climate-related financial information. The climate-related financial disclosures included in this Annual Report are consistent with the TCFD Recommendations and Recommended Disclosures, and have been prepared taking into account the Guidance for all Sectors.

In preparing this TCFD disclosure we considered recent developments in global affairs and macro trends, such as:

- The acceleration of the electric vehicle market growth (and consequently the faster peak and decline of the hybrid vehicles market)
- The energy crisis and price gaps that appeared between regions, and at the same time, the rapid reduction of the cost per installed kWh of renewable energy and associated massive investments plans

We concluded that the underlying assumptions and drivers of our scenario analysis, and the risks and opportunities that we have identified, do not require any significant modification this year.

We are aware of a growing acceptance that the 1.5°C global warming ambition will not be met, which supports the assumption in our scenario plans that the most optimistic scenario is a 2°C increase in global warming.

The table sets out where you can find information on how we have applied each of the recommendations of the TCFD.

Topic		Disclosure summary	Vesuvius disclosure	
Governance	Disclose the organisation's governance around climate-related risks and opportunities.	a Describe the Board's oversight of climate-related risks and opportunities.	*Sustainability: TCFD* *Risk, viability and going concern* *Directors' Remuneration Report*	p55 p27-31 p116-143
		b Describe management's role in assessing and managing climate-related risks and opportunities.	*Sustainability: TCFD* *Risk, viability and going concern*	p55-56 p27-31
Strategy	Disclose the actual and potential impacts of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning where such information is material.	a Describe the climate-related risks and opportunities the organisation has identified over the short, medium and long term.	*Sustainability: Our planet*	p57-60
		b Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy and financial planning.	*Sustainability: Our planet* *Our external environment* *Sustainability: Our customers*	p57-65 p14-15 p71-73
		c Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	*Sustainability: Our planet*	p61-63
Risk management	Disclose how the organisation identifies, assesses and manages climate-related risks.	a Describe the organisation's processes for identifying and assessing climate-related risks.	*Sustainability: Our planet* *Risk, viability and going concern*	p57-60 p27-31
		b Describe the organisation's processes for managing climate-related risks.	*Sustainability: Our planet* *Risk, viability and going concern*	p57-60 p28-29
		c Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organisation's overall risk management.	*Sustainability: Our planet* *Risk, viability and going concern*	p57-60 p27-31
Metrics and targets	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	a Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process.	*Sustainability*	p53
		b Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions, and the related risks.	*Sustainability: Our planet*	p66-68
		c Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.	*Sustainability: Our planet*	p53 and p66-70

Sustainability governance structure

Board oversight

The Board holds overall accountability and oversight for all matters related to sustainability and the management of all risks and opportunities, including the impact of climate change on the Group. In setting the Group's strategy it ensures that sustainability is embedded at the heart of the Group and is reflected in the operational plans of each Business Unit. The Board formally reviews all significant sustainability programmes.

The Board's oversight of the Group's response to climate change is integrated both into its monitoring of the Group's broader sustainability strategy and initiatives, and its approach to significant capital and other investments. The Board formally discusses the Group's Sustainability initiative at least twice per year. It sets the Group's priorities and targets, and reviews the Group's performance and progress against them. It also monitors the Group's external ESG ratings, and in 2022 has focused on the Group's roadmap to net zero.

The Board has undertaken a detailed assessment of the Group's climate-related risks and opportunities, including the Group's physical and transition risks. It has also considered the formulation of the three different climate-related scenarios constructed to assess the potential financial implications of climate change and assessed the impact of climate-related risks and opportunities on the Group's strategy. It is our policy for every capital expenditure above £5m requiring Board approval to include a sustainability assessment, which incorporates climate-related parameters.

The Group's Audit Committee supports the Board in ensuring climate-related issues are integrated into the Group's risk management process and reviewing the Group's TCFD reporting. As the Executive Director with key responsibility for the delivery of the Group's strategy, our Chief Executive, Patrick André, is ultimately responsible for the Sustainability initiative.

The Remuneration Committee supports the Group's Sustainability Initiative and climate change-related objectives, through the alignment of the Group's remuneration strategy. All Business Unit Presidents and each of the regional Business Unit Vice Presidents have a part of their annual incentive compensation tied to performance targets on CO_2 emissions reduction. In addition, the Executive Directors and other members of the Group Executive Committee participate in the Group's Long-Term Incentive Plan, with the vesting of 20% of each award based on three ESG measures, focused on a reduction in the Group's Scope 1 & 2 CO_2 emissions, a reduction in the Lost Time Incident Frequency Rate and an improvement in the gender representation in senior management.

Our Sustainability governance

Chief Executive
Is ultimately responsible for the delivery of the Sustainability initiative

Board
- Holds accountability and oversight for all matters related to sustainability
- Oversees the definition of the Sustainability strategy and initiatives
- Sets the main targets, reviews performance and progress

Audit Committee
- Supports the Board in ensuring climate-related issues are integrated into the Group's risk management process
- Reviews the Group's TCFD Reporting and confirmation of target assessment

Remuneration Committee
- Supports the Sustainability objectives through the alignment of the Group's remuneration strategy

Group Executive Committee
Chief Executive, Chief Financial Officer, General Counsel and Company Secretary, Chief HR Officer, Business Unit Presidents
- Approves Group sustainability-related policies
- Receives reports from the VP Sustainability on the Sustainability initiative
- Is responsible for the progress of the Group against its sustainability objectives

BU Presidents
- Incorporate Group sustainability strategy into their BU strategy
- Communicate targets inside their organisations
- Allocate resources, define and implement plans

Sustainability Council
Group Executive Committee, Vice President Sustainability, Head of Communication and Employee Engagement, Head of Investor Relations, Head of Strategy, Vice Presidents Operations, three Regional Business Unit VPs
- Oversees the Group's sustainability activity
- Monitors progress on metrics and targets
- Assists the Group in assessing the implications of long-term climate-related risks and opportunities, elaborating strategy and setting priorities

VP Sustainability
- Leads the Group's sustainability activities, coordinating the work of the Sustainability Council
- Ensures the Group has a clear set of KPIs and collates data
- Organises Group-wide communication
- Leads external reporting and disclosures

Task Force on Climate-related Financial Disclosures continued

Management oversight

In 2020, with the launch of the Group's new Sustainability initiative, a governance structure was established, comprising a Sustainability Council, supported by the new role of VP Sustainability, and a clear set of KPIs and targets were delineated. The Vesuvius Sustainability Council is chaired by the Chief Executive, and comprises the Group Executive Committee, VP Sustainability, regional Vice Presidents from each Business Unit, Head of Strategy, Head of Communication and Employee Engagement, Head of Investor Relations and Vice Presidents of the Operations.

It meets on a quarterly basis and oversees the Group's sustainability activity, monitors progress against our targets, and assists the Board with identifying and assessing the implications of long-term climate-related risks and opportunities, elaborating sustainability strategy, and setting priorities. The Council reports to the Board twice per year.

The VP Sustainability leads the Group's sustainability activities, coordinating the work of the Sustainability Council including the Group's assessment of climate change risks and opportunities and formulation of climate-related scenarios. He is also responsible for the collation of data to assess the Group's performance against its sustainability targets and KPIs, producing quarterly performance reports, managing Group-wide communications, and leading external reporting and disclosures.

Responsibility for the progress of the Group against its sustainability objectives lies with the Group Executive Committee and, operationally, each Business Unit President. These BU Presidents, along with the Regional BU VPs, ensure the Group sustainability strategy is reflected in each BU's strategy, communicating the sustainability targets inside their organisations and implementing plans – including overseeing resources and capital allocation, and selecting R&D priorities – to achieve these targets and address the climate-related risks and opportunities.

The VP Sustainability is responsible for overseeing reporting on the Group's sustainability matters and metrics. Formal channels for reporting a range of data points are embedded in the organisation. Escalation mechanisms, routine reviews, and internal controls such as auditing and due diligence are in place to ensure transparency, consistency and completeness of information. For certain topics these are supported by independent third-party verification.

Our Sustainability Council and VP Sustainability ensure that we have a clear set of KPIs and targets to track the Group's progress.

Scope 1, 2 and 3 CO_2 and CO_2e emissions

Scope 1 covers emissions from fuels used in our factories and offices, fugitive emissions and non-fuel process emissions.

Scope 2 relates to the indirect emissions resulting from the generation of electricity, heat, steam and hot water we purchase to supply our offices and factories.

Scope 3 includes all other indirect emissions that occur in the Company's value chain.

Vesuvius materiality assessment

Our Sustainability initiative focuses on our most significant sustainability issues and opportunities. These are defined by our ongoing materiality assessment, which identifies and prioritises issues based on two criteria: the impact or likely impact on the achievement of Vesuvius' Strategic Objectives; and the impact or potential impact on Vesuvius' stakeholders and their interests.

Name: Sukanta Rit
Role: Senior Engineer FC M&T
Location: Kolkata

Our planet

Vesuvius recognises the urgency of tackling climate change, the finite nature of most natural resources, and the obligation we have to preserve the environment for future generations. By their very nature, refractory products help our customers to reduce heat loss and the energy consumption of their processes. We are committed to making a strong contribution to the reduction of their greenhouse gas emissions. We also want to grow our engagement in the circular economy by extending the lifetime of our products, recovering and recycling more of our products after they have been used, and increasing the proportion of recycled materials in our recipes. Environmental compliance at our sites, reduction in waste and increased recycling are key to Vesuvius' operations and can be a significant differentiator for our business.

Tackling climate change

We are committed to reducing our environmental footprint by reaching net zero greenhouse gas emissions by 2050 at the latest and helping our customers reduce their emissions through improvements in the efficiency of their operations.

Supporting policy development

Vesuvius supports the Paris Agreement's central aim, to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above pre-industrial levels, and pursuing efforts to limit the temperature increase even further to 1.5°C, via the implementation of its roadmap to net zero.

As the world transitions to a low-carbon global economy, Vesuvius supports the call for policymakers to:

- Build a level global playing field, including carbon border adjustments and robust and predictable carbon pricing for companies. This will strengthen incentives to invest in sustainable technologies and to change behaviours
- Develop the necessary energy production and distribution infrastructure to provide access to abundant and affordable clean energy

Reducing our impact

Vesuvius actively participates in measures to tackle climate change by reducing our CO_2e emissions and use of raw materials, alongside helping our customers reduce their own CO_2 footprint thanks to the use of our products and services. Vesuvius embraces society's expectations for greater transparency around climate change, expressed by initiatives such as the recommendations of the TCFD.

Supporting our customers

According to estimates from the World Steel Association (WSA), on average for 2021, 1.91 metric tonnes of CO_2 were emitted for every tonne of steel produced. The WSA also estimated that the steel industry generates between 7% and 9% of global direct emissions from the use of fossil fuels. The iron and steel industries are taking action to address the decarbonisation challenge. We want to support them and will work in partnership with them to develop more sustainable solutions.

With around 10kg of refractory material required per tonne of steel produced, the careful selection and use of energy-saving refractories can beneficially impact the net emission of CO_2 in the steel manufacturing process. In the foundry process, the amount of metal melted versus the amount sold as finished castings is the critical factor impacting a foundry's environmental efficiency. Vesuvius continuously works with its customers to increase this metal yield.

Climate-change-related risks and opportunities

The actions being taken by governments and societies around the world to mitigate climate-change, and the changes in temperature and weather patterns resulting from it, present both opportunities and risks to Vesuvius. In its broadest context, we believe that the need for climate-change initiatives will create ever greater opportunities for the Group to support our customers – to improve their efficiency and reduce their environmental impact.

Methodology

Each year the Group undertakes a robust assessment of the principal and emerging risks which could have a material impact on the Group. A number of sustainability risks are recorded in this analysis (see the Risk, viability and going concern section on p27-33 of our Annual Report). In line with the recommendations of the TCFD, Vesuvius also undertakes a review of the key climate-related opportunities and risks that we foresee impacting the Group over the short, medium and long term.

The Audit Committee has reviewed and approved our climate-related risk and opportunity register, and considered the significance of climate-related risks in relation to risks identified in the standard risk management process. Climate-related risks are reviewed every six months as part of the Group's standard risk management process, to ensure the register reflects any material changes in the operating environment and business strategy, and to ensure that the management of climate-related risks is integrated into our overall principal risk management framework.

The Business Units use the analysis of risks and opportunities to inform their business development priorities and focus their R&D project portfolios. They factor climate-change risks and opportunities into their business planning processes, assessing the long-term impacts on profitability of both the risks and opportunities.

Physical risks and business continuity

Thanks to significant restructuring efforts carried out since 2017, Vesuvius now operates in a resilient and optimised global footprint. Proximity with customers limits transportation and associated CO_2 emissions, ensures higher flexibility and reactivity, and reduces working capital. Yet, a significant amount of redundancy for most product lines remains, providing backup in case of local disruption and ensuring continuity of supply for our customers.

Tackling climate change continued

Vesuvius operates in 55 manufacturing sites and six R&D centres of excellence located in 26 countries. From time to time our operations can be subject to physical damage driven by weather events, such as severe storms and flooding, water shortages or wildfires, whose frequency and intensity may be exacerbated by climate change. Such events may also impact the manufacturing capabilities of our customers, our tier 1 and lower tier suppliers and our supply chain logistics.

Sites are routinely audited by our insurers and our external risk manager. Their reports are combined with water stress analyses (based on the Aqueduct water risk atlas) covering all our manufacturing sites and R&D centres of excellence, along with our history of events, to create our physical and weather event risks map. This provides a comprehensive analysis of our sites' susceptibility to physical risks arising from climate change.

In 2022, we continued updating our risk map. 24 sites were identified as being high risk for at least one type of weather event (flooding, hailstorm, lightning, storms and tornadoes), and four are located in areas of very high water stress. None of our sites were materially affected by any major weather events in 2022.

We anticipate that the occurrence of adverse weather events will continue to increase, and we therefore manage our business to prepare for them and mitigate their impact when they do occur.

As the Group has restructured and concentrated its manufacturing footprint on a reduced number of locations, our strategy to address short-term risks has transitioned from a focus on redundant capacity to improved prevention and risk management.

Local and product line business continuity plans are maintained by our manufacturing sites and are regularly reviewed. Vesuvius sites maintain and exercise emergency plans to deal with such events as part of their normal risk management and business continuity processes. Exercises and drills are organised covering IT disaster recovery, fire, explosion, weather and geophysical events, and our processes are improved based on the lessons learned.

Climate-related risks and opportunities analysis

Transition risks

We believe that the main climate change transition risks facing the Group relate to:

1. The potential for carbon taxing or emissions rights trading schemes to be introduced or increased, without effective border adjustment mechanisms to accompany them, in Europe and the US, but not uniformly in other regions; and
2. The rapid transition from iron to aluminium for light vehicle castings

An increase in the cost of carbon emissions would affect our manufacturing costs. We are addressing this through our energy efficiency improvement initiatives and conversion to non-fossil fuels wherever possible. Long-lasting energy price increases and significant differences between Europe and other regions would further exacerbate this risk, affecting our customers' manufacturing footprint and our own.

A very rapid transition from iron to aluminium for light vehicle castings would affect our revenue in the iron castings market. We expect this to be compensated for by increased sales for aluminium castings, and growing sales of products for thin-section automotive component iron castings and turbo-charger castings for hybrid vehicles.

Sites with the highest exposure to weather events

Country	Site	Water stress	Flood – water bodies	Flood – precipitation	Hailstorm	Lightning	Wind – tropical storms	Wind – extra tropical storms	Tornado
China	Anshan	○							
	Changshu		●						
Belgium	Ostend							●	
Czech Republic	Trinec		●						
Italy	Muggio				●				
Netherlands	Hengelo		●						
Poland	Skawina		●						
South Africa	Johannesburg				●	●			
United Kingdom	Tamworth		●						
India	Kolkata		●	●			●		
	Mehsana	○							
	Puducherry	○							
	Pune	○							
	Vizag						●	●	
Mexico	Monterrey		●						
	Ramos Arizpe		●						
USA	Champaign				●				●
	Charleston		●						●
	Chicago Heights				●				●
	Conneaut			●		●			●
	Coraopolis		●			●			
	Wampum		●			●			
	Wurtland					●			
Japan	Toyokawa						●	●	
Taiwan	Ping Tung						●		
Brazil	Piedade				●	●			
	Resende		●	●					
	São Paulo				●	●			

Climate-related risks and opportunities analysis

Vesuvius considers the key climate-related opportunities and risks that we foresee impacting the Group over the following short, medium and long-term time horizons.

Short term (2025)

Our current strategic plans operate within this time frame. Most of the intermediate sustainability targets approved by the Board were set with 2025 as a deadline. This horizon encompasses our capital expenditure cycle, allowing time to decide, implement and measure the progress of actions.

Medium term (2035)

This is the most likely horizon for the regulatory frameworks (such as the EU Emissions Trading System and Carbon Border Adjustment Mechanism) currently being defined in many regions to reach their full effect. We anticipate that the major adjustments to customers' footprints and technology investments will be in full swing by then.

Long term (2050)

This deadline has been retained by the United Nations and many policy-making bodies to set decarbonisation goals. Vesuvius is committed to reaching net zero by 2050 at the latest.

The opportunities we have identified are integrated into the Group's business strategy and are being pursued by the relevant BUs. See Our business on p1-33.

Very high (>£25m)	Moderate (£5–10m)
Major (£15–25m)	Minor (£1–5m)
High (£10–15m)	Insignificant (£0–1m)

Opportunities

Opportunity	Description	Impact	Potential annual impact on trading profit in the short, medium and long term: Short term 2025	Medium term 2035	Long term 2050
Products and services					
Ability to diversify business activities	Commercialise refractory solutions for low-CO_2 emitting processes in the production of aluminium to replace carbon-based products	Increased revenue and trading profit	Minor	Minor to moderate	Minor to major
	Commercialise refractory solutions for hydrogen-based Direct Reduction Iron production and steel to replace traditional refractory products		Insignificant	Insignificant to minor	Insignificant to high
Markets					
Access to new markets	Accelerated growth of the wind turbine market	Increased revenue and trading profit	Minor	Minor	Minor to high
	Accelerated growth of the aluminium castings market for electric vehicles and light-weighting		Minor	Minor	Moderate to high
	Accelerated growth of ferrous castings for hybrid vehicles (turbo-chargers) and thin-section castings for internal combustion engines		Insignificant to minor	Insignificant to minor	Insignificant
	Accelerated growth of the high-technology steel segment		Minor	Minor to high	High to very high

Tackling climate change continued

Impact categories (trading profit)

We have assessed our risks and opportunities, and sorted them according to the following classification:

Catastrophic (>£25m)	Moderate (£5–10m)
Major (£15–25m)	Minor (£1–5m)
High (£10–15m)	Insignificant (£0–1m)

Risks

Risks	Description	Impact	Mitigating actions being undertaken	Potential annual impact on trading profit in the short, medium and long term: Short term 2025	Medium term 2035	Long term 2050
Physical risks						
Increased frequency and severity of extreme weather events (heatwaves, rain and river flooding, cyclones, snow)	Physical damage to Vesuvius locations and people Business disruption due to natural disaster	Increased cost due to physical damage Reduced revenue from business interruption	Mitigating actions for severe weather events and the associated risks are included in the business continuity plans of plants, and insurance is purchased	Minor	Minor	Minor
Transition risks – Policy and legal						
Carbon taxing/ emissions rights trading/border adjustment mechanisms introduced or extended	Increase in manufacturing costs	Increased operating costs (main risk in Europe)	Capex to improve energy efficiency and conversion to non-fossil fuels to eliminate CO_2 emissions. Relocation of manufacturing to reflect movements in customer base	Minor	Insignificant to moderate	Insignificant to high
Transition risks – Market						
Rapid growth of aluminium casting processes for light vehicle castings at the expense of traditional ferrous and other non-ferrous processes (due to conversion to electric vehicles)	Shift from castings using a high level of consumables to low consumable processes creates risk of revenue loss for the Foundry Division	Reduced revenue from shrinking market as some traditional castings will disappear or be converted to alternative processes	In ferrous, push to develop sales of feedex and coatings for thin-section automotive components, and products for turbo-charger casting. Invest in R&D, marketing and sales force. In non-ferrous, develop products for HPDC and LPDC processes and increase penetration in markets with lower usage of refractories	Minor	Moderate to high	Moderate to major
Transition from internal combustion engines to electric vehicles will lead to the decline of sand and gravity castings	Reduced volume of aluminium power train components	Reduced revenue from shrinking market of consumables for sand and gravity castings	Adapt product portfolio, focusing on HPDC and LPDC	Minor	Minor to moderate	Moderate
Transition from Blast Furnaces – Blast Oxygen Furnaces converted to Direct Reduction Iron or Electric Arc Furnaces (EAF) for iron and steel making	Share of EAF in total steel production increases	Reduced size of market where Vesuvius is strongest, leading to weaker positions in the steel market	Adjust R&D and product development priorities. Redeploy sales force, focusing on EAF market	Insignificant	Minor to moderate	Minor to moderate

Climate change scenario analysis

Vesuvius has undertaken scenario analysis to seek to quantify the likely impact of climate change on the business and to test the resilience of the Group's strategy to the changes that lie ahead.

We considered three scenarios, modelling the potential financial impact of 2°C, 3°C and 4°C temperature increases on our business.

Best case scenario

In formulating our scenarios, we took as our 'best case' a 2°C scenario. This was based on the premise that despite the tremendous acceleration of public awareness, regulation, technology development and capital allocation in recent years, we doubt that there is sufficient time for the 1.5°C target to be achieved. We therefore identified our most optimistic scenario as 2°C.

Our assumption is that any further acceleration which would allow the planet to get back onto a 1.5°C course would reinforce the main characteristics and accelerate the timeline of our 2°C scenario, without fundamentally changing its features.

From assumptions to strategy

The scenarios take as their starting point the regulatory and macroeconomic assumptions underpinned by the International Energy Agency's WEO 2020 Stated Policies Scenario and Sustainable Development Scenario.

Supplementing this we have identified, for each scenario, the areas of our business in which changes may occur, such as the evolution of end-markets, customer footprint, pace and breadth of technology transition in iron and steel making, pace of conversion from fossil fuels to clean electricity and hydrogen, and evolution of the aluminium market. We then evaluated the potential magnitude of the risks and opportunities in each scenario. We analysed the implications for Vesuvius and considered our strategic response in terms of our manufacturing and our commercial footprint, our portfolio of products and services, the conversion of our manufacturing processes to clean energy and the prospects for our aluminium casting business. With this approach, the impacts on all key areas of the business were covered (sales, R&D, manufacturing and procurement). The outcomes of the scenario analyses have been taken into account in formulating plans for achieving the Group's strategy.

Three long-term scenarios

4°C warming scenario 'Good intentions hampered by fear of economic war'	3°C warming scenario 'Closed doors'	2°C warming scenario 'Global accord'
Incomplete policy and fiscal packages distort competition, slowing down technology development and leading to geographic shifts in steel supply	Regional/national self-interest drives economic policy, competition wins over cooperation, regulatory framework and technologies evolve differently	High cooperation and commitment to limit emissions facilitates technology development and the transition to a low carbon world

Tackling climate change continued

	4°C warming scenario – 'Good intentions hampered by fear of economic war'	3°C warming scenario – 'Closed doors'	2°C warming scenario – 'Global accord'
1 Regulatory and macroeconomic environment	The European Union and United States implement carbon pricing mechanisms (taxation or cap on trade), but no Carbon Border Adjustment Mechanism or Tariffs (or insufficient to prevent the transfer of manufacturing away from these regions)	The European Union and United States implement carbon pricing mechanisms (taxation or cap on trade), and Carbon Border Adjustment Mechanisms or Tariffs to protect their industries from delocalisation	All major economies implement carbon pricing mechanisms. The cost of CO_2 increases in all regions at a comparable pace
2 Conversion of power generation from fossil fuels to clean electricity and hydrogen	– Fast growth of non-CO_2 emitting electricity sources (nuclear and renewable) in Europe – The cost of fossil fuels increases significantly in Europe – Energy prices differ greatly between Europe and the rest of the world over a long period of time – Coal reduces progressively, but does not disappear. Natural gas continues to grow outside Europe – Hydrogen does not become available on a wide scale and economically competitive until well after 2040	– Fast growth of non-CO_2 emitting energy sources (nuclear and renewable) in Europe – The cost of fossil fuels increases significantly in Europe. Coal reduces progressively, but does not disappear, natural gas continues to grow outside Europe – Energy prices in Europe and the rest of the world realign progressively – Hydrogen becomes available on a wide scale in the USA and Europe and economically competitive between 2030 and 2040	– Fast growth of non-CO_2 emitting energy sources (nuclear and renewable) in all regions – The cost of fossil fuels increases significantly (taxation), coal as a source of energy disappears, natural gas starts to reduce – Energy prices in Europe and the rest of the world realign progressively – Hydrogen becomes available on a wide scale and economically competitive between 2030 and 2040 – Fast electrification of the automotive industry – Fast growth of hydrogen-fuelled heavy vehicles
3 Technology transition – iron and steel making	– The transition in blast furnaces to clean processes (e.g. Direct Reduction Iron (DRI), hydrogen, Carbon Capture Storage (CCS), Carbon Capture Utilisation Storage (CCUS)) does not happen on a large scale – US steel producers convert blast furnaces to DRI and Electric Arc Furnaces (EAF) to benefit from the low cost and high availability of natural gas	– European iron making transitions to clean processes (e.g. hydrogen, DRI, CCS, CCUS). The speed of the transition is dictated by the availability of green hydrogen in large quantities – Some US blast furnaces are converted to hydrogen, others to DRI & EAF – Chinese steel plants convert to clean iron and steel-making processes, albeit at a slower pace – Little or no transition outside China, the EU and USA	– Fast transition of iron making to clean processes in all regions; blast furnaces are revamped ahead of their normal schedule – European and Chinese integrated steel making grows primarily in hydrogen-based iron production, implementing CCS and CCUS technologies as well – DRI and EAF grows in the US (benefiting from the availability of low cost shale gas) and Europe – Customers also invest to increase the performance of furnaces, including downstream of casting
4 High-technology steel market	High-technology steel market grows at 0.9% per year	High-technology steel market grows at 1.2% per year (light-weighting and material efficiency efforts by downstream industries accelerate shift from lower to higher performance grades)	High-technology steel market grows at 1.6% per year (light-weighting and material efficiency efforts by downstream industries accelerate shift from lower to higher performance grades)
5 Aluminium market	Aluminium market grows at 3% per year, especially High Pressure Die Casting (HPDC) and Low Pressure Die Casting (LPDC) processes	Aluminium market grows at 5% per year (driven by the demand for transportation, construction and packaging) until 2030. Growth of HPDC/LPDC at a higher pace in the US and EU markets. Moderate development of secondary aluminium casting	Aluminium market grows at 7% per year (driven by the demand for transportation, construction and packaging) until 2025. Growth of HPDC/LPDC at a higher pace in the US and EU markets. Rapid development of secondary aluminium casting
Potential financial impact by 2035 (profit before tax)	-£5m to £0m	£5m to £10m	£15m to £20m

Key factors impacting Vesuvius' three climate change scenarios

1 Regulatory and macroeconomic drivers differentiate our scenarios

Firstly, effective border adjustment mechanisms to accompany carbon taxation, or cap and trade systems in regions with ambitious emissions reduction objectives, will greatly support the implementation of technologies required to decarbonise steel making (including the development of hydrogen as the reducing agent). Conversely, the absence or ineffective implementation of border adjustments would lead to significant delocalisation of the steel industry and a displacement of CO_2 emissions to other countries rather than a significant reduction on a worldwide scale. The energy crisis which started in late 2021 and is particularly acute in Europe, has resulted in additional costs and loss of competitiveness for the European steel industry. In the short term, this was addressed by the temporary stoppage of steel plants. If the energy cost gap with other regions remains over a number of years, this could result in the permanent closure of steel plants and delocalisation of production to other regions. This shift in our customer footprint would lead to the need to adapt our own manufacturing footprint.

Secondly, public policy will significantly affect the relative cost and availability of non-CO_2 emitting energy sources vs fossil fuels and their associated infrastructures. These will greatly influence the pace of deployment of various technologies and industries (electric vehicles, carbon-free hydrogen, decarbonised steel making). Infrastructure, construction and other downstream markets will also be incentivised to reduce steel consumption, accelerating the shift towards high-technology steel. Rising energy costs as experienced since the end of 2021 will positively affect the growth rate of investment in renewable energies and penetration of electric vehicles in the automotive markets.

Finally, the level of international cooperation to encourage and support less developed economies to engage in the technology transition will also affect our customer manufacturing footprint.

2 The future of steel

All three scenarios assume that the strong connection between world GDP and world steel output will continue, supported by urbanisation and rising living standards, as there is no significant substitute for steel. The fight against climate change is expected to have a far-reaching impact on many different industries translating into the accelerated growth of the high-technology steel segment in which Vesuvius has a key presence. For example, solar and wind power plants, where investment is growing fast, are far more steel intensive per kWh of installed capacity than their fossil fuel equivalents. Likewise, hydrogen transportation, another area of rapid growth, also requires considerable amounts of special grades of steel for new pipelines and ships.

3 Technology transition

Our scenarios consider the pace and extent of the technology transition in iron and steel making. The Blast Furnace – Basic Oxygen Furnace (BF-BOF) route for steel making is significantly more CO_2 intensive than the Electric Arc Furnace (EAF) route. However, EAFs cannot currently be used to produce all higher quality steel grades and they rely on the availability of scrap steel (itself a function of the level of economic development). Going forward, quality levels produced by EAFs will continue to improve.

Various technologies to decarbonise the BF-BOF route are being developed, including solutions which seek to capture the carbon as it is emitted and either store it or use the carbon in other processes. Alternatively the BF-BOF route may be replaced by a combination of DRI and EAF.

Hydrogen-based DRI associated with EAFs has the potential to be nearly carbon-free if carbon-free electricity and hydrogen are available. We anticipate that there will be a gradual reduction in steel production via the BF-BOF route and growth in the EAF route. The extent and pace of this change will depend on technologies coming to maturity, the availability of infrastructure (carbon-free electricity and hydrogen), and regulatory frameworks.

Conclusion on strategic resilience

Sustainability has always been at the heart of Vesuvius' business and the Group's analysis concludes that the opportunities for the Group manifested by the global pressure to mitigate climate change outweigh the risks. Our technology helps our customers improve their process efficiency and their environmental footprint.

We estimate the financial impact of the opportunities and risks on the Group will be most adverse under a 4°C scenario and most positive under a 2°C scenario. Under all three scenarios, we expect to benefit from the continuing growth in the production of steel in line with GDP, along with the accelerating shift towards higher performance iron and steel castings, as we support customers to maximise the efficiency and quality of their production. With our technological expertise, strong customer relationships and broad manufacturing footprint, we expect to play a key role in supporting our customers' efforts to decarbonise their operations.

We also believe there is a low downside for Vesuvius in all three scenarios as approximately 75% of our business in steel is in the steel casting part of the operation which, as a stand-alone process, is low CO_2 emitting (1% to 3% of a steel plant's CO_2 emissions), and which we do not expect to be affected by technology shifts that the decarbonisation of iron and steel making will require.

Whilst the electrification of light vehicles and ongoing light-weighting efforts are expected to translate into a shrinking of the market for certain iron castings, it is anticipated that this will be more than compensated for by the growth in other markets such as wind turbines and aluminium castings.

We do not anticipate that climate change will lead to any significant changes in our access to capital or require the impairment of assets on a material scale.

Tackling climate change continued

Roadmap to net zero

We have set intermediate targets in our journey to reach net zero CO_2e emissions by 2050 (Scope 1 and Scope 2), in line with the Paris Agreement and the UK's commitment in the Climate Change Act 2008 (2050 Target Amendment) Order 2019. These emissions encompass the seven GHGs listed by the Intergovernmental Panel on Climate Change in the Kyoto Protocol (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3).

Our preferred metrics to monitor progress with our journey to net zero are energy and CO_2e emission intensity (energy consumption and CO_2e emissions per tonne of product packed for shipment). These reflect the progress made in our operations better than absolute metrics. Managing this energy intensity not only has environmental benefits but it is also part of our long-term strategy to enhance our cost competitiveness.

Our Targets

- 10% improvement in the Group's energy intensity between 2019 and 2025
- 20% reduction in CO_2e emission intensity normalised per metric tonne of product packed for shipment (Scope 1 and Scope 2) by 2025 (vs 2019 baseline)
- 100% carbon-free electricity by 2030
- A reduction in total Scope 1 and Scope 2 CO_2e emission intensity of 50% by 2035 (vs 2019 baseline)
- Zero Scope 1 and Scope 2 emissions by 2050

Our targets cover 100% of Vesuvius' operations and are to be achieved without the use of any offsets (or only to address residual emissions). They are aligned with the Science Based Targets initiative (SBTi) requirements for a well below 2°C global warming scenario.

The Group Energy CO_2e emissions reduction targets have been cascaded to all Business Units, which have built action plans accordingly. Portions of the Group Executive Committee's Long-Term Incentive Plan and senior management annual variable compensation are linked to the achievement of CO_2 emissions reduction targets.

Our Plan

Our roadmap to net zero is based on five key areas of focus:

- Modernising and upgrading installed equipment to reduce our energy consumption
- Investing to renew equipment to the best available technologies and converting to less CO_2 intensive energy sources
- When possible, replacing high CO_2e emission electricity (generated from coal) with greener electricity or other sources of energy
- Reducing our energy wastage, recovering heat to feed processes and hot water
- Generating clean energy

It is estimated that we will need to invest c.£60m of incremental capital expenditure between 2023 and 2035 to support our roadmap.

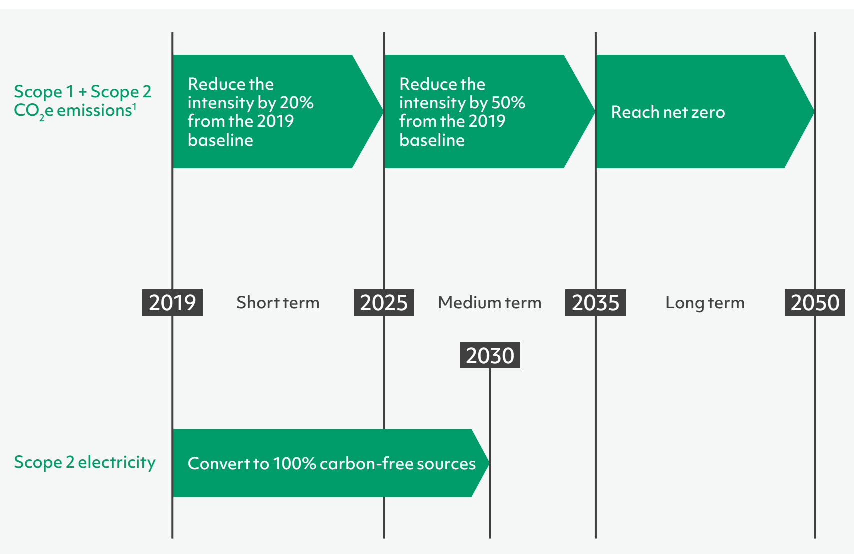
Some significant assumptions underpin our net zero plan, including:

- The availability of the necessary technologies, at an affordable level and at a scale appropriate for our industry, especially for the firing of refractory ceramics and carbon capture
- The development of additional production capacity and distribution infrastructure for renewable energy and hydrogen, and their cost competitiveness
- Adequate policy support to foster innovation and ensure the cost of CO_2 emissions will increase the attractiveness of carbon-free processes
- No significant change to our business model and product portfolio

The achievement of our CO_2e emissions targets will also be sensitive to:

- The growth of revenue, organically, and from acquisitions and divestitures
- Product mix evolution (especially driven by dolime volume, which is the most CO_2 intensive product line)
- Macroeconomic conditions and the capex cycle impacting plant loading (and thereby the energy efficiency of continuous processes)

Our journey to net zero



1. Re-baselined using pre-acquisition data for the business acquired from Universal Refractories.

Our Progress – Key Group initiatives for energy conservation and for increasing energy efficiency

Since 2019, we have undertaken a number of major projects to significantly reduce the Scope 1 CO_2 emissions of the Group by addressing some of its most CO_2e intensive installations. We closed the Skawina brick plant, eliminated dirty coke oven gas as a fuel in Wuhan, replacing it with a new natural gas-fired tunnel kiln, transferred the Tyler plant activity to Monterrey, and replaced the burner system of the Olifantsfontein rotary kiln. We also took advantage of the closure of our Chinese plant at Kuatang and the relocation of its activity to replace all drying ovens and kilns with new ones, with an energy efficiency improvement target of 20%.

In 2021, new capital expenditure worth circa £1.7m dedicated to 25 incremental improvement projects, which had energy efficiency and CO_2 emissions reduction as one of their prime objectives, was approved. Nine sites converted to carbon-free electricity contracts, taking the total number to 12, representing 20% of our manufacturing sites and R&D centres of excellence. We also inaugurated solar panel installation in our plant in Igorre, so by the end of 2021, four sites were equipped with renewable energy installations, and one had invested in a combined heat and power installation.

Progress in 2022

1 Carbon-free energy sources

The Group supports the transition towards renewable energy sources and cleaner carbon-free technology when possible. Our energy strategy includes an ongoing effort to convert to carbon-free electricity contracts whenever practical and economically manageable, invest in solar panels, and the conversion of processes to electricity as soon as the technology is cost-effective.

In 2022, 20 sites converted to carbon-free electricity contracts, taking the total number to 32, representing 52% of our manufacturing sites and R&D centres of excellence.

In 2022, 58% of the grid electricity consumed in our sites was generated from renewable sources, and 68% using processes that did not emit CO_2.

During 2022, we also inaugurated solar panel installations in eight new plants, taking the total number of manufacturing sites and R&D centres of excellence equipped with renewable energy installations to 11. We have a further 26 sites investigating solar panel projects.

2 Capital commitments and internal CO_2 pricing

We include an environmental impact analysis in the evaluation of each of our capital expenditure projects as these are the key decisions that drive long-term future sustainability performance, and CO_2 emissions in particular.

Our Environmental policy, which is the responsibility of the Chief Executive and the Group Executive Committee, covers all our operations and states that all our investment decisions will include an analysis of their environmental impact. An internal price for CO_2 emissions (Scope 1 and Scope 2) is included in the calculation of payback for all investments reaching the threshold for approval by the BU Presidents or Chief Executive.

Vesuvius views this shadow pricing mechanism as a key tool to ensure that the environmental impact of long-term investment decisions is understood. It seeks to ensure that the best available technology is adopted, even in locations where no external cost for carbon is in place or foreseen.

The internal price of CO_2 was initially set at €30 per tonne of CO_2 in 2020. This price is reviewed annually and is applicable across all Business Units and all regions. It has been set at €90 per tonne of CO_2 for 2023.

3 Improving our energy efficiency

We endeavour to use the best available technologies to reduce CO_2 emissions in all our major capital expenditure projects.

We have undertaken a Group-wide programme of energy efficiency and established formal efficiency programmes in all Business Units and regions. These include projects to upgrade or retrofit equipment to improve energy efficiency and reduce CO_2 emissions, such as the introduction of new refractory furniture and installation of heat recovery systems in ovens and kilns, upgrades of compressors, replacement of light sources with LED lights, solar panel installation and the purchase of electric forklift trucks.

In 2022, the Board approved major capacity expansion capital expenditure projects totalling more than £20m. Available technologies and their impacts in terms of energy efficiency and CO_2e emissions were systematically considered for these projects, and the most efficient technologies for the purpose selected. In addition, new capital expenditure worth c.£5.6m dedicated to 166 projects with energy efficiency and CO_2 emissions reduction as one of their prime objectives, was approved in 2022.

Next steps to achieve our Net Zero Plan

Various projects are being studied that will help us deliver our short-term (2025) targets on the road to net zero, including: the installation of further solar panels, retrofitting of ovens and kilns, replacement of older and less efficient units, burner setting optimisation and loading and cycle optimisation.

In the medium term (2035), we anticipate that further emissions reduction will be possible through upgrades to our ovens and kilns, and possibly the use of a combination of natural gas and renewable energy such as carbon-free hydrogen to fire refractory materials. We estimate the incremental capital commitment required by our decarbonisation roadmap until 2035 will be approximately £60m (approx. £5m per year). We do not expect the useful economic lives of our existing assets to be materially affected by our plans until 2035. Precise capital expenditure project lists have been defined for the 2025 horizon. We will continue using the internal price of carbon to assess the relative benefit and prioritise projects.

We also anticipate evolutions in our product portfolio towards less energy-intensive products (such as resin-bonded and unshaped refractories) to continue.

In the longer term (2050), various technologies are promising candidates for the near zero emissions curing and firing of refractory products (electricity, carbon-free hydrogen, synthetic gas, biomass). We currently foresee that carbon capture solutions will be available for our industrial application during the 2035-2050 period.

We are progressively adapting our product and process R&D programmes to explore such opportunities.

Tackling climate change continued

Our energy consumption and Scope 1 and Scope 2 CO_2e emissions

While Vesuvius' products differ significantly in the energy intensity of their manufacture, most of our manufacturing processes are not energy intensive nor do they produce significant quantities of waste and emissions. Dolime production, which uses coal to calcine dolomite, is our major emitter of CO_2. Dolime and the next six of our 32 main manufacturing processes account for 73% of our energy consumption and 79% of our location-based CO_2e emissions. These continue to be a clear focus for our investment to reduce CO_2e emissions.

Between 2019 and 2022 the Group achieved an overall reduction in energy intensity (normalised to per metric tonne of product packed for shipment) of 6% vs a target of 10% by 2025. Progress in 2022 was adversely affected by lower volumes, resulting in lower fill rates for continuous processes and lower energy efficiency.

During the same period, our CO_2e emission intensity metric (CO_2e emissions per metric tonne of product packed for shipment, Scope 1 and Scope 2, market-based) progressed by 18.8%, vs a target of 20% by 2025. This includes a 21% reduction in Energy CO_2e intensity and an 11% reduction in Process CO_2e intensity per metric tonne of product packed for shipment.*

* Re-baselined using pre-acquisition data for the business acquired from Universal Refractories.

Scope 1 covers emissions from fuels used in our factories and offices, fugitive emissions and non-fuel process emissions.

Scope 2 relates to the indirect emissions resulting from the generation of electricity, heat, steam and hot water we purchase to supply our offices and factories.

The conversion by many of our sites to carbon-free electricity contracts has helped our CO_2e emissions reduce at a faster pace than our energy efficiency improvements.

Vesuvius' 2022 total energy costs of £56.4m are c.2.8% of revenue. South Africa is the only country where we exceed the threshold to be submitted to a Carbon Tax or an Emissions Trading Scheme. The Carbon Tax cost in 2022 was c.£0.2m.

Scope 1, Scope 2 and Scope 3 emissions (market-based)

In 2022, Vesuvius' total Scope 1, Scope 2 and Scope 3 CO_2e emissions were 1,831,451 metric tonnes. This represented 895 metric tonnes per million £ revenue.

	2022		2021		2020		2019	
Metric tonnes CO_2e	Metric tonnes	%	Metric tonnes	%	Metric tonnes	%	Metric tonnes	%
Scope 1 Process CO_2e emissions	**91,276**	**5.0%**	101,121	5.4%	88,516	5.9%	106,737	6.0%
Scope 1 Energy CO_2e emissions[1]	**193,603**	**10.6%**	209,592	11.2%	183,741	12.2%	215,836	12.0%
Scope 1 CO_2e emissions	**284,879**	**15.6%**	310,713	16.6%	272,257	18.0%	322,573	18.0%
Scope 2 CO_2e emissions (market-based)	**56,517**	**3.1%**	82,519	4.4%	92,145	6.1%	106,681	5.9%
Scope 3 CO_2e emissions	**1,490,055**	**81.4%**	1,483,438	79.0%	1,147,557	75.9%	1,363,709	76.1%
Total	**1,831,451**	**100%**	1,876,670	100%	1,511,959	100%	1,792,963	100%

Notes:

1. Includes fugitive emissions.

Note: The numbers are collated from entities within the Group's Operational Control Boundary.

Vesuvius plc long-term energy consumption and energy intensity (aggregate of Scope 1 and Scope 2)

	2022[1]	2021	2020	2019	2018
Total energy consumption (million kWh)	**1,084**	1,159	1,026	1,176	1,339
Energy consumption per metric tonne of product packed for shipment (kWh/MT)	**1,207**	1,177	1,243	1,293	1,294

Notes:

1. 2022 includes the business of Universal Refractories, Inc but excludes BMC.

Note: The numbers are collated from entities within the Group's Operational Control Boundary.

Fuel consumption, emissions and normalised emissions for the main fuels consumed across the Group (location-based (Operational Control Boundary) statutory reporting)

In 2022, the Group's normalised energy consumption increased by 2.6% to 1,207kWh per metric tonne (2021: 1,177). Location-based emissions increased by 2.1% to 0.428 metric tonnes CO_2e per metric tonne product packed for shipment (2021: 0.419) and market-based emissions increased by 4.8% to 0.38 metric tonnes CO_2e per metric tonne product packed for shipment (2021: 0.40).

A significant reduction in CO_2e resulted from reductions in the production of dolime. The remaining decreases were primarily driven by changes in production volumes and product mix. Natural gas use decreased by 6%, electricity consumption by 3% and coal (a CO_2 intensive fuel) consumption by 10%, to 27.2 thousand metric tonnes (2021: 30.3).

During 2022, the Group also consumed 292 cubic metres of diesel (-17% on 2021: 352) primarily in the operation of forklift trucks on its sites and 165 cubic metres of fuel oil, an increase of 5% (2021: 157). In total 457 cubic metres of oil was used as fuel in 2022 (-10% on 2021: 508).

Greenhouse Gas (GHG) reporting

We have reported to the extent reasonably practicable on all the emission sources required under Part 7 of the Accounting Regulations which fall within our Group Financial Statements.

Statutory reporting is location-based according to the GHG Protocol.

In reporting GHG emissions, we have used the GHG Protocol Corporate Accounting and Reporting Standard (revised edition) methodology to identify our location-based GHG inventory of Scope 1 (direct) and Scope 2 (indirect) CO_2e. We report in metric tonnes of CO_2 equivalent (CO_2e). We have used emission factors from the UK Government's (DBEIS) and the IEA GHG Conversion Factors for Company Reporting 2022 in the calculation of our GHG emissions.

Our energy-related greenhouse gas (GHG) emissions, reported as carbon dioxide equivalents (CO_2e), include direct emissions of the three main GHGs (carbon dioxide (CO_2), methane (CH_4) and nitrous oxide N_2O).

Process related emissions of the following in CO_2 equivalent and in metric tonnes are not significant:

- Direct methane CH_4 emissions
- Direct nitrous oxide N_2O emissions

Emissions of the following in CO_2 equivalent and in metric tonnes are not significant:

- Direct sulphur hexafluoride (SF_6) emissions
- Direct HFC emissions
- Direct PFC emissions

The Group also meets all its obligations in relation to the Producer Responsibility Packaging Waste regulations and the Energy Saving Opportunity Scheme by which the UK implemented the EU Energy Efficiency Directive.

All sites report their energy consumption and GHG emissions on a quarterly basis. Performance and variation are analysed, and improvement plans built accordingly.

Our energy and Scope 1 and Scope 2 GHG data covers 100% of Vesuvius' operations including the business acquired from Universal Refractories, Inc and joint ventures, but excluding, for 2022, BMC (acquired late in 2022) and, for 2019 and earlier, the management joint venture with Anshan Angang Refractories which was outside of the operational control boundary.

2019 was selected as the baseline for all energy and GHG emissions data and targets, absolute and relative, as this was the last year of normal trading prior to the COVID-19 pandemic. Progress is measured against the 2019 performance.

In 2022, two new sites acquired with the business acquired from Universal Refractories in December 2021, were included. 2019 to 2021 figures were restated to include estimated energy consumption and GHG emissions of these two facilities.

Global GHG emissions and energy consumption Location-based statutory reporting (Operational Control Boundary)

Emissions and energy sources	UK and Offshore CO_2e '000 metric tonnes 2022	Global CO_2e '000 metric tonnes 2022	Proportion relating to the UK and Offshore Area	UK and Offshore CO_2e '000 metric tonnes 2021	Global CO_2e '000 metric tonnes 2021	Proportion relating to the UK and Offshore Area	UK and Offshore energy used '000 kWh 2022	Global energy used '000 kWh 2022	Proportion relating to the UK and Offshore Area	UK and Offshore energy used '000 kWh 2021	Global energy used '000 kWh 2021	Proportion relating to the UK and Offshore Area
Combustion of fuel and operation of facilities including fugitive emissions (Scope 1)	**2.268**	**285**	**0.8%**	2.433	311	0.8%	**11,839**	**877,757**	**1.3%**	12,688	949,036	1.3%
Electricity, heat, steam and cooling purchased for own use (Scope 2)	**0.608**	**99**	**0.6%**	0.556	102	0.5%	**2,740**	**205,859**	**1.3%**	2,503	210,415	1.2%
Total GHG emissions and energy	**2.876**	**384**	**0.7%**	2.989	413	0.7%	**14,578**	**1,083,616**	**1.3%**	15,191	1,159,451	1.3%
Change	**-3.8%**	**-7.0%**					**-4.0%**	**-6.5%**				

	Metric tonnes CO_2e per metric tonne of product packed for shipment				kWh of energy per metric tonne of product packed for shipment			
Vesuvius' chosen intensity measurement (location-based statutory reporting)	**UK and Offshore 2022**	**Global 2022**	UK and Offshore 2021	Global 2021	**UK and Offshore 2022**	**Global 2022**	UK and Offshore 2021	Global 2021
Emissions and energy reported above normalised to metric tonnes CO_2e per metric tonne of product packed for shipment	**4.173**	**0.428**	3.389	0.419	**21,150**	**1,207**	17,223	1,177
Change	**23.1%**	**2.1%**			**22.8%**	**2.6%**		

	Metric tonnes of CO_2e per £m revenue			
Total GHG emissions as metric tonnes CO_2e per £m revenue (location-based)	**23**	**188**	27	251
Change	**-15.9%**	**-25.4%**		

Tackling climate change continued

Metric tonnes CO_2e	2022 Metric tonnes	2022 %	2021 Metric tonnes	2021 %	2020 Metric tonnes	2020 %	2019 Metric tonnes	2019 %
Purchased goods and services	**1,137,416**	**76.3%**	1,159,810	78.2%	871,993	76.0%	1,039,766	76.2%
Capital goods	**87,043**	**5.8%**	62,004	4.2%	53,736	4.7%	68,461	5.0%
Fuel- and energy-related activities (not included in Scope 1 or 2)	**82,523**	**5.5%**	94,274	6.4%	86,544	7.5%	102,374	7.5%
Upstream transportation and distribution	**51,231**	**3.4%**	48,791	3.3%	30,762	2.7%	31,937	2.3%
Waste generated in operations	**7,926**	**0.5%**	5,833	0.4%	5,660	0.5%	6,312	0.5%
Business travel	**26,810**	**1.8%**	15,488	1.0%	13,574	1.2%	31,373	2.3%
Employee commuting	**20,400**	**1.4%**	20,400	1.4%	20,400	1.8%	20,400	1.5%
Upstream leased assets	**6,375**	**0.4%**	6,375	0.4%	6,375	0.6%	6,375	0.5%
Downstream transportation and distribution	**37,537**	**2.5%**	37,761	2.5%	25,770	2.2%	27,231	2.0%
Processing of sold products	**32,794**	**2.2%**	32,794	2.2%	32,794	2.9%	29,875	2.2%
Total Scope 3 CO_2e emissions	**1,490,055**	**100.0%**	1,483,530	100.0%	1,147,608	100.0%	1,364,104	100.0%

Scope 3 emissions

Vesuvius' Scope 3 CO_2e emissions, mainly upstream, contribute to a greater part of our total CO_2e emissions than our Scope 1 and Scope 2 emissions.

Scope 3 CO_2e emissions for 2019 to 2022 were calculated using the Quantis Scope 3 Evaluator software, in line with the GHG protocol. The evaluation covered 100% of operations.

The categories in the table above represent more than 95% of Vesuvius' total estimated Scope 3 emissions.

We assessed the most relevant and influenceable elements of our Scope 3 emissions, and purchased goods and services represent the largest category. Since 2021, we undertook a more focused evaluation of emissions associated with raw materials using publicly available average CO_2 emissions factors. In addition, we started collecting information on energy source, CO_2 emissions data and reduction plans from our raw materials suppliers as part of our Request for Quotation process. Suppliers representing 26% of the raw material spend have responded to our requests.

In 2022, we focused on the four categories of raw materials that make up approximately half of our Scope 3 emissions from purchased goods and services. We started engaging with our suppliers, supporting them with training and evaluation tools to evaluate their Scope 1 and Scope 2 emissions.

We also started collecting CO_2 emissions data related to transportation from our forwarders in all regions.

In parallel to this, various initiatives have been launched to reduce our Scope 3 CO_2 emissions. A few examples include:

- Returnable packaging solutions being implemented both with suppliers and customers
- Policies aimed at limiting the CO_2 emissions of Company fleet vehicles being deployed in various countries
- The encouragement of commuting to work by bus or other forms of collective transportation services. Vesuvius organises such services for more than 1,000 Vesuvius employees

Vesuvius plc statement of verification

CO2e Reduced Organisation

Scope 1, Scope 2 and Scope 3 carbon footprint reporting and supporting evidence contained herein for the period 1 January 2019 to 31 December 2022 were verified by Carbon Footprint Ltd in accordance with the ISO 14064 Part 3 (2019): Greenhouse Gases: Specification with guidance for the verification and validation of greenhouse gas statements.

A copy of the limited assurance statement can be found on our website: www.vesuvius.com.

Product responsibility – Growing our engagement in the circular economy

The drive to improve the sustainability performance of Vesuvius and the refractory industry's products was initiated many decades ago. Continuous improvements have led to considerable reductions in both the raw materials used and the quantity of product shipped to landfill. As the amount of refractory material consumed per tonne of steel cast levels off, the purpose and value of the use of refractory materials will move from delivering insulation to an even greater emphasis on helping to improve steel quality and process efficiency.

Product durability

Our first, and preferred, strategy to reduce the depletion of resources is the extension of product durability.

We are continuously working to extend the lifetime of our consumable products. Strategies include the development of advanced materials, the design of shapes that allow dual usage of products, and product repair and remanufacture. For mechanisms and equipment, we also offer wear monitoring and maintenance services to our customers to ensure their optimum performance and extend their lifetime.

Product recyclability

At the same time as reducing the quantity of raw materials required for each casting, technical solutions and economic cycles have grown to enable the recycling of refractory materials after usage in the production of iron and steel. Whereas in the early 1970s nearly all refractory materials were disposed of after use, it is estimated that more than half are now recycled. In Europe, as little as 5% of refractory materials now go to landfill.

As part of our product end of life management programme, we are developing various initiatives with customers, such as:

- Recovery and remanufacture of products after usage
- Recovery and recycling of refractory materials after usage
- Various options with regard to mechanisms and equipment, including rental

Recovered and recycled materials

Vesuvius is determined to increase the usage of recovered and recycled materials in its product formulations.

Increasing the share of recovered and recycled materials in product formulations poses multiple challenges, in terms of availability, consistency of quality, competitiveness versus virgin material whose prices fluctuate, regulatory frameworks for the transportation of end-of-life waste materials, and validations to ensure that product performance and reliability remain unaffected.

Recycled material usage

	2022	2021	2020	2019
Amount of recycled materials used in Vesuvius products (metric tonnes)	**66,137**	76,482	57,035	68,373
Amount of recovered materials that are not recycled used in Vesuvius products (metric tonnes)	**0**	0	0	0
Percentage of recycled materials in Vesuvius products from total materials	**6.0%**	6.2%	5.6%	5.9%
Percentage of revenue from products including recycled materials	**23.1%**	24.0%	23.3%	21.1%

All recovered materials undergo some processing before their usage in our products. Therefore, they are all included in the recycled materials category, and the recovered materials category is empty.

Name: Kyle Repine
Role: Senior Lab Technician
Location: Pittsburgh

Reducing consumption

Material waste

The Board has set a target of a 25% reduction of our solid waste (hazardous and sent to landfill) per metric tonne of product packed for shipment by 2025 (vs the 2019 baseline).

Manufacturing sites have started building action plans covering both hazardous and non-hazardous waste to eliminate, reduce and recycle waste. A wide range of actions have been initiated to reduce the amount of waste, such as closed conveyor and dust extraction systems, process improvements to reduce scrap and process waste generation, re-engineering of product recipes to include internally recycled material, and identification of recycling opportunities in other industries for by-products.

In 2022 the ratio of solid waste (hazardous and sent to landfill) per metric tonne of product packed for shipment reduced by 13.8% vs 2019, (2021: reduced by 22.7%). The 2022 performance was notably affected by the disposal of materials that had been damaged during the severe weather event and subsequent flooding that affected our plant in Malaysia in December 2021. A few sites also disposed of waste material that had been accumulated over a long period of time.

Water consumption

We aim to reduce both the amount of fresh water consumed in our manufacturing process and social water consumption. The main area of focus is the reduction of wastewater. Vesuvius works to reduce the consumption of water in its manufacturing operations by recycling and improving water management processes. No salt water or cooling water is abstracted, with no related outflow.

Various technological solutions have been implemented to reduce our water consumption and wastewater. Most noteworthy, investment in wastewater treatment installations have been made in 26 plants. Dry filter installations for particulates removal also allow far lower water consumption than wet scrubbers.

In 2022, our overall freshwater consumption per tonne of product packed for shipment decreased by 19.4% vs our baseline of 2019. As with energy use, normalised consumption of water varies with product mix. This decrease was driven by an evolution in our product mix towards products that require less water in their processing, and actions taken to reduce wastewater (-10.2%).

Five-year evolution of fresh water consumption

	% change 2022/2019	2022	2021	2020	2019	2018
Water in m^3	-20.4%	678,973	745,732	747,439	853,381	896,785
Water in m^3 used per metric tonne of product packed for shipment	-19.4%	0.756	0.757	0.905	0.939	0.866
Water in m^3 used per £ million revenue	-33.8%	330	454	513	499	499

Wastewater

The Board has set a target for the Group to reduce the amount of wastewater per metric tonne of product packed for shipment by 25% by 2025 (vs the 2019 baseline).

Our sites with the highest level of water consumption are equipped with wastewater treatment plants. These represent 43% of all manufacturing sites and R&D centres of excellence. Additionally, many types of activity are routinely undertaken by our sites to control and reduce their water consumption, and we have action plans in place to reduce our wastewater generation globally. Some of the most significant examples include:

- Replacing wet scrubbing systems for particulate removal with dry filter systems
- Optimising container cleaning processes
- Installing high pressure stations to improve the efficiency and speed of tool cleaning
- Optimising production schedules to reduce the need for cleaning between recipes
- The provision of environmental awareness training to employees

Environmental exceedances

Vesuvius is committed to addressing environmental exceedances and complying with local regulations. All exceedances are reported in a central database. Any significant exceedance or environmental incident is reported to the Group Executive Committee.

In 2022, Vesuvius recorded 60 minor environmental incidents. Of these, two related to emissions to air, five to emissions to water and 53 to ground.

Total environmental releases across the Group in 2022 are estimated to have totalled 11 metric tonnes (including 3.2 metric tonnes of water-based materials) and 1.3 m^3 of hydrocarbons, with the balance being solids and powders.

All releases to water and to the ground were fully contained.

Where incidents occur, they are managed via Vesuvius' site environmental response plans and reported through the Vesuvius incident reporting system. We comply with local reporting requirements in respect of such incidents. In Germany, a slightly increased legionella contamination was detected in showers and remedial action taken. An existing earlier action in relation to a disused US property for wastewater exceedances remains open. Two regulatory actions issued in 2021 against Vesuvius in Belgium also remain open; action plans to address them are being implemented. No action was taken by any authority in relation to an environmental incident in 2022 which resulted in financial penalties against Vesuvius. The Group does not operate any mines and consequently the Group generates zero tailings waste.

(Metric tonnes)	% change 2022/2019	2022	2021	2020	2019
Ratio of wastewater per tonne of product packed for shipment	-9.0%	0.263	0.268	0.290	0.289

Supporting our customers' journey to net zero

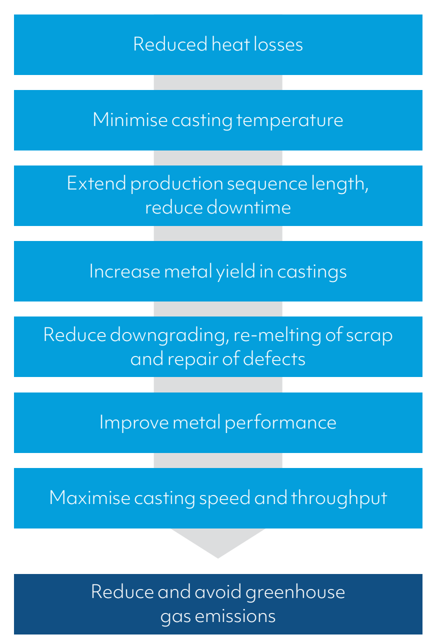
Vesuvius is committed to growing its contribution to a sustainable world, through products and services that improve safety, maximise environmental performance, reduce greenhouse gas emissions, and contribute to the circular economy.

Sustainable solutions

Our products have the potential to help customers reduce and avoid greenhouse gas emissions when compared with their current practices by amounts that far exceed the emissions required to manufacture and distribute them.

We actively cooperate with customers to help them evaluate the CO_2 emissions reduction our products bring to their complete value chain.

Our customers in the iron, steel and aluminium industries are embracing the challenge of dramatically reducing their CO_2 emissions. Many have pledged to reach net zero by 2050. They are investing significantly to transform their manufacturing technologies for the long term, working on a range of initiatives including the direct reduction of iron with carbon-free hydrogen and the replacement of carbon anodes in aluminium smelting. We contribute to their efforts through technology partnerships and developing new products for the next generation zero emissions aluminium, iron and steel making processes.



Product lifecycle assessments/ assessing our portfolio

We have created a comprehensive scorecard to evaluate our products over their full product life cycle (raw materials, manufacturing, transportation, use phase, and end of life). We rate our products in comparison with the standard offering in the market considering their performance in terms of health and safety, environmental impact, greenhouse gas emissions, and end-of-life processing. All criteria are assigned a weighting. In line with our objectives to reduce both our own CO_2 emissions and help our customers reduce their CO_2 emissions, we give these criteria a significantly higher weighting.

Performing this analysis supports our objective to develop and supply products that provide our customers with a superior overall sustainability performance against the market standard.

In 2022, we continued the roll-out of this internal scorecard across our product portfolio and assessed 97% of our consumable products. Of our 2022 sales 17.9% were generated from products with superior sustainability characteristics. Our objective is to continue growing their share of our product portfolio year after year.

Product sustainability benefits scorecard

Improves users' comfort, health and safety	Safety in manufacturing and transportation
	Safety during usage
	Exposure to health hazards
Limits our impact on natural resources	Product weight
	Product lifetime
	Recycled materials
Minimises energy consumption and emissions	Cradle to grave greenhouse gas emissions
	Reduced and avoided CO_2 emissions for the customer
	Volatile compounds emissions
Reduces waste, avoids landfill and increases recycling	Waste generation during manufacturing and usage
	Recyclability after usage

Supporting our customers' journey to net zero continued

Sustainable R&D

Vesuvius invests significantly in new product development, working closely with our customers to offer optimised solutions for their specific needs. We have a unique combination of expertise covering a wide range of fields including metallurgy, refractory ceramics, robotics and mechatronics, and IT. This is combined with close contact with customers through our network of account managers and service teams, and through regular technical and R&D meetings with our key customers to drive innovation.

When designing new products, the Marketing and Technology teams in our six R&D centres of excellence listen to our customers, closely observing their processes to understand their current and future challenges, needs and expectations.

We combine this learning with the information we have collected from our analysis of past issues, and seek to achieve both incremental improvements and breakthrough innovations in safety, robustness, reliability and performance, to steer the development of next-generation products and services.

We have formally integrated sustainability considerations into product R&D. Using the same health and safety, environmental impact, greenhouse gas emissions, and end-of-life processing criteria and scorecard as we use in the assessment of the existing product portfolio, we have begun a complete assessment of the pipeline of R&D and new product development projects, to check that their contribution is aligned with our sustainability ambitions, adjust priorities and allocation of resources, and fine-tune the selection of new projects entering the pipeline. All new product development projects are assessed using these criteria.

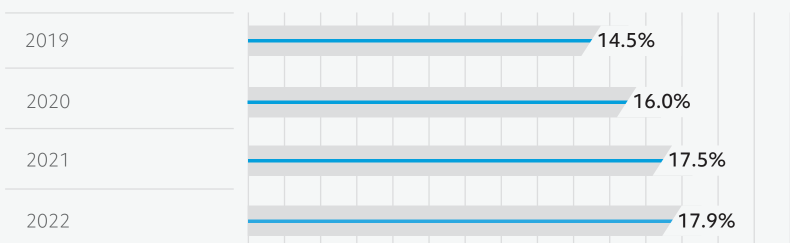
R&D covers a wide range of activities ranging from fundamental research and front-end innovation to the evaluation of alternative material sources and support to operations.

Using our internal product sustainability benefits scorecard we assess whether new products from our R&D have better sustainability characteristics than those already on the market - either from Vesuvius or from our competitors. Where we assess that they do, we consider these to be products with superior sustainability characteristics, which we term 'market-leading sustainable products'.

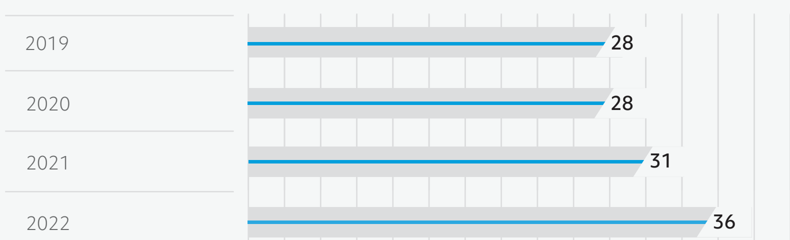
The challenge of decarbonising iron making and aluminium smelting requires the development and industrialisation of radically new technologies. We complement our internal efforts with partnerships with over a dozen research institutions, universities and strategic customers, working to develop the refractory solutions that will support these novel processes. In 2022, the Group spent £8.2m, representing 23% of the Group's central functions and processes R&D spend, on the development of market leading sustainable products (vs £9.7m, 31% in 2022).

Vesuvius' investment in innovation and sustainability

% of sales generated by market-leading sustainable products*



R&D spend (£m)**



* Using Vesuvius' internal scorecard.
** At constant currency.

75%
of new product development projects were dedicated to market-leading sustainable products

Product safety and quality

At the core of our business is the desire to help our customers improve their operational performance and efficiency. Customers rely on the quality of our products, and their structural integrity, to ensure the safety of their employees by controlling the flow of molten metal in their operations.

The reliability and performance of our products are critical to our customers in terms of safety on the shop floor, overall equipment effectiveness, labour productivity and metal yield, and their environmental impact (reducing energy consumption, CO_2 emissions and refractory material waste).

Many of our products allow our customers to achieve improved metallurgical properties in their products, for example, allowing the production of better wind turbine components or the light-weighting of vehicles.

Product safety and quality

New product development

Product safety is paramount to us. We have implemented a wide range of practices to optimise the safety and quality performance of our products in use, reduce failures and increase their lifetime.

We follow a strict stage gate process for the development of new products, ensuring that safety performance objectives are defined from the initial stages and progressively completed up to the product launch. Key deliverables include risk assessments, preparation of user and maintenance documentation, manufacturing control plans, and Vesuvius and customer operator training. We undertake extensive testing through rigorous alpha and beta trials, with systematic trial reports to confirm that targeted performance and robustness objectives are met and to allow for fine-tuning before product launch. Safety data sheets are available for all consumable products.

The development of human-centred robotic solutions for steel shops reduces the ergonomic strain on our customers' operators together with their exposure to high temperatures.

Safety and quality in use – product feedback

Our constant performance monitoring develops deep and lasting relationships with our customers.

After product launch, whenever a safety-related incident (an injury or a dangerous occurrence) occurs at one of our customers that may have involved a Vesuvius product or service, it is systematically reported and investigated. Likewise, all quality and performance issues raised by the Vesuvius field teams or by customers are systematically reported, documented and classified, based on their nature and severity.

Issues and incidents are dealt with through a rigorous problem-solving methodology and in-depth investigation using the 8D practical problem-solving methodology. This ensures we identify root causes, implement corrective actions, and prevent them recurring. The outcome of the investigation, including root causes and corrective actions, is shared with the customer and lessons learned are incorporated into the design of following generations of products.

Our people

We provide our employees with a safe workplace, where they are recognised, developed and properly rewarded.

Health, safety and well-being at work

Safety is our top priority and our overriding commitment to health and safety is embedded throughout the organisation.

Our approach is to identify, eliminate, reduce or control all workplace risks, and an ongoing system of training, assessment and improvement is in place to focus on achieving this. We remain fundamentally committed to protecting the health and safety of employees, contractors, visitors, customers and any other persons affected by our activities.

We want to become a zero-accident company and are striving to become a best-in-class organisation for safety performance and leadership.

Our beliefs

1. Good Health and Safety is Good Business
2. Safety is everybody's responsibility
3. Working safely is a condition of employment
4. All work-related injuries and work-related ill-health are preventable

Health and safety governance

The Board has overall responsibility for health and safety-related matters and delegates authority for the management of the health and safety performance of the business to the Chief Executive. The Health and Safety Policy is signed by all members of the Group Executive Committee and the Business Unit Presidents are responsible for its deployment.

The Board receives monthly information on every Lost Time Injury and key safety performance indicator. In addition, the Board carries out a biannual review of health and safety performance and overall Company safety strategy. Annual presentations of Business Unit strategy also include health and safety strategy. The results of our Group Safety Audits are presented to the Board twice per year.

Group safety audits

The Group operates a central safety auditing team of three auditors, each with more than ten years' experience, who report to the VP Sustainability, HSE & Quality. The team's main purpose is to verify the deployment and ongoing application of the Group's standards and policies in our locations, including our manufacturing sites, R&D facilities and the customer locations in which a significant number of our employees operate daily. Each audit also includes an assessment of the site's HSE leadership. During 2022, the team conducted 65 audits.

Following each audit, action plans are created by the site management teams to address any issues identified and work on completing these is assessed on a regular basis. The observations made during audits have been used to improve the Group's training programmes and to enhance the Group's health and safety standards. The results of the Group HSE audits, as well as the progress of action plans addressing the most critical issues, are reported to the Board twice a year.

Sites are also encouraged to carry out self-assessments, based on the Group safety audit compliance checklist, to monitor their progress.

Safety audits and improvement opportunities

In 2022, 80% (2021: 78%) of our working population performed routine safety audits every month. This generated an average of nine (2021: seven) implemented safety improvement opportunities per person from more than 10,200 (2021: 10,000) employees, resulting in an improvement in worker safety.

The audit programme involves employees at all levels – from the Group Executive Committee and safety specialists, through to local site management, employees and directly supervised contractors.

2022 safety performance

Our Lost Time Injury Frequency Rate (LTIFR) of 1.08 per million hours worked in 2022 was stable vs 2021 (1.06). Excluding third-party contractors and visitors, the LTIFR was 1.08. (Third-party contractors and visitors LTIFR 2022: 1.02.)

Fatalities and severe injuries

Sadly, in 2022, one of our colleagues suffered a fatal injury during a maintenance operation at the site of our joint venture partner in Wuhan, China. We are actively taking steps to learn from this tragedy and improve our systems and procedures to prevent any similar occurrence. Another of our colleagues was killed in a road traffic accident while commuting to work. Vesuvius is providing financial and social support to their families.

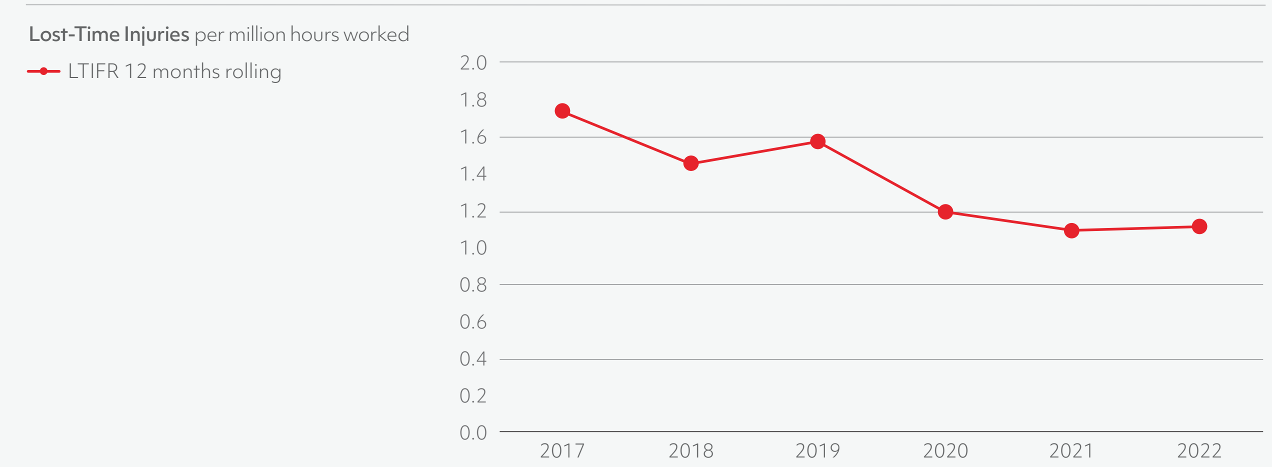
There were also several severe injuries in 2022. One of our colleagues in Brazil lost the tip of a finger in a moving conveyor belt. Another in China suffered some severe burns, from which he has fully recovered, from the explosion of raw materials during the charging of a mixer. The victims of two more injuries required short hospitalisations. Following full root cause analyses of each incident, robust preventative measures were implemented across Vesuvius with changes made to our HSE standards to reduce the risk of recurrences.

Lost time and medically treated injuries

Vesuvius operates a robust and comprehensive process for the timely reporting of incidents. In our internal standards, third-party contractors are included, and we use more stringent definitions for Lost Time Injuries (LTIs) and 'severe accidents' than the definitions used by many regulatory bodies. All sites are required to report on all Medically Treated Injuries (MTIs), to maintain the focus on safety. As an illustration of the precautionary preventative approach taken by Vesuvius in accident investigation, all LTIs and MTIs required a full 8D report.

Whilst 2020-2022 were unusual years because of the COVID-19 pandemic and associated changes in working, we believe that the long-term significant improvements in Lost Time Injury rates reflect a broader trend of underlying improvement for the Group and result from a strong management commitment to change.

Lost-Time injuries



2022 Safety performance

Performance indicators	Employees and directly supervised contractors 2022	Third-party contractors and visitors 2022	All employees, contractors and visitors 2022
Work Related Death	1	0	1
Severe Injuries	6	0	6
Lost Time Injuries (LTI)	29	1	30
LTI Frequency Rate (LTIFR) per million hours	1.08	1.02	1.08
Medically Treated Injuries (MTI)	178	6	184
MTI Frequency Rate (MTIFR) per million hours	6.6	6.1	6.6
Safety Audits (number)	120,307	0	120,307
Safety Audits per 20 employees per month	16	0	16

People and Culture

Our focus on People and Culture strategy aims to build an outstanding business by ensuring we have the individuals, skills and capabilities critical to the delivery of our strategy.

We seek to develop outstanding people. We ensure our people managers have what they need to lead their diverse, engaged and high-performing teams for business and personal growth. These goals are strongly underpinned by a values-driven, winning culture that embraces diversity of thinking and continuous innovation to achieve high levels of performance and growth.

We create this culture by building broad organisational understanding of our strategy, goals and accountability, supported by our CORE Values and positive management behaviours. We seek to foster a working environment that is inclusive and diverse, where people can be themselves without fear of harassment, bullying or discrimination. True to our decentralised business model, each of our Business Units has their own strategic HR agenda supporting delivery of their business strategies.

Our principles and approach

Vesuvius is a geographically and culturally diverse group, employing more than 11,000 people in 40 countries.

Our geographical diversity places us close to our customers around the globe. It also highlights the importance of maintaining and applying strong and consistent values and ethical principles in our worldwide approach to business. Our employees' engagement with our values and culture is vital to our success and the sustainable delivery of the Group's strategy.

Vesuvius has established a framework for explaining and embedding the culture and principles we consider to be fundamental to our success. To do this we communicate openly and transparently within the organisation, through 'town hall' meetings, senior management visits, management feedback, performance evaluation, measuring staff engagement and responding to the feedback we receive. Critically, there is ongoing and consistent communication of our CORE Values and the principles of our Code of Conduct. This is underpinned by engaging staff across the Group in both general and targeted training, to ensure a consistent understanding of our policies and procedures.

This transparency of communication also extends to our stakeholders. We want to increase the knowledge and understanding of our stakeholders, through internal and external reporting, and transparent and meaningful disclosure. Our Sustainability Report is a key part of this.

Our CORE Values

The Group's CORE Values – Courage, Ownership, Respect and Energy – are actively supporting the Group's priorities, encouraging consistent behaviours across the Group to sustain our business success in the future.

These Values, and the behaviours underpinning them, convey the mindset and attitudes we expect each employee to show every day. They are at the heart of the culture of the Group, promoting our image to external stakeholders, and underpinning the commercial promise we provide to our customers.

The Values are reinforced through our performance management systems and are celebrated each year through our Living the Values Awards which select regional and global winners for each Value.

At each of our sites we display CORE Values posters in local languages and use tools such as screen savers as a constant reminder of the behaviours our people display.

Vesuvius' Values

Courage

- I systematically say, decide and do what is right for Vesuvius including when it is difficult, unpopular, or not consensual
- I express my opinions openly during discussions, but I also defend Group decisions once they've been taken, even if they do not correspond to my initial position
- I proactively take leadership responsibility on difficult projects and topics that are important to the Group's performance, motivated by the perspective of success rather than paralysed by the risk of personal failure

Ownership

- I am personally accountable for the consequences of my actions and for the performance of the Group in my area of responsibility or oversight, without blaming external circumstances or the actions of others
- I demonstrate an entrepreneurial spirit, looking for and seizing business opportunities and I immediately address problems that come up as soon as I become aware of them
- I manage the Group's money and resources as though they were my own

Respect

- I demonstrate respect for other people's ideas and opinions even if I disagree with them
- I welcome open debate. I listen to others, foster esteem and fairness with customers, suppliers, co-workers, shareholders and the communities where we operate
- I communicate my objectives clearly and take time to explain all decisions. I behave with the highest level of integrity. I promote diversity at all levels of the Company

Energy

- I work hard and professionally in pursuit of excellence
- I constantly raise the bar and challenge the status quo. For me, the sky is the limit
- I lead by example, inspiring and motivating my team to go the extra mile. I promote a positive and energising work environment.
- I continuously deliver outstanding customer experience and innovative solutions
- I never underestimate competitors and permanently strive to reinforce the Group's leadership position

Code of Conduct

Our Code of Conduct sets out the standards of conduct expected, without exception, of everyone who works for Vesuvius in any of our worldwide operations.

The Code of Conduct emphasises our commitment to ethics and compliance with the law, and covers every aspect of our approach to business, from the way that we engage with customers, employees, the markets and other stakeholders, to the safety of our employees and workplaces.

Everyone within Vesuvius is individually accountable for upholding its requirements. We recognise that lasting business success is measured not only in our financial performance, but in the way we deal with our customers, business associates, employees, investors and local communities.

The Code of Conduct is displayed prominently at all our sites and is published in our 29 major functional languages. It is available to view at: www.vesuvius.com.

We continue to enhance the policies that underpin the principles set out in the Code of Conduct. These assist employees to comply with our ethical standards and the legal requirements of the jurisdictions in which we conduct our business. They also give practical guidance on how this can be achieved.

The Code of Conduct covers eight key areas:

Eight key areas

1. Health, safety and the environment
2. Trading, customers products and services
3. Anti-bribery and corruption
4. Employees and human rights
5. Disclosure and investors
6. Government, society and local communities
7. Conflict of interests
8. Competitors

Diversity - 31 December 2022

	Female	Male	Total	Female	Male
Board	3	5	8	37.5%	62.5%
Group Executive Committee members	2	5	7	29%	71%
Leadership roles reporting to members of the GEC	12	40	52	23%	77%
Directors of Subsidiaries included in consolidation[1]	20	85	105	19%	81%
Senior Managers[2]	**34**	**130**	**164**	**21%**	**79%**
All other employees	1,642	9,328	10,970	15%	85%
Grand total	**1,676**	**9,458**	**11,134**	**15%**	**85%**

1. Of the 105 employees who are directors of Group subsidiaries but not members of the GEC or direct reports of the GEC, 19% are women. This disclosure is made to comply with regulatory requirements. It includes directors of dormant companies. Some individuals hold multiple directorships.
2. Senior Managers as defined for the purposes of Section 414C(8)(c) includes directors of the Company's subsidiaries.

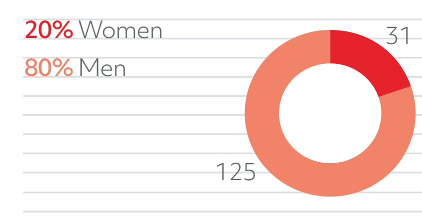
Diversity and inclusion

As an organisation, Vesuvius has a global, multicultural operational and customer base, which we wish to reflect inside our organisation with a multicultural, diverse community of excellent professionals from all backgrounds. This starts by focusing on broad diversity of gender and nationality, with an aim to ensure that all employees and job applicants are given equal opportunity and that our organisation is representative of all sections of society where we operate. Vesuvius operates in 40 countries around the world, employing people with 71 nationalities, making us a truly diverse business. We regard this diversity as a critical aspect of our success and future growth, as it allows us to access the widest range of skills and experience. Each employee is respected and valued and as a result they are all able to give their best. All employees are given help, training and encouragement to develop their full potential and utilise their unique talents.

Overall responsibility for implementing the Group's Diversity and Equality Policy rests with the Executive Directors. The Nomination Committee monitors progress with meeting its objectives. At the end of 2022, the Senior Leadership Group (comprising c.160 senior managers) consisted of 22 nationalities located in 22 countries. 15% of our overall workforce were women, which remained stable versus 2021.

Over the past three years we have made visible progress in gender diversity. Females now represent 20% of our Senior Leadership Group, a level that we consider is still too low, but which represents a significant improvement as compared with the level of 15% in 2019. Our ambition remains to reach 25% women in this tier by the end of 2025. Copies of the Board Diversity Policy and Group Policy on Diversity and Equality are available to view on the Vesuvius website: www.vesuvius.com. Further information on the Group's approach to promoting diversity can be found on p112 and 113.

Senior Leadership Group %



People and Culture continued

2022 Distribution of Vesuvius employees – full-time versus part-time

	Full-time employees	Full-time employees (%)	Part-time employees	Part-time employees (%)
Permanent salaried	4,391	99%	48	1%
Permanent hourly	5,939	100%	12	0%
Total Permanent	**10,330**	**99%**	**60**	**1%**
Temporary salaried	86	97%	3	3%
Temporary hourly	649	99%	6	1%
Total Temporary	**735**	**99%**	**9**	**1%**

Employee engagement

Companies with highly engaged staff deliver better business outcomes. They have lower absenteeism, lower staff turnover, fewer safety incidents, better product quality, and higher productivity, sales and profitability.

At Vesuvius, we regard engagement as critical to our ongoing success and we work hard to listen to our people and act when issues impacting engagement are identified.

Engagement is a collective responsibility, particularly among our management community. We conduct an annual employee engagement survey to measure our employees' attitudes to Vesuvius and their work. The survey generates reports of team responses to the survey. Managers then share the results openly with their teams and, working together, develop action plans to address issues.

The survey has been conducted since 2019 in partnership with Mercer. The results are clustered in eight strategic categories and benchmarked externally against global and manufacturing industry results.

Employee engagement action plans

We focus action plans not on the pure statistics, but on seeking to bring about meaningful change in line with our CORE Values of Courage, Ownership, Respect and Energy. For example, much of the action taken to date has resulted in improved Employee Experience and Safety.

In 2022, thanks to a tremendous effort by local management, supported by an effective communication campaign, we again achieved a very high participation level in our engagement survey with 92% of all employees completing it, the same level of participation as we achieved in 2021.

Following improvements across six of the eight categories of questions in 2021, the overall engagement score increased by 2% in 2022, again showing an upward trend in six out of the eight question categories. For the fourth consecutive year, safety remained our top strength with employees confident in the Company's approach to safety. Other highlights included increases in Employee Experience, Senior Leaders Effectiveness and Survey Follow-Up.

While there was an increase in the belief that action plans from the 2021 survey had a positive impact, it remains an area for improvement.

Internal communications

We continue to develop our internal communications programme, to ensure we have a strong mix of channels to reach our diverse population. The Chief Executive regularly addresses the whole Group via Company-wide email and video, delivering strategic messages, and in 2022 he held 13 interactive virtual sessions with the Senior Leadership Group to share business updates. Company news and announcements are regularly shared on the Group intranet and staff news app, whilst screen savers are used to support major communication campaigns. We also utilise posters and site 'town hall' meetings for on-site communications. Whenever possible, face-to-face communication is conducted at different levels of the organisation providing the necessary opportunities for interactive Q&A sessions with business leaders.

Employee consultation and industrial relations

Vesuvius supports freedom of association and the right to collective bargaining. In all of the countries in which we operate, the Group informs and consults local works councils and trade unions on matters concerning the Vesuvius business as required. These processes and procedures are regulated by local law and generate constructive dialogue between employee representatives and management, which provides benefit to our business. In 2022, 73% of permanent employees were represented by Collective Agreements that include working conditions such as local works councils, trade unions or other bodies.

In addition to local employee representation, the Group has, in the past, operated a European Works Council (EWC) containing representatives from each of the EU countries in which Vesuvius has employees. The existing EWC Agreement terminated in 2020, following notice given by management and the departure of the UK from the European Union. The Group continues to be engaged in the process of negotiating the agreement for the formation of a new EWC with a Special Negotiating Body.

Career management

Talent management

The Group Executive Committee holds direct responsibility for the roles and development of our senior leaders, jointly reviewing capability needs and deciding on succession and cross-organisational moves for the leadership group. This illustrates the strong commitment at the highest level of our organisation to growing the Group using its Company-wide resources.

We employ individuals with an entrepreneurial mindset and an international outlook. Whether they are recent graduates or seasoned professionals, everybody who wants to leave their mark in a dynamic rapidly developing business environment has a chance to succeed. Special attention is paid to building strong, diverse teams that bring different backgrounds and experiences to our daily work.

Leadership pipeline

Strengthening the leadership pipeline and facilitating people development throughout the organisation remain key areas of focus for Vesuvius. We continue to work hard to ensure that we have the right capability in every part of the organisation to drive our strategy and realise market opportunities. As a result, we have built high-calibre leadership teams, many of whom are relatively new to their roles and to Vesuvius. We empower our people to drive the business with an entrepreneurial spirit, and to develop a performance-oriented culture.

We aim to adopt an ideal balance between external hires and internal promotion, fuelled by a strong process of backup and succession planning, especially for management positions. In 2022, only 28% of middle and top management vacancies were filled by internal candidates, reflecting a period of transformation and capability building from external hires. In 2022, the percentage of key leadership roles reporting directly to members of the Group Executive Committee with more than three years of service was 42%.

Training and development

Our leaders take responsibility for managing and developing their teams. They are provided with access to a central resource, offering expertise in Global Rewards and Mobility, Talent and Performance Management, Culture and Learning, and supported by Group-wide processes and information systems.

We encourage and reward high performance, foster talent and aim to create an environment where all can realise their individual potential. To meet the demands of the business and add rigour to our employee value proposition, we have launched training programmes to assist our employees to develop their skills and progress their careers.

Our Learning Management System (LMS) provides a global hub for Vesuvius online training courses. Mandatory training courses are automatically assigned to new joiners and completion statistics are easily reportable. Targeted training courses can also be allocated to employees in specific roles, e.g. Modern Slavery training for specific people in purchasing.

Mentoring programme

In 2022, Vesuvius continued its mentoring programme focused on leadership and talent development. There are currently 49 mentees taking part in the 12-month programme, of which 11 are women.

Mentees learn from the experience and perspectives of a more senior person in Vesuvius, creating an individual personal development plan to enhance their careers and leadership capabilities. The programme ensures internal knowledge transfer and builds a broader, deeper and more ready talent pool.

Technical training

HeaTt training is aimed at the continuous technical development of Vesuvius employees. Courses range from entry to expert levels and are continuously updated to keep pace with developing technology and delivery methods, thereby guaranteeing that Vesuvius experts are at the forefront of technical innovation. They are a great way for our hugely experienced technical experts to pass on their knowledge to the next generation and ensure the sustainability of our know-how. The first introductory module is mandatory for all new employees and is available on the LMS, allowing participants to access learning at anytime, anywhere.

Expert levels of HeaTt training are still held face-to-face, as the course content is not suitable for web-based training. In 2022, 650 employees completed the first module online, four employees completed the second module online and 87 employees completed face-to-face HeaTt training sessions.

Compliance training

During the year, we continued to develop our training programme. This is based on the principles contained in the Vesuvius Code of Conduct and associated anti-bribery, corruption and other compliance policies and procedures. Training gives our employees a clearer understanding of the scope of risks that exist as we conduct our business and gives context to how the Group expects each employee to respond to those risks.

The Board has set a target of at least 90% of targeted staff completing the Anti-Bribery and Corruption training annually. 4,917 employees, representing 99% of the targeted staff and 44% of the total full- and part-time employees, completed the 2022 Anti-Bribery and Corruption training.

Mandatory online training courses - 2022 Participation	Number of employees trained	% of targeted audience completing course	Total training hours
Anti-Bribery and Corruption	4,917	99%	2,163
Gifts, Hospitality and Entertainment	4,174	99%	2,074
Modern Slavery	127	100%	35
Anti-Tax Evasion	138	100%	40
Data Protection	1,297	100%	586
Cyber Security Awareness – 5 Basic Modules[1]	1,155	73%	1,348
Cyber Security – USB Safety Training	415	92%	62
Cyber Security – Anti-phishing	464	88%	220

1. The Cyber Security Awareness training consists of five modules. 73% of employees allocated the training in 2022 have already completed all five modules.

People and Culture continued

Global reward

Reward and recognition are integral components of our employee value proposition, enabling us to attract, engage and retain key talent and highly qualified employees. Our systems and processes are designed to create a market-competitive and rewarding environment for all our employees and to reinforce the vision, strategy and expectations set by the Board.

We seek to create a culture that champions performance, building a strong link between individual performance and pay. Our global job grading framework, based on a structured, market-leading evaluation methodology, enables us to compare roles and ensure internal consistency throughout the organisation.

We are committed to creating reward and performance management systems which are transparent and objective, where employees receive equal pay for work of equal value, regardless of their age, race, disability, sexual orientation, gender, marital, civil partnership or parental status, religion or beliefs. Our management Annual Incentive Plans are measured against both Vesuvius' financial targets and personal performance, an incentive structure consistent with that of our Executive Directors. The Vesuvius Share Plan for Executive Directors and Group Executive Committee members encourages robust decision-making based on long-term goals rather than short-term gains and works to align the interests of participants with those of shareholders.

In 2022, 98% of our salaried permanent employees undertook an annual performance review with their line management. This compared with 93% in 2021, 95% in 2020 and 92% in 2019.

Global mobility

Vesuvius operates worldwide. We believe that our companies should be managed and staffed by local personnel. However, we also provide selected groups of employees with a range of international assignments. These assignments are usually for a limited period, most often three years.

International assignees do not come from one or two countries alone. We have a truly international mix of nationalities in our mobile population. Individuals move not only within a region, but also between regions. Our mobility programme shows that our assignee population is as diverse as our Group.

Vesuvius operates international assignment policies which support the varying nature and circumstances of these assignments – whether they be short-term, longer-term or require extended commuting. In addition, we do actively support, where appropriate, localisation of employees upon international assignment and provide comprehensive support to aid integration, settlement and localisation in the new environment. These policies are supplemented with clearly identified benefits, delivering support appropriate to the nature of the assignment. We manage international assignments with flexibility, catering for changing expectations and demands from employees, whilst at the same time meeting the needs of the business.

Key rationale behind international assignments

Vesuvius considers individuals for international assignment for three primary reasons:

- Providing Vesuvius companies with skills that are not locally available and that are required at short notice. This typically occurs in countries where we are establishing or developing our presence. The number of assignees working on this basis diminishes over time as the organisation matures and we recruit and train local talent to take over
- Career development. We believe that the personal development plan of any employee being developed for a senior management or senior expert position should include a posting outside their home country. This encourages them to develop the skills necessary to function successfully in an international environment. These postings are tailored to the needs of the organisation and the needs of the individual
- Enhancing diversity. Management teams benefit from having a mix of gender and cultures. In specific cases, we use international assignments to support this goal

Our communities

We seek to establish strong relationships with key stakeholders and support the communities in which we operate

A responsible company

Vesuvius is committed to making a positive contribution to society. As part of this, we focus on operating an ethical business with appropriate policies in place to ensure compliance with the regulations and laws in all our markets.

Governance and policies

Vesuvius' operating policies underpin the principles set out in our Code of Conduct. They are the practical representation of our status as a good corporate citizen, and they assist employees to understand and comply with our ethical standards and the legal requirements of the jurisdictions in which we conduct our business. They also give practical guidance on how this can be achieved.

Human rights

The Group Human Rights and Labour Policy reflects the principles contained within the UN Universal Declaration of Human Rights, the International Labour Organisation's Fundamental Conventions on Labour Standards and the UN Global Compact, to which the Group is a signatory. The Policy applies to all Group employees. It sets out the principles for our actions and behaviour in conducting our business and provides guidance to those working for us on how we approach human rights issues. The Group commits not to discriminate in any of our employment practices and to offer equal opportunities to all. The Group respects the principles of freedom of association and the effective recognition of the right to collective bargaining, and opposes the use of, and will not use, forced, compulsory or child labour. These principles have been integrated into the work of our procurement teams as we assess our suppliers and their business practices. The policy was reviewed and updated in 2023.

Prevention of slavery and human awareness training on child labour, slavery and/or human trafficking

During 2022, we published our seventh transparency statement outlining the Group's approach to the prevention of slavery and human trafficking in our business and supply chain. A copy of our latest statement is available to view on our website: www.vesuvius.com.

Since the publication of our first statement we have conducted a risk assessment of our purchasing activities, seeking to identify, by location and industry, where the potential risks of modern slavery are highest. Our assessment identified the following four industries that pose a higher risk of modern slavery for Vesuvius:

1. Mining and extractive industries (raw materials)
2. Textiles (personal protective equipment (PPE) and work clothing)
3. Transport and packaging
4. Maintenance, cleaning, agricultural work, and food preparation (contracted workers)

Following our modern slavery risk assessment, we provided webinar training to our key purchasing staff and we continue to use an online e-learning module to upgrade the training given to all supplier-facing staff. This provides key guidance on the red flags associated with modern slavery to assist them in identifying these during supplier visits and accreditation. Since the launch of the Modern Slavery red flag training we have trained 100% of the targeted staff.

See the Group's Statement on the Prevention of Slavery and Human Trafficking

www.vesuvius.com/en/sustainability/our-policies/statement-on-modern-slavery.html

Our principles – a responsible company continued

Business ethics/anti-bribery and corruption and working with third parties

Vesuvius' Code of Conduct affirms our commitment to competing vigorously, but honestly, and not seeking competitive advantage through unlawful means. We conduct ourselves ethically in all public affairs activities, in alignment with local laws and regulations. We do not engage in unfair competition, exchange commercially sensitive information with competitors, or acquire information regarding a competitor by inappropriate means. When received for business purposes, we safeguard third-party confidential information and use it only for the purpose for which it was provided.

We engage with various third-party representatives and intermediaries in our business. We recognise that they can present an increased bribery and corruption risk. Our procedure on working with third parties clearly outlines our zero-tolerance approach to bribery and provides practical guidance for our employees in identifying concerns and how to report them.

Vesuvius engages with third-party sales agents, many of whom operate in countries where we do not have a physical presence. Our employees' use of, and interaction with, sales agents is supported by an ongoing training programme for those who have specific responsibility for these relationships.

As part of our communication around anti-bribery and ethics, employees are actively encouraged to consult on ethical issues. They have open access to the Compliance Director and Legal function who provide support on a regular basis.

During 2022, the Group continued the due diligence review of our third-party representatives and intermediaries. Following the prior years' enhanced review of sales agents, custom clearance agents, distributors and logistics providers, we conducted repeat due diligence. We also conducted due diligence on any new third parties introduced into the organisation.

Our due diligence processes will continue to be extended using a risk-based approach during 2023 and beyond.

Name: Gabriel Rodrigues Soares
Role: Quality Inspector
Location: Rio de Janeiro

Community engagement

Vesuvius wants to make a positive contribution to the communities in which we work by supporting a wide variety of fundraising and community-based programmes around the world.

We prefer participation in events, donations in kind to registered not-for-profit organisations, and participation in community programmes, to cash donations. Our Anti-Bribery and Corruption policy defines rules for the proper handling of donations and sponsorship.

Below are some examples of the many community programmes and activities our colleagues were involved in throughout 2022.

United Kingdom

Colleagues from our Foundry Tamworth site took part in a triathlon to raise funds for the Child Growth Foundation, a charity which supports children, adults and families affected by growth conditions.

Belgium

Every year, Vesuvius Ghlin sponsors an award for the best postgraduate work in mechatronics at the Polytechnic Faculty of Mons. The 2022 award was given to a student for his work on the 'Instrumentation of a manipulator robot for control by the vision system'.

Poland

In 2022, colleagues in Poland continued their support for Ukrainian refugees with a number of initiatives, including purchasing a range of educational materials and toys for Ukrainian children attending a primary school in Skawina.

Germany

In April 2022, Vesuvius Borken presented a cheque for €36,000 to Aktion Lichtblicke e.V. (Action Rays of Hope Association) to support their work with people affected by the war in Ukraine. When the conflict in Ukraine started and the first donations were received from the workforce, the works council developed the 'Plus 5-Initiative' where improvement suggestions made by colleagues generated a company donation of €5 per suggestion. This raised €18,000, which management then doubled.

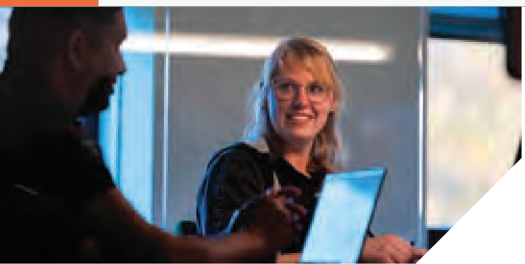
India

Vesuvius India is keen to encourage girls and women to participate in STEM (Science, Technology, Engineering and Mathematics) careers. It organised for a group of local residents to visit its Kolkata site to help them envisage a technical career. This was part of an ongoing #EducatetheGirlChild project.

China

As part of a partnership with the volunteer association in Suzhou Industrial Park, Vesuvius China organised a community project named 'Caring for the Heart'. The project promotes CPR training and family first aid activities. It popularises the concept of 'caring for your heart' and 'caring for your family' and improves people's awareness of heart disease and their ability to deal with emergencies.

Responsible sourcing



Vesuvius recognises the crucial role that its suppliers play in creating value in the products and services that Vesuvius ultimately provides to its customers. In addition to the consistent and timely supply of materials, products, and services which are of the highest quality, we expect our suppliers to operate in a manner that is appropriate, in terms of their ethical, legal, environmental and social responsibilities.

Principles

Overall, our objective is to encourage suppliers to implement a meaningful sustainability programme, embrace the UN Global Compact principles, evaluate and reduce our upstream CO_2 emissions and identify potential risks (and if necessary, address them) in our supply chain. The satisfaction of our customers' requirements, the safety and reliability of Vesuvius' products, and the efficiency of Vesuvius' internal processes are dependent on the reliability of its network of suppliers. Vesuvius is committed to ensuring that we utilise high-quality raw materials, secured through reliable and well-developed raw material suppliers. The principles of sustainable procurement are prescribed within the Vesuvius Sustainable Procurement Policy and supported by supplementary processes.

Sustainable Procurement Policy

We operate a Sustainability Procurement Policy which outlines key criteria for suppliers. The policy uses the Group Procurement's 'Request for Quotation' (RFQ) process to engage a significant number of Vesuvius suppliers and is provided in conjunction with the Vesuvius Terms and Conditions of Purchase.

For suppliers to participate in the RFQ, they are obliged to accept and agree to the terms of the Sustainability Procurement Policy, as it forms an addendum to Vesuvius' standard contract clauses. This policy is available on the Vesuvius website.

The policy applies to all suppliers of goods and/or services either used in our manufacturing processes and/or sold directly by us to customers, including Tolling and Resale suppliers. It applies to suppliers, their agents and their sub-contractors. Once accepted, it is the responsibility of the supplier to verify and monitor compliance against this policy – both for their operations and those of any sub-contractors. Compliance with the requirements in the policy is a key consideration in the selection of suppliers.

The major elements of the Sustainability Procurement Policy are:

- Employees and human rights
- Ethical and compliant business practices
- Environment
- Quality
- Business continuity
- Documentation and Verification encompassing Supplier due diligence and Supplier assessments

Since its launch in 2021, 181 suppliers (51% of the targeted group participating in the RFQ process) representing a spend of £213m, have already formally agreed to comply with the policy.

Supplier sustainability assessment criteria

Environment	Labour and Human Rights	Ethics	Sustainable Procurement
Energy Consumption & GHGs	Employee Health & Safety	Corruption	Supplier Environmental Practices
Water	Working Conditions	Anti-competitive Practices	Supplier Social Practices
Biodiversity	Social Dialogue	Responsible Information Management	
Local & Accidental Pollution	Career Management & Training		
Materials, Chemicals & Waste	Child Labour, Forced Labour & Human Trafficking		
Product Use	Diversity, Discrimination & Harassment		
Product End-of-Life	External Stakeholder Human Rights		
Customer Health & Safety			
Environmental Services & Advocacy			

21 criteria based on international standards

Supplier sustainability assessments

As part of our sustainability agenda, Vesuvius has implemented a Supplier Sustainability Assessment programme, setting targets for the proportion of the total raw material spend value covered by the assessment. The topic boundary extends to all suppliers of goods either used in our manufacturing processes and/or sold directly by us to customers, including Resale suppliers.

Vesuvius has partnered with an independent third-party service provider – EcoVadis – to rate our raw materials suppliers using a detailed set of criteria. These cover four themes and 21 criteria based on international standards: Labour and Human Rights; Ethics; Environment; and Sustainable Procurement.

Group procurement and regional procurement teams are heavily involved in the programme. In 2022, 23 (2021: 94) (Total to date: 118) employees from these teams have received specific training on supplier sustainability assessments (100% of the target group).

In 2019, the Board approved a target to assess at least 50% of our raw material spend by the end of 2023. Various criteria were chosen to select participating suppliers such as supplier size and risk metrics, including:

- Category of raw material
- Availability of alternative sources
- Share of supplier revenue with Vesuvius
- Grades in previous assessments
- New suppliers
- Supply chain incidents

Since its launch, 230 suppliers have joined the programme, representing a spend value of £280m, being approx. 14% of the Group's raw material suppliers, representing 48% of the Group's raw material spend, and 33% of the Group's spend on goods used in our manufacturing processes and/or sold directly by us to customers.

Of the rated suppliers, 13% did not meet the minimum score defined by Vesuvius and were asked to implement improvement actions within a three-year timeline. Routine reviews and an annual reassessment will enable progress to be measured.

Supplier CSR and Quality audits

Vesuvius conducts an annual Supplier Audit programme targeting their Corporate Social Responsibility (CSR) practices, product quality and security of supply. The programme is led by the Group's Purchasing and Quality teams, located across all regions. The goal of the audits is to verify that our suppliers abide by fundamental principles regarding the environment and social practices, and reduce the number of quality issues that may affect our raw materials, and consequently our operations and those of our customers.

As part of this, we carry out on-site inspections, share expectations with our suppliers, identify risks, and adapt our internal controls accordingly. We encourage our suppliers to improve their own processes and help them prioritise actions to achieve this. Commencing in 2022, a number of 'red flag' items have been included in our on-site verification questionnaire, especially addressing human rights issues, such as child or forced labour, for which immediate escalation and investigation is required in case any breach is detected.

In 2022, 139 (2021: 138) audits were conducted (100% on-site) at 136 (plus 3 follow up) supplier facilities (2021: 138, 13 follow up), representing 79.4% of targeted suppliers. No cases of human rights breaches were detected as part of the supplier audit programme. One supplier received grades below threshold. Where suppliers fail to meet the required standards, action is taken either to support them to improve or our relationship with them is terminated.

Areas of focus include:

Quality management rules:
Final inspection, controls at important process steps, management of incoming materials, data tracking, customer feedback and communication.

Management of non-conformities:
Reaction to non-conformities, protection of customer, problem resolution and application of lessons learned.

Sustainability criteria:
This aligns the supplier audits as a second platform to drive and visibly verify supplier sustainability efforts and programmes, complementing the assessments carried out by our third-party partner.

The Strategic Report set out on pages 1-85 contains a fair review of our businesses, strategy and business model, and the associated principal risks and uncertainties. We also deliver a review of our 2022 performance and set out an overview of our markets and our stakeholders. Details of our principles, and our people and community engagement, together with our focus on safety, are also contained in the Strategic Report.

Approved by the Board on 2 March 2023 and signed on its behalf by

Patrick André
Chief Executive

Governance

We're making production processes safer with our robotic solutions

Our products deliver superior safety performance in hazardous areas of production. Our robotic solutions can replace operators in the most dangerous parts of our customers' processes.

Name: Jennifer Metoyer Wiese
Role: Human Resources
Location: Cleveland

Name: Melany Serrato
Role: Quality Engineer
Location: Monterrey

Name: Phil Prelosky
Role: Research Technician
Location: Pittsburgh

Board of Directors

N

Carl-Peter Forster

Chairman

Appointed to the Board 1 November 2022, assumed the role of Chairman on 1 December 2022

Four months on the Board

- Extensive Board experience as Chairman and Chief Executive within international listed companies
- Proven strategic and operational skills gained in complex multinational industrial goods and engineering businesses
- Global commercial and engineering experience, including expertise in operational excellence and lean manufacturing

Current external appointments

Carl-Peter is Chairman of Chemring Group plc and Senior Independent Director at Babcock International Group plc. He is also Chairman of StoreDot, Director of The Mobility House AG, LeddarTech, Inc, Gordon Murray Group Ltd, Envisics Ltd, Lead Equities Fund Management Gmbh and associated companies and serves as a Director on the advisory board of Kinexon GmbH.

Career experience

Carl-Peter has spent the majority of his career holding senior leadership positions in some of the world's largest automotive manufacturers, including BMW, General Motors and Tata Motors (including Jaguar Land Rover). Since he stepped down from Tata Motors in 2011, he has served as a director on a wide variety of public and private company boards, including IMI plc from 2012-2021, Rexam plc from 2014-2016 and Geely Automotive Holdings, Hong Kong, as well as Volvo Cars Group from 2013-2019. Until recently he also served as Chair of the Shareholder Committee of Hella KGaA, the German automotive supplier.

Patrick André

Chief Executive

Appointed to the Board 1 September 2017

Five years on the Board

- Global career serving the steel industry
- Strong background in strategic development and implementation
- Customer focus and proven record of delivery, with strong commercial acumen
- Drive and energy in promoting his strategic vision

Current external appointments

None.

Career experience

Patrick joined the Group as President of the Vesuvius Flow Control Business Unit in 2016, until his appointment as Chief Executive in September 2017.

Before joining the Group, Patrick served as Executive Vice President Strategic Growth, CEO Europe and CEO for Asia, CIS and Africa for Lhoist company, the world leader in lime production. Prior to this, he was CEO of the Nickel division, then CEO of the Manganese division of ERAMET group, a global manufacturer of nickel and special alloys.

A N R

Douglas Hurt

Senior Independent Director (SID)

Appointed to the Board 2 April 2015

Seven years on the Board

- Qualified Chartered Accountant, with recent and relevant financial experience
- Highly knowledgeable in operational and corporate financial matters, with significant US and European experience
- Proven management and leadership skills

Current external appointments

Non-executive Director and Chair of the Audit Committees of Hikma Pharmaceuticals PLC and the British Standards Institution.

Career experience

Douglas was Finance Director of IMI plc, a UK listed company, until 2015. He spent 23 years at GlaxoSmithKline plc where he held senior finance and general management positions. Douglas served as SID and Chair of the Audit Committees of Tate & Lyle plc and Countryside Partnerships PLC until 2019 and July 2022 respectively, and he also served as Chairman of Countryside Partnerships PLC from July to November 2022 when it merged with Vistry Group.

Changes to the Board during the year

The Directors named were in office during the year and up to the date of this Annual Report, with the exception of:

- Carl-Peter Forster who was appointed to the Board on 1 November 2022, and assumed the role of Chairman on 1 December 2022
- Carla Bailo who joined the Board on 1 February 2023
- Guy Young who served as Chief Financial Officer from 1 November 2015 until he left the Group on 17 February 2023

In addition, John McDonough stepped down as Chairman and as a Director of the Company on 1 December 2022.

Richard Sykes (formerly Group Vice President, Business Development) currently serves as Interim Chief Financial Officer, but is not a Director of Vesuvius plc.

Mr Mark Collis, currently Chief Financial Officer of the Operations business of John Wood Group PLC, will join the Board as an Executive Director and Chief Financial Officer at the latest on 4 July 2023. Mark has over 20 years of senior financial experience in a number of international businesses including Amec Foster Wheeler plc and Expro International Group. Mr Collis is a Chartered Accountant qualified with the ICAEW.

Guy Young

Chief Financial Officer

Served on the Board from 1 November 2015 to 17 February 2023

Career experience

Guy qualified with the South African Institute of Chartered Accountants. He was Chief Financial Officer of Tarmac and latterly Lafarge Tarmac, the British building materials company, between 2011 and 2015. Prior to this he spent 13 years working at Anglo American plc.

A N R

Carla Bailo

Non-executive Independent Director

Appointed to the Board 1 February 2023

One month on the Board

- Strong engineering and product management experience
- Research and development background gained during >40 years working in the automotive industry
- International experience and extensive knowledge of US markets

Current external appointments

Non-executive Director of EVe Mobility Acquisition Corp., Advance Auto Parts, Inc. and SM Energy Company.

Career experience

Carla spent the past five years serving as President and CEO of the Center for Automotive Research (CAR) in the USA, a position she stepped down from at the end of September 2022. Prior to joining CAR, Carla was Assistant Vice President for Mobility Research and Business Development at The Ohio State University. She spent 25 years working at the Nissan Motor Company where she served in a variety of senior management and engineering roles, culminating as Senior Vice President, Research and Development, Americas and Total Customer Satisfaction. Carla also spent ten years earlier in her career with General Motors.

Key to Board Committee membership

- A Audit Committee
- N Nomination Committee
- R Remuneration Committee
- ● Committee Chair

Engagement with the workforce

E Jane Hinkley serves as the designated Non-executive Director responsible for overseeing engagement with the workforce.

* Cevian Capital is a shareholder of Vesuvius plc and, at 2 March 2023, held 21.11% of Vesuvius' issued share capital.

A N R

Kath Durrant

Non-executive Independent Director

Appointed to the Board 1 December 2020

Two years on the Board

- 30 years' experience of people management
- Strong operational and strategic track record, gained working at a number of large global manufacturing companies
- Experienced UK governance professional

Current external appointments

Non-executive Director and Chair of the Remuneration Committee of SIG plc, and a Non-executive Director of Essentra plc.

Career experience

Kath held various operational and specialist HR roles at GlaxoSmithKline plc and AstraZeneca plc, and was Group HR Director of Rolls-Royce plc. She was most recently Group HR Director of Ferguson plc and Chief HR Officer of CRH plc. Kath served as a Non-executive Director and Chair of the Remuneration Committee of Renishaw plc from 2015 to 2018 and as a Non-executive Director and Chair of the Remuneration Committee of Calisen plc from 2020 to 2021.

N

Friederike Helfer

Non-executive Director

Appointed to the Board 4 December 2019

Three years on the Board

- An experienced strategist, with strong analytic capability
- Commercial acumen and a strong track record of working with a portfolio of companies to identify scope for operational and strategic improvement

Current external appointments

Partner of Cevian Capital.*

Career experience

Friederike is a Partner of Cevian Capital. She joined Cevian in 2008 and served as a Non-executive Director on the boards of thyssenkrupp AG from 2020 to 2023 and Valmet Oyj from 2013 to 2017. These are both companies in which Cevian was also invested. Prior to joining Cevian, Friederike worked at McKinsey & Company. She is a CFA Charterholder.

A N R

Dinggui Gao

Non-executive Independent Director

Appointed to the Board 1 April 2021

One year on the Board

- Strong operational experience driving performance at a range of multinational companies
- Proven track record of leadership and international commercial experience
- Strong focus on technology and in-depth knowledge of Asian markets

Current external appointments

Non-executive Director Intramco Europe B.V and Operating Partner CITIC Capital Holdings Ltd.

Career experience

Dinggui has nearly 40 years of operational experience having worked in a range of multinational companies including Bosch, Honeywell, Eagle Ottawa and Sandvik AB. He latterly served as Managing Director, China of Formel D Group, the German global service provider to the automotive and components supply industry, joining the company in 2017 and stepping down at the end of October 2021.

A N R E

Jane Hinkley

Non-executive Independent Director

Appointed to the Board 3 December 2012

Ten years on the Board

- Proven track record of managing complex global trading businesses
- Qualified Chartered Accountant, with significant financial and operational experience in large multinational companies
- Leadership and global management skills

Current external appointments

None.

Career experience

Jane is a Chartered Accountant and was Managing Director of Navion Shipping AS for three years until 2001. Prior to this, she spent her executive career as Chief Financial Officer and Managing Director of Gotaas-Larsen Shipping Corporation. She was previously Chairman of Teekay GP LLC, a Non-executive Director and Chairman of the Remuneration Committee of Premier Oil plc, and a Non-executive Director of Revus Energy ASA.

Group Executive Committee

Patrick André

Chief Executive

Seven years with the Group

For biographical details, please see the Board of Directors on page 88.

Karena Cancilleri

President, Foundry

Three years with the Group

Appointed President, Foundry in October 2019. Karena joined the Group from Beaulieu International Group, where she served for six years as VP Engineered Products and latterly President Engineered Products. She has a breadth of managerial experience spanning various international leadership roles in companies such as FiberVisions, Kraton Corporation and Shell.

Karena is based in London, UK.

Pascal Genest

President, Flow Control

Two years with the Group

Appointed President, Flow Control in January 2021. Pascal joined the Group from GFG Alliance where he held the position of CEO Liberty Ostrava in the Czech Republic. Prior to this he was CEO of SULB in Bahrain. Pascal has more than 15 years' experience working in the steel industry, mainly with ArcelorMittal. He has also worked in consulting, in private equity and in the aluminium industry.

Pascal is based in London, UK.

Henry Knowles

General Counsel and Company Secretary

Nine years with the Group

Appointed as General Counsel and Company Secretary in September 2013. Prior to joining Vesuvius, Henry spent eight years at Hikma Pharmaceuticals PLC, a generic pharmaceutical manufacturer with significant operations in the Middle East, North Africa and the US where he held the roles of General Counsel and Company Secretary. Henry is also responsible for the Group's Intellectual Property function.

Henry is based in London, UK.

Agnieszka Tomczak

Chief HR Officer

Four years with the Group

Appointed as Chief HR Officer in October 2018. Agnieszka has over 25 years of senior leadership experience in multinational companies spanning various business sectors and industries. Prior to joining Vesuvius, she spent 12 years at ICI, which was subsequently acquired by AkzoNobel, in regional and global HR roles.

Agnieszka is based in London, UK.

Changes to the Group Executive Committee (GEC)

Thiago Avelar, President, Advanced Refractories served on the GEC until he left the Group on 8 December 2022.

Patrick Bikard, President Operations and Technology served on the GEC until he retired from the Group on 31 December 2022.

Guy Young, Chief Financial Officer also served on the GEC until he left the Group on 17 February 2023.

Mark Collis will join the Group Executive Committee on his appointment as CFO.

Corporate Governance Statement

Dear Shareholder,

On behalf of the Board, I am delighted to present my first Corporate Governance Statement. This Statement provides investors and other stakeholders with an insight into the governance activities of the Board and its Committees during the year. It describes how the Group has complied with the Principles of the UK Corporate Governance Code during 2022, except where we considered it clearer for us to describe the application of a Principle elsewhere in this Annual Report. The table on page 92 signposts where detailed information on each section of the Code (and associated Principles) can be found. The Board of Vesuvius plc is committed to maintaining high standards of governance and to continuous improvement to reflect ongoing best practice.

During 2022, the Board oversaw the continued progression of the Group's strategy, approving the acquisition of the Group's long-term tolling partner, Bayuquan Magnesium Co, as well as significant new investments in plant capacity. Following the launch of hostilities in Ukraine, the Board monitored the safety of the Group's employees in the region and determined the Group's approach to the continuance of trade with non-sanctioned Russian customers. In addition, as the global macroeconomic environment deteriorated, the Board monitored the impact on the business of rising energy and raw material prices, as well as other inflationary items.

During the year the Nomination Committee oversaw the recruitment of three new Directors, with the Board not only appointing me as Chairman but also Carla Bailo as a new Non-executive Director with effect from 1 February 2023 and securing the services of Mark Collis as our new CFO, who will join by 4 July 2023 at the latest. In addition the Nomination Committee was updated on the progress of filling vacancies at the Executive Committee and senior management level, and was also kept apprised of the recruitment and development of additional talent in our Business Units to strengthen the pipeline of talented individuals to fill leadership positions going forward.

The Remuneration Committee, alongside its regular duties, spent a considerable amount of time discussing proposals for the 2023 Remuneration Policy, to be tabled at the forthcoming AGM. Following the changes made to the incentive structure in 2022, the Remuneration Committee concluded that no further material changes were required this year, but some changes to the quantum of remuneration were necessary in respect of the Chief Executive. These were the subject of consultation with our top shareholders. More details about the proposed changes and the other work undertaken by the Committee in 2022 can be found in the Directors' Remuneration Report.

The Audit Committee continued to carefully monitor the Group's financial situation during the year, in light of the challenging macroeconomic environment. In conjunction with its usual responsibilities, it paid particular heed to the impact of the conflict in Ukraine on the Group's activities and controls, assessing the impact of events on Russia and Ukraine themselves, and the wider repercussions of increases in energy and raw material pricing. In addition, the Committee continued to focus on the development of the Group's cyber security measures, as well as receiving regular updates on the implementation of changes to the Group's Finance Operating Model.

The Board's formal evaluation process for 2022 was externally facilitated by the corporate advisory firm, Lintstock. Overall, the Board was considered to operate effectively with appropriate engagement and challenge from all Directors. The balance of the topics submitted to the Board for discussion was the subject of some debate and this is an area I intend to review further in 2023, to ensure that the Board's time is devoted to matters that add maximum value to the business. The evaluation highlighted a number of ongoing Board priorities, including its continued focus on strategic execution, the scope to improve the process for the Board's engagement with the workforce, and ensuring that we continue work to ensure there are robust succession plans for Executive Director and GEC roles, with wider talent development fully aligned to the strategic requirements of the business. The Board is progressing these in 2023.

Yours sincerely

Carl-Peter Forster
Chairman
2 March 2023

In this section

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Division of responsibilities on **p96**
Audit Committee report on **p101**
Nomination Committee report on **p110**
Directors' Remuneration Report on **p116**
Also see:
Group's statement of purpose on **p1**
Strategic Report on **p1–85**

Corporate Governance Statement continued

Board Report

2018 UK Corporate Governance Code – information availability

Board leadership and Company purpose	The Corporate Governance statement (CG Statement) on pages 91–143 gives information on the Group's compliance with the Principles relating to the Board's leadership and Company purpose. More detailed information on: – The Group's statement of purpose can be found on page 1 – The Group's strategy, resources and the indicators it uses to measure performance can be found on pages 18 and 19, 20 and 21, and 36 and 37, respectively – The Group's engagement with stakeholders and the Group's Section 172(1) Statement is contained in the Section 172(1) Statement and stakeholder engagement section on pages 22–26 – The Group's approach to workforce matters can be found in the Our people section on pages 74–80, with further details of the Group's approach to employee involvement and engagement contained in the Section 172(1) Statement on page 24 Details of the Group's framework of controls is contained in the Audit Committee report on pages 104–106 of the CG Statement and in the Risk, viability and going concern section on pages 29 and 30.
Division of responsibilities	The CG Statement describes the structure and operation of the Board. The Nomination Committee report, on pages 114 and 115, describes the process the Company conducts to evaluate the Board, to ensure that it continues to operate effectively, that individual Directors' contributions are appropriate and that the oversight of the Chairman promotes a culture of openness and constructive yet challenging debate.
Composition, succession and evaluation	Details of the skills, experience and knowledge of the existing Board members can be found in the Board biographies contained on pages 88 and 89. Information on the Board's appointment process and approach to succession planning and Board evaluation is contained in the Nomination Committee report on pages 110-115 of the CG Statement.
Audit, risk and internal control	Information on the policies and procedures the Group has in place to monitor the effectiveness of the Group's Internal and External Audit functions and the integrity of the Group's financial statements is contained in the Audit Committee report on pages 101–109 of the CG Statement, along with an overview of the procedures in place to manage risk and oversee the internal control framework. Further information on the Group's approach to risk management is contained in the Risk, viability and going concern section of the Strategic Review on pages 27–33. The Board believes the 2022 Annual Report to be a fair, balanced and understandable assessment of the Company's position and prospects. A description of the Audit Committee's work in enabling the Board to reach this conclusion is contained in the Audit Committee report on page 104.
Remuneration	The Company's approach to investing in and rewarding its workforce is described in the Our people section on pages 74-80. The Directors' Remuneration Report section of the CG Statement describes the Group's approach to Directors' remuneration, including the procedure for developing policy and the Remuneration Committee's discretion for authorising remuneration outcomes. It also includes information about the Remuneration Consultants appointed by the Remuneration Committee. Details of the linkage of the Directors' Remuneration Policy with long-term strategy is contained on page 119 and also highlighted on pages 36 and 37 in the section on Key Performance Indicators.

The aforementioned sections are incorporated into the Corporate Governance Report by reference.

Board leadership and Company purpose

The Board is responsible for leading the Group in an efficient and entrepreneurial manner, establishing the Group's purpose, values and strategy, and satisfying itself that these and the Group's culture are aligned. It focuses primarily on strategic and policy issues and is responsible for ensuring the long-term sustainable success of the Group. It sets the Group's strategy, oversees the allocation of resources and monitors the performance of the Group. It is responsible for effective risk assessment and management. In performance of these duties, the Board has regard to the interests of the Group's key stakeholders and is cognisant of the potential impact of the decisions it makes on wider society.

Purpose

Vesuvius' purpose is to be a global leader in molten metal flow engineering and technology, servicing process industries operating in challenging high-temperature conditions. We think beyond the status quo to create the innovative solutions that will shape the future for our customers, wider stakeholders and business. We help our customers make their industrial processes safer, more efficient and sustainable. The Group aims to deliver sustainable, profitable growth, providing its shareholders with a superior return on their investment, whilst providing each of its employees with a safe workplace where they are recognised, developed and properly rewarded.

The Board has identified seven Strategic Objectives for achieving long-term sustainable success. It is currently pursuing five shorter-term key execution priorities, which encapsulate the Group's immediate aims, including its strategic focus on sustainability. Further information on these can be found on pages 18 and 19. The Board regularly reviews the Group's performance against a number of Key Performance Indicators (KPIs) which provide information on key aspects of the Group's financial and non-financial performance. This information assists the Board to assess progress with the execution of the Group's strategy and to determine any remedial action that needs to be taken. Detailed information on the Group's KPIs can be found on pages 36 and 37.

The Group has established a framework of controls to enable risk to be assessed and managed, and further information on this can be found in the Audit, risk and internal control section on page 100 of this Board Report.

Sustainability

Vesuvius recognises that lasting business success is measured not only in financial performance but in the way in which the Group deals with its customers, business associates, employees, investors and local communities. Our Sustainability strategy supports the Group's key Strategic Objectives which are focused on creating a better tomorrow in a profitable and sustainable way. To drive change throughout the Group, the Board has set specific targets focused on ways in which the Group can improve its impact on our planet, our communities, our people and our customers. The Board monitors these and oversees the work of the Sustainability Council in spearheading new activities to enhance our performance. Further information can be found in the Sustainability section on pages 50–85.

Culture

The Board takes seriously its responsibility for shaping and monitoring the corporate culture of the Group. The Group's CORE Values – Courage, Ownership, Respect and Energy – define our behaviours across the business and are the practical representation of the culture we seek to foster, aligning with the Company's purpose and strategy, and supporting our governance and control processes. These Values are prominently displayed at all sites. Our CORE Values are reinforced in our performance management systems, which ensures that they are firmly embedded in our day-to-day conversations and behaviours. Further detail can be found on page 76.

The CORE Values are supported by the Group's Code of Conduct which sets out the standards of conduct expected, without exception, of everyone who works for Vesuvius in any of its worldwide operations. The Code of Conduct emphasises the Group's commitment to ethical behaviour and compliance with the law. It also covers every aspect of Vesuvius' approach to business, from the way that the Group engages with customers, employees, its markets and each of its other stakeholders, to the safety of its employees and places of work. Everyone within Vesuvius is individually accountable for upholding these requirements.

The Board seeks to ensure that the Group's workforce policies and practices are consistent with the Group's long-term sustainable success. Further information about the Group's remuneration practices for senior managers can be found in the Directors' Remuneration Report on pages 116-143, the Group's approach to diversity in the Nomination Committee report on pages 112-113, and the Group's approach to HR matters in the Our people section on pages 74–80. Information on the Group's Speak Up confidential employee concern helpline is set out overleaf.

Corporate Governance Statement continued

Whistleblowing policy

Speak Up

All Vesuvius employees can speak up without fear of retaliation, either to Vesuvius management or via independent channels. We have implemented a Speak Up policy, under the responsibility of our Board, which is included in our Code of Conduct. Details of it are provided on the internal Vesuvius website, and communicated by local language posters in all our locations. A third-party operated confidential Speak Up helpline is available 365 days per year, 24 hours per day, to anyone wishing to raise concerns anonymously or in situations where they feel unable to report directly. Details of the helpline can also be found on the Vesuvius website. This independent facility supports online reporting through a web portal and reporting by phone or by voicemail. Ensuring global accessibility, employees can speak with operators in any of our 29 functional languages.

All reports received are reviewed and, where appropriate, investigated and feedback is provided to the reporter via the helpline portal. Vesuvius' Speak Up helpline is highlighted during internal compliance training and new joiner inductions. No Vesuvius employee will ever be penalised or disadvantaged for reporting a legitimate concern in good faith. Reports received via Speak Up channels are managed by the General Counsel and Compliance Director. When received, reports are assessed for risk and category of concern. All reports are considered in line with a protocol for review, investigation, action, closure and feedback, independent of management lines where necessary, and involving senior Business Unit or HR management as appropriate. For complex issues, formal investigation plans are drawn up, and support from external experts is engaged where necessary. Feedback is recognised as an important element of the Speak Up process and we aim to provide an update on all reports within 28 days of receipt. The Group monitors the volume, geographic distribution and range of reports made to the Speak Up facility to ascertain not only whether there are significant regional compliance concerns, but also whether there are countries where access to this facility is less well understood or publicised.

During 2022, the Board received updates on the nature and volume of reports received from the confidential Speak Up helpline, key themes emerging from these reports and the results of any investigations undertaken. Further details on specific issues were provided where requested. In 2022, the Group received 141 reports (2021: 93) through the Speak Up facility and 38 walk-in reports (2021: 94). Each one of these was reviewed and, where appropriate, investigated. Similar to 2021, a substantial majority of these reports related to HR issues which indicated no compliance concerns, nor serious breaches of the Code of Conduct. Of the small number of reports received that contained allegations of a breach of our Code of Conduct, thorough investigations were performed and, where appropriate, disciplinary action was taken.

During the year, the Board's assessment of the Group's culture focused on the Group's:

(1) Adherence to the CORE Values – The Board focused on ensuring that there was a consistent culture across the Group, underpinned by the CORE Values. During their site visits, the Directors focused on the extent to which the Values are published, understood and motivate employee behaviour, and reported on their individual findings as part of their feedback. During the year, nominations were once again sought for the Group's peer-nominated Living The Values Awards. The Board was delighted that there were almost 1,600 nominations, showcasing examples of individuals and teams going the 'extra mile' to live the CORE Values. Members of the Group Executive Committee presented both regional and global awards as part of the process of recognising those individuals who exemplify our values. This year, the global award presentation was held online to allow all employees to join. The strength of the Group's commitment to its Values was evidenced by the activities undertaken in the Group during the year to support our Ukrainian colleagues and their families, and by the energy that was applied throughout the business to the pursuit of new and innovative business approaches.

(2) Commitment to safety – At each meeting during the year, the Board received an update on issues affecting the global health and well-being of the Group's employees. Following the tragic fatality in China, the Board was kept fully apprised of the investigations into its cause and the mitigating actions being taken. As a matter of course the Board receives regular updates on the Group's performance against safety targets, and discusses all Lost Time Incidents and the follow-up action taken. In addition, the Board receives biannual reports on the progress of the Group's safety programmes. The Directors used individual site visits to assess each site's commitment to safety, and the Executive Directors and Group Executive Committee members' long-term incentives include a safety target alongside other sustainability measures. A core tenet of the Group's Sustainability Initiative is a focus on ensuring the Group affords a safe working environment for all its employees. The Board has set a challenging Group safety target of fewer than one lost time injury per million hours worked. This equates to an average of less than two lost time work-related injuries or illnesses per month.

(3) Entrepreneurship – As part of the Board's rolling agenda, the Board received reports from each of the Business Unit Presidents on their business' strategy, new commercial initiatives and future technology trends. These were complemented by a presentation from the President, Operations and Technology on R&D activities throughout the Group, including the processing of new product launches. The Nomination Committee focused on the development and retention of key talent across the Group to execute the Group strategy, and the Board also received reports on the key commercial achievements across the Business Units as part of regular reporting from the Chief Executive.

(4) Transparency – With the lifting of COVID-19 travel restrictions, the Board was once again able to undertake individual and collective site visits to meet employees face-to-face in 2022. The engagement and openness of the employees the Board met, both in person and virtually over the course of the year, was assessed in terms of the Group's culture. These first-hand reviews were supported by the Directors' review of the output of the Group's Speak Up processes. In addition, the Audit Committee sought qualitative feedback from External and Internal Audit on how transparent/engaged managers had been during audit interactions.

(5) Customer focus – The Chief Executive undertook a range of customer visits in 2022, meeting face-to-face with key customers to discuss business challenges and future prospects. The Board received detailed briefings on the Group's key customers, their concentration, diversity and core challenges, alongside information on the state of the Group's markets. The Board also received regular updates on quality performance. These were supported by a full annual presentation on the Group's ongoing initiatives on quality and information provided at each Board meeting on specific quality issues. At each Board meeting, the Board also considered the state of the Group's markets and the associated customer developments.

(6) Diversity and respect for local cultures – During 2022, the Board, through the work of the Nomination Committee, considered the Board's diversity as part of the Director recruitment exercises and monitored progress with the achievement of the Group's gender diversity target which seeks to have 25% female representation in the Senior Leadership Group, which comprises c.160 individuals, by 2025. The Board also reviewed the results of the employee engagement survey and subsequent management actions to support its diversity initiatives.

Following the easing of COVID-19 travel restrictions during 2022, the Directors were once again able to undertake a programme of individual site visits. An off-site Board meeting was held in India, with visits conducted to Foseco India Ltd's site in Pune and Vesuvius India Ltd's operation in Visakhapatnam. In addition, the Non-executive Directors visited sites in Toyokawa in Japan, Rio de Janeiro in Brazil, Monterrey in Mexico, Enschede in the Netherlands, Skawina in Poland, Borken in Germany and Ghlin in Belgium. The visits provided the Board with greater clarity on local organisation and management, along with providing updates on business performance. During the visits the Directors were able to interact with a cross-section of employees, from various functions and organisational levels. As part of some of these site visits a 'town hall' meeting was held, providing the Non-executive Directors with the opportunity to engage with the workforce to explain the function of the Board and also to explain how executive remuneration aligns with wider Company pay policies. A number of other informal interactions with staff were also conducted. These meetings gave the Non-executive Directors the opportunity to hear the views of employees and answer their questions about the Company. The Directors engaged in first-hand discussions on culture and purpose, providing direct feedback to the Board on their perceptions of each site and potential areas for improvement, alongside highlighting examples of best practice that could be shared more widely.

Section 172 duties

The Directors are cognisant of the duty they have under Section 172 of the Companies Act 2006, to promote the success of the Company over the long term for the benefit of shareholders as a whole, whilst also having regard to a range of other key stakeholders. In performance of its duties throughout the year, the Board has had regard to these duties and remained cognisant of the potential impact on these stakeholders of the Group's activities. The effects of the war in Ukraine and the wider economic impact, had repercussions for all the Group's stakeholders, and the Board remained cognisant of this throughout 2022. Details of the Board and the Company's engagement with stakeholders during the year can be found in the Section 172(1) Statement on pages 22–26.

The Board is committed to communicating with shareholders and other stakeholders in a clear and open manner and seeks to ensure effective engagement through the Company's regular activities. The Company undertakes an ongoing programme of meetings with investors, which is managed by the Investor Relations team. The majority of meetings with investors are led by the Chief Executive and the Chief Financial Officer, but the Chairman also meets with shareholders, and all the Directors are available to meet shareholders on request. The Group appointed a new Investor Relations Manager during the year who is also available to support investors and acts as an extra point of contact in the Company. In advance of the AGM in May, the Chairman contacted the Group's largest shareholders informing them of the publication of the 2021 Annual Report and the 2022 AGM Notice, and offering to meet with them to discuss any matters of concern. Several shareholders acknowledged receipt of the email, but none requested any further follow-up.

With regard to remuneration matters, early in 2022 the Chair of the Remuneration Committee wrote to our largest shareholders and key governance agencies, to provide additional detail on the Group's executive remuneration proposals for 2022 and invite further engagement. Responses were received from the majority of shareholders and governance agencies, and further information provided as requested. As a result of this dialogue, the Remuneration Committee concluded that the proposals were well supported and proceeded to implement them. Towards the end of the year the Chair of the Remuneration Committee contacted these shareholders and governance agencies once again, to invite their feedback on proposals to table minor amendments to the Company's Remuneration Policy at the 2023 AGM, and to make changes to the Chief Executive's remuneration. Again, responses were received from the majority of shareholders and governance agencies, with extensive further dialogue and a number of meetings held to discuss the proposals. The Remuneration Committee will proceed to table the new Policy at the forthcoming AGM. Further detail is contained in the Directors' Remuneration Report on pages 116-121.

Statement on compliance with the UK Corporate Governance Code

Save as set out for Provisions 19 and 38 below, the Company applied the Principles of the 2018 UK Corporate Governance Code (the 'Code'), and was fully compliant with its Provisions, throughout the year ended 31 December 2022. A copy of the Code can be found on the FRC website at: https://www.frc.org.uk/directors/corporate-governance-and-stewardship/uk-corporate-governance-code.

Provision 19: John McDonough CBE completed nine years' service as Chairman of the Board on 31 October 2021. The Company commenced a search for a new Chairman in 2021 and the process, which took longer than anticipated, was completed in April 2022. In order to allow Carl-Peter Forster to step down from certain external commitments in advance of his appointment at Vesuvius, he joined the Board on 1 November 2022. He subsequently took over from John McDonough as Chairman on 1 December 2022, at which point Mr McDonough left the Board.

Provision 38: The Company has now implemented plans to align the level of pension allowance for Executive Directors with that applicable to the majority of the workforce. Since 2020, our incumbent Executive Directors' pension contributions were frozen at the 1 January 2020 amount and reduced to 17% at the end of 2022, being the level of the majority of the workforce. Further details can be found on page 125.

Corporate Governance Statement continued

Division of responsibilities

The Board currently comprises eight Directors – the Non-executive Chairman, Carl-Peter Forster; the Chief Executive, Patrick André; and six Non-executive Directors, Carla Bailo, Kath Durrant, Dinggui Gao, Friederike Helfer, Jane Hinkley and Douglas Hurt. Douglas Hurt is the Senior Independent Director. Henry Knowles is the Company Secretary. Carlo Bailo joined the Board on 1 February 2023. Guy Young, Chief Financial Officer served on the Board throughout 2022 and stepped down from the Board on 17 February 2023, when he left the Company.

The Board considers that, for the purposes of the UK Corporate Governance Code, 71% of the Board – five of the current Non-executive Directors (excluding the Non-executive Chairman), namely Carla Bailo, Kath Durrant, Dinggui Gao, Jane Hinkley and Douglas Hurt, are independent of management and free from any business or other relationship which could affect the exercise of their independent judgement. During 2022 the Board considered Jane Hinkley's tenure and concluded that she should continue to be regarded as independent despite having completed ten years of service on the Board on 3 December 2022, as she continues to operate with an independent spirit and exhibits robust challenge at Board and Committee meetings. Jane will step down from the Board at the close of the forthcoming AGM. Friederike Helfer is a Partner of Cevian Capital, which continues to hold 21.11% of Vesuvius' issued ordinary share capital. As a result Friederike Helfer is not considered to be independent. The Chairman satisfied the independence criteria on his appointment to the Board. The Board and its Committees have a wide range of skills, experience and knowledge, and further details of each Director's individual contribution in this regard can be found in their biographical details on pages 88 and 89.

Division of responsibilities

The Board
Responsible for Group strategy, risk management, succession and policy issues. Sets the purpose, Values and culture for the Group. Monitors the Group's progress against the targets set

Chairman
Provides leadership and guidance for the Board, promoting a high standard of corporate governance. Sets the Board agenda and chairs and manages meetings. Independent on appointment, he is the link between the Executive and Non-executive Directors

Chief Executive
Develops strategy for review and approval by the Board. Directs, monitors and manages the operational performance of the Company. Responsible for the application of Group policies, implementation of Group strategy and the resources for their delivery. Accountable to the Board for Group performance

Chief Financial Officer
Supports the Chief Executive in developing strategic direction and works with the Board to develop and implement the Group's strategy. Directs, monitors and manages the finance and IT functions to ensure the Company's financial objectives are met, ensuring sound financial management and control of the Company's business

Senior Independent Director
Acts as a sounding board for the Chairman, an alternative contact for shareholders and an intermediary for other Non-executive Directors. Leads the annual evaluation of the Chairman and recruitment process for the Chairman's replacement, when required

Non-executive Directors
Exercise a strong, independent voice, constructively challenging and supporting the Executive Directors. Scrutinise performance against objectives and monitor financial reporting. Monitor and oversee risks and controls, determine Executive Director remuneration and manage Board succession through their Committee responsibilities. The Non-executive Directors meet at least twice a year without the Executive Directors being present

Company Secretary
Advises the Chairman on governance, together with providing updates on regulatory and compliance matters. Supports the Board agenda with clear information flow. Acts as a link between the Board and its Committees and between the Non-executive Directors and senior management

The Chairman and Chief Executive

The division of responsibilities between the Chairman and the Chief Executive is set out in writing. These were reviewed during the year as part of the Company's annual corporate governance review. They are available to view on the Company's website: www.vesuvius.com.

The Board

The Board has a formal schedule of matters reserved to it and delegates certain matters to its Committees. It is anticipated that the Board will convene on seven occasions during 2023, holding ad hoc meetings to consider non-scheduled business if required.

Board Committees

The principal governance Committees of the Board are the Audit, Nomination and Remuneration Committees. Each Committee has written terms of reference which were reviewed during the year. These terms of reference are available to view on the Company's website: www.vesuvius.com.

Committee composition is set out in the relevant Committee reports. No one, other than the Committee Chairman and members of the Committee, is entitled to participate in meetings of the Audit, Nomination and Remuneration Committees. However, as detailed in the Committee reports, where the agenda permits, other Directors and senior management regularly attend by invitation, supporting the operation of each of the Committees in an open and consensual manner.

The interactions in the governance process are shown in the schematic below.

Group Executive Committee

The Group also operates a Group Executive Committee (GEC), which is convened and chaired by the Chief Executive and assists him in discharging his responsibilities. During 2022, the GEC comprised the Chief Executive, Chief Financial Officer, the main Business Unit Presidents, the Chief HR Officer, the President Operations and Technology and the General Counsel/Company Secretary. The GEC met for six formal multi-day meetings and two R&D reviews during 2022, and also held bi-weekly meetings to discuss the Group's business activities.

Board

Governance Committees

Audit Committee
To monitor the integrity of financial reporting and to assist the Board in its review of the effectiveness of the Group's internal controls and risk management systems

Chair
Douglas Hurt

Membership
All independent Non-executive Directors

Remuneration Committee
To determine the remuneration policy for the Executive Directors and set the appropriate remuneration for the Chairman, Executive Directors and senior management

Chair
Kath Durrant

Membership
All independent Non-executive Directors

Nomination Committee
To advise the Board on appointments, retirements and resignations from the Board and its Committees and to review succession planning and talent development for the Board and senior management

Chair
Carl-Peter Forster, Chairman

(except when considering his own succession, in which case the Committee would be chaired by the Senior Independent Director)

Membership
Chairman and the Non-executive Directors

Administrative Committees

In addition, the Board delegates certain responsibilities to a Finance Committee and Share Scheme Committee, which operate in accordance with the delegated authority agreed by the Board

Finance Committee
To approve specific funding and treasury-related matters in accordance with the Group's delegated authorities or as delegated by the Board

Chair
Carl-Peter Forster, Chairman

Membership
Chairman, Chief Executive, Chief Financial Officer and Group Treasurer

Share Scheme Committee
To facilitate the administration of the Company's share schemes

Chair
Any Board member

Membership
Any two Directors or any two Directors and the Company Secretary

Corporate Governance Statement continued

2022 Board programme

The Board discharges its responsibilities through an annual programme of meetings.

At each of the regularly scheduled meetings, a number of standard items were considered.

These included:

- Directors' duties, including those in respect of s172, and conflicts of interest
- Minutes of the previous meeting and matters arising
- Reports from the Chief Executive (CEO) and the Chief Financial Officer (CFO) on key aspects of the business, and the General Counsel and Company Secretary on governance matters

In 2022, the Board focused on key areas of strategy, performance and governance, including the matters outlined below:

Strategy

- Reviewing M&A opportunities and approving the acquisition of Bayuquan Magnesium Co
- Receiving and reviewing reports on strategy from the Flow Control, Advanced Refractories, Foundry and Sensors & Probes Business Units
- Reviewing and approving significant items of capital expenditure
- Receiving and reviewing regular reports from the CEO on business highlights and the implementation of the Group's Strategic Objectives
- Reviewing the progress of the Group's Sustainability agenda, including receiving regular updates on the Group's health, safety and environmental objectives, the Group's TCFD compliance and the Group's roadmap to net zero
- Participation in a two-day off-site review of strategy presented by the CEO, CFO, the three main Business Unit Presidents and the Company's key financial advisers
- Considering the impact of the conflict in Ukraine, and determining the Group's approach to trading with Russia
- Receiving and considering reports on the Group's key customers, its HR, purchasing, IT, tax and treasury strategies, legal and compliance activities and the management of the Group's key pension liabilities
- Receiving and considering a progress report on the Group's R&D strategy and objectives
- Reviewing the Group's financing structure
- Reviewing the Group's investor relations strategy and receiving reports from the Company's brokers on market issues and from the CEO, CFO and the Head of Investor Relations on investor relations meetings and feedback

Performance

- Receiving regular business reports from the CEO
- Reviewing the measures being taken to mitigate the impact of energy and raw material cost increases, and ongoing supply chain disruption
- Receiving regular reports on the Group's financial performance against key indicators, including each of the Group's KPIs
- Receiving regular reports on progress against the Group's sustainability targets and regular updates from the CEO on the performance of the Group's businesses
- Receiving regular safety reports and summaries of the investigations conducted after any serious safety incident
- Receiving regular reports on performance against product quality targets
- Scrutinising the Group's financial performance and forecasts
- Reviewing and agreeing the annual budget and financial plans
- Approving trading updates, and preliminary and half-year results

Governance

- Receiving regular reports from the Board Committees
- Approving the Annual Report and Notice of AGM
- Approving the payment of the interim dividend, and approving the recommendation of the payment of the final dividend subject to shareholder approval
- Approving the appointment of Carl-Peter Forster as a new Chairman and overseeing the processes to identify a new CFO and new Non-executive Director
- Reviewing fees for the Non-executive Directors
- Completing an evaluation of the Board and Committees' performance and regularly reviewing progress against the improvement actions identified in the 2021 evaluation
- Reviewing the Group's internal controls, risk management practices and risk appetite, monitoring the Group's key risks and approving the Group's risk register
- Reviewing and approving the Group's Modern Slavery Statement
- Receiving regular updates on corporate governance and regulatory developments, and conducting the formal annual review of the Group's governance arrangements
- Reviewing information received through the Group's Speak Up reporting processes
- Reviewing the Board's engagement with employees, including the results of the Group engagement survey
- Renewing the Group's delegated authorities

Information and support

The Board ensures that it receives, in a timely manner, information of an appropriate quality to enable it adequately to discharge its responsibilities. Papers are provided to the Directors in advance of the relevant Board or Committee meeting to enable them to make further enquiries about any matters prior to the meeting should they so wish. This also allows Directors who are unable to attend to submit views to the relevant Chairperson in advance of the meeting.

In addition to the formal Board processes, the Chief Executive provides updates on important Company business issues between meetings, and the Board is provided with regular reports on key financial and management information. The Directors also receive regular updates on shareholder matters, along with copies of analysts' notes issued on the Company. For the distribution of all information, Directors have access to a secure online portal, which contains a reference section containing relevant background information.

All Directors have access to the advice and services of the Company Secretary.

There is also an agreed procedure in place for Non-executive Directors, in the furtherance of their duties, to take independent legal advice at the Company's expense. The procedure was not utilised during the year under review.

Directors' conflicts of interest

The Board has established a formal system to authorise situations where a Director has an interest that conflicts, or may possibly conflict, with the interests of the Company (situational conflicts). Directors declare situational conflicts so that they can be considered for authorisation by the non-conflicted Directors.

In considering a situational conflict, these Directors act in the way they consider would be most likely to promote the success of the Company and may impose limits or conditions when giving authorisation, or subsequently, if they think this is appropriate.

The Company Secretary records the consideration of any conflict and any authorisations granted. The Board believes that the approach it has in place for reporting situational conflicts continues to operate effectively. The Board has authorised any potential or actual conflicts of interest that might arise as a result of Ms Helfer's role as a Partner of Cevian Capital AG. Prior to her resignation as a director of thyssenkrupp AG, the Board had also authorised any potential or actual conflicts of interest that might have arisen from this role.

Board and Committee attendance

The attendance of Directors at the Board meetings held in 2022, and at meetings of the principal Committees of which they are members, is shown in the table below. The maximum number of meetings in the period during which the individual was a Board or Committee member is shown in brackets.

	Board	Audit Committee	Remuneration Committee	Nomination Committee	% attendance
Chairman					
John McDonough CBE	9 (9)	–	–	5 (5)	100%
Carl-Peter Forster[1]	2 (2)	–	–	1 (1)	100%
Executive Directors					
Patrick André	10 (10)	–	–	–	100%
Guy Young	10 (10)	–	–	–	100%
Non-executive Directors					
Kath Durrant	9 (10)	5 (5)	7 (7)	6 (6)	96%
Dinggui Gao	10 (10)	5 (5)	7 (7)	6 (6)	100%
Friederike Helfer	10 (10)	–	–	6 (6)	100%
Jane Hinkley	10 (10)	5 (5)	7 (7)	6 (6)	100%
Douglas Hurt	9 (10)	5 (5)	7 (7)	6 (6)	96%

1. Carl-Peter Forster was appointed to the Board on 1 November 2022, and assumed the role of Chairman on 1 December 2022. The table reflects the number of Board and Committee meetings that he could attend following his appointment to the Board.

Kath Durrant and Douglas Hurt were unable to attend one Board meeting arranged at short notice due to pre-existing commitments. They both received the papers for the meeting in advance and relayed their comments to the Chairman for communication at the meeting. Dinggui Gao attended all meetings virtually until October, as until that time he was precluded from participating in person due to travel restrictions between China and the UK.

The Chairman and Non-executive Directors have letters of appointment which set out the terms and conditions of their directorship. An indication of the anticipated time commitment is provided in recruitment role specifications, and each Non-executive Director's letter of appointment provides details of the meetings that they are expected to attend, along with the need to accommodate travelling time. Non-executive Directors are required to set aside sufficient time to prepare for meetings, and regularly to refresh and update their skills and knowledge. Copies of all contracts of service or, where applicable, letters of appointment of the Directors, are available for inspection during business hours at the registered office of the Company and are available for inspection at the location of the Annual General Meeting (AGM) for 15 minutes prior to and during each AGM.

All Non-executive Directors have agreed to commit sufficient time for the proper performance of their responsibilities, acknowledging that this will vary from year to year depending on the Group's activities, and will involve visiting operational and customer sites around the Group. The Chairman in particular dedicates a significant amount of time to Vesuvius in discharging his duties.

Corporate Governance Statement continued

Directors are expected to attend all scheduled Board and Committee meetings and any additional meetings as required. Each Director's other significant commitments are disclosed to the Board during the process prior to their appointment and they are required to notify the Board of any subsequent changes. Between July and September 2022, Douglas Hurt, having served as Senior Independent Director of Countryside Partnerships plc for a number of years, briefly assumed its Chairmanship prior to its merger with Vistry Group. He discussed the change with the Chairman in advance and it was assessed that despite the increased commitment, he would continue to have adequate time to devote to his Vesuvius Board duties.

The Company has reviewed the availability of the Chairman and the Non-executive Directors to perform their duties and considers that each of them can, and in practice does, devote the necessary amount of time to the Company's business.

Composition, evaluation and succession

Appointment and replacement of Directors

The Company's Articles of Association specify that Board membership should not be fewer than five nor more than 15 Directors, save that the Company may, by ordinary resolution, from time to time, vary this minimum and/or maximum number of Directors. Directors may be appointed by ordinary resolution or by the Board. The Board may appoint one or more Directors to any executive office, on such terms and for such period as it thinks fit, and it can also terminate or vary such an appointment at any time. The Articles specify that, at every AGM, any Director who has been appointed by the Vesuvius Board since the last AGM and any Director who held office at the time of the two preceding AGMs, and who did not retire at either of them, shall retire from office. However, in accordance with the requirements of the Code, all Directors will offer themselves for election or re-election at the 2023 AGM. The Board believes that each of the current Directors is effective and demonstrates commitment to his or her respective role. Accordingly, the Board recommends that shareholders approve the resolutions to be proposed at the 2023 AGM relating to the election and re-election of the Directors. The biographical details of the Directors offering themselves for election or re-election, including details of their other directorships and relevant skills and experience, will be set out in the 2023 Notice of AGM. The biographical details of the Directors are also set out on pages 88 and 89.

Recommendations for appointments to the Board and rotation of the Board are made by the Nomination Committee. The Nomination Committee is also responsible for overseeing the maintenance of an effective succession plan for the Board and senior management. Further information on the activities of the Nomination Committee is set out in the Nomination Committee report on pages 110-115.

A comprehensive induction programme is available to new Directors. The induction programme is tailored to meet the requirements of the individual appointee and explains the dynamics and operations of the Group, and its markets and technology. The induction includes, as a minimum, a series of meetings with key Group executives and advisers, along with site visits to the Group's key strategic sites. Further details of the induction provided for the new Chairman are set out in the Nomination Committee report on page 112.

The Chairman, through the Company Secretary, continues to ensure that there is an ongoing process to review training and development needs. Directors are provided with details of seminars and training courses relevant to their role and are encouraged and supported by the Company to attend them. In 2022, regulatory updates were provided as a standing item at each Board meeting in a Secretary's Report. External input on legal and regulatory developments impacting the business was also given, with specialist advisers invited to the Board and Committee meetings to provide briefings on topics such as the changing landscape of Corporate Governance, particularly the latest FRC guidance, Market Abuse Regulations and TCFD.

Performance evaluation

The Board carries out an evaluation of its performance and that of its Committees and individual Directors, including the Chairman, every year. Details of the evaluation conducted in 2022 can be found in the Nomination Committee report.

Audit, risk and internal control

The Board is responsible for ensuring that policies and procedures are in place to ensure the independence and effectiveness of the Internal and External Audit functions. The Audit Committee assists the Board in reviewing the effectiveness of the Group's Internal and External Audit functions, in addition to monitoring the integrity of the Group's financial and narrative statements. Further information about the work of the Audit Committee can be found in the Audit Committee report on pages 101–109.

The Board is also responsible for setting the Group's risk appetite and ensuring that appropriate risk management systems are in place. The Audit Committee assists the Board in reviewing the effectiveness of the system of internal control, including financial, operational and compliance controls, and risk management systems. The Group's approach to risk management and internal control is discussed in greater detail on pages 27–31 and the Group's principal risks and how they are being managed or mitigated are detailed on pages 32 and 33. The Viability Statement which considers the Group's future prospects is included on page 31. Risk management and internal control are also discussed in greater detail in the Audit Committee report.

All of the independent Non-executive Directors serve on both the Audit and Remuneration Committees. They therefore bring their experience and knowledge of the activities of each Committee to bear when considering critical areas of judgement. This means that, for example, the Directors are able to consider carefully the impact of incentive arrangements on the Group's risk profile and ensure that the Group's Remuneration Policy and programme are structured to align with the long-term objectives and risk appetite of the Company.

Remuneration

The Directors' Remuneration Report on pages 116–143 describes the work of the Remuneration Committee in developing the Group's policy on executive remuneration, determining Director and senior management remuneration, reviewing workforce remuneration and related policies – including ensuring that these align with the Group's Strategic Objectives and culture, and overseeing the operation of the executive share incentive plans.

Audit Committee

Douglas Hurt – Committee Chairman

Carla Bailo (from 1 February 2023)

Kath Durrant

Dinggui Gao

Jane Hinkley

The Company Secretary is Secretary to the Committee

Dear Shareholder,

On behalf of the Audit Committee, I am pleased to present the Audit Committee report for 2022. The foundation of the Committee's work each year is a recurring and structured programme of activities which are defined in an annual rolling Audit Committee timetable. The Audit Committee then considers additional items as matters arise or priorities change.

During 2022, the Committee spent time assessing the impact of the war in Ukraine on the Group's activities, both in terms of the immediate effect on the Group's Russian and Ukrainian businesses, but also in terms of the wider impact on energy and raw material pricing, and the macroeconomic effects of inflation and consumer confidence on the business. With the further development of the Group's sustainability reporting the Committee also considered the assurance required for the validation of sustainability metrics, alongside reviewing the Group's TCFD reporting. Finally, in light of the inflationary environment, the Committee undertook a deep dive into the Group's inventory accounting methodology, and again focused on the development of the Group's cyber security measures, as well as continuing to receive regular updates on the implementation of changes to the Group's Finance Operating Model.

The Audit Committee report describes the work of the Committee during the year, including its role in monitoring the integrity of the Company's financial statements and the effectiveness of the Internal and External Audit processes. It provides an overview of the significant issues the Committee has considered during the year and its material judgements. It also describes how the Committee fulfilled its responsibilities to assist the Board in reviewing the effectiveness of the Group's system of internal financial controls and its internal control and risk management systems.

Yours sincerely

Douglas Hurt
Chairman, Audit Committee
2 March 2023

The Audit Committee

The Audit Committee comprises all the independent Non-executive Directors of the Company, who bring a wide range of financial and commercial expertise to the Committee's decision-making processes. Douglas Hurt is the Senior Independent Director and Chairman of the Audit Committee. He was the Finance Director of IMI plc for nine years prior to his appointment and has worked in various financial roles throughout his career. Douglas currently serves as the Chairman of the Audit Committees of Hikma Pharmaceuticals PLC and the British Standards Institution. He is a Chartered Accountant. This background provides him with the 'recent and relevant financial experience' required under the Code.

The Code and Financial Conduct Authority Disclosure Guidance and Transparency Rules also contain requirements for the Audit Committee as a whole to have competence relevant to the sector in which the Company operates. Vesuvius' Non-executive Directors have significant breadth of experience and depth of knowledge on matters relevant to Vesuvius' operations, both from their previous roles and from their induction and other activities since joining the Vesuvius Board. The Directors' biographies on pages 88 and 89 outline their range of multinational business-to-business experience and expertise in fields such as engineering, manufacturing, services, logistics and human resources, as well as their financial and commercial acumen. The Board considers that the Audit Committee as a whole has competence relevant to Vesuvius' business sector.

Meetings

The Committee met five times during 2022. The Committee has also met twice since the end of the financial year and prior to the signing of this Annual Report. The Board Chairman, the non-independent Non-executive Director, the Chief Executive, the Chief Financial Officer, the Head of Finance, the Group Head of Internal Audit and the External Auditors were all invited to each meeting. Other management staff were also invited to attend as appropriate.

Audit Committee meetings are conducted to promote an open debate, they enable the Committee to provide constructive challenge of significant accounting judgements, and guidance and oversight to management, to ensure that the business maintains an appropriately robust control environment. Between Audit Committee meetings, the Chairman of the Audit Committee encourages open dialogue between the External Auditors, the management team and the Group Head of Internal Audit to ensure that emerging issues are addressed in a timely manner.

Audit Committee continued

Activities in 2022

1. During 2022, the Committee paid particular attention to the effects of the macroeconomic environment on the Group. This included assessing the impact of the war in Ukraine on the Group's businesses in Russia and Ukraine, and the wider impact to the Group of the concomitant increases in global energy and raw material pricing, inflation and interest rates. It also continued to monitor the impact of COVID-19 on the Group, particularly in China.
2. The Committee's agenda covered the usual standing items – the review of financial results, the effectiveness of the Group's internal financial controls, and the review of the internal control and risk management systems – as well as additional topics, including updates on cyber security and an in-depth review of the Group's inventory accounting methodology.
3. The Committee continued to receive feedback throughout the year on the implementation of the updated Finance Operating Model. This structure continues the transition of the Business Unit finance functions from purely accounting to forward-looking business support, with clearer accountabilities for controlling functions and a focus on further standardising core processes. The Committee monitored changes to the structure of finance roles and the roll-out of the new model.
4. The Audit Committee continued to devote time to ensure that initiatives to mitigate potential risks and financial exposure remained robust and appropriate.
5. The Committee challenged the assumed growth rates and discount rates used for asset impairment assessments.
6. The Committee considered the Company's going concern statement, challenging the nature, quantum and assessment of the significant risks to the business model, future performance, solvency and liquidity of the Group which were modelled as part of the scenarios and stress testing undertaken to support the Viability Statement made by the Company in the Annual Report and Financial Statements. In particular the Committee examined the criteria selected for enhanced stress testing, which included an unplanned drop in customer demand, debt recovery risk due to customer default, business interruption due to unplanned closure of several key plants and raw material price inflation. The Committee also considered the potential effect of a combination of risk factors occurring at the same time. At the half year the Committee undertook another detailed look at the Company's going concern statement. The going concern statement and Viability Statement are contained within the Strategic Report on page 31.
7. The Committee reviewed the resourcing and delivery of the 2022 Internal Audit plan, considering the effect of the residual COVID-19 travel restrictions in China, and approved the 2023 Internal Audit plan. The Committee monitored both the responses from and follow-up by management to Internal Audit recommendations arising during the year, in particular making sure that where longer-term actions were needed to resolve an issue, effective short-term mitigations were put in place. The Committee discussed at length any significant issues raised, the root causes for those issues and the actions being taken to resolve them.
8. The Committee conducted detailed reviews of provisions, including provisions for disposal, closure and environmental costs, challenging the reasonableness of underlying assumptions and estimates of costs, and the quantum of any related insurance assets.
9. The Committee challenged management's revised forecasts for UK taxable profits that have resulted in the recognition of previously unrecognised deferred tax assets and concurred with the judgement and estimates made to derive the amount recognised and its disclosure as a separately reported item.
10. The Committee reviewed the Group's TCFD reporting and the assurance received regarding the sustainability KPI data.
11. In light of the inflationary environment, the Committee undertook a deep-dive review of the Group's inventory accounting methodology.
12. The Committee reviewed the effectiveness of the Internal and External Audit processes.
13. The Committee Chairman and other members of the Committee were involved in the process to identify and appoint a new Chief Financial Officer. The Committee Chairman was also involved in the selection of a new Group Head of Internal Audit following the resignation of the incumbent.
14. The Committee met with the Internal and External Auditors without management present and received valuable feedback on a range of topics.
15. The Committee received updates on the preparations for the filing of the Group's annual financial report in the required European Single Electronic Format (ESEF).
16. The Committee received regular updates from PwC on material accounting and governance developments impacting the Group, with a more detailed review of alignment with best practice reporting provided in October.
17. The Committee conducted an evaluation of its performance and effectiveness, concluding that the Committee continued to work effectively across all key areas, with a clear and effective agenda and meetings remaining well managed and appropriately resourced.
18. The Committee reviewed its terms of reference.

During the year, as is the Audit Committee's established practice, the Committee members met and discussed business and control matters with senior management both during Board presentations and site visits.

The outcomes of Audit Committee meetings were reported to the Board, and all members of the Board received the agenda, papers and minutes of the Committee.

Statement of compliance with the Competition and Markets Authority (CMA) Order

The Committee considers that the Company has complied with the Statutory Audit Services for Large Companies Market Investigation (Mandatory Use of Competitive Tender Processes and Audit Committee Responsibilities) Order 2014 (Article 7.1), published by the CMA on 26 September 2014, including with respect to the Audit Committee's responsibilities for agreeing the audit scope and fees and authorising non-audit services.

Role and responsibilities

The main role and responsibilities of the Committee are to:

– Monitor the integrity of the Financial Statements of the Company and the Group, and any formal announcements relating to the Group's financial performance, reviewing significant financial reporting judgements contained in them

– Provide advice, as requested by the Board, on whether the Annual Report and Financial Statements, taken as a whole, are fair, balanced and understandable and provide the information necessary for the shareholders to assess the Group's position and performance, business model and strategy

– Review and monitor the effectiveness of the Company's internal financial controls, and internal control and risk management systems

– Review procedures for detecting fraud, and systems and controls for the prevention of bribery and ensure that a thorough review is carried out of all alleged instances of fraud notified to the Committee

– Monitor and review the role and effectiveness of the Company's Internal Audit function and audit programme, ensuring that the function is adequately resourced and operates free from management or other restrictions

– Make recommendations to the Board on the appointment, reappointment and removal of the External Auditors and negotiate and agree the fees and terms of engagement of the External Auditors

– Monitor and review with the External Auditors the findings of their work, including key accounting and audit judgements, how any risks to audit quality were addressed and the External Auditors' views of their interactions with senior management

– Review and monitor the External Auditors' independence, objectivity and effectiveness, taking into consideration relevant law, regulation, the Ethical Standard, other professional requirements and any FRC audit inspection findings

– Oversee the operation of the policy on the engagement of the External Auditors to supply non-audit services

– Report to the Board on how the Committee has discharged its responsibilities

The Committee operates under formal terms of reference approved by the Board. These were reviewed during the year. They are available to view in the Investors/Corporate Governance/Board Committees section of the Company's website: www.vesuvius.com. Within these terms, the Committee and its individual members are empowered to obtain outside legal or other independent professional advice at the cost of the Company. These powers were not utilised during the year. The Committee may also secure the attendance at its meetings of any employee or other parties with relevant experience and expertise should it be considered necessary.

The Committee members believe that they received sufficient, relevant and reliable information throughout the year from management and the Internal and External Auditors to enable the Committee to fully discharge its responsibilities. The work of the Audit Committee is further elaborated in the remainder of this report.

Financial reporting

The Committee fulfilled its primary responsibility to review the integrity of the half year and annual Financial Statements and recommended their approval to the Board.

In forming its views, the Committee assessed:

– The quality, acceptability and consistency of the accounting policies and practices

– The clarity and consistency of the disclosures, including compliance with relevant financial reporting standards and other reporting requirements

– Significant issues where management judgements and/or estimates had been made that were material to the reporting or where discussions had taken place with the External Auditors in arriving at the judgement or estimate

– In relation to the overall Annual Report, whether the Annual Report and Financial Statements taken as a whole were fair, balanced and understandable, taking into consideration all the information available to the Committee

– The Group's compliance with the requirements in respect of TCFD reporting, including the assurance received regarding the sustainability KPI data. The Committee reviewed and approved the climate-related risk and opportunities register, the scenario analyses and the roadmap to net zero

– The application of the FRC's guidance on clear and concise reporting and the key takeaways from the Thematic Reviews issued by the FRC throughout the year on themes such as Judgements and Estimates, TCFD disclosures, Earnings per Share and Deferred Tax Assets

– The disclosure and presentation of alternative performance measures, in view of the guidelines issued by the FRC

The Committee actively deliberated on and challenged reports from the Chief Financial Officer and the Head of Finance. These were well prepared and, for areas of judgement and/or estimation, set out the rationale for the accounting treatment and disclosures, and the pertinent assumptions and the sensitivities of the estimates to changes in the assumptions. The External Auditors also delivered memoranda for the half-year and year-end, stating their views on the treatment of significant issues. The External Auditors provided a summary for each issue, including their assessment of the appropriateness of management's judgements or estimates.

Significant issues and material judgements

The Committee considered the following significant issues in the context of the 2022 Financial Statements. It identified these areas to be significant, taking into account the level of materiality and the degree of judgement exercised by management.

The Committee resolved that the judgements and estimates made on each of the significant issues detailed overleaf were appropriate and acceptable.

Audit Committee continued

Impairment of goodwill

The 2022 year-end carrying value of goodwill of £658m was tested against the current and planned performance of the Steel Flow Control, Steel Advanced Refractories and Foundry CGUs. The Committee considered the Board-approved medium-term business plans and terminal growth assumptions, and the discount rates used in the assessments. Relevant sensitivities using reasonably possible changes to key assumptions were evaluated. The detailed assumptions are provided in Note 17 to the Group Financial Statements.

Given that the models indicated, even with the application of reasonable sensitivities to the assumptions, that there remains significant headroom between the Value in Use and the carrying value, the Committee concurred that no goodwill impairment charges were required.

Other provisions

The Committee continues to monitor the implications of a number of potential exposures and claims arising from ongoing litigation, product quality issues, employee disputes, restructuring, vacant sites, environmental matters, legacy matter lawsuits, indirect tax disputes and indemnities or warranties outstanding for disposed businesses. Due to the long gestation period before settlement for a number of these issues can be reached, provisioning for these items requires careful judgement in order to establish a reasonable estimate of future liabilities. The Committee also assessed the strength of any insurance coverage for certain of these liabilities and challenged the accounting treatment for any amounts deemed to be recoverable from insurers. After due consideration and challenge, and having considered legal advice obtained by the Company, the Committee is satisfied that there are appropriate levels of provisions set aside to settle third-party claims and disputes (Note 30 to the Group Financial Statements) and that adequate disclosure has been made. Where no reliable estimate of the potential liability can be made for the outcome of an existing issue, no provision has been made and appropriate disclosure is included under contingent liabilities (Note 32 to the Group Financial Statements).

Operating segments for continuing operations

The Committee considered the aggregation of the Steel Flow Control, Steel Advanced Refractories, and Steel Sensors & Probes operating segments into the Steel reportable segment, noting the economic characteristics of these operating segments which include a similar nature of products, customers, production processes and margins. The Committee concluded that this segmentation remained appropriate.

Impairment of investment in subsidiaries

The Committee has reviewed management's impairment analysis of the parent company's investment in subsidiaries. Following this review it concurred that no impairment was required.

Provisions for trading balances related to the Russia/Ukraine war

The Committee challenged management's expected credit loss model to ensure that appropriate allowance was made for both receivables balances linked to customers impacted by the Russia Ukraine war, or by the changing sanctions regime, and for obsolete inventory impacted by these factors.

Deferred tax

The Committee challenged management's revised forecasts of UK taxable profits and the amount of the previously unrecognised tax losses that should be recognised. The Committee concurred with management's judgements and forecast estimates to derive the amount of the deferred tax losses to be recognised and with their recognition being treated as a separately reported item in the Consolidated Income Statement.

Fair, balanced and understandable reporting

The Committee considered all the information available to it in reviewing the overall content of the Annual Report and Financial Statements and the process by which it was compiled and reviewed, to enable it to provide advice to the Board that the Annual Report and Financial Statements are fair, balanced and understandable. In doing so, the Committee ensured that time was again dedicated to the drafting and review process so that internal linkages were identified and consistency was tested. Drafts of the Annual Report and Financial Statements were also reviewed by a senior executive not directly involved in the year-end process who reported to the Committee on his impressions of their clarity, comprehensiveness and the balance of disclosure in the document. On completion of the process, the Committee was satisfied that it could recommend to the Board that the Annual Report and Financial Statements are fair, balanced and understandable.

Risk management and internal controls

As highlighted in the reviews of strategy and principal risks in the Strategic Report, risk management is inherent in management's thinking and is embedded in the business planning processes of the Group. The Board has overall responsibility for establishing and maintaining a system of risk management and internal control, and for reviewing its effectiveness. The Audit Committee assists the Board in reviewing the effectiveness of the Group's system of internal control, including financial, operational and compliance controls, and risk management systems. This framework is consistent with the Code.

In 2022, Committee members fully participated in the Board review of existing risks and ongoing mitigating actions, further details of which are given on pages 32 and 33. The Committee believes that the Group's process for identifying and understanding its principal risks and uncertainties, including its emerging risks, remains robust and appropriate.

The Committee considered the Company's going concern statement and challenged the nature, quantum and effects of the combination of the unlikely but significant risks to the business model, future performance, solvency and liquidity of the Group. These were all modelled as part of the scenarios and stress testing undertaken to support the Viability Statement. As part of this review, the Committee considered the Group's forecast funding requirements over the next three years and analysed the impact of key risks faced by the Group with reference to the Group's debt covenants; these included stress testing for an unplanned drop in customer demand, debt recovery risk due to customer default and business interruption due to unplanned closure of several key plants. The scenarios considered the impact of multiple risks occurring simultaneously and the additional mitigating actions that the Group could take. The Committee noted that the Group's debt headroom was sufficient to accommodate the modelled stress scenarios. As a result of its review, the Committee was satisfied that the going concern statement and Viability Statement had been prepared on an appropriate basis. The 2022 going concern statement and the 2022 Viability Statement are contained within the Risk, viability and going concern section on page 31.

The key features of the Group's internal control system, which provides assurance on the accuracy and reliability of the Group's financial reporting, are detailed in the Risk, viability and going concern section on pages 27–33. During 2022, the Committee considered the process by which management evaluates internal controls across the Group. The Group Head of Internal Audit provided the Committee with a summary overview of the assurance provided by the Group's control framework and the testing of these controls. PwC reports if there are any significant control deficiencies identified during the course of their audit.

The Group is made up of several large operating units, but also many small units in geographically diverse locations. Consequently, segregation of duties, overlapping access controls on systems and remote management oversight can give rise to control vulnerabilities and fraud opportunities. The Group has not adopted a common Enterprise Resource Planning system as a Group-wide standard, though where it becomes necessary to update the ERP for a particular business, the same supplier is used for these implementations, where appropriate. Over time, the Group is moving towards a shared services model for financial transactions, enabled by process, systems and controls standardisation between businesses. This is expected to enhance the overall internal control environment in the smaller operating units.

Cyber security

The processes and controls to manage cyber risks continued to be a significant area of focus for the Group in 2022. Vesuvius like most other companies, receives a large number of 'phishing' emails presenting fake credentials and malicious links, and has also been subject to repeated attempts at social engineering fraud. In February this year, the Group was the subject of a cyber incident involving unauthorised access to our IT systems. The Group responded swiftly to the incident, instigating the Cyber Incident Plan and shutting down our IT systems to contain the incident. The Group's sites implemented their business continuity plans to maintain their operations. The Audit Committee has considered the potential impact of the incident on the Group's year-end audit and is satisfied that the data required for the audit was not compromised. The Committee will continue to monitor the impact of this incident and will review the actions being taken to mitigate the risk of further incidents in the future.

Whilst the Audit Committee maintains oversight of the Group's control systems for reducing cyber risk, the Group's IT Committee is responsible for managing this risk. The IT Committee meets on a regular basis to review and progress the Group's plans for mitigating cyber risks and tackling any cyber issues that arise, and the Audit Committee receives regular updates.

Cyber risks are integrated into the Group's wider risk management, including forming part of the Business Continuity Plan (BCP) undertaken to counteract business interruption – either in loss of production capacity or supply chain disruption due to physical site damage (accidents, fires, natural disasters, terrorism), industrial action, cyber attack or global health crises.

Our BCP and cyber security risk management are closely integrated. The Group has conducted repeated cyber security risk assessments, analysing the business impact of certain scenarios to mitigate potential downtime, with an Incident Handling and Response Policy, which has been kept under continual review, and which sets out how we improve visibility and monitoring of all network infrastructure. In addition the Group maintains a Disaster Recovery Plan for inclusion in wider business continuity plans to address network, data centre and infrastructure issues.

Vesuvius operates a multi-year strategy for maintaining and developing cyber security based on best practices and standards, and monitoring trends and cyber threats against appropriate indicators. This encompasses in-house vulnerability testing and analysis, using external reports and benchmarks to develop our processes. Our cyber security work therefore supports and protects our production capacity and delivers investment in appropriate resources in this fast-changing environment. The Group's IT Security Strategy and Roadmap, whilst not formally accredited, is based on the ISO 27001 standard and NIST frameworks, implementing best practices in the area.

During 2022, the Group completed a number of infrastructure and network enhancements to improve its IT security. The Committee places significant emphasis on operational security, of which information and communication technology and cyber security are a vital part. Cyber resilience continues to be a significant area of focus for the Group.

2022 saw further progress in the development of the Group's security monitoring operations, with specialised cyber security tools constantly being introduced and tuned. Significant emphasis is placed on user awareness and in 2022 the Group continued to conduct a series of mandatory cyber security training courses.

The Committee concluded that the work undertaken in 2022 indicated the existence of an appropriate control environment. It did however, note that there were some areas for further upgrade, for which clearly defined improvement actions had been identified, particularly in respect of the Group's cyber risks. The subsequent cyber attack serves to reinforce this as an area of continued focus. The Committee recognises that with an organisation of the size and complexity of Vesuvius it is virtually impossible to eradicate the risk of cyber attack but is pleased to note that whilst the Group's systems were penetrated, the risk management plans and practices in place, particularly the business continuity plans, did serve to mitigate the incident.

Audit Committee continued

The Group undertakes a range of activities to mitigate the risk of fraud. This framework is regularly reviewed to determine areas for improvement. Eliminating the risk of fraud remains one of the key areas of focus for Internal Audit, forming a fundamental part of 'full scope' and financial audits. These assess the quality of the balance sheet reconciliations, review key judgement matters, consider ERP access rights, review tenders and quotations, review the entity's controls over master data changes, and review controls over payments, journals and associated applications, along with travel and expense reimbursements.

Any control issues identified by management locally or as a result of the work performed by Internal Audit are escalated as appropriate. Internal Audit rates all control issues they identify in terms of their significance and agrees remediation plans with the management of the auditee and an action owner, in each case establishing a target date for remediation. For significant issues, management at all levels within the Business Unit are engaged to agree the actions and remediation dates. The status of the remediation is monitored and overdue issues are escalated appropriately with management, and reported at Audit Committee meetings. Where a specific audit identifies multiple issues, or where issues arise on the progress of remediation activities, the Audit Committee continues to challenge management to identify root causes and ensure that the right organisational structure and people are in place to address issues effectively.

During 2022, the Group continued to focus on its framework, policies and procedures for the management of anti-bribery and corruption risk and other compliance/regulatory risks, and the Committee noted the Group's ongoing work conducted in this area. Given the conflict in Ukraine, the Committee discussed in detail the due diligence/compliance processes underpinning the business the Group continues to conduct in Russia and the surrounding region, as well as, more broadly, the process for the monitoring of new and ongoing third-party sales agents. The Committee continued its assessment of the Group's potential exposure to bribery and corruption risks as part of its wider responsibilities for risk management. It was noted that the Group's regular risk assessment work continues, underpinning the Group's activities to ensure that the processes in this area reflect an appropriate level of control for the business.

In line with the requirements of the Code, responsibility for the oversight and monitoring of the Group's Speak Up helpline, which collates allegations of improper behaviour and employee concerns, has passed from the Audit Committee to the full Board. The Committee is kept apprised of any complaints received by the Company regarding fraud, accounting, internal accounting controls and auditing matters. Further details of the operation of the Group's Speak Up policy and helpline can be found on page 94.

Each year, the senior financial, operational and functional management of the businesses self-certify compliance with Group policies and procedures for the areas of the business under their responsibility and confirm the existence of adequate internal control systems throughout the year. The Committee reviews any exceptions noted in this bottom-up exercise.

The Committee has also requested that an updated review of fraud opportunities and risk across the Group be conducted, which is currently under preparation. This will drive a further analysis of the controls in place to prevent this specific instance occurring and the testing of these controls. In addition, the Committee has requested a review of the revenue generated by the sales agents utilised by the Group.

No significant control issues were raised by our External Auditors, PwC and Mazars, and no material issues were identified in 2022. After considering these various inputs, the Committee was able to provide assurance to the Board on the effectiveness of internal financial control within the Group, and on the adequacy of the Group's broader internal control systems.

Internal Audit

The Group's Internal Audit function operates on a global basis through professionally qualified and experienced individual members located in the UK and Poland. They report to the Group Head of Internal Audit, based in London, who in turn reports directly to the Chairman of the Audit Committee. During the year there was a change in the Group Head of Internal Audit. The Chairman of the Audit Committee met with the departing Head of Internal Audit to ensure that this departure was not precipitated by any internal control concerns and was involved in the decision to appoint an internal successor.

Throughout 2022, Internal Audit continued to perform a programme of audits focusing on internal financial controls and key Board compliance issues.

The Committee received, considered and approved the 2022 Internal Audit plan which was constructed using a risk-based approach to cover the Group's control environment. The plan is based on the premise that all operating units are audited at least once every three to four years, and each of the large operating entities located in Germany, the US, China, Mexico and Brazil are audited on an annual basis. With further relaxations in COVID-19 travel restrictions during the year, audits were conducted on-site in the majority of instances, with European audits scheduled in the first half of the year and long-haul audits in the second half. The China audit was conducted remotely due to continuing travel restrictions.

Four categories of audit were conducted: Financial Controls Audits, Deep Dive Trial Balance Audits, Compliance Audits and IT Audits, with the majority of the 32 audit assignments undertaken in 2022 (2021: 34) focused on financial controls. The Committee received a report from the Group Head of Internal Audit at each of its meetings detailing progress against the agreed plan and key trends and findings. An update on the progress made towards resolving open issues was also given. Common themes emerging from Internal Audit reports coupled with Internal Audit and management's assessment of risk have informed the development of the 2023 Internal Audit plan.

When necessary, Internal Audit contracts auditors from other audit firms to supplement internal resources on an ad hoc basis. This process provides valuable learning opportunities and we expect to continue to use external resources in specialist areas and geographies in the future.

Control issues continue to be recorded in a live web-based database into which management is required to report progress towards addressing any open issues. Internal Audit monitors the progress made and frequent meetings continue to be held with each Business Unit President to ensure that engagement on the resolution of issues is clearly understood at all levels of the business and responsibility for remediation has been appropriately assigned. The results are communicated to the Audit Committee which also involves senior management as necessary to provide an update against any high-priority actions. Internal Audit undertakes follow-up reviews as required. In situations where audit findings require longer-term solutions, the Committee oversees the process for ensuring that adequate mitigating controls are in place.

An internal review was undertaken of the effectiveness of the Internal Audit function in 2022. The CFO reviewed the Internal Audit process and function, in conjunction with the new Group Head of Internal Audit, with a view to further enhancing the quality of the department's contribution and maximising efficiency. As a result small changes to the department's protocols were agreed to ensure resource was appropriately applied to ad hoc requests, and that the process for managing and resolving audit findings was always targeted by significance. Having considered the work of the Internal Audit function during 2022, including progress against the 2022 Internal Audit plan, the quality of reports provided to the Committee, and the results of the review of the function's effectiveness, the Committee concluded that the Internal Audit function operated effectively during 2022, exhibiting an appropriate level of independence and challenge.

The Audit Committee has also commissioned Ernst & Young to undertake a formal review of the quality of the Group's Internal Audit function.

External Audit

Auditors' appointment

In 2017, the Company appointed PricewaterhouseCoopers LLP (PwC) as External Auditors to the Company and the Group, and Mazars LLP (Mazars) to audit the non-material entities within the Group. Darryl Phillips serves as the PwC audit partner responsible for the Group audit, a role he assumed following the completion of the 2020 half-year review.

Under the Statutory Audit Services for Large Companies Market Investigation (Mandatory Use of Competitive Tender Processes and Audit Committee Responsibilities) Order, the Audit Committee is required to report in which year the Company proposes to complete a competitive tender process in respect of the statutory External Auditor, and the reasons why the proposed year for the competitive tender process is in the best interests of the shareholders. In compliance with the Order, the Audit Committee confirms that a competitive tender process for the appointment of a statutory auditor will, subject to satisfactory annual reviews of the effectiveness of the External Auditors and its costs in the intervening period, be conducted during 2026 with a view to recommending the appointment of a new statutory auditor or the reappointment of the incumbent auditor, for the financial year ending December 2027. The Audit Committee believes that conducting a competitive tender process during 2026 for the appointment of a new statutory auditor for the financial year ending December 2027 is appropriate, and in the best interests of the shareholders.

2022 Audit plan

During the year the Committee evaluated the PwC Group audit scope for 2022. The year-end audit plan was based on agreed objectives, with the audit focused on areas identified as representing significant risk and requiring judgement. In order to manage costs, and ensure that the Group maintains audit relationships outside the 'Big 4', Mazars undertakes some of the Group audit work under the direction of PwC. It is principally responsible for the statutory audits of the non-material Group subsidiaries, but also undertook specific audit procedures for certain component entities that were within PwC's Group audit scope in 2022. Mazars reported independently to PwC on this work and the work was directed, supervised and reviewed by PwC. Mazars also reported independently to the Committee on the work it undertook auditing non-material subsidiaries.

PwC maintained an ongoing dialogue with the Audit Committee throughout the year providing regular updates, including commentaries on significant issues and its assessment of consistency and appropriateness in the judgements and estimates made by management. Private sessions were held with PwC without management being present. PwC confirmed that its work had not been constrained in any way and that it was able to exercise appropriate professional scepticism and challenge throughout the audit process. The Chairman of the Audit Committee met on a number of occasions with PwC to monitor the progress of the audit and discuss questions as they arose. The Committee also received a report from Mazars during the year which noted that there were no findings or recommendations in respect of its statutory audits of the non-material Group subsidiaries for the year ended 31 December 2021 that Mazars deemed sufficiently material or significant to bring to the attention of the Audit Committee.

The Independent Auditors' Report provided by PwC on pages 151–159 includes PwC's assessment of the key audit matters. These key audit matters are discussed in the significant issues and material judgements comments above. The report also summarises the scope, coverage and materiality levels applied by PwC in its audit. As part of the audit planning process and based on a detailed risk assessment, the Committee agreed a materiality figure of £10.3m for Group financial reporting purposes which is 63% higher than last year (£6.3m) and is set at 4.7% of headline profit before tax of £217m. Importantly, much lower levels of materiality are used in the audit fieldwork on the individual businesses across the Group and these lower figures drive the scope and depth of audit work. Any misstatement at or above £0.52m was reported to the Committee.

There were no significant changes this year to the coverage of the audit which stood at 71% of the Group's revenue, 80% of profit before tax and 82% of headline profit before tax. This coverage was considered to be sufficient by the Committee. The audit coverage is reflective of the long tail of smaller businesses within the Group that individually are not 'material' to the Group result.

The PwC audit fee approved by the Audit Committee was £2.3m. This was constructed bottom-up on a local currency basis and was assessed in light of the audit work required by the agreed materiality level and scope. The fee agreed with Mazars for the audit of the non-material entities and three material entities was £0.9m, resulting in a combined audit fee for 2022 of £3.2m, compared with £2.6m in 2021.

Audit Committee continued

Independence and objectivity

The Committee is responsible for safeguarding the independence and objectivity of the External Auditors in order to ensure the integrity of the external audit process. In discharging this responsibility during 2022, the Committee:

- Sought regular confirmation from the incumbent External Auditors that they considered themselves to be independent of the Company in their own professional judgement, and within the context of applicable professional standards
- Assessed the work of the External Auditors and considered whether they were exercising an appropriate level of professional scepticism
- Evaluated all the relationships between the External Auditors and the Group, including compliance with the Group's policy on the employment of former employees of the External Auditors, to determine whether these impaired, or appeared to impair, the Auditors' independence
- Reviewed compliance against the policy on the provision of non-audit services by the External Auditors
- Reviewed details of the non-audit services provided by the External Auditors and associated fees

As a result of its review, the Committee concluded that the External Auditors remained appropriately independent.

Non-audit services

Vesuvius operates a policy for the approval of non-audit services. A copy of the current policy is available to view in the Audit Committee section of the 'Investors/Corporate Governance' pages of the Company's website: www.vesuvius.com.

The use of the External Auditors for the provision of non-audit services is strictly prohibited except for specific permitted audit related services. These comprise: Category 1 services which the External Auditors are obliged to perform due to law or regulation, such as regulatory and solvency reports; and Category 2 services which could be provided by others (albeit there are typically significant efficiencies to be had when done in combination with the audit such as interim reporting). An annual budget for the additional Category 2 service fees proposed to be paid to the External Auditors in the following year is presented for pre-approval to the Audit Committee each year. Audit Committee approval is required for expenditure in excess of this approved budget.

All audit-related and permissible non-audit services proposed to be carried out for any Group company worldwide by the External Auditors must be pre-approved before an engagement is agreed. Pre-approval must be obtained from the Head of Finance or the Chief Financial Officer, who will confirm that the Audit Committee has approved the engagement. Any assignment proposed to be carried out by the External Auditors must also have been cleared by the External Auditors' own internal pre-approval process, to assess the firm's ethical ability to do the work.

In 2022, the fees for non-audit services payable to PwC amounted to £0.2m (2021: £0.1m). The 2022 fees represent payment for assurance services related to the review of the Group's half-year financial statements, quarterly reviews and tax form audits in India (as required by regulation), tax form audits in Mexico, assistance with an R&D certificate in Italy and a Brazilian equity validation. These are all services where it was considered most efficient to use PwC because of their existing knowledge of the business or because the information required was a by-product of the audit process. In each of the past four years the non-audit related fees have represented <9% of the statutory audit fees.

Effectiveness of the External Audit process

The Committee and the Board are committed to maintaining the high quality of the external audit process. Each year the Committee carries out a formal assessment of the performance of the External Auditors in carrying out their work and of the audit process in general. Input into the evaluation in 2022 was obtained from management and other key Company personnel, members of the Audit Committee and the External Audit team. The review focused on the External Auditors' mindset and culture, skills, character and knowledge, and the quality of its controls, as set out in the guidance for audit committees prepared by the FRC.

The evaluation of the External Auditors included the following steps:

- A survey of key finance and non-finance stakeholders in Head Office and in-scope countries
- A commentary-based survey of Audit Committee members focused on their experience of working with PwC
- A review of other external evidence on PwC audit quality (e.g. report on PwC by the FRC)
- Discussions with PwC and key finance and non-finance personnel

The evaluation concluded that PwC had provided an effective audit for 2022, with the Auditors exhibiting an appropriate mindset and culture, along with possessing the right skills, character and knowledge to effectively manage the audit, whilst adopting appropriate quality controls. Building on last year's feedback, PwC had improved their audit approach and worked on ensuring effective and early communication of audit requirements. PwC was judged to challenge the business in the right areas and provide strong technical expertise. The PwC team was also seen as independent by the Audit Committee and management. Debrief meetings were held at a local level to discuss the 2021 audit, and to constructively share feedback that would facilitate further improvements to the audit planning for the 2022 audit and an improved understanding of the audit approach and requirements. Areas highlighted for further improvement in 2022 included greater stability in the US audit team and enhanced coordination with Mazars and the Shared Service Centres.

Reappointment of PwC for 2022

The Committee is responsible for making recommendations to the Board in relation to the appointment, reappointment and removal of the External Auditors. In undertaking this duty, the Committee takes into consideration a number of factors concerning the External Auditors and the Group's current activity, including:

- The results of its most recent review of the effectiveness of the Auditors
- The results of its review of the independence and objectivity of the Auditors, particularly in light of the provision of non-audit services
- Its ability to coordinate a global audit, working to tight deadlines
- The cost-competitiveness of the Auditors in relation to the audit costs of comparable UK companies
- The tenure of the incumbent Auditors
- The periodic rotation of the senior audit management assigned to the audit of the Company
- External reviews of the performance and quality of the Auditors, including:
  - The annual report issued by the Audit Quality Review team of the Financial Reporting Council on the work of the Auditors
  - The Auditors' own annual Transparency Report

Having considered the aforementioned factors, the Committee recommended to the Board that PwC be reappointed for 2023. It confirms that its recommendation is free from the influence of any third party and that there are no contractual restrictions on the choice of auditor. A resolution proposing the reappointment of PwC will be included in the notice of AGM for 2023.

The Committee requested confirmation, and PwC confirmed that there are no longer any restrictions on PwC network companies performing audits of the Group's listed entities in India.

Audit Committee evaluation

The Audit Committee's performance was evaluated as part of the overall externally facilitated Board and Committee performance evaluation, which is described in-depth on pages 114 and 115. The review concluded that the Committee continued to function well, with the quality and quantity of information provided to the Committee judged to be good, and the level of engagement between the Audit Committee and the Chief Financial Officer and his team, the Group Head of Internal Audit and the External Audit Partner rated highly. It was noted that rigorous processes were in place to review and monitor the work of the Internal and External Auditors, and that the Committee dedicated appropriate resource to monitoring and challenging significant audit issues and material accounting judgements. A number of priorities were identified for the Audit Committee over the coming year, including further focus on cyber security, cognisance of the need to ensure that the Group's internal controls are developed to comply with the new BEIS and Corporate Governance Code requirements when they are announced, and supporting the transition to the new Group Head of Internal Audit and new CFO.

On behalf of the Audit Committee

Douglas Hurt
Chairman, Audit Committee
2 March 2023

Nomination Committee

John McDonough CBE – Committee Chairman (until 1 December 2022)

Carl-Peter Forster – Committee Chairman (from 1 December 2022)
Served on the Committee following his appointment to the Board on 1 November 2022 and chaired the Committee following his appointment as Chairman of the Company on 1 December 2022

Carla Bailo (from 1 February 2023)
Kath Durrant
Dinggui Gao
Friederike Helfer
Jane Hinkley
Douglas Hurt

The Company Secretary is Secretary to the Committee

Dear Shareholder,

On behalf of the Nomination Committee, I am pleased to present the Nomination Committee report for 2022. The primary responsibility of the Nomination Committee is to focus on Board composition and succession planning, and to ensure that the Board is composed of individuals with the appropriate drive, abilities, diversity and experience to lead the Company in the delivery of its strategy. As part of this work, the Committee is also responsible for overseeing succession plans for the Board and senior management, and ensuring that the Group has a consistent pipeline of diverse talent for future potential progression to the Board.

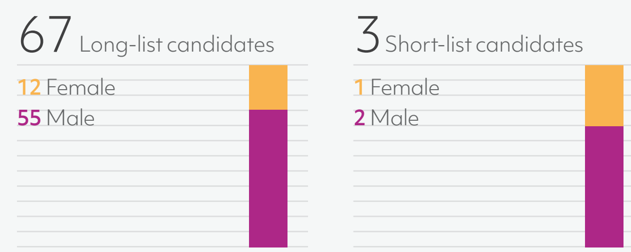
The primary focus of the Committee during 2022 was on succession. Early in the year, the Committee, led by the Senior Independent Director, Douglas Hurt, concluded the process for my appointment as the new Chairman of the Company. Subsequently, following the resignation of our CFO Guy Young in September, the Committee undertook a search for his successor. We are delighted to have appointed Mark Collis as CFO; he will join the Board at the latest on 4 July 2023. At the same time, work also progressed with the appointment of new non-executive expertise on the Board, with Carla Bailo joining us on 1 February 2023. Jane Hinkley, who has provided stalwart service to the Board and its Committees over ten years, confirmed that she would step down from the Board at the close of the 2023 AGM.

Alongside this focus on Board recruitment, the Committee also spent a considerable amount of time during the year discussing senior management succession planning, and in this context, responding to the resignation and retirement of two members of the Group Executive Committee. Allied to this, the Committee discussed more general aspects of resourcing further down the organisation, discussing the turnover, sourcing and diversity of staff in the Senior Leadership Group of c.160 managers. It noted that further work was needed to strengthen the pipeline for future vacancies, to ensure that the Group has the right pool of talent available to fill senior manager vacancies.

Yours sincerely

Carl-Peter Forster
Chairman, Nomination Committee
2 March 2023

Diversity of candidates for the CFO role



The Nomination Committee

The Nomination Committee is made up of me, as Chairman of the Company, and the Non-executive Directors. I joined the Committee on my appointment to the Board on 1 November 2022 and began chairing the Committee when I assumed the Chairmanship of the Company on 1 December 2022. Prior to this John McDonough CBE chaired the Committee. The Company Secretary is Secretary to the Committee. Members' biographies are set out on pages 88 and 89.

Role and responsibilities

The Nomination Committee's foremost priorities are to ensure that the Company has the best possible leadership and to ensure that plans are in place for orderly succession to both the Board and Group Executive Committee positions. The Committee ensures that the procedure for the selection of potential candidates for Board appointments – either as an Executive Director or independent Non-executive Director – is formal, rigorous and transparent, and undertaken in a manner consistent with best practice. It also ensures that appointments to the Board are made on merit, against objective criteria and with due regard for the benefits of gender, social, ethnic and cognitive diversity, and personal strengths.

The Committee met six times during the year. It operates under formal terms of reference, a copy of which is available on the Group's website: www.vesuvius.com.

The Committee and its members are empowered to obtain outside legal or other independent professional advice at the cost of the Company in relation to its deliberations. These rights were not exercised during the year. The Committee may also secure the attendance at its meetings of any employee or other parties it considers necessary.

Process for Board appointments

The Committee follows formal, rigorous and transparent procedures for the appointment of new Directors. When considering a Board appointment, the Nomination Committee draws up a specification for the role, taking into consideration the balance of skills, knowledge and experience of its existing members, the diversity of the Board, the independence of continuing Board members, and the ongoing requirements and anticipated strategic developments of the Group. The search process is then able to focus on appointing a candidate with the necessary attributes to enhance the Board's performance.

During 2022, the Committee finalised the selection process to recruit a new Chairman, undertook a search for a new CFO and, as part of the Group's planned Director rotation, commenced the process to identify a new Non-executive Director for the Board. With regard to the Non-executive Director role, the Committee resolved that it was particularly keen to identify candidates who had significant commercial experience and a US background, to complement the skills of the other Directors. The Committee approached appropriate search consultants to assist with the search. After careful consideration, the global specialist search consultant, Spencer Stuart, was retained to assist with the Chairman and Non-executive Director recruitment, and Odgers Berndtson with the CFO recruitment. Both firms have adopted the Voluntary Code of Conduct addressing gender diversity and best practice in search assignments. They do not have any other connection with the Group, other than in respect of management recruitment work undertaken as part of normal trading activities. They were selected for these assignments following a review of potentially qualified agencies, based on their skills and expertise.

In line with Vesuvius' considerable geographical diversity, the searches for these new Directors targeted candidates from around the world for the long-lists of potential appointees produced by the agencies. For each appointment, the Committee reviewed the long-list of candidates, from which a short-list of candidates for interview was drawn up, based upon the objective criteria identified at the inception of each process.

Key activities during the year

Board composition

During the year, the Committee reviewed the structure, size and composition of the Board. This review also included consideration of the skills, knowledge and experience required for the Board to continue to function effectively and support the delivery of our strategy. This analysis took into account the need to ensure an appropriate balance of independence and diversity among Board members, in particular identifying the need to diversify the geographical make-up of the Board, to reflect the wide geographical spread of the Company's business. The Committee then evaluated the current Board composition against an assessment of future business needs, considering the Directors standing for election and re-election at the AGM.

Board succession

Alongside the focus on the recruitment of the new Chair, CFO and Non-executive Director during the year, the Committee also reviewed the future rotation of Directors from the Board. It considered the requirements for Board composition, and seeking to ensure that the Board continues to be resourced by a group of Directors with the skills, diversity and experience necessary to support the future delivery of the Group's strategic objectives. As part of this review the Committee considered the Company's ongoing compliance with the Board Diversity Policy, also noting the update to the UK Listing Rules effective for financial years starting on or after 1 April 2022, pursuant to which one of the Chair, Chief Executive, Chief Financial Officer and Senior Independent Director should be female. The Board is not currently compliant with this requirement.

Senior management development and succession

The Committee maintained oversight of the changes to membership of the Group Executive Committee during the year, reviewing the Group's succession processes, talent development and proposals for the resourcing of vacant roles going forward. It also considered the management cadre below this level, focusing on the recruitment and retention of talent in the Business Unit Executive Committees, and considering the level of turnover and diversity in the broader Senior Leadership Group, along with the balance of internal promotions and external appointments into these roles. It examined how the Group's talent management processes were developing, how the senior management cadre was performing and how the mentoring programme established for the development of individuals flagged as 'high potential' was proceeding – all aimed at developing the pipeline of experienced and talented managers to succeed to roles at the highest level of the business. In this process, the Committee focused both on the bench strength in key skills and expertise as well as the talent pipeline in critical geographies.

Diversity

The Committee reviewed the Group's progress in achieving its diversity targets, with a particular focus on the recruitment of women to the senior management tiers.

Committee evaluation

The Committee reviewed its performance and effectiveness during 2022, including evaluating whether each Non-executive Director was spending sufficient time fulfilling their duties.

Committee terms of reference

The Committee reviewed its terms of reference.

Nomination Committee continued

Members of the Committee conducted initial interviews with the short-listed candidates. The candidates then went on to meet with other Board members. Detailed external references were taken up and, following this, the Committee made formal recommendations to the Board for the appointments. The successful candidates for the non-executive roles were required to demonstrate that they had sufficient time available to devote to their roles and to identify any potential conflicts of interest. No conflicts were identified.

A comprehensive induction programme is put in place for all new Directors. They are given access to past Board and Committee papers and a programme of meetings and site visits is drawn up to ensure that they can quickly assimilate fundamental information about the business and the Group's operations. For the incoming Chairman this process commenced following the announcement of his appointment in May, so that he was well prepared as he joined the Board and took over the role of Chairman in December 2022.

Carl–Peter Forster induction programme

Areas covered:	Provided by:
Vesuvius' purpose, strategic priorities and business operations	Chief Executive, BU Presidents, CFO, CHRO
Business operations, people and culture	HeaTt Training, site visits to Skawina (Poland), Borken (Germany) and Ghlin (Belgium)
Health and Safety and Sustainability Strategy	Provision of policies/procedures, access to past Board sustainability presentations
Financial position, performance and treasury matters	CFO, External Auditors
Corporate governance, Board operations, legal and regulatory matters	Outgoing Chairman, General Counsel/ Company Secretary, existing NEDs
Shareholder and investment community perspective	Corporate brokers, Cevian

Board composition

The Committee keeps the current and future membership needs of the Board and its Committees under continual review. It reflects on the balance of skills, knowledge and experience of the current Directors and compares this to the list of key skills the Board assesses are needed to support the delivery of the Company's strategy. The independence and diversity of the Board, and the balance of skills, experience and development needs of Board members are also examined as part of the Group's annual corporate governance review, which considers the existing tenure and the prospective rotation and retirement of Board members, so that succession can be planned accordingly. The Board considers its diversity, size and composition to be appropriate for the requirements of the business.

In 2021 the Committee noted that Jane Hinkley had served nine years on the Board. However, given the transition of the Board Chairman, Jane agreed to remain on the Board and continue to support the Group until a successor was recruited following the appointment of the new Chairman. The Board, having carefully considered her circumstances, concluded that she continued to be independent of management and a strong and valuable contributor to the Board's work. Following Carla Bailo's appointment as a new Non-executive Director in February 2023, Jane Hinkley will retire from the Board immediately following the Company's AGM on 18 May 2023.

Diversity

The Group's policy on diversity and inclusion outlines Vesuvius' commitment to encouraging a supportive and inclusive culture among its global workforce, promoting diversity and eliminating any potential discrimination in our work environment. Vesuvius' Board Diversity Policy explains how this commitment manifests in relation to the Board.

Vesuvius recognises the value of a diverse and skilled workforce and is committed to creating and maintaining an inclusive and collaborative workplace culture that will provide sustainability for the organisation into the future. We believe that the dedication and professionalism of our people is the most significant contributor to our success. Having a balance of cultures, ethnicities and genders helps to promote innovation, creativity and engagement. The diversity of our senior management cadre and employees is one of the core strengths of the Group. Copies of the Group's diversity policies can be found on the Group's website: www.vesuvius.com.

The Nomination Committee considers the Group's progress in implementing the Group's diversity policy each year and the achievement of the Group's diversity targets.

Across the Group in 2022, 15% (2021: 14%) of our workforce were women, a slight increase versus 2021. The Group has set a target of ensuring that 25% of the Senior Leadership Group of the Company (which comprises c.160 individuals) are female by 2025. This KPI has been incorporated into the long-term incentives of our senior management. The number of women in the Senior Leadership Group decreased by 1 percentage point in 2022 versus 2021 to 20%. Each of the Group's four Business Units has put in place strategies to address gender diversity.

Board diversity

A large part of the work of the Nomination Committee focuses on ensuring that the Board and its Committees have the appropriate range of diversity, skills, experience, independence and knowledge of the Company and the markets in which it operates, to enable them to discharge their duties and responsibilities effectively. The Board Diversity Policy confirms the Group's commitment to maintaining a diverse Board, while continuing to appoint candidates based on merit. We continue to look at diversity in its broadest sense – reflected in the range of backgrounds and experience of Board members who are drawn from different nationalities and have managed a variety of complex global businesses. The Nomination Committee recognises that diversity is a key ingredient in creating a balanced culture for open discussions at Board level and in minimising 'groupthink'.

All independent Non-executive Directors serve on the Audit and Remuneration Committees, and the Chairman and all the Non-executive Directors serve on the Nomination Committee, so the diversity of the Board's principal Committees reflects the diversity of our Non-executive Directors. The Nomination Committee therefore considers the diversity of the Non-executive Directors as a stand-alone cadre, as well as the diversity of the Board as a whole, when considering recruitment to the Board.

The Board notes the recent change to the UK Listing Rules effective for financial years starting on or after 1 April 2022, requiring companies to confirm whether or not 40% of the board are women; at least one of the senior board positions (Chair, CEO, SID or CFO) is held by a woman; whether at least one member of the board is from a minority ethnic background; and to provide numerical disclosure on the ethnic background and sex or gender identity of the Board, senior board positions (Chair, CEO, SID and CFO) and executive management team.

In 2017, the Board set a target for at least 33% female Board membership. This was achieved in 2019. As at 31 December 2022, women made up 38% of the Directors, no women occupied senior Board positions, one of the Directors (12.5%) identified as having an Asian heritage, and another Director (12.5%) identified as having a mixed race heritage. This represented no change in the Board's gender and ethnic diversity versus 31 December 2021.

Following the appointment of Carla Bailo on 1 February and Guy Young's departure from the Company on 17 February, the proportion of women on the Board has increased to 50%. Currently, five Directors hold citizenship outside the UK.

The Board recognises that over time the proportion of female Directors may fluctuate naturally as Board members retire and new Directors are appointed. The Board always seeks to review a diverse long-list of candidates for all Board positions. All independent Non-executive Directors serve on the Audit and Remuneration Committees, so with the appointment of Carlo Bailo women currently make up 60% of the membership (50% in 2022), and all the Non-executive Directors (including the Chairman) serve on the Nomination Committee so women represent 57% of the membership of this Committee (50% in 2022).

Further information on the Group's approach to promoting diversity can be found on page 77.

As at 31 December 2022, the gender balance of the Group's employees was as follows:

	Female	Male	Total	Female	Male
Group Executive Committee member	2	5	7	29%	71%
Leadership roles reporting to members of the GEC	12	40	52	23%	77%
Senior Managers[1]	**14**	**45**	**59**	**24%**	**76%**
All other employees	1,662	9,413	11,075	15%	85%
Grand total	**1,676**	**9,458**	**11,134**	**15%**	**85%**
Senior Leadership Group[2]	**31**	**125**	**156**	**20%**	**80%**

1. Senior Managers comprise Group Executive Committee members plus key leadership roles reporting directly to members of the Group Executive Committee.
2. The Senior Leadership Group comprises the 156 most senior managers in the organisation.

As at 31 December 2022, the gender balance of the Directors and members of the Group Executive Committee was as follows:

	Number of Board members	Percentage of the Board	Number of senior positions on the Board (CEO, CFO, SID and Chair)	Number in Group Executive Committee	Percentage of Group Executive Committee
Men	5	62.5%	4	5	71%
Women	3	37.5%	–	2	29%
Not specified/prefer not to say	–	–	–	–	–

As at 31 December 2022, the ethnic background of the Directors and members of the Group Executive Committee was as follows:

	Number of Board members	Percentage of the Board	Number of senior positions on the Board (CEO, CFO, SID and Chair)	Number in Group Executive Committee	Percentage of Group Executive Committee
White British or other White (including minority-white groups)	6	75%	75%	6	86%
Mixed/Multiple Ethnic Groups	1	12.5%	25%	1	14%
Asian/Asian British	1	12.5%	–	–	–
Black/African/Caribbean/Black British	–	–	–	–	–
Other ethnic group, including Arab	–	–	–	–	–
Not specified/prefer not to say	–	–	–	–	–

The data for these tables was collected by asking individuals to self report against the categories displayed.

Nomination Committee continued

Board evaluation

The Board carries out an evaluation of its performance in Q4 each year. This year's evaluation was again externally facilitated by the corporate advisory firm, Lintstock. The Group uses Lintstock's Insider List database tool but has no other connection with the organisation and Lintstock does not have a connection with any of the Directors.

Each evaluation was conducted via a series of targeted questionnaires. As with previous years, the evaluation covered both the performance of the Board and that of its Committees, along with individual reviews of each Director and an analysis of the performance of the Chairman. Narrative reports were prepared for the Board, the Audit, Nomination and Remuneration Committees, and in respect of the Chairman.

In 2022, the Board assessment focused on eleven core areas:

- Board composition
- Board dynamics
- Strategy
- Sustainability
- Talent
- Risk oversight
- Oversight of stakeholders
- Board support and focus of meetings
- External developments
- Business priorities
- Priorities for change

Lintstock also compared the Board's ratings against those of other organisations, to identify areas of particular strength and to provide additional context. In particular, given the change of Board leadership, the evaluation was structured to provide the incoming Chairman with a 'baseline' of overall Board performance, rather than focusing on specific events or elements of the Board's work as has been the case in previous years.

Overall, the Board was seen to operate effectively with an appropriate composition and range of diversity, with the Non-executive Directors deemed to provide appropriate and constructive challenge to management. The Board's relationships and dynamics were rated positively overall, although it was noted that Remuneration Committee deliberations had created areas of tension. The management of meetings, quality and adequacy of performance reporting, quality of presentations made to the Board and level of support provided received high ratings. The balance of the Board's focus was also generally viewed favourably although, as in previous years, there were areas highlighted for greater or reduced emphasis going forward.

The Board's understanding of the views and requirements of stakeholders was rated highly with regard to investors, employees and customers. It was noted that there was continued scope to improve the Board's understanding of the interests of suppliers, and the dynamics of the Group's sourcing of raw materials and services. The Board's effectiveness in setting and monitoring culture throughout the organisation was rated positively and it was noted that the process for Non-executive Director workforce engagement would be further refined in 2023.

In terms of strategy, Vesuvius' significant focus on Sustainability was highly rated, with the integration of sustainability initiatives and targets throughout the business well understood. The Board indicated the importance it placed on continuing to develop its understanding of the Group's technology offerings for customers. Vesuvius' capacity to deliver on its strategic objectives continued to be rated highly overall, with emphasis placed on the importance of having the right people in place to execute the strategy. It was noted that talent retention, development and succession planning continue to be key areas of focus for the Board.

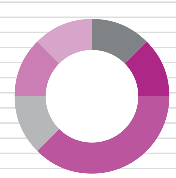
In addition to the primary focus on safety, and the issues highlighted above, the top priorities for Vesuvius as a business over the coming year were identified by the Board as being continuing to focus on succession planning for executive and GEC roles, expanding the geographical diversity of the Board and improving the effectiveness of the workforce engagement programme through site visits. The Board is also keen to gain further insight into the Group's supplier base and profile.

The new Chairman conducted one-on-one meetings with each of the other Directors, to discuss the evaluation process and outcomes and ensure that the Group was drawing effectively on each of their skills and experience. He concluded that each Director continued to contribute effectively to the work of the Board. An assessment of the outgoing Chairman was conducted by the Senior Independent Director. Each of the Committees was also considered to have operated effectively during the year.

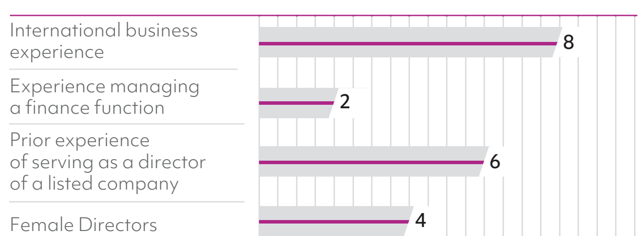
As in previous years, a set of action points was compiled from the output of the evaluation to ensure that its findings are integrated into the Board's activities. These will be implemented by the Board in 2023, with progress reviewed by the Board throughout the year.

Current Board nationalities

1 Austrian
1 German
3 British
1 French
1 American
1 Chinese



Board composition



Further information on the Group's approach to promoting diversity 77

The 2021 evaluation identified the following Board priorities for future Board attention; these were addressed during 2022 as follows:

Area	Issue	Action taken in 2022
Strategy	Oversee the further development of the Group's sustainability strategy and its integration into business planning	Throughout the year the Board received briefings from the Chief Executive and VP Sustainability on the activities of the Group's Sustainability Council, which is tasked with immediate oversight of the Group's sustainability activity. The Board monitored progress against the Group's targets and received updates from the Business Unit Presidents on the work being undertaken in the businesses to further embed the Group's sustainability objectives. The Board also reviewed the more detailed work that had been undertaken to set intermediate targets to drive the Group's progress to net zero at the latest by 2050.
	Enhance the Board's awareness of competitors' activities and the dynamics of the Group's customers and suppliers	A 'deep-dive' into the breadth of Vesuvius' competitive landscape was presented at the Board's Strategy meeting alongside more detailed information on each Business Unit's particular customer and competitor dynamics. A presentation covering Vesuvius' global customer landscape was made in September during the Board's Indian site visit, and a further paper covering the Group's purchasing and key supplier strategy was presented to the Board in October. Further updates on the activities of the Group's competitors, customers and suppliers were given by the Chief Executive throughout the year, as significant matters arose.
People and organisation	Board and GEC succession planning	The Nomination Committee undertook searches for a new Chairman, new CFO and new Non-executive Director. It also oversaw the actions undertaken to address vacancies in the GEC and monitored the recruitment, development and retention of individuals in the senior management cadres, along with the impact of these actions on the Group's talent pipeline.
	Workforce engagement	After two years of limited opportunity for travel, the Non-executive Directors were able to undertake a more comprehensive schedule of site visits in 2022. Each of the nine sites they visited provided them with the opportunity to engage directly with the workforce, including conducting 'town hall' meetings to discuss the work of the Remuneration Committee and respond to questions from employees across all topics.
	Board dynamics	A detailed series of induction meetings and site visits were conducted, and key past Board papers were shared to facilitate the integration of the new Chairman into the work of the Board.

Senior management succession

The Committee's succession planning activities also encompass the senior management levels immediately below the Board, aiming to support and encourage the growth of a pool of talent able to step up to the Group's top roles. The Committee spent a significant amount of time during the year discussing senior management succession, in the context of the resignation of the President of Advanced Refractories and the retirement of the President Operations and Technology from the Executive Committee. As a matter of routine, the Committee considers succession plans for all the senior functional and Business Unit positions, assessing the availability of candidates who could cover the roles on a short-term contingency basis should the need arise, along with the pool of medium-term and long-term talent available for future development into specific roles. The Committee was kept apprised of plans in relation to the resourcing of the two Executive Committee vacancies. No internal candidates were judged ready to assume the role of President of Advanced Refractories and so an external recruitment exercise was launched which remains ongoing. It was resolved that the role of President Operations and Technology would not be directly replaced, with the responsibilities allocated to existing senior managers in the Business Units or supported by recruitment to new non-Executive Committee roles. The Committee also considered the level of turnover in the Senior Leadership Group and the activities being undertaken to retain existing talent, along with the action being taken to develop and recruit new executives to fill gaps in this talent pool.

Committee evaluation

The Committee's activities were a separate part of the externally facilitated evaluation of Board effectiveness during the year. The results of the questionnaires were collated, and a written report tabled and discussed by the Committee. The management of Nomination Committee meetings continued to be rated highly, with a further improvement seen in the quality of information provided, including a greater breadth of information presented on executive talent development and succession planning. The Committee's effectiveness in promoting the development of a diverse pipeline of talent throughout the organisation was rated positively, although it was noted that further work needed to be undertaken to promote greater gender diversity. The succession planning process for the Non-executive Directors was deemed to be functioning well but it was noted that the succession plans for the Executive Directors and other members of the GEC were not fully developed, which had been brought into sharp focus by the departures from this group during the year. The pipeline of talent for these roles and those in the immediate levels below will be an area of significant emphasis for the Committee during 2023.

On behalf of the Nomination Committee

Carl-Peter Forster
Chairman, Nomination Committee
2 March 2023

Directors' Remuneration Report

Remuneration overview

Kath Durrant – Committee Chair

Dinggui Gao
Jane Hinkley
Douglas Hurt
Carla Bailo (from 1 February 2023)

The Company Secretary is Secretary to the Committee

Dear Shareholder,

I am pleased to present our Directors' Remuneration Report (Remuneration Report) for 2022 which, in addition to this Chair's letter, is divided into two sections:

– Our proposed new Directors' Remuneration Policy for approval by shareholders at the AGM in May 2023; and

– The Annual Report on Directors' Remuneration. This outlines how we implemented the current Directors' Remuneration Policy in 2022 and how we intend to apply the new Policy in 2023

2022 was a year of considerable challenge for the Committee as it sought to ensure that the Company's remuneration strategy remained fit-for-purpose and appropriately rewarding in the face of retention challenges and a recent history of low incentive pay-outs.

Key activities in 2022

- Reviewing and approving achievement against the performance targets for the 2021 Annual Incentive arrangements
- Setting performance targets and approving the structure of the 2022 Annual Incentive arrangements, including targets for the new KPIs supported by shareholders in the January 2022 consultation
- Reviewing and assessing the Company's attainment of performance conditions applicable to the Vesuvius Share Plan (VSP) awards made in 2019
- Setting the performance measures and targets, and authorising the grant of new awards in 2022 under the VSP, the Deferred Share Bonus Plan and the Medium-Term Incentive Plan
- Considering the Company's ongoing share sourcing requirements to meet obligations under the Company's share plans, and funding of the Employee Benefit Trust (EBT)
- Reviewing employee remuneration arrangements around the Group, with particular reference to the cost of living issues facing many of our workforce in the current climate
- Reviewing the impact, on the Group's remuneration targets, of the war in Ukraine and of the sanctions regime on Russian entities
- Considering retention issues and reviewing a range of options
- Approving the 2021 Directors' Remuneration Report and reviewing the 2022 Directors' Remuneration Report
- Reviewing the Committee's terms of reference
- Approving the 2023 remuneration for the Chairman, Chief Executive and senior management

Review of executive remuneration

2023 Remuneration Policy

> Our current Policy was approved by shareholders in 2020 and expires in 2023 so we will seek shareholder approval at the forthcoming AGM for a new Policy. The Remuneration Committee has concluded that modest changes are required to the Policy at this time, including a change to the annual incentive opportunity level.

In my statement last year I reported on the extensive executive remuneration review that the Committee undertook in 2021 to understand our competitive positioning, our alignment of pay and performance over time, feedback from shareholders and the views of Board and Executive Committee members. That review identified a number of issues including the challenge of setting long-term targets in a cyclical business, the scope for alignment with strategy to be improved through the selection of alternative KPIs, a desire to incorporate ESG KPIs more explicitly into incentive arrangements and a desire to ensure both the incentivisation and retention of the executive team.

During this review we considered a range of alternative share incentive structures – including a hybrid arrangement of part Restricted Stock Units (RSUs) and part performance shares, and whilst potentially attractive the Committee concluded that it was unlikely that this would achieve shareholder support in the present environment. The Committee also considered a full RSU plan, but was (and remains) of the opinion that long-term share awards should be linked, in the main, to long-term performance.

Following the review, some modest changes were made to the performance measures in our incentive structure for 2022, principally the introduction of a returns measure (post-tax ROIC) to align with our strategy of delivering value to shareholders and the introduction of ESG measures aligned with our Sustainability Strategy. The Committee has noted positively the resultant increased focus on ROIC in internal discussions regarding potential acquisitions and in the deployment of capital across the Group. The inclusion of ESG metrics has similarly had a reinforcing effect on behaviours with continued focus on the environmental scorecard in management teams across the business, particularly with regard to CO_2 emissions, diversity and safety, which are prime tenets of the culture of Vesuvius. We now need to take time to assess whether these changes have addressed the underlying issues identified in the review or whether more fundamental changes may be required in the future to ensure the long-term plan achieves its objectives and to ensure continued alignment with our Group strategy. Accordingly, the Committee has concluded that no substantive changes should be made to the Policy concerning long-term incentives at this time, in order to allow an appropriate assessment of the impact of the changes to the performance measures. We intend to keep the issue under close review during 2023.

The Committee has spent further time in 2022 considering issues of retention in light of the findings from our review in 2021 and we appreciated the support of shareholders for a substantial increase in salary for our CFO, Guy Young, in early 2022. Unfortunately, we were not able to retain Guy who left Vesuvius in February 2023. The market for talented executives is very strong and we have also experienced other regrettable losses in the senior team, of which there are more details below. A consequent focus on our competitiveness has led us to review the upper limit of annual incentive opportunity in the Policy which, after extensive debate by the Committee, we propose to increase from 150% to 175% of salary for the Executive Directors. A number of shareholders queried this aspect of our policy proposal and we discussed the Committee's track record of setting highly challenging performance targets, as evidenced by the below-market level of incentive pay-outs over the ten years since demerger despite consistently strong performance by management (average AIP c.56% of max; average VSP vesting c.31% of max). Whilst setting targets in a cyclical business can be challenging, I would like to reassure shareholders that we have every intention of continuing to set challenging targets going forward.

The Committee additionally took the opportunity to review the current Policy against the UK Corporate Governance Code, shareholder guidance and general market practice. Following that review, a handful of other minor changes are proposed to the new Policy, details of which are summarised on page 124.

CEO remuneration in 2023

In turbulent times steady leadership is particularly important. Unfortunately, we have suffered a number of regrettable recent losses amongst our senior team. In addition to Guy Young's recent departure, Thiago Avelar, the Business Unit President responsible for Advanced Refractories left the business in December 2022 and Patrick Bikard, President Operations and Technology retired at the end of 2022. The loss of experience at the helm of the organisation has concerned the Board and the Remuneration Committee. Whilst there are usually multiple factors in people's decisions to move, it is the Committee's judgement that dissatisfaction with overall remuneration has played a part. In particular the lack of pay-outs from the long-term incentive is a particular cause for concern amongst the management team.

The Board, absent the CEO and CFO, determined that it was a commercial imperative, and in the best interests of all stakeholders – including our employees – to retain the CEO, Patrick André, and the remainder of the Executive team given the vital stability that they provide at the head of Vesuvius in this important period whilst a number of leadership transitions take place, including that of the Chairman. As such, the Board requested that the Remuneration Committee consider all options at its disposal to ensure retention. In this context, the Committee concluded that there needed to be a substantial repositioning of Patrick's remuneration and therefore agreed an increase of 12% in his salary to £720,000 and, subject to approval of the new Remuneration Policy, an increase in his annual incentive opportunity from 150% to 175% of salary. The market for talent is strong in both public and private organisations and this arrangement places Patrick's remuneration firmly in the upper quartile of a competitive market which the Committee believes is appropriate given his critical importance to the Group, his position as a seasoned FTSE CEO and his sustained strong performance. Patrick's extensive industry experience is particularly important as the business seeks to successfully navigate a complex macro environment across multiple countries in this period of transition.

This is not a decision we have taken lightly, particularly in the current circumstances, and the Committee looked at a range of options for changing Patrick's remuneration. However, we believe that the solution we have arrived at is the best option to ensure that we have continuity and stability in the leadership of the Group. This proposal was discussed with a range of stakeholders including both the former and new Chairmen and our top twenty shareholders, which included Cevian Capital, our largest shareholder with a 21.11% holding in the Company. As part of these consultations, I discussed in detail the rationale for such a significant increase in the overall package, the skills and experience of the Executive team remaining, the gaps left by those departing, succession planning in a broader sense and remuneration comparisons to other industrial businesses along with the broader FTSE 250 and other comparable non-UK and private businesses. I also discussed how Vesuvius is a global business and its Executive team is diverse, with four nationalities present, reflecting the way in which Vesuvius recruits from the global marketplace, and how this practice creates greater risk for the Group, as our Executives have a worldwide market to access for alternative roles in both public and private businesses.

In coming to this decision, the Committee was also cognisant of the experience of our general workforce during challenging times. We are all acutely conscious of the difficult economic environment faced by our workforce in the 40 different countries in which we operate and this is reflected in our broader pay decisions this year. For context, our 2023 salary budget increase for the wider workforce (on a weighted average basis) is c.9% globally, higher than any in recent years. The majority of the non-managerial workforce are represented by trade unions or via other collective arrangements, so the Committee is satisfied that employees' interests are being represented, both in our own review and through salary negotiations throughout the organisation. Additionally, we have taken action in certain key markets particularly affected by the cost of living crisis. For example, in Poland, the 2023 salary increase was partially accelerated into Q4 2022 to help address the issues faced by our workforce.

Remuneration overview continued

In Brazil, we have been offering employees access to health and nutrition advisers, and psychologist support, to counter the physical and mental challenges faced as a result of increased financial pressures; and in the United States we provided one-off lump sum payments to selected employees mid-year, and formally introduced hybrid working in many locations to reduce the burden of rising travel costs.

Employee engagement continues to be measured, participation rates are high and overall results positive relative to benchmarks.

Appointment of new Chief Financial Officer

Our new Chief Financial Officer, Mark Collis, will join the Company on or before 4 July 2023. Mark has been appointed on an annual salary of £420,000 (unchanged from the salary received by his predecessor in 2022) and pension provision of 17% of salary (in line with the average received by the majority of the global workforce). He will also be entitled to an annual incentive opportunity of 150% of salary and a long-term incentive award of 150% of salary (both unchanged from the opportunities available to his predecessor). In 2023, both will be prorated to reflect the period employed during the calendar year. The Committee believes this package to be competitive and broadly at median, but more importantly, appropriately positioned vis-à-vis the remuneration received by members of the Group Executive Committee.

As a consequence of joining Vesuvius plc, Mark Collis is expected to forfeit certain annual and long-term incentives from his current employer. In order to compensate him for this, he will receive a one-off payment equivalent in value to the 2022 annual incentive payment he has foregone. He will also receive a combination of restricted share awards and performance share awards under the Vesuvius Share Plan, over Vesuvius plc shares, to compensate him for the equity incentives that he has foregone. These shares will vest on a like-for-like basis with regard to quantum/value and timeline versus the awards he has lost. The share awards will be made in accordance with the rules of the Vesuvius Share Plan, and the Group's Remuneration Policy for Executive Directors, and will count towards Mark's shareholding requirement. Full details of the compensatory awards, with share awards expected to total around 80,000 shares, will be included in next year's Remuneration Report once they have been finalised and granted following Mark's commencement of employment.

Our outgoing Chief Financial Officer, Guy Young, will not receive any annual bonus for the performance year 2022, and all his outstanding performance share awards lapsed upon his departure date, in line with the Remuneration Policy.

Alignment of our KPIs with Company strategy, purpose and values

The delivery of financial KPIs and the development of an effective organisation sustainable over the long term relies on a clear set of values. Vesuvius believes that high levels of performance and growth require a diversity of thinking and continuous innovation, underpinned by the behaviours of courage, ownership, respect and energy. The alignment of our incentives with our Strategic Objectives is summarised in the table below. As outlined above, no changes are proposed in the KPIs used to assess performance in 2023.

KPI	2022 and 2023 weighting	Strategic rationale
Annual Incentive Plan: one-year performance		
EPS	40%	Consistent with our strategic aim of sustainable, profitable growth Maintains the primary focus on a profit measure in short-term incentivisation
Working capital/sales	20%	Consistent with our strategic aim of maintaining strong cash generation and an efficient capital structure
Post-tax ROIC	20%	Consistent with our strategic aim of generating sustainable profitability and creating shareholder value
Personal measures	20%	Enables a focus on specific personal deliverables, managed through the performance management system
Vesuvius Share Plan: three-year performance		
Relative TSR	40%	Consistent with our strategic aim of delivering shareholders a superior return on their investment
Post-tax ROIC	40%	Consistent with our strategic aim of generating sustainable profitability and creating shareholder value
ESG	20%	Provides a specific focus on the three priority long-term ESG measures for the Group: CO_2 intensity (10%), Safety (5%) and Diversity (5%)

Performance and incentive outcomes in 2022

Health and safety

As the Chairman and Chief Executive outlined in their statements, Safety continues to be our number one priority at Vesuvius. After the significant improvement registered in 2021, we stabilised our safety results in 2022 with a Lost Time Incident Frequency Rate of 1.08 vs 1.06 in 2021. However, we remain dissatisfied with this level and are intensifying our efforts to progress rapidly towards our objective of zero incidents. Despite continued focus and strong performance across our sites, it is deeply regrettable to report that we suffered a fatality at our joint venture site in Wuhan, China. The Committee considered whether any adjustments to incentives should be applied as a result of this fatality, however, given the relevant elements of operational management of this site sit outside of Vesuvius' control, this was not felt to be appropriate. We have worked quickly with our partners to ensure we learn the necessary lessons to prevent this tragedy being repeated.

Operational

Revenue for the year increased to £2,047m (+18% on an underlying basis vs 2021), continuing the post-pandemic bounce back in key markets. Trading profit at £227m was 50% greater than 2021 (on an underlying basis) and return on sales increased by 240bps, on an underlying basis, to 11.1%. These results exceeded expectations in what has been a challenging year for Vesuvius and many industrial businesses. The conflict in Ukraine, coupled with continuing pandemic-related supply chain disruptions have continued to bring significant challenge and complexity to each area of our operations. The ongoing management of pricing and the ability to pass on frequent price increases has been a critical area of focus both centrally and in our decentralised operations requiring extensive customer interaction.

The conflict in Ukraine posed challenges for us in Russia, where the cessation of sales to sanctioned customers affected revenue and profits. Nevertheless, both the Steel and Foundry Divisions achieved a strong commercial performance in 2022, gaining market share in most regions, and with the Flow Control Business Unit specifically gaining market share in all regions.

Our trade working capital to sales ratio was 23.8%, an increase of 290bps vs 2021. We are working to reduce the ratio, focusing on driving down overdues, and managing production to control inventory levels. Product quality metrics have continued to improve.

Strategic

We significantly increased our investment in research and development in 2022, reaching £36m, an increase of 18% over 2021, fully expensed in our profit and loss statement. Our main focus areas remain the innovation in materials science, with the objective to continuously improve the performance of our consumables, and the development of mechatronics solutions enabling our customers to substitute operators to manipulate our consumables and, by doing so, improve their safety, reliability, cost and quality performance.

We successfully launched 15 new products in 2022 in our three Business Units. Our New Product Sales ratio, defined as the percentage of our sales realised with products which didn't exist five years ago, reached 16.2% in 2022, up from 15.3% in 2021.

The Sustainability initiative launched in 2020 has continued to deliver strong results across the associated KPIs, with Scope 1 & 2 CO_2e emission intensity continuing to reduce (with 2022 emissions 18.8% lower than the 2019 base year); sustained levels of diversity with women representing 20% of the Senior Leadership Group, and succession candidates identified for the majority of critical roles.

The Chief Executive led the Board through extensive strategy discussions exploring options for both organic and inorganic growth. The 2021 acquisition of the refractory business from Universal Refractories, Inc was leveraged with the consolidation of manufacturing of advanced refractory and foundry products (both of Vesuvius and those acquired from Universal) to enhance operational efficiency. In addition, in October 2022 we acquired Bayuquan Magnesium Co (BMC), a world-class basic monolithic refractory plant in China and a long-standing manufacturing partner of ours. As outlined in the Chief Executive's statement, we hope this will support our continued development in the fast-growing Asia-Pacific region. The balance sheet remains strong after these acquisitions with the Company's net debt position at 0.9x EBITDA.

Strategic alignment

Always put safety first

Deliver profitable growth

Generate value for our shareholders

Maintain an efficient capital structure

Deliver industry-leading sustainable operations and solutions

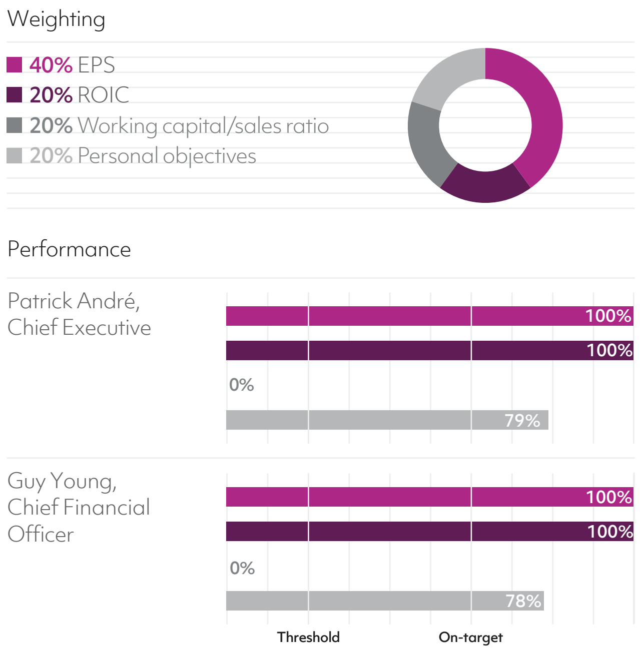
Think beyond in innovation

Foster talent, skill and motivation in our people

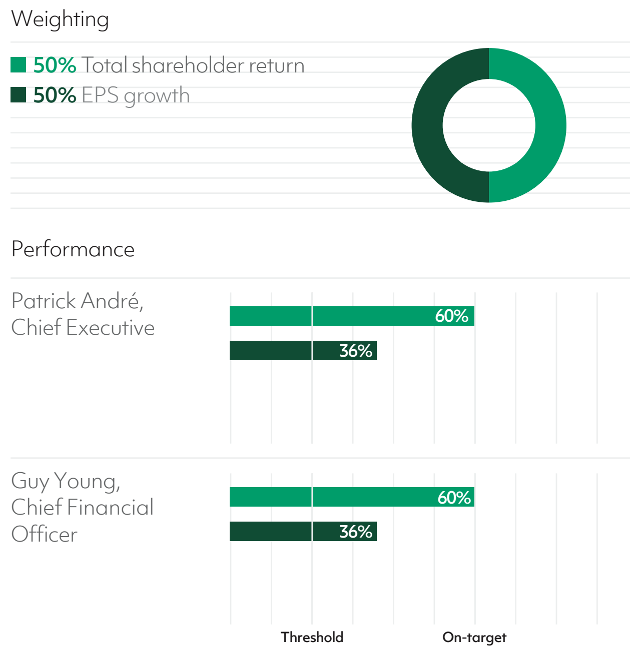
See more about Our strategy on p18 and 19

Remuneration overview continued

Annual Incentive Plan outturn



Vesuvius Share Plan 2020 outturn



In 2022, the Annual Incentive Plan (AIP) was based 40% on Group headline earnings per share (EPS), 20% on Group post-tax ROIC (Return on Invested Capital), 20% on the Group's working capital to sales ratio (based on the 12-month moving average) and 20% on specified personal objectives. Performance against these measures is illustrated above and full details of the targets are given on page 136.

Our adjusted headline earnings per share of 56.5 pence, 53.6 pence when restated at December 2021 exchange rates, was above the maximum Annual Incentive Plan target of 46.6 pence and above the 2021 outturn of 38.8 pence.

The Group's post-tax ROIC of 10.7% also exceeds the maximum Annual Incentive Plan target of 10.0%.

The Group's working capital to sales ratio of 23.8% fell below the threshold Annual Incentive Plan target of 23.6%.

The Committee agreed personal objectives for the Chief Executive and CFO at the start of 2022 and assessed their performance to merit 79% and 78% of maximum targets respectively.

The overall formulaic outcome of the bonus scorecard was 75.8% of maximum for the Chief Executive and 75.6% of maximum for the CFO. However, it should be noted that, due to the resignation of Guy Young in 2022, he forfeited his entitlement to any pay-out under this plan.

The Committee gave careful consideration to these outcomes and was satisfied that they were consistent with the strong financial and operational performance and strategic progress outlined above. The Committee noted that similar and complementary KPIs exist in the incentive programmes for managers and employees and was mindful of the outturns for the wider workforce in confirming its decisions for Executive Directors and the Executive Committee. Consequently, the Committee concluded that no discretionary adjustment was required.

The performance period for the awards made under the Vesuvius Share Plan (VSP) in 2020 was completed at the end of 2022. Performance was measured equally by reference to total shareholder return (TSR) relative to the FTSE 250 (excluding investment trusts) and headline EPS growth over the three-year period. Although this has been a particularly challenging period for the global economy and, by extension, a cyclical business like Vesuvius, relative TSR performance was above median and headline EPS growth was above the target performance level. These results mean that 48.1% of the shares potentially available to the Chief Executive under this award will vest. Due to his resignation, Guy Young's awards lapsed upon his departure. The Committee has not applied any discretion with respect to this vesting of the 2020 VSP awards which it believes is a fair result in the context of overall business performance over this three-year period. In particular, the Committee was satisfied that, as a result of its decision in 2020 to use a share price which was 11.4% higher than the formulaic grant price to determine the level of VSP awards, there are no concerns in relation to windfall gains pertaining to these awards.

Chairman and Non-Executive Directors' fees

During the year, the Committee reviewed the Chairman's annual fee, and determined that an increase from £240,000 p.a. to £250,000 p.a. was appropriate. Separately, the Board considered Non-executive Director fees and made a number of consequent adjustments to the fee structure that are detailed on page 138. Those adjustments include the proposed introduction of a travel allowance payable in respect of additional time spent travelling internationally on Company business.

Employee engagement

During the year the Non-executive Directors visited plants in Belgium, Brazil, India, Japan, the Netherlands and Mexico. Each of these site visits enabled direct discussions with local management teams and the workforce on a range of topics. At larger sites, 'town hall' meetings enabled two way dialogue on a range of issues. In these meetings it was usual for Non-executive Directors to present on how the Board and its Committees operate, and on corporate governance, including executive remuneration.

In 2022, the Remuneration Committee received a report from the Chief HR Officer regarding workforce terms and conditions across the globe. The subsequent discussion enabled the Committee to better understand the standards applied across a highly decentralised group to ensure appropriate and competitive remuneration arrangements exist in each operating company. The key issues raised reflect the pressures of the present inflationary environment – particularly in higher inflation countries; the impact of low unemployment levels in many of our main markets, retirement levels and decreasing workforce availability – all of which are driving very competitive recruitment market conditions at all levels of the organisation. The Committee noted the range of solutions being developed as part of the People Strategy – including improved employer branding and alternative recruitment market targeting.

Shareholder engagement

At the 2022 AGM, the Directors' Remuneration Report was supported by 97.7% of voting shareholders and I am very grateful for this demonstration of broad-based support for our executive remuneration arrangements.

During 2022, the Company's top 22 shareholders were consulted on the proposed changes to the Remuneration Policy in advance of the 2022 AGM and discussions regarding changes in the CEO's remuneration took place at length either in face-to-face meetings or through detailed correspondence where this was the shareholder's preference. We are grateful for the responses received and discussions had, and appreciate the support expressed by many of our shareholders.

The business has reported strong results for 2022, despite facing significant operational challenges, and we hope to gain your support for the actions we have taken to enable the future success of Vesuvius.

I welcome feedback at any point in time from our entire shareholder base regarding our remuneration arrangements and I hope that we will earn your understanding and support at the forthcoming AGM.

Kath Durrant
Chair of the Remuneration Committee
2 March 2023

Directors' Remuneration Report

Operation of the Remuneration Committee

Remuneration Committee structure

The current members of the Remuneration Committee are all the independent Non-executive Directors of the Company.

The Committee Chair is Kath Durrant. She, Dinggui Gao, Jane Hinkley and Douglas Hurt have served on the Committee throughout 2022. Carla Bailo joined the Committee on her appointment to the Board on 1 February 2023. The Committee complies with the requirements of the UK Corporate Governance Code for the composition of remuneration committees. Each of the members brings a broad experience of international businesses and an understanding of their challenges to the work of the Committee. The Company Secretary is Secretary to the Committee. Members' biographies are on pages 88 and 89.

Meetings

The Committee met seven times during the year. The Group's Chairman, Chief Executive, Chief Financial Officer and Chief HR Officer were invited to each meeting, together with Friederike Helfer, Vesuvius' non-independent Non-executive Director, though none of them participated in discussions regarding their own remuneration. In addition, a representative from Deloitte, the Remuneration Committee adviser, attended the meetings. The attendees supported the work of the Committee, giving critical insight into the operational demands of the business and their application to the overall remuneration strategy within the Group. In receiving views on remuneration matters from the Executive Directors and senior management, the Committee recognised the potential for conflicts of interest to arise and considered the advice accordingly. The Chair of the Committee reported the outcomes of all meetings to the Board.

The Committee operates under formal terms of reference which were reviewed during the year. The terms of reference are available on the Group website: www.vesuvius.com. The Committee members are permitted to obtain outside legal advice at the Company's expense in relation to their deliberations. The Committee may also secure the attendance at its meetings of any employee or other parties it considers necessary.

Role and responsibilities

The Committee is responsible for:

- Determining the overall remuneration policy for the Executive Directors, including the terms of their service agreements, pension rights and compensation payments
- Setting the appropriate remuneration for the Chairman, the Executive Directors and Senior Management (being the Group Executive Committee)
- Reviewing workforce remuneration and related policies, and the alignment of incentives and rewards with culture, taking these into account when setting the policy for Executive Director remuneration
- Overseeing the operation of the executive share incentive plans

Advice provided to the Remuneration Committee

Deloitte is appointed directly by the Remuneration Committee to provide advice on executive remuneration matters, including remuneration structure and policy, updates on market practice and trends, and guidance on the implementation and operation of share incentive plans. The Committee appointed Deloitte, a signatory to the Remuneration Consultants Group Code of Conduct in relation to Executive Remuneration Consulting in the UK, following a formal tender process in 2014. Deloitte also provides the Remuneration Committee with ongoing calculations of total shareholder return (TSR) to enable the Committee to monitor the performance of long-term share incentive plans. Deloitte does not have any other connection with any individual Director.

In addition, in 2022, Deloitte provided the Group with IFRS 2 calculations for the purposes of valuing the share plan grants and, within the wider Group, was engaged in various jurisdictions to provide tax advisory work, and some consultancy services. During 2022, Deloitte's fees for advice to the Remuneration Committee, charged on a time spent basis, amounted to £103,375. The Committee conducted a review of the performance of Deloitte as remuneration adviser during the year and concluded that Deloitte continued to provide effective, objective and independent advice to the Committee. No conflict of interest arises as a result of other services provided by Deloitte to the Group.

Activities of the Remuneration Committee

In addition to the activities outlined within the Chair's letter, the Committee was the subject of an externally moderated performance evaluation in 2022. As part of this review it was noted by the Committee Chair that there were a number of areas for continued focus, which will be taken into consideration by the Committee during 2023. These included continuing to review the alignment of metrics with strategy, monitoring the effectiveness of policy in a cyclical environment, and senior management retention.

Directors' Remuneration Report

Remuneration Policy Design Principles

Remuneration Policy Design

The Committee is satisfied that the Remuneration Policy is designed to promote the long-term success of the Company in accordance with the requirements of the Code with regard to:

Clarity

Executive remuneration arrangements are transparent with full disclosure in the Annual Report. The Annual Incentive structure for the Executive Directors is based on the same structure utilised for senior executives throughout the Group. Long-term sustainable growth is core to the long-term incentive, and alongside five-year holding periods clearly aligns the interests of executives with those of the Group's shareholders.

Simplicity

The new Policy with its focus on three core elements: fixed pay, Annual Incentive and Long-Term Incentive is clear, simple and easy to understand.

Risk

The Committee has carefully analysed the range of possible outcomes of awards and believes the Policy to be fair and proportionate, with the clear linkage to Group profitability mitigating the potential for excessive rewards and the reliance on audited profit numbers and externally verified TSR targets serving to mitigate behavioural risk. The Committee has discretion under the Vesuvius Share Plan to determine the vesting of awards in accordance with the Code requirement and malus and clawback provisions also apply.

Predictability

The remuneration illustrations indicate the minimum and maximum potential remuneration. The Committee reviews the underlying financial performance of the Company over the performance period, and the non-financial performance of the Group and participants, to ensure that pay-out levels are justified. The Committee has the discretion to amend the final vesting level if required.

Proportionality

The Committee believes that the performance-related elements of remuneration have financial targets which are transparent, stretching and clearly align the Executive Directors' remuneration with the delivery of the Group's strategy. The Vesuvius Share Plan rewards long-term performance directly linked with the Group's strategy and results, ensuring that only strong performance is rewarded (see page 133).

Alignment to culture

The Executive Directors' incentive arrangements are consistent with the Group's core strategic objective of delivering long-term sustainable and profitable growth and support our performance-orientated culture, values and purpose (see page 118).

The Remuneration Policy was prepared in accordance with the Companies Act 2006 and the Large and Medium-sized Companies and Groups (Accounts and Reports) Regulations 2008 (as amended). It also meets the requirements of the Financial Conduct Authority's Listing Rules and the Disclosure Guidance and Transparency Rules. The policy was developed within the framework of the meetings as set out on pages 116 and 117 and, as part of that process, the Committee paid particular attention to the need to avoid any conflicts of interest in its decision-making.

Directors' Remuneration Report

2023 Remuneration Policy

Changes to Policy

Changes in the 2023 Policy are summarised below. The only substantive change is an increase in the maximum annual incentive opportunity. A handful of other minor changes are proposed.

- **Pension (page 125)**
  The pensions section of the Remuneration Policy table contains our updated Executive Director pension arrangements which are compliant with the UK Corporate Governance Code.
- **Annual Incentive (page 126)**
  Maximum annual incentive opportunity for Executive Directors will increase from 150% to 175% of salary as explained in the Remuneration Committee Chair's overview. In 2023, maximum annual incentive opportunity will be 175% of salary for the CEO and 150% of salary for the CFO. The 2023 Policy also includes a specific cap on pay-out (0-25% of maximum) for achieving a threshold level of performance.

  Consistent with emerging market practice, the 2023 Policy contains scope for the Committee to set and measure bonus targets other than on an annual basis. Use of this option will be reserved for particularly unusual circumstances where there is limited visibility to set robust annual targets. Additionally, in line with Investment Association guidance, the 2023 Policy ensures that the Committee has appropriate discretion to adjust the formulaic annual incentive outturn so that it properly reflects the performance of the executives and the business, the experience of shareholders in terms of value creation, the experience of wider stakeholders and the general market environment.
- **Shareholding guidelines (page 128)**
  Consistent with market practice, the 2023 Policy clarifies the Committee's discretion to exempt shares purchased by an Executive Director in a personal capacity from the post-employment shareholding guidelines. Shares received from incentive plans remain fully subject to the guidelines.
- **Recruitment Policy (page 129)**
  Consistent with market practice, the 2023 Policy contains flexibility for the reimbursement of legal or other costs approved by the Committee when incurred by an individual in relation to their appointment.
- **Exit payment policy (page 130)**
  The default approach is to apply time pro-rating to the VSP awards of a 'good leaver'. For future awards, subject to AGM approval of the proposed minor technical amendments to the VSP, the default basis for time pro-rating will be by reference to the proportion of the performance (rather than vesting) period that has elapsed.
- **Remuneration Policy for Non-executive Directors (page 131)**
  Under the 2023 Policy, Non-executive Directors may be provided with travel allowance payments to reflect the additional time commitment involved with travelling internationally on Company business. The 2023 Policy also clarifies the flexibility to approve relevant benefits (e.g. liability insurance) in connection with the performance of their duties.

Comparison of Remuneration Policy for Executive Directors with that for other employees

The Remuneration Policy for Executive Directors is designed in line with the remuneration philosophy set out in this report – which also underpins remuneration for the wider Group. However, given that remuneration structures for other employees need to reflect both seniority and local market practice, they differ from the policy for Executive Directors. In particular, Executive Directors receive a higher proportion of their remuneration in performance-related pay and share-based payments.

All members of the Group Executive Committee participate in the Vesuvius Share Plan and receive awards of Performance Shares, which vest on the basis of the same performance targets set for the Executive Directors. The level of awards granted to members of the Group Executive Committee who don't serve on the Board are lower than those granted to the Executive Directors.

Middle and senior managers also participate in the Annual Incentive Plan and, in certain cases, longer-term share or cash-based plans, with awards predominantly based on a blend of Group and regional or Business Unit performance measures appropriate for the scope of participants' responsibilities. Individual percentages of variable versus fixed remuneration and participation in share-based structures increase as seniority increases.

Consideration of conditions elsewhere in the Group in developing policy

The Non-executive Directors participated in a number of 'town hall' meetings during the year which provided the opportunity to engage with the workforce to explain how executive remuneration aligns with wider Company pay policies. The Remuneration Committee undertook a global review of workforce remuneration and conditions in 2022, and thus takes into account the pay and employment conditions of other Group employees when determining Executive Directors' remuneration, particularly when determining base salary increases, when the Committee will consider the salary increases for other Group employees in the same jurisdiction.

Consideration of shareholder views

Vesuvius is committed to open and transparent dialogue with its shareholders on remuneration as well as other governance matters. As Chair of the Committee, Kath Durrant welcomes shareholder engagement and is available for any discussions investors wish to have on remuneration matters. In November 2022, the Committee wrote to the top 22 shareholders and key governance agencies outlining its proposals for the 2023 Remuneration Policy, as referenced in the Chair's letter. We received responses from around 80% of recipients and we responded to all questions that were raised.

Remuneration Policy Table for Executive Directors[1]

Alignment/purpose	Operation	Opportunity	Performance
S Base salary			
Helps to recruit and retain key employees. Reflects the individual's experience, role and contribution within the Company	Base salary is normally reviewed annually, with changes effective from 1 January. Base salary is positioned to be market competitive when considered against other global industrial companies, and relevant international and FTSE 250 companies (excluding investment trusts). Paid in cash, subject to local tax and social security regulations.	Salary increases will normally not exceed the average increase awarded to other employees in the Group, although increases may be made above this level at the Committee's discretion in appropriate circumstances. In considering any increase in base salary, the Committee will also take into account: (i) The role and value of the individual (ii) Changes in job scope or responsibility (iii) Progression in the role (e.g. for a new appointee) (iv) A significant increase in the scale of role and/or size, value or complexity of the Group (v) The need to maintain market competitiveness No absolute maximum has been set for Executive Director base salaries. Current Executive Directors' salaries are set out in the Annual Report on Directors' Remuneration section of this Remuneration Report.	Any increase will take into account the individual's performance, contribution and increasing experience.
B Other benefits			
Provides normal, market-aligned benefits	A range of benefits including, but not limited to: car allowance, private medical care (including spouse and dependent children), life insurance, disability and health insurance, expense reimbursement (including costs if a spouse accompanies an Executive Director on Vesuvius business), together with relocation allowances and expatriate benefits, in some instances grossed up for tax, in accordance with the Group's policies, and participation in any employee share scheme operated by the Group.	There is no formal maximum as benefit costs can fluctuate depending on changes in provider, cost and individual circumstances.[1]	None.
P Pension			
Helps to recruit and retain key employees Ensures income in retirement	An allowance is given as a percentage of base salary. This may be used to participate in Vesuvius' pension arrangements, invested in own pension arrangements or taken as a cash supplement (or any combination of the above options).	Maximum of 17% of base salary for incumbent Executive Directors from the end of 2022, in line with the average of that received by the majority of the global workforce.[2] The level of allowance for Executive Directors appointed following the adoption of this Policy will be aligned with the post-retirement benefits applicable to the majority of the workforce or, where appropriate, to the majority of the workforce of the relevant geography.	None.

1. The Remuneration Committee reserves the right to make any remuneration payments and payments for loss of office (including exercising any discretions available to it in connection with such payments), notwithstanding that they are not in line with the Policy set out here, where the terms of the payment were agreed: (i) before the Policy set out here came into effect, provided that the terms of the payment were consistent with the shareholder-approved Remuneration Policy in force at the time they were agreed; or (ii) at a time when the relevant individual was not a Director of the Company and, in the opinion of the Remuneration Committee, the payment was not in consideration for the individual becoming a Director of the Company. For these purposes, 'payments' include the Remuneration Committee satisfying awards of variable remuneration and, in relation to an award over shares, the terms of the payment are 'agreed' at the time the award is granted.
2. As analysed in the business's Workforce Retirement Practices review conducted in 2020, as detailed on page 122 of the 2020 Annual Report.

2023 Remuneration Policy continued

Alignment/purpose	Operation	Opportunity	Performance
AI Annual Incentive			
Incentivises Executive Directors to achieve key short-term financial and strategic targets of the Group Additional alignment with shareholders' interests through the operation of bonus deferral	Normally 33% of any Annual Incentive earned by Executive Directors will be deferred into awards over shares under the Vesuvius Deferred Share Bonus Plan which normally vest after at least three years, other than in specified circumstances, i.e. in cases of dismissal for cause, as outlined on page 130 in this Policy. These may be cash or share settled. The Committee has the discretion to award participants the equivalent value of dividends accrued during the vesting period on any shares that vest. Subject to malus and clawback.	Below threshold: 0%. At threshold: Between 0–25% of maximum. On-target: 50% of the applicable maximum opportunity in any year. Maximum: Up to 175% of base salary. The Remuneration Committee will normally set the level of maximum bonus opportunity for each Executive Director at the start of each year. Payments start to accrue on meeting the threshold level of performance, with payments between threshold and on-target and between on-target and maximum made on a pro rata basis.	The Annual Incentive is normally measured on targets set at the beginning of each year. In unusual or exceptional circumstances, for example where there is exceptional economic volatility which limits visibility to set robust 12-month targets, the Committee may elect to set and measure targets other than on an annual basis. The majority of the Annual Incentive will be determined by measure(s) of Group financial performance. The remainder of the Annual Incentive will be based on financial, strategic or operational measures appropriate to the individual Director. Actual performance targets will be disclosed after the performance period has ended. They are not disclosed in advance due to their commercial sensitivity. The Committee may use its discretion to amend the formulaic outturn upwards or downwards if it does not consider the formulaic outcome appropriate.
VSP Vesuvius Share Plan (VSP)			
Aligns Executive Directors' interests with those of shareholders through the delivery of shares. Rewards Executive Directors for achieving the strategic objectives of growth in shareholder value and earnings Assists retention of Executive Directors over a three-year performance period and the further two-year holding period	VSP awards to Executive Directors are granted as Performance Share awards. These may be cash or share settled. Awards vest three years after their award date, other than in specified circumstances outlined elsewhere in this Policy, subject to the achievement of specified conditions. All vested shares, net of any tax liabilities, are then subject to a further two-year holding period after the vesting date, which will continue to apply notwithstanding the termination of employment of the participants during this holding period, except at the Committee's discretion in exceptional circumstances, including a change of control or where the participant dies or has left employment due to ill health, injury or disability. The Committee has the discretion to award participants the equivalent value of dividends accrued during the vesting period and further two-year holding period on any shares that vest. Subject to malus and clawback.	Executive Directors are eligible to receive an annual award with a face value of up to 200% of base salary in Performance Share awards. Vesting at threshold performance is between 0–25% of the award, rising to vesting of the full award at maximum.	Vesting will be subject to performance conditions as determined by the Remuneration Committee ahead of each award. Those conditions will be disclosed in the Annual Report on Directors' Remuneration section of the Remuneration Report. The performance conditions for 2023 are relative TSR, post-tax ROIC and ESG measures, weighted at 40%, 40% and 20% respectively. The Remuneration Committee will retain discretion for future awards to include additional or alternative performance conditions which are aligned with the corporate strategy. At its discretion, the Committee may elect to add additional underpinning performance conditions. The Company reserves the right only to disclose certain of the performance targets after the performance period has ended, due to their commercial sensitivity. Prior to any vesting, the Remuneration Committee reviews the underlying financial performance of the Group over the performance period, and the non-financial performance of the Group and participants, to ensure that the vesting is justified. Following this review, the Committee has the discretion to amend the final vesting level if it does not consider that it is justified.

Illustration of the application of the Remuneration Policy for 2023

The charts below show the total remuneration for Executive Directors for 2023 for minimum, on-target and maximum performance. The fixed elements of remuneration comprise base salary, pension and other benefits, using 2023 salary data. The assumptions on which they are calculated are as follows:

Minimum

Fixed remuneration only.

On-target

Fixed remuneration plus on-target Annual Incentive (made at 87.5% of base salary for Patrick André and 75% for Mark Collis); and for the Performance Share awards under the Vesuvius Share Plan, median performance for the TSR element and the mid-point between threshold and maximum performance for the post-tax ROIC and ESG performance conditions (with overall vesting at 40% of maximum, based on the vesting schedule detailed on page 134). No share price appreciation is assumed.

Maximum

Fixed remuneration plus maximum Annual Incentive (being full achievement of financial and personal targets, made at 175% of base salary for Patrick André and 150% for Mark Collis) and 100% vesting for Performance Share awards (made at 200% of base salary for Patrick André and 150% of base salary for Mark Collis) under the Vesuvius Share Plan. No share price appreciation is assumed.

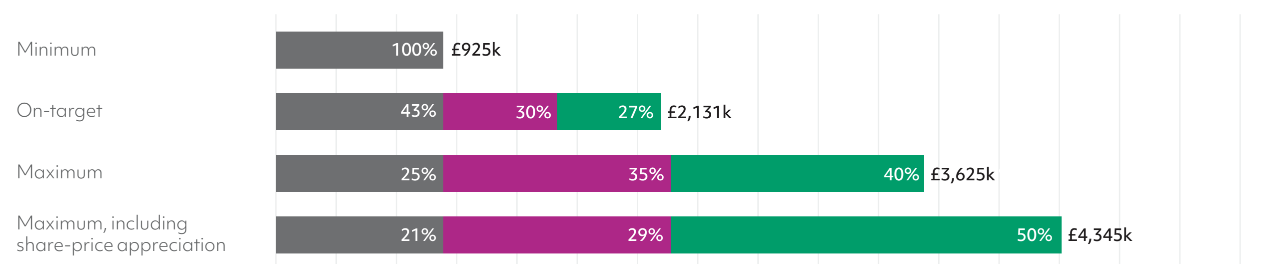
Maximum including assumed 50% share price appreciation

This shows the value of the maximum scenario if 50% share price appreciation is assumed over the three-year performance period of the Performance Share awards.

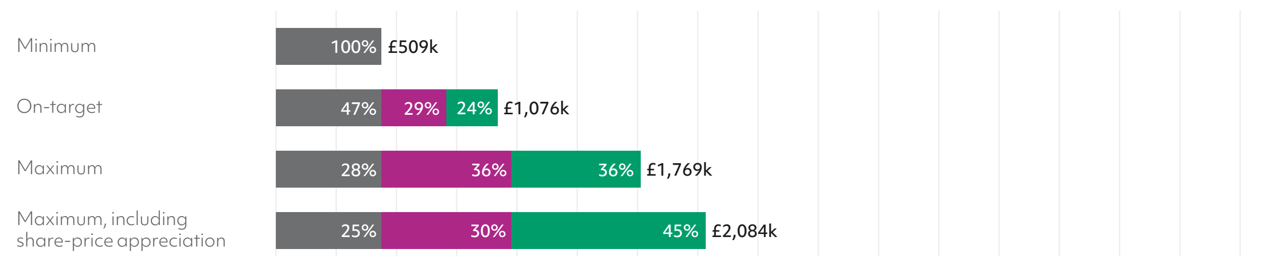
Note: In addition, the Committee retains the discretion to award dividends (either shares or their cash equivalent) on any shares that vest.

Remuneration illustrations £000

Patrick André, Chief Executive



Mark Collis, Chief Financial Officer*



Fixed elements Annual variable elements Long-term variable elements

* Annualised equivalent shown for illustrative purposes.

2023 Remuneration Policy continued

General operation of the Policy for Executive Directors

Shareholding guidelines

The Remuneration Committee encourages Executive Directors to build and hold a shareholding in the Company equivalent in value to at least 200% of base salary.

Compliance with the shareholding policy is tested at the end of each year for application in the following year, with the valuation of any holding being taken at the higher of: (1) the share price on the date of vesting of any shares derived from a share award, in respect of those shares only; and (2) the average of the closing prices of a Vesuvius ordinary share for the trading days in that December.

Unless exceptionally the Committee determines otherwise, under the post-employment shareholding guideline the Executive Directors will remain subject to their shareholding requirement in the first year after their cessation as an Executive Director and to 50% of the shares retained in the first year during the second year after such cessation, recognising that there is no requirement to purchase additional shares if the shares held when they cease to be an Executive Director are less than the applicable shareholding guideline. However, in relation to shares acquired by an Executive Director in their personal capacity, the Committee may, where appropriate, exempt such shares from the post-employment guideline.

Malus/clawback arrangements

The Executive Directors' variable remuneration is subject to malus and clawback provisions. These provide the Committee with the flexibility, if required, to withhold or recover payments made to Executive Directors under the Annual Incentive Plan (including deferred awards) and/or to withhold or recover share awards granted to Executive Directors under the Vesuvius Share Plan, including any dividends granted on such awards. The circumstances in which the Committee could potentially elect to apply malus and clawback provisions include: a material misstatement in the Group's financial results; an error in the calculation of the extent of payment or vesting of an incentive; gross misconduct by an individual; or significant financial loss or serious reputational damage to Vesuvius plc resulting from an individual's conduct, a material failure of risk management or a serious breach of health and safety. These malus and clawback provisions apply for a period of up to three years after the end of a performance period (or end of the deferral period in respect of awards made under the Vesuvius Deferred Share Bonus Plan).

Performance measures

In selecting performance measures for the Annual Incentive, the Committee seeks to reflect key strategic aims and the need for a rigorous focus on financial performance. Each year, the Committee agrees challenging targets to ensure that underperformance is not rewarded. The Company will not be disclosing the specific financial or personal objectives set until after the relevant performance period has ended because of commercial sensitivities. The personal objectives are all job-specific in nature and track performance against key strategic, organisational and operational goals.

In selecting performance measures for the Vesuvius Share Plan, the Committee seeks to focus Executive Directors on the execution of long-term strategy and also align their rewards with value created for shareholders.

In the Policy period, the Committee will continually review the performance measures used to ensure that awards are made on the basis of challenging targets that clearly support the achievement of the Group's strategic aims.

The Committee may vary or waive any performance condition(s) if circumstances occur which cause it to determine that the original condition(s) have ceased to be appropriate, provided that any such variation or waiver is fair, reasonable and not materially less difficult to satisfy than the original condition (in its opinion). In the event that the Committee were to make an adjustment of this sort, a full explanation would be provided in the next Remuneration Report.

Service contracts for Executive Directors

The Committee will periodically review the contractual terms for new Executive Directors to ensure that these reflect best practice. Service contracts currently operate on a rolling basis and are limited to a 12-month notice period.

Patrick André is employed as Chief Executive of Vesuvius plc pursuant to the terms of a service agreement made with the Company dated 17 July 2017. Mark Collis will be employed as Chief Financial Officer, with a start date on or before 4 July 2023, pursuant to the terms of a service agreement with Vesuvius plc dated 4 January 2023. Patrick André's appointment is terminable by Vesuvius on not less than 12 months' written notice, and by him on not less than six months' written notice. Mark Collis's appointment is terminable by him and Vesuvius on not less than six months' written notice.

External appointments of Executive Directors

The Executive Directors do not currently serve as Non-executive Directors of any other quoted company. Subject always to consent being granted by the Company for them to take up such an appointment, were they to so serve, the Company would allow them to retain any fees they received for the performance of their duties.

Other

The Committee may: (a) in the event of a variation of the Company's share capital, demerger, special dividend or any other corporate event which it reasonably determines justifies such an adjustment, adjust; and (b) amend the terms of awards granted under the share schemes referred to above in accordance with the rules of the relevant plans.

Share awards may be settled by the issue of new shares or by the transfer of existing shares. In line with prevailing best practice at the time this Policy was approved, any issuance of new shares is limited to 5% of share capital over a rolling ten-year period in relation to discretionary employee share schemes and 10% of share capital over a rolling ten-year period in relation to all employee share schemes.

The Committee may make minor amendments to the Policy set out in this Policy Report (for regulatory, exchange control, tax or administrative purposes or to take account of a change in legislation) without obtaining shareholder approval for that amendment.

Policy for joining and leaving: Recruitment policy

Typical event	Policy
Executive Director appointed or promoted	On appointment or promotion of a new Executive Director, the Committee will typically use the Remuneration Policy in force at the time of the Committee's decision to determine ongoing remuneration. Base salary levels will generally be set in accordance with the Remuneration Policy current at the time of the Committee's decision, taking into account the experience and calibre of the appointee. Other than in exceptional circumstances, other elements of annual remuneration will, typically, be set in line with the Remuneration Policy, including a limit on awards under the Annual Incentive and Vesuvius Share Plan of 375% of salary in aggregate.
First year of appointment	If appropriate the Committee may apply different performance measures and/or targets to a Director's first incentive awards in his/her year of appointment.
Service contract agreed	Service contracts will be entered into on terms similar to those for the existing Executive Directors, summarised in the service contracts of Executive Directors section above.
Appointment of Chairman or Non-executive Director	With respect to the appointment of a new Chairman or Non-executive Director, appointment terms will be consistent with those applicable at the time the appointment is agreed. Variable pay will not be considered. With respect to Non-executive Directors, fees will be consistent with the Policy at the time the appointment is agreed. If, in exceptional circumstances, a Non-executive Director was asked to assume an interim executive role, the Company retains the discretion to pay them appropriate executive compensation, in line with the Policy.
Individual appointed on a base salary below market, contingent on performance	If it is appropriate to appoint an individual on a base salary initially below what is adjudged to be market positioning, contingent on individual performance, the Committee retains the discretion to realign base salary over the one to three years following appointment, which may result in a higher rate of annualised increase than might otherwise be awarded under the Policy. If the Committee intends to rely on this discretion, it will be noted in the first Remuneration Report following an individual's appointment.
Internal appointment	In the event that an internal appointment is made, or where a Director is appointed as a result of transfer into the Group on an acquisition of another Company, the Committee may continue with existing remuneration provisions for this individual, where appropriate.
Relocation required	If necessary and appropriate to secure the appointment of a candidate who has to move locations as a result of the appointment, whether internal or external, the Committee may make additional payments linked to relocation, above those outlined in the policy table, and would authorise the payment of a relocation allowance and repatriation, as well as other associated international mobility terms. Such benefits would be set at a level which the Committee considers appropriate for the role and the individual's circumstances.
Buying out compensation forfeited on leaving previous employer	In addition to the annual remuneration elements noted above, the Committee may consider buying out terms, incentives and any other compensation arrangements forfeited on leaving a previous employer that an individual forfeits in accepting an appointment with Vesuvius. The Committee will have the authority to rely on Listing Rule 9.4.2 R(2) or to apply the existing limits within the Vesuvius Share Plan to make Restricted Share awards on recruitment. In making any such awards, the Committee will review the terms of any forfeited awards, including, but not limited to, vesting periods, the expected value of such awards on vesting and the likelihood of the performance targets applicable to such awards being met, while retaining the discretion to make any buy-out award the Committee determines is necessary and appropriate. The Committee may also require the appointee to purchase shares in Vesuvius to a pre-agreed level prior to vesting of any such awards. The value of any buy-out award will be capped, to ensure its maximum value is no higher than the value of the awards that the individual forfeited on joining Vesuvius. Any such awards will be subject to malus and clawback.
Reimbursement of other costs	In addition to the elements noted above, the Committee may consider reimbursement of other demonstrable, specific costs incurred by an individual in relation to their appointment (e.g. legal costs).

Remuneration Policy continued

Policy for joining and leaving: Exit payment policy

Vesuvius has the option to make a payment in lieu of part or all of the required notice period for Executive Directors. Any such payment in lieu will consist of the base salary, pension contributions and value of benefits to which the Director would have been entitled for the duration of the remaining notice period, net of statutory deductions in each case. Half of any payments in lieu of notice would be made in a lump sum, the remainder in equal monthly instalments commencing in the month in which the midpoint of their foregone notice period falls (and are reduced or extinguished by salary from any role undertaken by the departing Executive in this time). Executive Directors are subject to certain non-compete covenants for a period of nine to 12 months, and non-solicitation covenants for a period of 12 months, following the termination of their employment. Their service agreements are governed by English law.

Executive Directors' contracts do not contain any change of control provisions; they do contain a duty to mitigate should the Director find an alternative paid occupation in any period during which the Company must otherwise pay compensation on early termination.

The table below summarises how the awards under the annual bonus and Vesuvius Share Plan are typically treated in different leaver scenarios and on a change of control.

Whilst the Committee retains overall discretion on determining 'good leaver' status, it typically defines a 'good leaver' in circumstances such as retirement with agreement of the Company, ill health, disability, death, redundancy, or part of the business in which the individual is employed or engaged ceasing to be part of the Group. Final treatment is subject to the Committee's discretion.

Event	Timing	Calculation of vesting/payment
Annual Incentive Plan – during period prior to payment		
Good leaver	Paid at the same time as to continuing employees.	Annual bonus is paid only to the extent that any performance conditions have been satisfied and is prorated for the proportion of the financial year worked before cessation of employment. In determining the level of bonus to be paid, the Committee may, at its discretion, take into account performance up to the date of cessation or over the financial year as a whole based on appropriate performance measures as determined by the Committee. The bonus may, at the Committee's discretion, be paid entirely in cash.
Bad leaver	Not applicable.	Individuals lose the right to their annual bonus.
Change of control	Paid on the effective date of change of control.	Annual bonus is paid only to the extent that any performance conditions have been satisfied and is prorated for the proportion of the financial year worked.
Annual Incentive Plan – in respect of any amount deferred into awards over shares under the Vesuvius Deferred Share Bonus Plan		
Good leaver	On the date of the event.	Deferred awards vest in full.
Bad leaver	On the date of the event.	Other than dismissal for cause, deferred awards will vest in full.
Change of control[1]	Within seven days of the event.	Deferred awards vest in full.
Vesuvius Share Plan		
Good leaver[2]	On normal release date (or earlier at the Committee's discretion).	Unvested awards vest to the extent that any performance conditions have been satisfied and a pro rata reduction applies to the value of the awards to take into account the proportion of performance period not served, unless the Committee decides that the reduction in the number of vested shares is inappropriate.
Bad leaver	Unvested awards lapse.	Unvested awards lapse on cessation of employment.
Change of control[1]	On the date of the event.	Unvested awards vest to the extent that any performance conditions have been satisfied and a pro rata reduction applies for the proportion of the vesting period not served, unless the Committee decides that the reduction in the number of vested shares is inappropriate.

1. In certain circumstances, the Committee may determine that unvested awards under the Vesuvius Deferred Bonus Plan and Vesuvius Share Plan will not vest on a change of control but will instead be replaced by an equivalent grant of a new award, as determined by the Committee, in the new company.
2. Under the rules of the Vesuvius Share Plan, any vested shares, net of any tax liabilities, are subject to a further two-year holding period after the vesting date. The holding period may be terminated early at the Committee's discretion in exceptional circumstances, including a change of control or where the award holder dies or leaves employment due to ill health, injury or disability.

Benefits normally cease to be provided on the date employment ends. However, the Committee has the discretion to allow some minor benefits (such as health insurance, tax advice and repatriation expenses) to continue to be provided for a period following cessation where this is considered fair and reasonable, or appropriate on the basis of local market practice. In addition, the Committee retains discretion to fund other expenses for the Executive Director; for example, payments to meet legal fees incurred in connection with termination of employment, or to meet the costs of providing outplacement support, and de minimis termination costs up to £5,000 to cover the transfer of mobile phone or other administrative expenses.

The Committee reserves the right to make any other payments in connection with a Director's cessation of office or employment where the payments are made in good faith in discharge of an existing legal obligation (or by way of damages for breach of such an obligation) or by way of a compromise or settlement of any claim arising in connection with the cessation of a Director's office or employment.

In certain circumstances, the Committee may approve new contractual arrangements with departing Executive Directors, including (but not limited to) settlement, confidentiality, restrictive covenants and/or consultancy arrangements. These would be used only where the Committee believed it was in the best interests of the Company to do so.

Remuneration Policy for Non-executive Directors

The Company seeks to appoint Non-executive Directors who have relevant professional knowledge and have gained experience in a relevant industry and geographical sector, to support diversity of expertise at the Board and match the wide geographical spread of the Company's activities.

Non-executive Directors attend Board, Committee and other meetings, held mainly in the UK, together with an annual strategy review to debate the Company's strategic direction.

All Non-executive Directors are expected to familiarise themselves with the scale and scope of the Company's business and to maintain their specific technical skills and knowledge.

The Board sets the level of fees paid to the Non-executive Directors after considering the role and responsibilities of each Director and the practice of other companies of a similar size and international complexity. The Non-executive Directors do not participate in Board discussions on their own remuneration.

Alignment/purpose	Operation	Opportunity	Performance
Fees			
To attract and retain Non-executive Directors of the necessary skill and experience by offering market-competitive fees	Fees are usually reviewed every year by the Board. Non-executive Directors are paid a base fee for the performance of their role plus additional fees for roles that involve significant additional time commitment and/or responsibility. Such roles could include, but are not limited to, Committee chairmanship (and, where appropriate, membership) or acting as the Senior Independent Director. Fees are paid in cash. When travelling internationally on Company business, all Non-executive Directors may also be provided with additional travel allowance payments, reflecting the associated time commitment, paid in cash. The Chairman is paid a single cash fee and receives administrative support from the Company.	Non-executive Directors and the Chairman will be paid market-appropriate fees, with any increase reflecting changes in the market or adjustments to a specific Non-executive Director's role. Any travel allowances payable will be reflective of travel time incurred as necessary to fulfil Company business. No eligibility for bonuses, retirement benefits or to participate in the Group's employee share plans. Base fees paid to Non-executive Directors will, in aggregate, remain within the aggregate limit stated in our Articles, currently being £500,000.	None.
Benefits and expenses			
To facilitate execution of responsibilities and duties required by the role	All Non-executive Directors are reimbursed for reasonable expenses incurred in carrying out their duties (including any personal tax owing on such expenses). Should the Board deem it appropriate, additional benefits can be provided to Non-executive Directors as required (e.g. liability insurance).	Non-executive Directors' expenses are paid in accordance with Vesuvius' expense procedures. Provision of additional benefits will be at the discretion of the Board and will reflect the reasonable needs of a Non-executive Director in undertaking Company business.	None.

Remuneration Policy continued

Terms of service of the Chairman and other Non-executive Directors

The terms of service of the Chairman and the Non-executive Directors are contained in letters of appointment. Each Non-executive Director is appointed subject to their election at the Company's first Annual General Meeting following their appointment and re-election at subsequent Annual General Meetings. The Chairman is entitled to six months' notice from the Company. None of the other Non-executive Directors is entitled to receive compensation for loss of office at any time.

All Non-executive Directors are subject to retirement, and election or re-election, in accordance with the Company's Articles of Association. The current policy is for Non-executive Directors to serve on the Board for a maximum of nine years, with review at the end of three and six years, subject always to mutual agreement and annual performance evaluation. The Board retains discretion to extend the tenure of Non-executive Directors beyond this time, subject to the requirements of Board balance and independence being satisfied.

The table below shows the date of appointment for each of the Non-executive Directors:

Non-executive Director	Date of appointment
Carl-Peter Forster	1 November 2022
Carla Bailo	1 February 2023
Kath Durrant	1 December 2020
Dinggui Gao	1 April 2021
Friederike Helfer	4 December 2019
Jane Hinkley	3 December 2012
Douglas Hurt	2 April 2015

Directors' Remuneration Report

Annual Report on Directors' Remuneration

Executive Directors' remuneration in year ahead

The table below sets out the phasing of receipt of the various elements of Executive Director remuneration for 2023.

	2023	2024	2025	2026	2027	2028	Description and link to strategy
S Base salary							Salaries are set at an appropriate level to enable the Company to recruit and retain key employees, and reflect the individual's experience, role and contribution within the Company.
B Benefits							Provides normal market practice benefits.
P Pension							The pension benefit helps to recruit and retain key employees and ensures income in retirement.
AI Annual Incentive							The Annual Incentive incentivises the Executive Directors to achieve key short-term financial and strategic targets of the Group.
AI Deferred Annual Incentive							The deferral of a portion of the Annual Incentive increases alignment with shareholders.
VSP Vesuvius Share Plan				Holding period			Awards under the Vesuvius Share Plan align Executive Directors' interests with those of shareholders through the delivery of shares and assist in the retention of the Executive Directors. The VSP rewards the Executive Directors for achieving the strategic objectives of growth in shareholder value and earnings.

The table below sets out how the Remuneration Policy will be applied to the Executive Directors' remuneration for 2023. Further details about each of the elements of remuneration are set out in the Remuneration Policy.

S Base salary

Patrick André

£720,000

2022: £643,000

As explained in the Committee Chair's letter, the CEO was awarded a 12% increase, effective 1 January 2023.

Mark Collis

£420,000

2022: n/a

To be prorated based on tenure from date of hire in 2023.

B Benefits

Benefits for Executive Directors include:

- Car allowance
- Private medical care
- Relocation expenses
- Tax advice and tax reimbursement
- Commuting costs
- School fees
- Directors' spouses' travel
- Administrative expenses

P Pension

17% of base salary, in line with the average received by the majority of the global workforce.

AI Annual Incentive*

Annual Incentive potential for Patrick André, maximum value 175% of base salary

Annual Incentive potential for Mark Collis, maximum value 150% of base salary

For 2023, the maximum Annual Incentive potential for Patrick André will increase to 175% of base salary with target Annual Incentive potential being 87.5% of base salary for the achievement of target performance in all elements. For Mark Collis, potential will remain at the level available previously to the Chief Financial Officer, i.e. 75% at target, and 150% at maximum. Pay-outs will commence and increase incrementally from 0% once the threshold performance for any of the elements has been met. In the case of Mark Collis, the incentive payable will be calculated pro rata to reflect his period of employment in the 2023 calendar year.

33% of any Annual Incentive earned will be deferred into awards over shares, which will vest after a holding period of three years.

These incentives are based 40% on Group headline earnings per share, 20% on the Group's working capital to sales ratio (based on the 12-month moving average), 20% on post-tax Return on Invested Capital (ROIC) and 20% on specified personal objectives. The Company will not be disclosing the targets set until after the relevant performance period has ended because of commercial sensitivities. The personal objectives for 2023 are focused on long-term strategic objectives, or are job-specific in nature and track performance against the Group's key strategic, organisational and operational goals with a specific focus on ESG outcomes.

VSP Vesuvius Share Plan* (VSP)

Patrick André, maximum value 200% of base salary

Mark Collis, maximum value 150% of base salary

Share awards with a maximum value of 200% of salary will be granted to Patrick André and, for Mark Collis a maximum value of 150% of salary will be granted, prorated to reflect his period of employment during the 2023–2025 performance period. The strike price for the awards will be determined by reference to the average share price over the 30 calendar days prior to grant.

Vesting of 40% of shares awarded will be based upon the Company's TSR performance relative to that of the constituent companies of the FTSE 250 (excluding investment trusts), 40% on post-tax Return on Invested Capital (ROIC) and 20% on ESG. Targets are set out overleaf.

Performance will be measured over three years with awards vesting after three years. There will then be a further two-year holding period applicable to the awards.

* The Committee is mindful of the present geopolitical environment and the existing energy crisis. In this context it reserves its discretion to amend targets for both the AIP and VSP should major industrial market disruption prevail.

Annual Report on Directors' Remuneration continued

Targets for the VSP Awards for the year 2023

TSR ranking relative to FTSE 250 excluding investment trusts — Weighting 40%

	Vesting percentage (of total LTIP)
Below median	0%
Median	10%
Between median and upper quintile	Pro rata between 10% and 40%
Upper quintile and above	40%

Post-tax ROIC[1] — Weighting 40%

	Vesting percentage (of total LTIP)[2]	Average ROIC over three-year performance period
Threshold and below	0%	8.5%
Maximum	40%	11.0%

1. ROIC is defined as Net Operating Profit After Tax (NOPAT), divided by invested capital (IC). NOPAT is defined as Group trading profit, plus post-tax share of JV results, less amortisation of intangible assets calculated as an average over the target period. (The inclusion of amortisation charges serves to reduce the calculation of ROIC returns though we believe this to be the most appropriate definition.) Invested capital is defined as total assets excluding cash and non-interest-bearing liabilities, calculated as the average of IC at the start and the end of the target period at constant currency. See Note 4.18 of the Group Financial Statements.
2. Vesting between these points will be on a straight-line basis.

Environment, Social, Governance — Weighting 20%

Safety: Average Lost Time Injury Frequency Rate (LTIFR)[1] 2023–2025

	Vesting percentage (of total LTIP)[2]	Range
Threshold and below	0%	1.05
Maximum	5%	0.85

Energy: CO_2e: Reduction Scope 1 and 2 CO_2e emission intensity (vs 2019 baseline) in 2025[3]

	Vesting percentage (of total LTIP)[2]	Range
Threshold and below	0%	-17%
Maximum	10%	-23%

Diversity: Gender diversity in senior leadership group[4] on 31 Dec 2025

	Vesting percentage (of total LTIP)[2]	Range
Threshold and below	0%	20%
Maximum	5%	26%

1. LTIFR is the Lost Time Injury Frequency Rate, based on the number of lost time injuries that occur during the performance period per million hours worked.
2. Straight-line vesting between threshold and maximum.
3. Reduction of CO_2e emissions per metric tonne of product packed for shipment.
4. Senior Leadership Group is defined as the Group Executive Committee plus the most senior Vesuvius managers worldwide, in terms of their contribution to the Group's overall results and to the execution of the Group's strategy. This group comprises between 150 and 170 members (number may slightly fluctuate from one year to the next based on organisational changes).

Explaining the ROIC target range

The Committee has considered the Group strategy over the period, market conditions, and historic and current estimates of WACC provided by JP Morgan in determining the target range.

Whilst we expect ROIC to be at the lower end of the range in Year 1, we believe a range of 8.5–11.0% to be appropriate for the VSP award 2023–2025. The threshold pay-out level remains at 0% this year, but may change for future awards.

Adjustments to the ROIC target range may be required should the Board approve certain mergers, acquisitions or disposals. For any such event that requires Board approval then management will assess the potential impact on ROIC as part of their broader submission, and the Committee will determine whether any adjustment to targets should be made. In general, the Committee will have regard to the materiality of the event and the timing in the life of the award cycle. The intention will be to maintain fair, stretching but achievable targets, whilst not providing a disincentive to management to bring forward proposals for mergers, acquisitions or disposals that are in the Company's interest.

Explaining the ESG metrics

The Environment, Social and Governance targets for the 2023 awards represent key strategic priorities for the management team as well as the Board.

Safety continues to be of paramount cultural importance to Vesuvius and progressive improvement has been made in recent years. The targets are considered stretching in the context of an operationally challenging environment with many employees working remotely at customer sites. Lost Time Injury Frequency Rate is a recognised metric, and is measured per million hours worked.

Energy, the reduction in Scope 1 and 2 emissions is a key feature of the Company's sustainability strategy (see pages 50-70) and as such a measure of CO_2e emission intensity is used (CO_2e emissions per tonne of product packed for shipment). Baseline and current emissions have been verified by Carbon Footprint Ltd. Vesuvius has committed to achieve a net zero status by 2050 at the latest and a roadmap, with clear intermediary targets in 2025 and 2035, has been established, as detailed in our Sustainability report (see pages 64 and 65 for further information). Restated performance of -15.3% vs the 2019 baseline has been considered reasonable by the Committee in setting the forward target range. This restatement takes into account the continuing expansion projects in Skawina, Poland and Kolkata, India which will have a deleterious effect on the -18.8% calculated to 2022 vs 2019 baseline.

Diversity, a focus on gender diversity has seen improvements in the Senior Leadership Group of c.150–170 individuals in recent years. Targets are set so as to drive continued progress towards the targets outlined in our Sustainability Initiative.

Executive Directors' remuneration in year under review

Single total figure table – audited

The table below sets out the total remuneration received by Executive Directors in the financial year under review:

	Patrick André		Guy Young	
	2022 (£000)	2021 (£000)	2022 (£000)	2021 (£000)
Total salary	643	618	420	385
Taxable benefits[1]	83	60	18	18
Pension[2]	155	154	96	96
Total fixed pay[3]	880	832	535	499
Annual Incentive[4]	731	874	0	537
Long-Term Incentives[5,6,7]	594	0	0	0
Total variable pay[8]	1,325	874	0	537
Total[9]	2,206	1,706	535	1,036

1. Standard benefits for the Executive Directors include car allowance and private medical care. In 2022, Patrick André also received external professional services support, funded by the Company, in relation to EU Settled Status applications for him and his wife, in line with the approval for such support granted by the Remuneration Committee in May 2019. The total cost of this support including gross-up of associated taxes was £44,811.
2. In 2021 and 2022, Patrick André and Guy Young received a pension allowance of 25% of base salary capped at the January 2020 level. The figures for 2022 in the table represent the value of all cash allowances and contributions received in respect of pension benefits, at voluntarily reduced rates.
3. The sum of total salary, taxable benefits and pension.
4. This figure includes the Annual Incentive payments to be made to the Executive Directors in relation to the year under review. Note that Guy Young will receive no such payment, having forfeited his entitlement to such payments on account of his resignation from the Company in September 2022. 33% of any Annual Incentive payments will be deferred into awards over shares, to be held for a period of three years. See page 126 for more details.
5. The 2022 figures represent the Performance Share awards granted to Patrick André and Guy Young in 2020 under the VSP. Patrick André's award will vest in 2023 while Guy Young's lapsed, in line with Company leaver policies, on his resignation from the Company in February 2023.
6. The value of the 2022 long-term incentives, relating to the Performance Share awards granted to Patrick André under the VSP in 2020, is reflective of a share price depreciation of 0.17% between the share price used at grant (392.5p), versus the Q4 2022 average share price (391.8p), used here as a proxy for the vesting price. The values also includes dividend vesting at 45.1p per vested share.
7. The 2021 figures represent the Performance Share awards granted to Patrick André and Guy Young in 2019 under the VSP which lapsed in 2022.
8. The sum of the value of the Annual Incentive and the Long-Term Incentives where the performance period ended during the financial year.
9. The sum of base salary, benefits, pension, Annual Incentive and Long-Term Incentives where the performance period ended during the financial year.

Additional note:

10. Total 2022 Directors' Remuneration (Executive Directors and Non-executive Directors) is £3.377m. 2021 Directors' Remuneration for the Directors who served during 2021 was £3.257m.

Annual Incentive for 2022 performance – audited

The Executive Directors are eligible to receive an Annual Incentive calculated as a percentage of base salary, based on achievement against specified financial targets and personal objectives. Each year, the Remuneration Committee establishes the performance criteria for the forthcoming year. The financial targets are set by reference to the Company's financial budget. The target range is set to ensure that Annual Incentives are only paid out at maximum for significantly exceeding performance expectations. The Remuneration Committee considers that the setting and attainment of these targets is important in the context of achievement of the Company's longer-term strategic goals.

The Annual Incentive has a threshold level of performance below which no award is paid, a target level at which 50% of the maximum opportunity is payable, and a maximum performance level at which 100% of the maximum opportunity is earned, on a pro rata basis.

For 2022, the maximum Annual Incentive potential for the Executive Directors was 150% of base salary and their target Annual Incentive potential was 75% of base salary.

For the financial year 2022, the Executive Directors' Annual Incentives were based 40% on Group headline EPS, 20% on the Group's return on invested capital (post-tax ROIC), 20% on the Group's working capital to sales ratio (based on the 12-month moving average) and 20% on specified personal objectives.

No Annual Incentive 2022 award is payable to Guy Young in light of his resignation from the Company in September 2022 and associated forfeiting of his rights to any such payment in line with the Company's leaver policies.

Annual Report on Directors' Remuneration continued

Financial targets in 2022

The 2022 Vesuvius Group headline EPS performance targets set out below were set at the December 2021 full-year average foreign exchange rates, being the rates used for the 2022 budget process:

Threshold:	On-target:	Maximum:
36.7p	41.6p	46.6p

The 2022 Group's return on invested capital (post-tax ROIC) targets were set as follows:

Threshold:	On-target:	Maximum:
7.5%	8.5%	10.0%

The 2022 Group's working capital to sales ratio targets were set as follows:

Threshold:	On-target:	Maximum:
23.6%	22.6%	21.6%

In assessing the Group's performance against these targets, the Committee uses a constant currency approach. Thus, the 2022 full-year EPS performance was retranslated at December 2021 full-year average foreign exchange rates to establish performance. This is consistent with practice in previous years.

In 2022, Vesuvius' EPS performance at the December 2021 full-year average foreign exchange rates was 53.6 pence, return on invested capital (post-tax ROIC) outcome was 10.7% and the working capital to sales ratio was 23.8%. Consequently, EPS performance was above the maximum target, return on invested capital (post-tax ROIC) performance was above the maximum target, and the Group working capital to sales ratio was below threshold.

As a result, in respect of the financial performance metrics of the 2022 Annual Incentive, 60% is due on the EPS targets, 30% on the ROIC targets, and 0% on the working capital targets (related to a maximum bonus opportunity of 60%, 30% and 30% of salary respectively).

Personal objectives

In 2022, a proportion (20%) of the Annual Incentive for Executive Directors (representing 30% of salary) was based on the achievement of personal objectives.

Patrick André

Summary of objective	Summary outcome
Drive performance and deliver results	– Strong performance on quality, Investor Relations strategy, market share gains, cash conversion and improvement of gross margin
Reinforce talent management and prepare succession plans	– During 2022 there was strong progress in the identification and ongoing development of successors to key management positions
Review and implement the Group strategy	– Significant progress in developing the strategic roadmap to enhance return to shareholders, closed the acquisition of BMC and ensured smooth integration of the refractories business acquired from Universal Refractories, Inc
Improve Vesuvius' sustainability performance	– Delivered a strong Sustainability strategy in 2022 and delivered further improvements in CO_2 reduction and Top Management diversity

In summary, after considering performance as outlined above, the Committee approved an Annual Incentive pay-out of 23.7% of contractual base salary, out of the maximum potential 30%, in respect of the personal objectives of Patrick André.

Guy Young

Summary of objective	Summary outcome
Optimise cash management and profitability	– Delivered a clear review of Investor Relations strategy and robust performance on cash management and gross margin
Support growth strategy	– Supported the successful closure of the BMC acquisition and facilitated strong progression on the integration of the refractories business acquired from Universal Refractories, Inc
Drive IT performance	– Continued the implementation of the cyber resilience plan and maintained progress on SAP A1 implementation
Drive Opex reductions	– Successfully implemented the optimisation plan of finance shared services and progressed implementation of the new Finance Operating Model in EMEA
Improve Vesuvius' sustainability performance	– Supported development of a strong sustainability strategy and delivered further improvements in CO_2 reduction and Top Management diversity

In summary, after considering performance as outlined above, the Committee approved a hypothetical Annual Incentive pay-out of 23.4% of contractual base salary, out of the maximum potential 30%, in respect of the personal objectives of Guy Young.

The total Annual Incentive awards payable to Patrick André in respect of his service as an Executive Director during 2022 is therefore 113.7% of salary, of which 33% will be deferred into awards over shares, to be held for a period of three years, with vesting in accordance with the Remuneration Policy.

The Committee considered the appropriateness of this overall AIP payment in the context of the experience of our various stakeholders during 2022 and was satisfied that no discretionary adjustments were required.

2020 VSP Awards (vesting in 2023) – audited

The performance period applicable to these awards ended on 31 December 2022.

	Weighting	0% vesting	25% vesting	50% vesting	100% vesting	Performance achieved	Pay-out level (% of maximum)
TSR relative to FTSE 250 excluding investment trusts[1]	50%	Below median	Median	–	Upper quintile	Between median and upper quintile (Ranked 71st)	36.1%
Annual compound headline EPS growth[1]	50%	Less than 3%	3%	6%	15%	7.8%	60.0%

1. Straight-line vesting applies between the vesting points.

Share awards granted during the financial year – audited

VSP award

An award was granted under the VSP to selected senior executives, including the Executive Directors, in March 2022. UK executives receive awards in the form of nil-cost options with a flexible exercise date and non-UK executives receive conditional awards which are exercised on the date of vesting. This award is subject to the performance conditions described below and will vest in March 2025 (with a subsequent two-year holding period for any vested shares to March 2027).

	Type of award	Date of grant	Maximum number of shares[1]	Face value (£)	Face value (% of salary)	Threshold vesting	End of performance period
Patrick André	Nil-cost option	17 March 2022	319,900	£1,238,653	193%	25% of award	31 December 2024
Guy Young[2]		17 March 2022	156,716	£606,804	144%		

1. In 2022, Patrick André and Guy Young were entitled to receive allocations of Performance Shares worth 200% and 150% of their base salaries respectively. In light of the volatile share price, the Committee applied its discretion so that the maximum number of shares in these allocations were capped at a level based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the February 2022 Remuneration Committee meeting of £4.020, while the average closing mid-market price of Vesuvius' shares on the five dealing days prior to grant was £3.872. The maximum number of shares quoted excludes any additional shares that may be awarded in relation to dividends accruing during the vesting and holding periods.
2. As with his other, in-flight VSP awards, Guy Young's 2022 award lapsed upon his departure from the business on 17 February 2023.

Vesting of the VSP awards is subject to satisfaction of the following performance conditions. Any LTIP vesting is at the discretion of the Remuneration Committee.

	Weighting	Threshold	100% vesting
TSR relative to FTSE 250 excluding investment trusts[1]	40%	Median	Upper quintile
Group post-tax ROIC[1]	40%	7.5%	10%
ESG: Safety: Average Lost Time Injury Frequency Rate (LTIFR) 2022–2024[1,2]	5%	1.1	0.9
ESG: Energy: CO_2e: Reduction in Scope 1 and 2 energy CO_2e emissions/tonne (vs 2019 baseline) in 2024[1,3]	10%	-14%	-20%
ESG: Diversity: Gender diversity in Senior Leadership Group on 31 December 2024[1,4]	5%	20%	26%

1. Straight-line vesting applies between the vesting points. Threshold vesting for the TSR element is 25% of maximum, and 0% of maximum for all other elements.
2. LTIFR is the Lost Time Injury Frequency Rate, based on the number of lost time injuries that occur during the performance period. The calculation rate is LTIFR per million hours worked.
3. Reduction of energy CO_2e emissions per metric tonne of product packed for shipment.
4. Senior Leadership Group is defined as the Group Executive Committee plus the most senior Vesuvius managers worldwide, in terms of their contribution to the Group's overall results and to the execution of the Group's strategy. This group comprises between 150 and 170 members (number may slightly fluctuate from one year to the next based on organisational changes).

Each of the VSP performance measures operates independently. The use of these measures is intended to align Executive Director remuneration with shareholders' interests. Prior to vesting, the Remuneration Committee reviews the underlying financial performance of the Company and non-financial performance of the Company and individuals over the performance period to ensure that the vesting is justified, and to consider whether to exercise its discretion including consideration of any potential windfall gains.

Deferred Share Bonus Plan award

33% of the Annual Incentive earned by Patrick André and Guy Young in respect of performance in 2021 was deferred into a share award granted in March 2022 under the Company's Deferred Share Bonus Plan. There are no additional performance conditions applicable to these awards.

	Type of award	Date of grant	Number of shares[1]	Face value (£)	Vesting date
Patrick André	Nil-cost option	17 March 2022	75,207	£291,202	18 March 2025
Guy Young		17 March 2022	46,235	£179,022	

1. The number of shares has been calculated using the share price of £3.872 (average closing share price for the five dealing days prior to grant) and excludes any additional shares that may be awarded in relation to dividends accruing during the vesting period.

Annual Report on Directors' Remuneration continued

Statement of Executive Directors' shareholding – audited

The interests of Executive Directors and their closely associated persons in ordinary shares as at 31 December 2022, including any interests in share options and shares provisionally awarded under the VSP, are set out below:

	Beneficial holding in shares[3]	Beneficial holding %	Outstanding share incentive awards: With performance conditions[1]	Outstanding share incentive awards: Without performance conditions[2]
Patrick André	184,020	0.07	832,882	91,681
Guy Young	153,259	0.06	396,398	57,673

1. These are Performance Shares granted under the VSP. The awards were all granted subject to performance conditions.
2. These are awards granted under the Deferred Share Bonus Plan. These awards are not subject to any additional performance conditions.
3. Patrick André's beneficial shareholding includes 30,000 shares he purchased on 7 March 2022.

Additional notes:

4. None of the other Directors, nor their spouses, nor their minor children, held non-beneficial interests in the ordinary shares of the Company during the year.
5. There were no changes in the interests of Patrick André in the ordinary shares of the Company in the period from 1 January 2023 to the date of this Report.
6. For Guy Young, there were no changes in these interests in the period from 1 January 2023 to his date of leaving, 17 February 2023, other than in respect of his outstanding performance-related awards which lapsed on his date of leaving.
7. All awards under the VSP are subject to performance conditions and continued employment until the relevant vesting date as set out on page 143.
8. Full details of Directors' shareholdings and incentive awards are given in the Company's Register of Directors' Interests, which is open to inspection at the Company's registered office during normal business hours.

Shareholding guidelines – audited

The Remuneration Committee encourages Executive Directors to build and hold a shareholding in the Company. Under the 2023 Remuneration Policy, the required holding is 200% of salary for all Executive Directors. Executive Directors are required to retain at least 50% (measured as the value after tax) of any shares received through the operation of share schemes; in addition, permission to sell shares held – whether acquired through the operation of share schemes or otherwise – will not be given, other than in exceptional circumstances, if, following the disposal, the shareholding requirement is not achieved or is not maintained.

Compliance with the shareholding policy is tested at the end of each year for application in the following year. Under the 2023 Remuneration Policy, the valuation of any holding is taken at the higher of: (1) the share price on the date of vesting of any shares derived from a share award, in respect of those shares only; and (2) the average of the closing prices of a Vesuvius ordinary share for the trading days in that December.

As at 31 December 2022, the Executive Directors' shareholdings against the shareholding guidelines contained in the Directors' Remuneration Policy in force on that date (using the Company's share price averaged over the trading days of the period 1 December to 31 December 2022, of 387.48 pence per share) were as follows:

Director	Actual share ownership as a percentage of salary at 31 Dec 2022	Policy share ownership as a percentage of salary	Policy met?
Patrick André	135%	200%	In the build-up period
Guy Young	187%	200%	In the build-up period

Payments to past Directors and loss of office payments – audited

There were no payments made to any Director for loss of office during the year ended 31 December 2022. External, professional services support was provided in 2022 to former Chief Executive, François Wanecq, in the form of international tax advice relating to his retirement, in line with the commitment to cover such reasonable costs, as specified in the Section 430(B) statement referenced in the Company's 2017 Annual Report. Total costs amounted to £3,629 (exclusive of VAT). No other payments were made to any other past Directors of the Company during the year ended 31 December 2022.

Non-executive Directors

Single total figure table – audited

The table below sets out the total remuneration received by Non-executive Directors in the financial year under review:

(£000)	2022 Total fees	2022 Taxable benefits[1]	2022 Total	2021 Total fees	2021 Taxable benefits[1]	2021 Total
Carl-Peter Forster[2]	40	2	42	–	–	–
John McDonough CBE[3]	221	9	230	205	9	214
Kath Durrant	75	7	82	60	3	63
Dinggui Gao	60	0	60	38	0	38
Friederike Helfer	60	2	62	50	3	53
Jane Hinkley	70	3	73	56	2	58
Douglas Hurt	85	3	88	70	1	71
Total Non-executive Director remuneration	**610**	**26**	**636**	479	18	497

1. The UK regulations require the inclusion of benefits for Directors where these would be taxable in the UK on the assumption that the Director is tax resident in the UK. The figures in the table therefore include expense reimbursement and associated tax relating to travel, accommodation and subsistence for the Director (and, where appropriate, their spouse) in connection with attendance at Board meetings and other corporate business during the year, which are considered by HMRC to be taxable in the UK.
2. Carl-Peter Forster joined the Board on 1 November 2022 and took over as Chairman on 1 December 2022.
3. John McDonough retired from the Board on 1 December 2022.

Fee structure in 2023

The fee for the Chairman was also reviewed by the Committee during the year and the fees for the Non-executive Directors by the Board. Following an assessment of time commitment, roles and responsibilities it was decided that the fees would increase with effect from 1 January 2023. The Chairman's fee was increased to £250,000; the Non-executive Directors' fees were increased to £63,000. Supplementary fees remain unchanged (supplementary Senior Independent Director fee at £10,000; supplementary fee for the Chairs of the Audit and Remuneration Committees at £15,000; and supplementary fee for the Non-executive Director responsible for workforce engagement at £10,000). In addition, it was decided that Non-executive Directors should receive a stipend of £4,000 in respect of each overseas, intercontinental trip they undertake on Vesuvius business, with the stipend payable for a maximum of five such trips in any calendar year.

Statement of Non-executive Directors' shareholding – audited

The interests of Non-executive Directors and their closely associated persons in ordinary shares as at 31 December 2022 are set out below:

	Beneficial holding in shares	Beneficial holding %
Carl-Peter Forster	–	0.00
Carla Bailo[1]	–	0.00
Kath Durrant	–	0.00
Friederike Helfer[2]	–	0.00
Dinggui Gao	–	0.00
Jane Hinkley	12,000	<0.01
Douglas Hurt	18,000	0.01

1. Carla Bailo was appointed as a Non-executive Director effective 1 February 2023.
2. Friederike Helfer is a Partner of, and has a financial interest in, Cevian Capital which held 57,249,896 ordinary shares (21.11% of Vesuvius' issued share capital) as at 31 December 2022 and at the date of this Report.

Additional notes:

3. Former Chairman, John McDonough, held 145,000 ordinary shares as at his retirement date of 1 December 2022.
4. None of the other Directors, nor their spouses, nor their minor children, held non-beneficial interests in the ordinary shares of the Company during the year.
5. There were no changes in the interests of the Non-executive Directors in the ordinary shares of the Company in the period from 1 January 2023 to the date of this Report.
6. Full details of Directors' shareholdings are given in the Company's Register of Directors' Interests, which is open to inspection at the Company's registered office during normal business hours.

Other regulatory disclosure requirements

Annual changes in Executive Directors' pay versus employee pay

Executive Directors' pay comparison

The London headquartered salaried employee workforce is presented as a voluntary disclosure of the representative comparator group for the Vesuvius Group parent company as there is only one non-Director employee in the parent company.

Year-on-year change in pay for Directors compared to the London headquartered employee average

	2022 Salary[3]	2022 Bonus[3]	2022 Benefits[5]	2021 Salary[3,4]	2021 Bonus[3]	2021 Benefits[5,6]	2020 Salary[3,4]	2020 Bonus[3]	2020 Benefits[5]
London headquartered employee average[1,2]	(8)%	(12)%	3%	19%	236%	120%	0%	165%	18%
Executive Directors									
Patrick André	4%	(16)%	11%	11%	469%	(6)%	(7%)	183%	(25%)
Guy Young	9%	(100)%	1%	11%	442%	9%	(1%)	155%	(14%)
Non-executive Directors[12]									
Carl-Peter Forster[7]	n/a	–	n/a	n/a	–	n/a	n/a	–	n/a
John McDonough CBE[8]	17%	–	(1)%	11%	–	48%	(10%)	–	(46%)
Kath Durrant[9]	25%	–	117%	19%	–	100%	n/a	–	n/a
Friederike Helfer	20%	–	(31)%	11%	–	969%	(10%)	–	(60%)
Dinggui Gao[10]	20%	–	100%	n/a	–	n/a	n/a	–	n/a
Jane Hinkley[11]	26%	–	40%	(5%)	–	63%	(10%)	–	(60%)
Douglas Hurt	21%	–	275%	11%	–	24%	(10%)	–	–

1. This is the average percentage change, excluding the Executive Directors. Salaries, bonus and benefits relate to the relevant financial reporting year.
2. Average London headquartered salary reduced year-on-year, due largely to the departure from the business, during 2022, of several high paid employees.
3. Calculated using data from the single figure table in the Annual Report.
4. During 2020 all Executive and Non-executive Directors took a voluntary 20% pay reduction for six months. Other senior employees in London headquarters also took a pay reduction between 10% and 20%, depending on their level of seniority. Therefore, the total percentage increase for the Executive Directors between 2021 and 2022 was higher than their agreed salary increases, as these increases are compared with actual, partly-reduced salary paid during 2020 rather than full, contractual base salary.
5. Calculated using data from the audited Directors' Emoluments. Benefits relate to taxable travel benefits, and Company pensions in the case of Executive Directors. It is calculated as the percentage increase or decrease on the actual figures year-on-year and not annualised or prorated for any new starters.
6. Calculations of 2021 benefits changes have been restated as compared with the 2021 Annual Report, to ensure correct alignment with Single Figure Remuneration tables.
7. Carl-Peter Forster joined the Board on 1 November 2022 and took over as Chairman on 1 December 2022.
8. John McDonough retired from the Board on 1 December 2022.
9. Kath Durrant joined on 1 December 2020 and then became the Remuneration Committee Chair following the 2021 AGM, and it is this change that accounts for the proportionally higher increase on her salary in 2021.
10. Dinggui Gao joined on 1 April 2021.
11. Jane Hinkley stood down as the Remuneration Committee Chair following the 2021 AGM, which accounts for her net reduction in year-on-year change in 2021.
12. The Non-executive Directors' fees were reviewed and increased in 2015, 2019 and 2022.

Annual Report on Directors' Remuneration continued

CEO pay ratio

The UK employee workforce is the representative comparator group to the Chief Executive, Patrick André, who is based in the UK (albeit with a global role and responsibilities). Levels of pay vary widely across the Group depending on geography and local market conditions.

Year	Method	25th percentile pay ratio	50th percentile (median) pay ratio	75th percentile pay ratio
2019	Option A	35:1	28:1	17:1
2020	Option A	32:1	24:1	13:1
2021	Option A	53:1	41:1	21:1
2022	Option A	45:1	34:1	19:1
2022	Total pay and benefits (£)	36,030	47,013	84,926
2022	Salary (£)	30,612	43,102	77,139

The table above shows the Chief Executive pay ratios versus our UK employees for 2019, 2020, 2021 and 2022. The pay ratios compare amounts disclosed in the single total figure table for the Group Chief Executive to the annual full-time equivalent remuneration of our UK employees for 2019, 2020, 2021 and 2022.

Notably the ratios have lowered in 2022 vs 2021, which is in line with the trend of annual incentives pay-outs, with overall annual incentive plan pay-outs set to be lower for 2022 compared with 2021. Given that variable pay makes up a more substantial proportion of Chief Executive pay than for other employees, an increase or decrease in incentives outturn has a disproportionate impact on the resulting ratio.

The data has been calculated in accordance with 'Option' A in The Companies (Miscellaneous Reporting) Regulations 2018, because it allows the Company to show the total annualised full-time equivalent remuneration (salary, incentives, allowances, fees, taxable benefits) and percentiles across the financial year as at 31 December 2019, 2020, 2021 and 2022.

Amounts have been annualised for those who joined part way through the year or who are on part-time arrangements and exclude those who left the organisation during the reporting period.

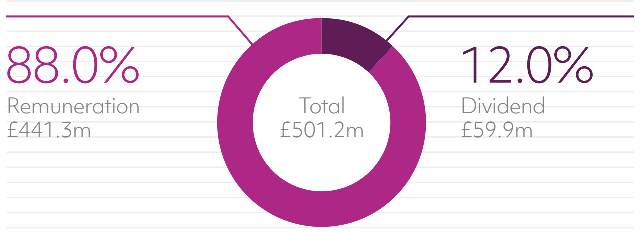
The approach to calculating the pay ratios is consistent with the prior year and there have not been any changes to the compensation models in the reporting period.

The Committee is comfortable that the principles applied and the quantum of compensation are appropriate across the Group's employee base. These are regularly benchmarked to ensure market competitiveness. There is a consistent approach of measuring against both business and personal performance for all those who participate in incentive programmes. The Group continues to monitor the effectiveness of all compensation practices to identify future opportunities to ensure they remain fair, consistent and in line with best practice.

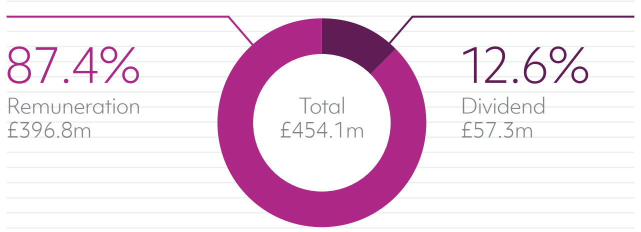
Annual spend on employee pay[1] versus shareholder distributions[2]

The charts below show the annual spend on all employees (including Executive Directors) compared with distributions made and proposed to be made to shareholders for 2021 and 2022:

Relative importance of spend on pay (2022) £m



Relative importance of spend on pay (2021) £m



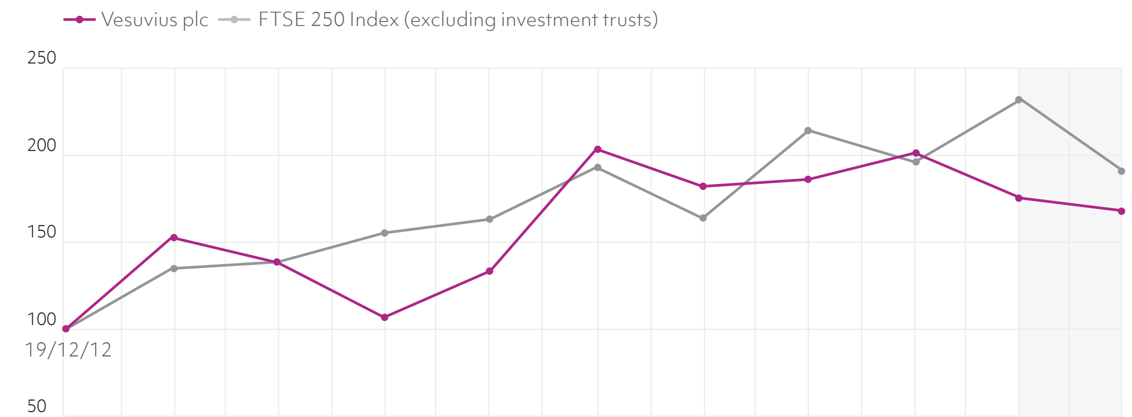
	2022 (£m)	2021 (£m)	Change
Employee pay[1]	**441.3**	396.8	11.2%
Dividends[2] (based on final proposed dividend)	**59.9**	57.3	4.5%

1. Employee pay includes wages and salaries, social security, share-based payments and pension costs, and other post-retirement benefits. See Note 8 to the Group Financial Statements.
2. Shareholder distributions/dividends includes interim and final dividends paid in respect of each financial year. See Note 24 of the Group Financial Statements.

TSR performance and Chief Executive pay

The TSR performance graph compares Vesuvius' TSR performance with that of the same investment in the FTSE 250 Index (excluding investment trusts). This index has been chosen as the comparator index to reflect the size, international scope and diversity of the Company. TSR is the measure of the returns that a company has provided for its shareholders, reflecting share price movements and assuming reinvestment of dividends.

Vesuvius' total shareholder return compared against total shareholder return of the FTSE 250 index (excluding investment trusts) since demerger



Chief Executive pay – financial year ended	François Wanecq[1]					Patrick André[2]				
	31/12/13	31/12/14	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19	31/12/20	31/12/21	**31/12/22**
Total remuneration (single figure (£000))	£2,447	£1,519	£752	£1,173	£1,675[1] £465[2]	£2,022	£1,220	£936	£1,706	**£2,206**
Annual variable pay (% of maximum)	100%	64%	0%	50%	81%[1] 85%[2]	83%	11%	20%	94%	**76%**
Long-term variable pay (% of maximum)	28%	27%	0%	0%	43.7%[1] n/a[2]	100%	63%	0%	0%	**48%**

1. Amounts shown in respect of François Wanecq for 2017 reflect payments in respect of his service as Chief Executive from 1 January 2017 to 31 August 2017 and the full value of his VSP award in relation to the performance period 2015–2017.
2. Amounts shown in respect of Patrick André for 2017 reflect payments in respect of his service as Chief Executive from 1 September 2017 to 31 December 2017.

Shareholder voting on remuneration resolutions

	Votes for	Votes against	Votes withheld
Approval of the Directors' Remuneration Policy 2020 AGM	244,618,671 (97.2%)	7,105,663 (2.8%)	3,640
Approval of the Annual Report on Remuneration 2022 AGM	243,341,031 (97.7%)	5,754,991 (2.3%)	5,500

The Directors' Remuneration Report has been approved by the Board and is signed on its behalf by

Kath Durrant
Chair of the Remuneration Committee
2 March 2022

Appendix: Supplementary share-related information

Share usage

Under the rules of the VSP, the Company has the discretion to satisfy awards either by the transfer of Treasury shares or other existing shares, or by the allotment of newly issued shares. Awards made under the Deferred Share Bonus Plan to satisfy shares awarded to Directors in respect of their Annual Incentive, and awards made to management of the Company over shares pursuant to the Medium-Term Incentive Plan, must be satisfied out of Vesuvius shares held for this purpose by the Company's Employee Benefit Trust (EBT).

The decision on how to satisfy awards is taken by the Remuneration Committee, which considers the most prudent and appropriate sourcing arrangement for the Company.

At 31 December 2022, the Company held 7,271,174 ordinary shares in Treasury and the EBT held 2,454,110 ordinary shares. No additional shares were purchased between 31 December 2022 and the date of this report.

The EBT can be gifted Treasury shares by the Company, can purchase shares in the open market or can subscribe for newly issued shares, as required, to meet obligations to satisfy options and awards that vest.

The VSP complies with the current Investment Association guidelines on headroom which provide that overall dilution under all plans over a rolling ten-year period should not exceed 10% of the Company's issued share capital, with a further limitation over a rolling ten-year period of 5% for discretionary share schemes. More than 9.9% of the 10% limit and more than 4.9% of the 5% limit remains available as headroom for the issue of new shares or the transfer of Treasury shares for the Company. No Treasury shares were transferred, or newly issued shares allotted under the VSP during the year under review.

Deferred Share Bonus Plan allocations – audited

33% of the Annual Incentives earned by Patrick André and Guy Young in respect of their periods of service as Directors of Vesuvius plc were deferred into shares under the Company's Deferred Share Bonus Plan. The following table sets out details of outstanding awards:

Grant and type of award	Total share allocations as at 1 Jan 2022	Additional shares allocated during the year	Allocations lapsed during the year	Shares vested during the year	Total share allocations as at 31 Dec 2022	Market price of the shares on the day before award (p)	Earliest vesting/ release date
Patrick André							
14 March 2019[1] Deferred Bonus Shares	29,646	–	–	(29,646)	**0**	608	14 Mar 2022
12 March 2020[2] Deferred Bonus Shares	7,044	–	–	–	**7,044**	391.8	12 Mar 2023
18 March 2021[3] Deferred Bonus Shares	9,430	–	–	–	**9,430**	538	18 Mar 2024
17 March 2022[4] Deferred Bonus Shares	–	75,207	–	–	**75,207**	385	17 Mar 2025
Total	46,120	75,207	–	(29,646)	**91,681**		
Guy Young[5]							
14 March 2019[1] Deferred Bonus Shares	19,028	–	–	(19,028)	**0**	608	14 Mar 2022
12 March 2020[2] Deferred Bonus Shares	5,345	–	–	–	**5,345**	391.8	12 Mar 2023
18 March 2021[3] Deferred Bonus Shares	6,093	–	–	–	**6,093**	538	18 Mar 2024
17 March 2022[4] Deferred Bonus Shares	–	46,235	–	–	**46,235**	385	17 Mar 2025
Total	30,466	46,235	–	(19,028)	**57,673**		

1. In 2019, Patrick André and Guy Young received Annual Incentive bonuses in respect of their service as Directors of Vesuvius plc in 2018 of £546,131 and £350,525 respectively. 33% of each bonus was awarded in deferred shares (conditional awards) under the Vesuvius Deferred Share Bonus Plan. The allocations of shares were made on 14 March 2019 and were calculated based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the award was made, being £6.079. The total value of these awards based on this share price was £180,218 and £115,671, respectively. There are no additional performance conditions applicable to these awards, therefore these shares vested in full on the third anniversary of their award date.
2. In 2020, Patrick André and Guy Young were awarded Annual Incentive bonuses in respect of their service as Directors of Vesuvius plc in 2019 of £83,775 and £63,569 respectively. 33% of each bonus was awarded in deferred shares (conditional awards). The allocations of shares were made on 12 March 2020 and were calculated based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the award was made, being £3.9248. The total value of these awards based on this share price was £27,646 and £20,978 respectively. There are no additional performance conditions applicable to these awards, therefore these shares will vest in full on the third anniversary of their award date.
3. In 2021, Patrick André and Guy Young were awarded Annual Incentive bonuses in respect of their service as Directors of Vesuvius plc in 2020 of £153,419 and £99,138 respectively. 33% of each bonus was awarded in deferred shares (conditional awards). The allocations of shares were made on 18 March 2021 and were calculated based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the award was made, being £5.3690. The total value of these awards based on this share price was £50,628 and £32,715 respectively. There are no additional performance conditions applicable to these awards, which will therefore will vest in full for Patrick André on the third anniversary of their award date.
4. In 2022, Patrick André and Guy Young were awarded Annual Incentive bonuses in respect of their service as Directors of Vesuvius plc in 2021 of £873,604 and £537,075 respectively. 33% of each bonus was awarded in deferred shares (conditional awards). The allocations of shares were made on 17 March 2022 and were calculated based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the award was made, being £3.872. The total value of these awards based on this share price was £291,202 and £179,022 respectively. There are no additional performance conditions applicable to these awards, which will therefore vest in full for Patrick André on the third anniversary of their award date.
5. Following his departure from the Company on 13 February 2023, Guy Young's outstanding awards vested in full.

Additional note:

6. The mid-market closing price of Vesuvius' shares during 2022 ranged between 284.6 pence and 491.0 pence per share, and on 30 December 2022, the last dealing day of the year, was 404.2 pence per share.

Vesuvius Share Plan award allocations – audited

The following table sets out outstanding awards that were allocated to Patrick André and Guy Young under the VSP:

Grant and type of award	Total share allocations as at 1 Jan 2022	Additional shares allocated during the year	Allocations lapsed during the year	Shares vested during the year	Total share allocations as at 31 Dec 2022	Market price of the shares on the day before award (p)	Performance period	Earliest vesting date	End of holding period[1]
Patrick André									
14 March 2019[2] Performance Shares	197,400	–	(197,400)	–	**0**	608	1 Jan 19– 31 Dec 21	14 Mar 2022	14 Mar 2024
12 March 2020[3] Performance Shares	282,772	–	–	–	**282,772**	391.8	1 Jan 20– 31 Dec 22	12 Mar 2023	12 Mar 2025
18 March 2021[4] Performance Shares	230,210	–	–	–	**230,210**	538	1 Jan 21– 31 Dec 23	18 Mar 2024	18 Mar 2026
17 March 2022[5] Performance Shares	–	319,900	–	–	**319,900**	385	1 Jan 22– 31 Dec 24	17 Mar 2025	17 Mar 2027
Total	710,382	319,900	(197,400)	0	**832,882**				
Guy Young[6]									
14 March 2019[2] Performance Shares	86,362	–	(86,362)	–	**0**	608	1 Jan 19– 31 Dec 21	14 Mar 2022	14 Mar 2024
12 March 2020[3] Performance Shares	132,120	–	–	–	**132,120**	391.8	1 Jan 20 31 Dec 22	12 Mar 2023	12 Mar 2025
18 March 2021[4] Performance Shares	107,562	–	–	–	**107,562**	538	1 Jan 21– 31 Dec 23	18 Mar 2024	18 Mar 2026
17 March 2022[5] Performance Shares	–	156,716	–	–	**156,716**	385	1 Jan 22– 31 Dec 24	17 Mar 2025	17 Mar 2027
Total	326,044	156,716	(86,362)	0	**396,398**				

1. Performance shares granted from 2019 onwards are subject to a further two-year holding period.
2. In 2019, Patrick André and Guy Young received allocations of Performance Shares worth 200% and 150% of their base salaries. These allocations were calculated based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the award was made, being £6.079. The total value of these awards based on this share price was £1,199,994 and £524,994 respectively. Following an assessment of the performance conditions, these awards lapsed in full in 2022.
3. In 2020, Patrick André and Guy Young were entitled to receive allocations of Performance Shares worth 200% and 150% of their base salaries respectively. In light of the volatile share price, the Committee applied its discretion so that the number of shares in these allocations were capped at a level based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the February 2020 Remuneration Committee meeting of £4.371. As a result, Patrick André received an award of 282,772 shares which, at grant, was equivalent in value to 180% of his base salary (£1,109,823*) and Guy Young received an award of 132,120 shares which, at grant, was equivalent in value to 135% of his base salary (£518,544*).

   * Grant values are based on the average closing mid-market price of Vesuvius' shares on the five dealing days prior to grant (£3.9248).
4. In 2021, Patrick André and Guy Young were entitled to receive allocations of Performance Shares worth 200% and 150% of their base salaries respectively. These allocations were calculated based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the award was made, being £5.3690. The total value of these awards based on this share price was £1,235,997 and £577,500 respectively.
5. In 2022, Patrick André and Guy Young were entitled to receive allocations of Performance Shares worth 200% and 150% of their base salaries respectively. In light of the volatile share price, the Committee applied its discretion so that the number of shares in these allocations were capped at a level based upon the average closing mid-market price of Vesuvius' shares on the five dealing days before the February 2022 Remuneration Committee meeting of £4.02. As a result, Patrick André received an award of 319,900 shares which, at grant, was equivalent in value to 193% of his base salary (£1,239,653**) and Guy Young received an award of 156,716 shares which, at grant, was equivalent in value to 144% of his base salary (£606,804**).

   ** Grant values are based on the average closing mid-market price of Vesuvius' shares on the five dealing days prior to grant (£3.872).
6. Guy Young's outstanding awards lapsed in full on his departure from the Company on 13 February 2023.

Additional notes:

7. If the respective performance conditions for Patrick André's awards are not met, then the awards will lapse. If the threshold level of either of the two performance conditions applicable to the awards is met, then 12.50% of the awards will vest.
8. The Remuneration Committee also has the discretion to award cash or shares equivalent in value to the dividend that would have been paid during the vesting period on the number of shares that vest.
9. The mid-market closing price of Vesuvius' shares during 2022 ranged between 284.6 pence and 491.0 pence per share, and on 30 December 2022, the last dealing day of the year, was 404.2 pence per share.

Directors' Report

The Directors submit their Annual Report together with the audited financial statements of the Group and of the Company, Vesuvius plc, registered in England and Wales No. 8217766, for the year ended 31 December 2022.

The Companies Act 2006 requires the Company to provide a Directors' Report for Vesuvius plc for the year ended 31 December 2022.

Information incorporated by reference

The information that fulfils this requirement and which is incorporated by reference into, and forms part of, this report is included in the following sections of the Annual Report:

- The Section 172(1) Statement
- The Non-financial and sustainability information statement (the Sustainability section)
- The Governance section, including the Corporate Governance Statement
- Financial instruments: the information on financial risk management objectives and policies contained in Note 25 to the Group Financial Statements

This Directors' Report and the Strategic Report contained on pages 1 to 85 together represent the management report for the purpose of compliance with DTR 4.1.8 R of the Financial Conduct Authority's Disclosure and Transparency Rules.

Going concern	Information on the business environment in which the Group operates, including the factors that are likely to impact the future prospects of the Group, is included in the Strategic Report. The principal risks and uncertainties that the Group faces throughout its global operations are shown on pages 32 and 33. The financial position of the Group, its cash flows, liquidity position and debt facilities are also described in the Strategic Report. In addition, the Group's Viability Statement is set out within the Strategic Report on page 31. Note 25 to the Group Financial Statements sets out the Group's objectives, policies and processes for managing its capital; financial risks; financial instruments and hedging activities; and its exposures to credit, market (both currency and interest rate related) and liquidity risk. Further details of the Group's cash balances and borrowings are included in Notes 13, 14 and 25 to the Group Financial Statements. The Directors have prepared profit and loss, balance sheet and cash flow forecasts for the Group for a period in excess of 12 months from the date of approval of the 2022 financial statements. On the basis of the exercise described above, the Directors have prepared a going concern statement which can be found on page 31.
Events since the balance sheet date	On 6 February 2023, we announced that we had suffered a cyber security incident. In order to contain the threat, we voluntarily shutdown our systems on a precautionary basis. During this period our sites instigated manual procedures and work arounds to maintain production, shipping and invoicing. We have since worked tirelessly on the reinstatement of our systems, and I am pleased to report that the initial period of major disruption has been short, and all sites and significant systems are now operational. As such we expect the impact on trading to be modest, limited to one-off costs of between £3m and £5m.
Future developments	A full description of the activities of the Group, including performance, significant events affecting the Group in the year and indicative information in respect of the likely future developments in the Group's business, can be found in the Strategic Report.
Financial instruments	Information on Vesuvius' financial risk management objectives and policies can be found in Note 25 to the Group Financial Statements.
Research and development	The Group's investment in research and development (R&D) during the year under review amounted to £36m (representing approximately 1.8% (2021: 1.8%) of Group revenue). Further details of the Group's R&D activities can be found in the Operating reviews and Sustainability section of the Strategic Report.
Political and charitable donations	In accordance with Vesuvius policy, the Group did not make any political donations or incur any political expenditure in relation to any UK or non-UK political parties during 2022 (2021: nil). The Company made charitable donations of £0.5m in the UK in 2022. In 2021 no charitable donations of more than £2,000 were made in the UK.

Task Force on Climate-related Financial Disclosures (TCFD)	The Group has reported its climate-related information in accordance with the TCFD disclosure framework. The majority of this information is included in the Sustainability section of the Strategic Report. A schedule of disclosure is included on page 54.
Energy consumption and efficiency/greenhouse gas emissions	Information on our reporting of greenhouse gas emissions, and the methodology used to record these, is set out on page 67 of the Strategic Report. Details of the Group's energy usage for 2022, and the efficiency initiatives currently being undertaken, can be found in the Sustainability section on pages 57–70.
Branches	A number of the Group's subsidiary undertakings maintain branches; further details of these can be found in Note 33.1 to the Group Financial Statements.
Dividends	An interim dividend of 6.5 pence (2021: 6.2 pence) per Vesuvius ordinary share was paid on 16 September 2022 to shareholders on the register at the close of business on 5 August 2022. The Board is recommending a final dividend in respect of 2022 of 15.75 pence (2021: 15.0 pence) per ordinary share which, if approved, will be paid on 31 May 2023 to shareholders on the register at 21 April 2023.
Accountability and audit	A responsibility statement of the Directors and a statement by the Auditor about its reporting responsibilities can be found on pages 150, and 151–159, respectively. The Directors fulfil the responsibilities set out in their statement within the context of an overall control environment of central strategic direction and delegated operating responsibility. As at the date of this report, as far as each Director of the Company is aware, there is no relevant audit information of which the Company's Auditors are unaware and each Director hereby confirms that they have taken all the steps that they ought to have taken as a Director in order to make themselves aware of any relevant audit information and to establish that the Company's Auditor is aware of that information.
Auditors' reappointment	PricewaterhouseCoopers LLP (PwC) were reappointed as External Auditors for Vesuvius plc for the year ended 31 December 2022, at the 2022 AGM. PwC have been Vesuvius' External Auditors since 2017 and have expressed their willingness to continue in office as Auditors of the Company for the year ending 31 December 2023. Consequently, resolutions for the reappointment of PwC as External Auditors of the Company and to authorise the Directors to determine their remuneration are to be proposed at the 2023 AGM.
Directors	The current Directors of the Company are Patrick André, Carla Bailo, Kath Durrant, Carl-Peter Forster, Dinggui Gao, Friederike Helfer, Jane Hinkley and Douglas Hurt. Carl-Peter Forster joined the Board on 1 November 2022 and succeeded John McDonough CBE as Chairman of the Company on 1 December 2022. Carla Bailo joined the Board as a Non-executive Director on 1 February 2023. John McDonough CBE served on the Board as Chairman of the Company until he stepped down on 1 December 2022. Guy Young resigned from the Board and as Chief Financial Officer on 17 February 2023. All the current Directors, with the exception of Jane Hinkley who will step down from the Board at the close of the 2023 AGM, will retire at the 2023 AGM on 18 May 2023 and offer themselves for election or re-election. Biographical information for the Directors is given on pages 88 and 89. Further information on the remuneration of, and contractual arrangements for, the Executive and Non-executive Directors is given on pages 116-143 in the Directors' Remuneration Report. The Non-executive Directors do not have service agreements.
Directors' indemnities	The Directors have been granted qualifying third-party indemnity provisions by the Company and the Directors of the Group's UK Pension Plans Trustee Board (none of whom is a Director of Vesuvius plc) have been granted qualifying pension scheme indemnity provisions by Vesuvius Pension Plans Trustees Limited. The indemnities for Directors of Vesuvius plc have been in force since the date of their appointments. The Pension Trustee indemnities were in force throughout the last financial year and remain in force.

Directors' Report continued

Annual General Meeting

The Annual General Meeting of the Company will be held at the offices of Linklaters LLP, One Silk Street, London EC2Y 8HQ on Thursday 18 May 2023 at 11.00 am.

Amendments of Articles of Association

The Company may make amendments to the Articles by way of special resolution in accordance with the Companies Act. The Articles were last amended at the 2021 AGM, to reflect changes in the law and developments in market practice and technology.

Share capital

As at the date of this report, the Company had an issued share capital of 278,485,071 ordinary shares of 10 pence each; 7,271,174 of these ordinary shares are held in Treasury. Therefore, the total number of Vesuvius plc shares with voting rights is 271,213,897.

Further information relating to the Company's issued share capital can be found in Note 9 to the Company Financial Statements.

The Company's Articles specify that, subject to the authorisation of an appropriate resolution passed at a General Meeting of the Company, Directors can allot relevant securities under Section 551 of the Companies Act up to the aggregate nominal amount specified by the relevant resolution. In addition, the Articles state that the Directors can seek the authority of shareholders in a General Meeting to allot equity securities for cash, without first being required to offer such shares to existing ordinary shareholders in proportion to their existing holdings under Section 561 of the Companies Act, in connection with a rights issue and in other circumstances up to the aggregate nominal amount specified by the relevant resolution.

At the AGM on 18 May 2022, the Directors were authorised to issue relevant securities up to an aggregate nominal amount of £9,040,463, and, in connection with a rights issue, to issue relevant securities up to a further nominal value of £9,040,463. In addition, the Directors were empowered to allot equity securities, or sell Treasury Shares, for cash on a non-pre-emptive basis up to an aggregate nominal amount of £1,356,069, and for the purposes of financing (or refinancing, if the authority is to be used within six months after the original transaction) a transaction which the Board of the Company determines to be an acquisition or other capital investment, to allot equity securities, or sell Treasury Shares, for cash on a non-pre-emptive basis up to an additional nominal amount of £1,356,069. Each of the authorities given in these resolutions expires on 30 June 2023 or the date of the AGM to be held in 2023, whichever is the earlier. The resolutions were all tabled in accordance with the terms of the Pre-Emption Group's Statement of Principles. The Directors propose to table updated resolutions at the 2023 AGM, to reflect the revised Pre-Emption Group guidance. In the year ahead, other than potentially in respect of Vesuvius' ability to satisfy rights granted to employees under its various share-based incentive arrangements, the Directors have no present intention of issuing any share capital of Vesuvius plc.

Authority for purchase of own shares

Subject to the provisions of company law and any other applicable regulations, the Company may purchase its own shares. At the AGM on 18 May 2022, Vesuvius shareholders gave authority to the Company to make market purchases of up to 27,121,389 Vesuvius ordinary shares, representing 10% of the Company's issued ordinary share capital as at the latest practicable day prior to the publication of the Notice of AGM. This authority expires on 30 June 2023 or the date of the AGM to be held in 2023, whichever is the earlier. The Directors will seek renewal of this authority at the 2023 AGM.

In 2013, the Company acquired 7,271,174 ordinary shares, representing a nominal value of £727,117 and 2.6% of the entire called up share capital of the Company prior to the purchase. These shares were purchased pursuant to the Board's commitment to return the majority of the net proceeds of the disposal of the Precious Metals Processing Division to shareholders. These shares are currently held as Treasury shares. The Company has not subsequently disposed of any of the repurchased shares. During the year, the Company did not make any further acquisitions of shares nor did it dispose of any shares previously acquired. The Company does not have a lien over any of its shares.

Share plans

Vesuvius operates a number of share-based incentive plans. Under these plans, the Group can satisfy entitlements by the acquisition of existing shares, the transfer of Treasury shares or by the issue of new shares. Existing shares are held in an employee benefit trust (EBT). The Trustee of the EBT purchases shares in the open market as required to enable the Group to meet liabilities for the issue of shares to satisfy awards that vest. The Trustee does not register votes in respect of these shares at the Company's Annual General Meetings and has waived the right to receive any dividends.

At 31 December 2021, the EBT held 884,856 ordinary shares of 10p each in the Company. During the year, the EBT sold/transferred 239,233 ordinary shares to satisfy the vesting of awards under the Company's share-based incentive plans. It also purchased 1,808,487 ordinary shares in Vesuvius with a nominal value of £180,849 at a total cost, including transaction costs, of approximately £6.9m, to hold to satisfy the future vesting of awards under the Company's share incentive plans. As at 31 December 2022, the EBT held 2,454,110 ordinary shares. The total purchases during the year represented <1% of the Company's called up share capital. As at the date of this report the EBT held 2,438,772 ordinary shares.

Restrictions on transfer of shares and voting

The Company's Articles do not contain any specific restrictions on the size of a holding or on the transfer of shares. The Directors are not aware of any agreements between holders of the Company's shares that may result in restrictions on the transfer of securities or voting rights.

No person has any special rights with regard to the control of the Company's share capital and all issued shares are fully paid. This is a summary only and the relevant provisions of the Articles should be consulted if further information is required.

Change of control provisions

The terms of the Group's committed bank facility and US Private Placement Loan Notes contain provisions entitling the counterparties to exercise termination or other rights in the event of a change of control on takeover of the Company. A number of the arrangements to which the Company and its subsidiaries are party, such as other debt arrangements and share incentive plans, may also alter or terminate on a change of control in the event of a takeover. In the context of the Group as a whole, these other arrangements are not considered to be significant.

Interests in the Company's shares

The Company has been advised in accordance with DTR 5 of the Disclosure and Transparency Rules of the following notifiable interests of 3%, or more, of its issued ordinary shares:

	As at 31 Dec 2022	As at 2 Mar 2023
Cevian Capital	21.11%	**21.11%**
GLG Partners LP	6.26%	**6.26%**
Martin Currie	4.83%	**4.83%**
BlackRock Inc	5%	**5%**
Aberforth Partners	4.93%	**4.93%**

The interests of Directors and their connected persons in the ordinary shares of the Company as disclosed in accordance with the Listing Rules of the Financial Conduct Authority are as set out on pages 138 and 139 of the Directors' Remuneration Report and details of the Directors' Deferred Share Bonus Plan and Vesuvius Share Plan are set out on pages 142 and 143.

Suppliers, customers and others

Information summarising how the Directors have regard to the need to foster the Company's business relationships with suppliers, customers and others is included in the Group's Section 172(1) Statement on pages 22–26. This also details how that regard impacted the principal decisions taken by the Directors during the year.

Our approach to business places a significant number of Vesuvius Steel employees at customer sites on a permanent basis. In the Foundry Division, our success is built on our deep understanding of customer processes and technical requirements, and our ability to assist them in delivering the greatest efficiency from their operations.

During the year, our supplier audit programme covered the operations of 139 suppliers. This approach allows Vesuvius to gain a deep understanding of our suppliers' operations to ensure sustainability and quality of supply.

Vesuvius agrees payment terms with its suppliers and seeks to pay in accordance with those terms.

Directors' Report continued

Equal opportunities employment

Vesuvius is an equal opportunities employer, and decisions on recruitment, development, training and promotion, and other employment-related issues are made solely on the grounds of individual ability, achievement, expertise and conduct. These principles are operated on a non-discriminatory basis, without regard to race, colour, nationality, culture, ethnic origin, religion, belief, gender, sexual orientation, age, disability or any other reason not related to job performance or prohibited by applicable law. In cases where employees are injured or disabled during employment with the Group, support, including appropriate training, is provided to those employees and workplace adjustments are made as appropriate in respect of their duties and working environment, supporting recovery and continued employment.

Employee engagement

Information on the mechanisms through which Vesuvius engages with its workforce is included in the Section 172(1) Statement on pages 22–26 and in the Sustainability section on pages 76-80.

Pensions

In each country in which the Group operates, the pension arrangements in place are considered to be consistent with good employment practice in that particular area. Independent advisers are used to ensure that the plans are operated in accordance with local legislation and the rules of each plan. Group policy prohibits direct investment of pension fund assets in the shares of Vesuvius plc.

The majority of the ongoing pension plans are defined contribution plans, where our only obligation is to make contributions, with no further commitments on the level of post-retirement benefits. During 2022, cash contributions of £10.8m (2021: £10.2m) were made into the defined contribution plans and charged to trading profit.

The Group's principal defined benefit pension plans are in the UK and the US, the benefits of which are based upon the final pensionable salaries of plan members. The assets of these plans are held separately from the Group in trustee-administered funds. The Trustees are required to act in the best interests of the plans' beneficiaries. The Group also has defined benefit pension plans in other territories but, except for those in Germany, these are not individually material in relation to the Group.

Vesuvius continues to seek ways to de-risk its existing pension plans through a combination of asset matching, buy-in opportunities and, where prudent, voluntary cash contributions. The total gross defined benefit obligations at 31 December 2022 were £416.0m funded (2021: £565.9m funded) and £60.2m unfunded (2021: £77.2m unfunded). After asset funding there was a net deficit of £56.1m (2021: £77.0m) representing a decrease of £20.9m. The Group's UK defined benefits plan (the 'UK Plan') and the main US defined benefits plans are closed to new entrants and have ceased providing future benefits accrual, with all eligible employees instead being provided with benefits through defined contribution arrangements. For the Group's closed UK Plan, a Trustee Board exists comprising employees, former employees and an independent trustee. The Board currently comprises six trustee Directors, of whom two are member-nominated. The administration of the UK Plan is outsourced. The Company is mindful of its obligations under the Pensions Act 2004 and of the need to comply with the guidance issued by the Pensions Regulator. Regular dialogue is maintained between the Company and the Trustee Board of the UK Plan to ensure that both the Company and Trustee Board are apprised of the same financial and other information about the Group and the UK Plan. This is pertinent to each being able to contribute to the effective functioning of the UK Plan. In November 2021, the Trustee of the Vesuvius Pension Plan signed a pension insurance buy-in agreement with Pension Insurance Corporation plc (PIC). This buy-in secured an insurance asset from PIC that matches the remaining pension liabilities of the UK Plan, with the result that the Company no longer bears any investment, longevity, interest rate or inflation risks in respect of the UK Plan. All benefits in the UK Plan (with the exception of a small amount of benefits expected to arise in future as a result of guaranteed minimum pensions (GMP) equalisation) are now insured with PIC.

The Group has several defined benefit pension plans in the US, providing retirement benefits based on final salary or a fixed benefit. The Group's principal US defined benefit pension plans are closed to new members and to future benefit accrual for existing members. The Group has several defined benefit pension arrangements in Germany which are unfunded, as is common practice in that country. In 2016, the main German defined benefit plan was closed for new entrants and existing members were offered a buy-out of their benefits under this plan. Those who accepted this buy-out then joined the new defined contribution plan.

Listing Rule 9.8.4C R Disclosures

The following disclosures are made in compliance with the Financial Conduct Authority's Listing Rule 9.8.4C R:

Disclosure requirement under LR 9.8.4 R	Reference/Location
(1) Interest capitalised by the Group during the year	None
(2) Publication of unaudited financial information	Not applicable
(3) Details of any long-term incentive schemes	Pages 133 and 134
(4) Director waiver of emoluments	Not applicable
(5) Director waiver of future emoluments	Not applicable
(6) Allotment for cash of equity securities made during the year	Not applicable
(7) Allotment for cash of equity securities made by a major unlisted subsidiary during the year	Not applicable
(8) Details of participation of parent undertaking in any placing made during the year	Not applicable
(9) Details of relevant material contracts in which a Director or controlling shareholder was interested during the year	Not applicable
(10) Contracts for the provision of services by a controlling shareholder during the year	Not applicable
(11) Details of any arrangement under which a shareholder has waived or agreed to waive any dividends	Vesuvius plc holds 7,271,174 of its 10 pence ordinary shares as Treasury shares. No dividends are payable on these shares. The Trustee of the Company's EBT has agreed to waive, on an ongoing basis, any dividends payable on shares it holds in trust for use under the Company's Employee Share Plans, details of which can be found on pages 142, 143 and 147
(12) Details of where a shareholder has agreed to waive future dividends	See above
(13) Statements relating to controlling shareholders and ensuring company independence	Not applicable

The Directors' Report has been approved by the Board and is signed, by order of the Board, by the Secretary of the Company.

Henry Knowles
Company Secretary
2 March 2023

Statement of Directors' Responsibilities in respect of the Financial Statements

The Directors are responsible for preparing the Annual Report and Financial Statements in accordance with applicable law and regulation.

Company law requires the Directors to prepare financial statements for each financial year. Under that law, the Directors have prepared the Group financial statements in accordance with UK-adopted international accounting standards and the Company financial statements in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards, comprising FRS 101 'Reduced Disclosure Framework', and applicable law).

Under company law, the Directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Group and Company and of the profit or loss of the Group for that period. In preparing the financial statements, the Directors are required to:

– Select suitable accounting policies and then apply them consistently
– State whether applicable UK-adopted international accounting standards have been followed for the Group financial statements and United Kingdom Accounting Standards, comprising FRS 101 have been followed for the Company financial statements, subject to any material departures disclosed and explained in the financial statements
– Make judgements and accounting estimates that are reasonable and prudent
– Prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Group and Company will continue in business

The Directors are also responsible for safeguarding the assets of the Group and Company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

The Directors are responsible for keeping adequate accounting records that are sufficient to show and explain the Group's and Company's transactions and disclose with reasonable accuracy at any time the financial position of the Group and Company and enable them to ensure that the financial statements and the Directors' Remuneration Report comply with the Companies Act 2006.

The Directors are responsible for the maintenance and integrity of the Company's website. Legislation in the United Kingdom governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

Directors' confirmations

The Directors consider that the Annual Report and Financial Statements, taken as a whole, is fair, balanced and understandable and provides the information necessary for shareholders to assess the Group and Company's position and performance, business model and strategy.

Each of the Directors, whose names and functions are listed below, confirm that, to the best of their knowledge:

– The Company financial statements, which have been prepared in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards, comprising FRS 101 Reduced Disclosure Framework, and applicable law), give a true and fair view of the assets, liabilities and financial position of the Company
– The Group financial statements, which have been prepared in accordance with UK-adopted international accounting standards, give a true and fair view of the assets, liabilities, financial position and profit of the Group
– The Strategic Report includes a fair review of the development and performance of the business and the position of the Group and Company, together with a description of the principal risks and uncertainties that the Group faces

The names and functions of the Directors of Vesuvius plc as at the date of signing these financial statements are as follows:

Carl-Peter Forster	Chairman
Patrick André	Chief Executive
Douglas Hurt	Non-executive Director, Senior Independent Director and Chair of the Audit Committee
Carla Bailo	Non-executive Director
Kath Durrant	Non-executive Director and Chair of the Remuneration Committee
Dinggui Gao	Non-executive Director
Friederike Helfer	Non-executive Director
Jane Hinkley	Non-executive Director

On behalf of the Board

Patrick André
Chief Executive
2 March 2023

Independent auditors' report to the members of Vesuvius plc

Report on the audit of the financial statements

Opinion

In our opinion:

– Vesuvius plc's Group financial statements and Company financial statements (the "financial statements") give a true and fair view of the state of the Group's and of the Company's affairs as at 31 December 2022 and of the Group's profit and the Group's cash flows for the year then ended;
– the Group financial statements have been properly prepared in accordance with UK-adopted international accounting standards as applied in accordance with the provisions of the Companies Act 2006;
– the Company financial statements have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards, including FRS 101 "Reduced Disclosure Framework", and applicable law); and
– the financial statements have been prepared in accordance with the requirements of the Companies Act 2006.

We have audited the financial statements, included within the Annual Report, which comprise: the Group and Company Balance Sheets as at 31 December 2022; the Group Income Statement, the Group Statement of Comprehensive Income, the Group Statement of Cash Flows and the Group and Company Statements of Changes in Equity for the year then ended; and the notes to the financial statements, which include a description of the significant accounting policies.

Our opinion is consistent with our reporting to the Audit Committee.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) ("ISAs (UK)") and applicable law. Our responsibilities under ISAs (UK) are further described in the Auditors' responsibilities for the audit of the financial statements section of our report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence

We remained independent of the Group in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, which includes the FRC's Ethical Standard, as applicable to listed public interest entities, and we have fulfilled our other ethical responsibilities in accordance with these requirements.

To the best of our knowledge and belief, we declare that non-audit services prohibited by the FRC's Ethical Standard were not provided.

Other than those disclosed in Note 6.2 of the Group financial statements, we have provided no non-audit services to the Company or its controlled undertakings in the period under audit.

Independent auditors' report to the members of Vesuvius plc continued

Our audit approach

Context

The Vesuvius Group (Vesuvius plc together with its subsidiaries) has operations in 40 countries, including 68 sales offices and has 55 production sites. In 2022, as set out in the Chief Executive's strategic review, Vesuvius delivered record results, despite a difficult market environment in both Steel and Foundry reporting segments and challenging inflationary cost pressure. The results were driven by market share and pricing performance in both Steel and Foundry. The sustainability strategy is important for the Group and includes plans to achieve a net zero carbon footprint by 2050 at the latest. The 'Sustainability' section of the Strategic report sets out the Group's climate change risk assessment, the climate related targets set and an evaluation of the potential financial impacts. We specifically considered the impacts of climate change on the audit and these are set out within the 'The impact of climate risk on our audit' section in this report.

Overview

Audit scope

- Our audit included full scope audits of 18 components and specific audit procedures on certain balances and transactions for 14 additional components.
- Taken together, the components at which either full scope audit work or specified audit procedures were performed enabled us to get coverage on 71% of revenue, 80% of profit before tax and 82% of profit before tax and separately reported items (Headline profit before tax).

Key audit matters

- Impairment of goodwill (Group)
- Provisions for exposures (Legacy matter lawsuits) (Group)
- Impairment of investment in subsidiaries (Company)

Materiality

- Overall Group materiality: £10.3 million (2021: £6.3 million) based on approximately 4.7% (2021: approximately 4.6%) of profit before tax and separately reported items ('Headline profit before tax').
- Overall Company materiality: £10.3 million (2021: £6.3 million) based on 1.0% of total assets, capped at the level of overall Group materiality.
- Performance materiality: £7.73 million (2021: £4.73 million) (Group) and £7.73 million (2021: £4.73 million) (Company).

The scope of our audit

As part of designing our audit, we determined materiality and assessed the risks of material misstatement in the financial statements.

Key audit matters

Key audit matters are those matters that, in the auditors' professional judgement, were of most significance in the audit of the financial statements of the current period and include the most significant assessed risks of material misstatement (whether or not due to fraud) identified by the auditors, including those which had the greatest effect on: the overall audit strategy; the allocation of resources in the audit; and directing the efforts of the engagement team. These matters, and any comments we make on the results of our procedures thereon, were addressed in the context of our audit of the financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

This is not a complete list of all risks identified by our audit.

The key audit matters below are consistent with last year.

Key audit matter

Impairment of goodwill (Group)

At 31 December 2022, the carrying value of goodwill is £657.9 million (2021: £614.2 million). Goodwill arising from acquisitions has an indefinite expected useful life and so is not amortised but rather is tested for impairment at least annually at the cash-generating unit ("CGU") level. Management has determined its CGUs to align with the operating segments, which are Steel Advanced Refractories, Steel Flow Control and Foundry. Steel Sensors and Probes goodwill was previously impaired and is fully written down.

Management prepares a Value in Use (VIU) model (discounted cash flow) to test for impairment of the carrying value of the above CGUs. This is based on a Board approved budget and 3 year forecast, on which a terminal value is calculated based on long term growth rates. The VIU model requires estimation of projected future cash flows and involves making key assumptions of revenue and trading profit growth rates, an appropriate discount rate and long term growth rates for each of the CGUs. In making such future assumptions there is an inherent level of estimation uncertainty to consider, including impacts to the forecast cash flows that may arise from climate change, inflationary conditions and COVID-19.

We focused on the valuation of the goodwill due to its material carrying value, and with regard to the estimation uncertainties arising from the factors set out above.

Refer to Intangible Assets (Note 16), Impairment of Tangible and Intangible Assets (Note 17),Critical Accounting Judgements and Estimates (Note 3) and Significant issues and material judgements in the Audit Committee report.

How our audit addressed the key audit matter

Our audit procedures included:

- For each CGU we obtained management's Value in Use model. We ensured the calculations were mathematically accurate and that the valuation methodology conformed with the requirements of IAS 36 'Impairment of Assets'.
- For key assumptions made by management in respect of forecast revenue and trading profit growth:
  - We obtained management's supporting evidence such as the Board approved budget and 3 year forecast. We agreed the forecast cash flows and underlying assumptions to these and assessed historical evidence of CGU growth rates. We also challenged the extent to which climate change considerations had been reflected in management's forecast cash flows.
  - We obtained evidence through our own independent research. This included evidence of forecast production and demand levels for the CGU's end customer markets, inflation forecasts, climate change driven trends and recovery and growth in cyclical end markets.
  - We considered market valuation evidence such as current and target share price and understood material differences.
  - Our audit evidence corroborated trends in the cash flows modelled, although in year 2 and 3 and into perpetuity estimation uncertainty increases (see our sensitivities below).
- We utilised internal valuations experts to support our audit procedures over the discount rate and long term growth rate assumptions used in the impairment model and sensitised the impacts of changes in the discount rate within our view of a reasonable range.
- We remained professionally sceptical of the impacts of forecasting uncertainty, particularly where evidence in later years is more judgemental as set out above. We determined alternative sensitivity scenarios to ascertain the extent of changes in projections that would be required for the goodwill to be impaired. These included scaling back year 3 forecasts and factoring in historical levels of forecasting inaccuracy. We also evaluated the sensitivity of impairment model cash flows to the impacts of climate change set out in the 'Sustainability' section of the Strategic report, including identified costs of working to 'net zero' and the potential financial impacts of the scenarios for temperature change. We did not identify reasonable sensitivities that would result in impairment of any of the CGUs being tested.

In addition to the above procedures (which comprised our area of focus), we instructed our component audit teams to evaluate the appropriateness of management impairment indicator assessments performed within the components and to also assess any material impacts of climate change. These assessments focused on individual or groups of assets below the levels of the CGUs. Our component teams, under our supervision, did not identify any additional impairments required or inconsistent findings to our Group level assessment in respect of climate change.

From our procedures we concluded that estimates and key assumptions made by management in performing impairment testing, including reasonably possible downside sensitivities which showed no scenarios of impairment, were supported. Appropriate disclosures have been included within the Annual Report. The Critical Accounting Judgements and Estimates note (Note 3) accordingly highlights this area as a critical accounting estimate although it is not expected to materially impact the financial statements in the next 12 months. Our findings were discussed with the Audit Committee.

Independent auditors' report to the members of Vesuvius plc continued

Key audit matter	How our audit addressed the key audit matter
Provisions for exposures (Legacy matter lawsuits) (Group) The Group holds a provision for 'Disposal, closure and environmental costs' (which includes provisions relating to legacy matter lawsuits for closed businesses) amounting to £57.7 million (2021: £41.7 million). Determining the quantum of this provision involves modelling and estimation of expected future legal claim periods, volumes, settlement amounts and associated legal costs. It also requires the directors to use judgement to determine whether associated insurance recoverable amounts should be recognised within assets. We specifically focused on the provision in respect of legacy matter lawsuits due to the material quantum of the provision and the judgement and estimates involved in determining its valuation. Refer to Critical Accounting Judgements and Estimates (Note 3), Provisions (Note 30), Contingent Liabilities (Note 32) and Significant issues and material judgements in the Audit Committee report.	Our audit procedures included: – Obtaining management's model of the estimated legal costs, associated insurance recoverable and testing the mathematical accuracy and integrity of this model. – We challenged claims arising, settlements made and expected trends with management's in-house and external legal experts. – We tested the accuracy of historical source data which is used to determine estimates of future trends of claim volumes, types of future claims and settlement amounts and legal costs associated with claims, to supporting claim documentation. – We utilised our own auditor's expert to support our audit of the key assumptions and to independently determine a reasonable range for the provision estimate based on reasonably possible changes in significant assumptions due to the estimation uncertainty involved. – We inspected evidence of the available insurance cover, the routine and consistent collection of this and considered the financial condition of insurance providers to gain evidence over the recognition and recoverability of the insurance asset. We also verified that this was appropriately presented as gross of the associated provisions (within 'Other receivables'). From our procedures, we concluded the amount of the provision held was within our acceptable range, albeit more towards the optimistic end of the range. We evaluated the level of disclosures and that these adequately explain estimation uncertainty of key assumptions including over the longer term. Critical Accounting Judgements and Estimates (Note 3) highlights this area as a critical accounting estimate. Our findings were discussed with the Audit Committee.
Impairment of investment in subsidiaries (Company) The Company holds investments in subsidiaries with a total carrying amount of £1,778.0 million at 31 December 2022 (2021: £1,778.0 million) in addition to amounts owed to subsidiary undertakings of £1009.8 million (2021: £977.4 million). IAS 36 'Impairment of assets' requires management to consider whether there are any indicators of impairment in respect of non-financial assets. Due to the quantum of the carrying amount, levels of estimation uncertainty that exist similar to assumptions used in testing for impairment of goodwill (Group) and the market capitalisation of the Company this was an area of focus for the audit of the Company. Consistent with the prior year management performed an impairment test utilising cash flow forecasts used for testing for impairment of the Group's goodwill together with additional considerations of cash flows relevant to the subsidiaries that the Company owns. The judgements and estimates required to determine the cash flow forecasts are aligned with those set out in 'Impairment of goodwill (Group)' above. Refer to Investments (Note 7), Other Creditors including Taxation and Social Security (Note 8), Critical Accounting Judgements and Estimates (Note 3) in the Company financial statements and Significant issues and material judgements in the Audit Committee report.	Our audit procedures included: – We assessed the results of the Value in Use model used for the impairment test for goodwill, together with adjustments made to reflect cash inflows to subsidiaries due from the Company. – Our testing of the Group Value in Use model, including procedures performed over management's model and evidence obtained in respect of key assumptions made is set out in Key audit matter 'Impairment of goodwill'. We also compared the carrying value of the investment in subsidiaries and the Group Value in Use to the market capitalisation and market valuation expectations. – We performed sensitivity analyses which showed there was no reasonably possible scenarios of impairment when taking account of estimation uncertainty in key assumptions. Scenarios modelled included consideration of historical forecasting inaccuracies, scaling back year 3 forecasts and impacts of climate change. – This indicated headroom in the determined Value in Use and that the investment in subsidiaries balance was not impaired. We reviewed financial statement disclosures and these are consistent with the results of management's testing and our audit evidence Critical Accounting Judgements and Estimates (Note 3) in the Company financial statements highlights this area as a critical accounting estimate although it is not expected to materially impact the financial statements in the next 12 months. Our findings were discussed with the Audit Committee.

How we tailored the audit scope

We tailored the scope of our audit to ensure that we performed enough work to be able to give an opinion on the financial statements as a whole, taking into account the structure of the Group and the Company, the accounting processes and controls, and the industry in which they operate.

The Vesuvius Group (Vesuvius plc (Company) together with its subsidiaries) has operations in 40 countries, including 68 sales offices and has 55 production sites. The Group consolidates financial information through reporting from its components which include divisions and functions at these sites.

Our audit scope was determined by considering the significance of the component's contribution to profit before tax and separately reported items (Headline profit before tax). We also evaluated contribution to revenue and to other individual financial statement line items, with specific consideration to obtaining sufficient coverage over areas of heightened risk and locations.

We identified one component (2021: none) as financially significant in 2022. The audit scope comprised of a further 17 components for which we determined that full scope audits would need to be performed and 14 components for which specific audit procedures on certain balances and transactions were performed by either component teams or the Group team. This collectively provided audit coverage of 71% of the Group's revenue, 80% of the Group's profit before tax and 82% of the Group's Headline profit before tax. This, together with the additional procedures performed at the Group level, including testing the consolidation process, gave us the evidence we needed for our opinion on the financial statements as a whole.

In establishing the overall approach to the Group audit, we determined the type of work that needed to be performed by us, as the Group audit team, or by component auditors in both PwC network firms and other audit firms. Where the work was performed by component auditors, we determined the level of involvement and oversight we needed to have in the audit work at those components to be able to conclude whether sufficient appropriate audit evidence had been obtained as a basis for our opinion on the financial statements as a whole. This was achieved through:

- Issuance of formal instructions and regular communications with the component auditors throughout the audit, including visits to 2 components by Group audit senior team members;
- Attendance at audit clearance meetings by Group audit senior team members;
- Interactions with local component management;
- Our direction and supervision of the audit approach and review of audit findings;
- Review of selected audit workpapers of certain in-scope component, including for the financially significant component and material components; and
- For the financially significant component and material components, meetings with the Group audit quality review partner.

The Group audit team also performed the audit of the Company and other procedures over those components of the Group not subject to full scope audits.

The impact of climate risk on our audit

The 'Sustainability' section of the Strategic report sets out the Group's climate change risk assessment, the climate related targets set and an evaluation of the potential financial impacts. In planning and executing our audit we considered management's risk assessment and analysis of impacts to the financial statements. We made enquiries of management to understand the process adopted by management to assess the extent of the potential impact of climate related risk and targets established by management on the Group's financial statements and support the disclosures made within the 'Sustainability' section of the Strategic Report and Note 2.6 of the financial statements. Management has made commitments to achieve net zero for the Group's Scope 1 and Scope 2 carbon emissions by 2050 as disclosed in the 'Sustainability' section of the Strategic report of the Annual Report. Management considers the impact of climate risk gives rise to a potential material financial statement impact in the long term (between 2025 and 2050).

We challenged the completeness of management's climate risk assessment by:

- Reading additional sustainability related reporting made by management on the Group's website and in its Carbon Disclosure Project public submission and making management aware of any internal inconsistencies in its climate reporting;
- Challenging the consistency of management's climate impact assessment disclosed within the 'Sustainability' section of the Strategic Report and Note 2.6 of the financial statements with internal climate plans and board minutes, including consideration of whether the time horizons management has used take account of transition risks;
- Using our knowledge of the business to evaluate management's risk assessment, its judgements and estimates as set out in note 2.6 and note 3 of the financial statements and resulting disclosures where significant; and
- Considering findings from our own independent research in respect of climate change driven trends to the Group's end customer markets.

Based on the procedures set out above, we understood the key impacts to the Group could include potential increases in costs from carbon pricing mechanisms, costs and benefits of technology transition in Iron and Steelmaking and the conversion of manufacturing processes to clean energy. This would most likely impact the financial statement line items and estimates associated with future cash flows because the impact of climate change for the Vesuvius Group is expected to become more notable in the medium to long term. We considered the following areas to potentially be materially impacted by climate risk and consequently we focused our audit work in these areas: valuation of goodwill and other non-financial assets (Group), useful lives applied to tangible and intangible assets (Group) and impairment of investment in subsidiaries (Company), with impairment of goodwill (Group) and impairment of investment in subsidiaries (Company) determined to be key audit matters for the year ended 31 December 2022. In our audit of the forecasts used by management in its Value in Use models prepared to test for

Independent auditors' report to the members of Vesuvius plc continued

impairment of goodwill (Group) and investment in subsidiaries (Company), we challenged management on how the impact of climate commitments made by the Group would impact the discounted forecast cash flows prepared by management. We also evaluated the sensitivity of impairment model cash flows to the impacts of climate change set out in the 'Sustainability' section of the Strategic report, including identified costs of working to 'net zero' and the potential financial impacts of the scenarios for temperature change. We did not identify reasonable sensitivities that would result in impairment of Group's goodwill or the Company's investment in subsidiaries carrying value. We also assessed the appropriateness of the associated disclosures. For further details see our Key Audit Matter on impairment of goodwill (Group) and impairment of investment in subsidiaries (Company).

Additionally, we considered the consistency of the disclosures in relation to climate change (including the disclosures in the Task Force on Climate-related Financial Disclosures (TCFD) related reporting within the 'Sustainability' section of the Strategic report, with the financial statements and our knowledge obtained from our audit. This included considering whether the assumptions made by management in the TCFD scenario analysis are consistent with the assumptions used elsewhere in the financial statements.

We have not noted any issues as part of this work which contradict the disclosures in the Annual Report or materially impact the financial statements, or our key audit matters for the year ended 31 December 2022.

Materiality

The scope of our audit was influenced by our application of materiality. We set certain quantitative thresholds for materiality. These, together with qualitative considerations, helped us to determine the scope of our audit and the nature, timing and extent of our audit procedures on the individual financial statement line items and disclosures and in evaluating the effect of misstatements, both individually and in aggregate on the financial statements as a whole.

Based on our professional judgement, we determined materiality for the financial statements as a whole as follows:

	Financial statements – Group	Financial statements – Company
Overall materiality	£10.3 million (2021: £6.3 million).	£10.3 million (2021: £6.3 million).
How we determined it	Approximately 4.7% (2021: approximately 4.6%) of profit before tax and separately reported items ('Headline profit before tax')	1.0% of total assets, capped at the level of overall Group materiality
Rationale for benchmark applied	We believe that profit before tax and separately reported items ('Headline profit before tax') provides us with an appropriate basis for determining our overall Group audit materiality given it is a key measure for users of the financial statements both internally and externally. Headline profit before tax is an Alternative Performance Measure presented and defined in the Annual Report. (2021: Headline profit before tax)	We believe that total assets is an appropriate basis for determining materiality for the Company, given this entity is an investment holding company and this is an accepted auditing benchmark. The materiality was capped to the level of Group overall materiality. The Company is not an in-scope component for our Group audit. (2021: 1% of total assets, capped at the level of overall Group materiality)

For each component in the scope of our Group audit, we allocated a materiality that is less than our overall Group materiality. The range of materiality allocated across components was £0.7 million and £6.5 million. Certain components were audited to a local statutory audit materiality that was also less than our overall Group materiality.

We use performance materiality to reduce to an appropriately low level the probability that the aggregate of uncorrected and undetected misstatements exceeds overall materiality. Specifically, we use performance materiality in determining the scope of our audit and the nature and extent of our testing of account balances, classes of transactions and disclosures, for example in determining sample sizes. Our performance materiality was 75% (2021: 75%) of overall materiality, amounting to £7.73 million (2021: £4.73 million) for the Group financial statements and £7.73 million (2021: £4.73 million) for the company financial statements.

In determining the performance materiality, we considered a number of factors – the history of misstatements, risk assessment and aggregation risk and the effectiveness of controls – and concluded that an amount at the upper end of our normal range was appropriate.

We agreed with the Audit Committee that we would report to them misstatements identified during our audit above £515,000 (Group audit) (2021: £350,000) and £515,000 (Company audit) (2021: £350,000) as well as misstatements below those amounts that, in our view, warranted reporting for qualitative reasons.

Conclusions relating to going concern

Our evaluation of the directors' assessment of the Group's and the Company's ability to continue to adopt the going concern basis of accounting included:

- Evaluating management's base case and severe but plausible downside case for liquidity and available financial resources and obtaining supporting evidence for key assumptions. This included agreeing the underlying cash flow projections to the Board approved forecast, assessing how these forecasts were compiled and assessing the historical accuracy of the forecasts. We also evaluated current performance and available financing facilities and related liquidity headroom.
- Testing the accuracy of cash flow models used to assess available liquidity during the going concern period disclosed.
- Determining alternative sensitivity scenarios to ascertain the impact of changes in assumptions. These included scaling back forecasts and increasing working capital as a percentage of forecast revenue.
- Reading management's disclosures in the financial statements and relevant 'other information' in the Annual Report, and assessing consistency with the financial statements and our knowledge based on our audit.

Based on the work we have performed, we have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the Group's and the Company's ability to continue as a going concern for a period of at least twelve months from when the financial statements are authorised for issue.

In auditing the financial statements, we have concluded that the directors' use of the going concern basis of accounting in the preparation of the financial statements is appropriate.

However, because not all future events or conditions can be predicted, this conclusion is not a guarantee as to the Group's and the Company's ability to continue as a going concern.

In relation to the directors' reporting on how they have applied the UK Corporate Governance Code, we have nothing material to add or draw attention to in relation to the directors' statement in the financial statements about whether the directors considered it appropriate to adopt the going concern basis of accounting.

Our responsibilities and the responsibilities of the directors with respect to going concern are described in the relevant sections of this report.

Reporting on other information

The other information comprises all of the information in the Annual Report other than the financial statements and our auditors' report thereon. The directors are responsible for the other information, which includes reporting based on the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. Our opinion on the financial statements does not cover the other information and, accordingly, we do not express an audit opinion or, except to the extent otherwise explicitly stated in this report, any form of assurance thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If we identify an apparent material inconsistency or material misstatement, we are required to perform procedures to conclude whether there is a material misstatement of the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report based on these responsibilities.

With respect to the Strategic report and Directors' report, we also considered whether the disclosures required by the UK Companies Act 2006 have been included.

Based on our work undertaken in the course of the audit, the Companies Act 2006 requires us also to report certain opinions and matters as described below.

Strategic report and Directors' report

In our opinion, based on the work undertaken in the course of the audit, the information given in the Strategic report and Directors' report for the year ended 31 December 2022 is consistent with the financial statements and has been prepared in accordance with applicable legal requirements.

In light of the knowledge and understanding of the Group and Company and their environment obtained in the course of the audit, we did not identify any material misstatements in the Strategic report and Directors' report.

Directors' Remuneration

In our opinion, the part of the Directors' Remuneration Report to be audited has been properly prepared in accordance with the Companies Act 2006.

Independent auditors' report to the members of Vesuvius plc continued

Corporate governance statement

The Listing Rules require us to review the directors' statements in relation to going concern, longer-term viability and that part of the corporate governance statement relating to the Company's compliance with the provisions of the UK Corporate Governance Code specified for our review. Our additional responsibilities with respect to the corporate governance statement as other information are described in the Reporting on other information section of this report.

Based on the work undertaken as part of our audit, we have concluded that each of the following elements of the corporate governance statement is materially consistent with the financial statements and our knowledge obtained during the audit, and we have nothing material to add or draw attention to in relation to:

- The directors' confirmation that they have carried out a robust assessment of the emerging and principal risks;
- The disclosures in the Annual Report that describe those principal risks, what procedures are in place to identify emerging risks and an explanation of how these are being managed or mitigated;
- The directors' statement in the financial statements about whether they considered it appropriate to adopt the going concern basis of accounting in preparing them, and their identification of any material uncertainties to the Group's and Company's ability to continue to do so over a period of at least twelve months from the date of approval of the financial statements;
- The directors' explanation as to their assessment of the Group's and Company's prospects, the period this assessment covers and why the period is appropriate; and
- The directors' statement as to whether they have a reasonable expectation that the Company will be able to continue in operation and meet its liabilities as they fall due over the period of its assessment, including any related disclosures drawing attention to any necessary qualifications or assumptions.

Our review of the directors' statement regarding the longer-term viability of the Group and Company was substantially less in scope than an audit and only consisted of making inquiries and considering the directors' process supporting their statement; checking that the statement is in alignment with the relevant provisions of the UK Corporate Governance Code; and considering whether the statement is consistent with the financial statements and our knowledge and understanding of the Group and Company and their environment obtained in the course of the audit.

In addition, based on the work undertaken as part of our audit, we have concluded that each of the following elements of the corporate governance statement is materially consistent with the financial statements and our knowledge obtained during the audit:

- The directors' statement that they consider the Annual Report, taken as a whole, is fair, balanced and understandable, and provides the information necessary for the members to assess the Group's and Company's position, performance, business model and strategy;
- The section of the Annual Report that describes the review of effectiveness of risk management and internal control systems; and
- The section of the Annual Report describing the work of the Audit Committee.

We have nothing to report in respect of our responsibility to report when the directors' statement relating to the Company's compliance with the Code does not properly disclose a departure from a relevant provision of the Code specified under the Listing Rules for review by the auditors.

Responsibilities for the financial statements and the audit

Responsibilities of the directors for the financial statements

As explained more fully in the Statement of Directors' Responsibilities in respect of the Financial Statements, the directors are responsible for the preparation of the financial statements in accordance with the applicable framework and for being satisfied that they give a true and fair view. The directors are also responsible for such internal control as they determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the Group's and the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Group or the Company or to cease operations, or have no realistic alternative but to do so.

Auditors' responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Irregularities, including fraud, are instances of non-compliance with laws and regulations. We design procedures in line with our responsibilities, outlined above, to detect material misstatements in respect of irregularities, including fraud. The extent to which our procedures are capable of detecting irregularities, including fraud, is detailed below.

Based on our understanding of the Group and industry, we identified that the principal risks of non-compliance with laws and regulations related to income and other tax, international trade restrictions, health and safety, environmental and anti-bribery, and we considered the extent to which non-compliance might have a material effect on the financial statements. We also considered those laws and regulations that have a direct impact on the financial statements such as the Companies Act 2006 and Listing Rules of the Financial Conduct Authority (FCA). We evaluated management's incentives and opportunities for fraudulent manipulation of the financial statements (including the risk of override of controls), and determined that the principal risks were related to posting inappropriate journal entries and management bias in accounting estimates. The Group engagement team shared this risk assessment with the component auditors so that they could include appropriate audit procedures in response to such risks in their work. Audit procedures performed by the Group engagement team and/or component auditors included:

- Enquiries of Group and local management, those charged with governance, internal audit and the Group's legal counsel (internal and, where relevant, external), including consideration of known or suspected instances of non-compliance with laws and regulations and fraud;
- Understanding and evaluation of the design and implementation of management's controls designed to prevent and detect irregularities, including compliance, whistle-blowing arrangements and the results of management's investigation of such matters;
- Inspecting management reports and Board minutes in relation to health and safety and other compliance matters;
- Reading and assessing key correspondence with regulatory authorities, including in respect of uncertain tax positions;
- Testing assumptions and judgements made by management in their critical accounting estimates, in particular relating to impairment of goodwill (Group), provisions for exposures (Legacy matter lawsuits) (Group) and impairment of investment in subsidiaries (Company) (see related key audit matters section of this report);
- Identifying and testing journal entries, in particular any journal entries posted with unusual account combinations including in respect of journals posted to revenue; and
- Obtained an understanding of the nature of any trade restrictions and our component auditors tested relevant supporting evidence that exists locally.

There are inherent limitations in the audit procedures described above. We are less likely to become aware of instances of non-compliance with laws and regulations that are not closely related to events and transactions reflected in the financial statements. Also, the risk of not detecting a material misstatement due to fraud is higher than the risk of not detecting one resulting from error, as fraud may involve deliberate concealment by, for example, forgery or intentional misrepresentations, or through collusion.

Our audit testing might include testing complete populations of certain transactions and balances, possibly using data auditing techniques. However, it typically involves selecting a limited number of items for testing, rather than testing complete populations. We will often seek to target particular items for testing based on their size or risk characteristics. In other cases, we will use audit sampling to enable us to draw a conclusion about the population from which the sample is selected.

A further description of our responsibilities for the audit of the financial statements is located on the FRC's website at: www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditors' report.

Use of this report

This report, including the opinions, has been prepared for and only for the Company's members as a body in accordance with Chapter 3 of Part 16 of the Companies Act 2006 and for no other purpose. We do not, in giving these opinions, accept or assume responsibility for any other purpose or to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by our prior consent in writing.

Other required reporting

Companies Act 2006 exception reporting

Under the Companies Act 2006 we are required to report to you if, in our opinion:

- we have not obtained all the information and explanations we require for our audit; or
- adequate accounting records have not been kept by the Company, or returns adequate for our audit have not been received from branches not visited by us; or
- certain disclosures of directors' remuneration specified by law are not made; or
- the Company financial statements and the part of the Directors' Remuneration Report to be audited are not in agreement with the accounting records and returns.

We have no exceptions to report arising from this responsibility.

Appointment

Following the recommendation of the Audit Committee, we were appointed by the members on 10 May 2017 to audit the financial statements for the year ended 31 December 2017 and subsequent financial periods. The period of total uninterrupted engagement is 6 years, covering the years ended 31 December 2017 to 31 December 2022.

Other matter

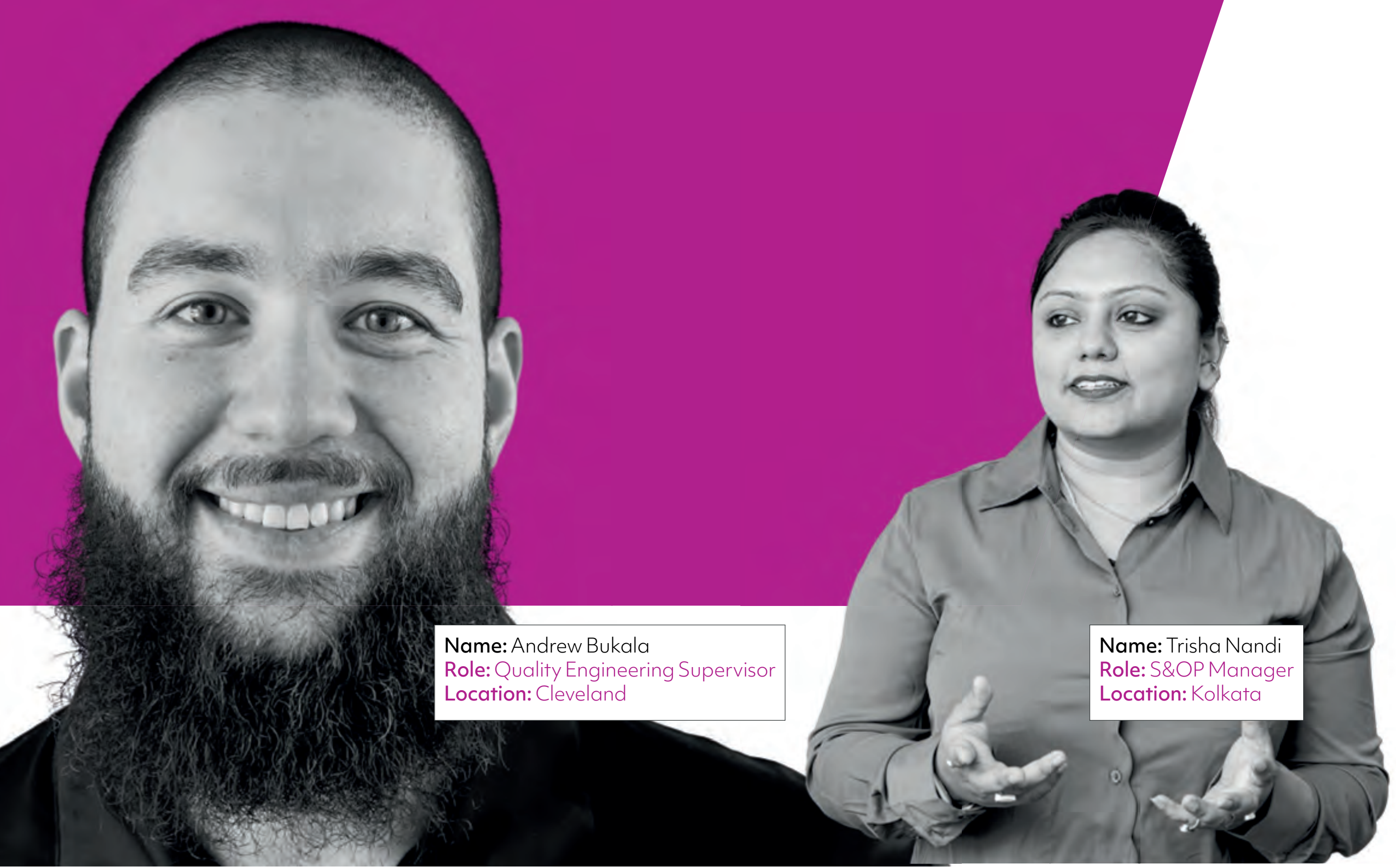
In due course, as required by the Financial Conduct Authority Disclosure Guidance and Transparency Rule 4.1.14R, these financial statements will form part of the ESEF-prepared annual financial report filed on the National Storage Mechanism of the Financial Conduct Authority in accordance with the ESEF Regulatory Technical Standard ('ESEF RTS'). This auditors' report provides no assurance over whether the annual financial report will be prepared using the single electronic format specified in the ESEF RTS.

Darryl Phillips (Senior Statutory Auditor)
for and on behalf of PricewaterhouseCoopers LLP
Chartered Accountants and Statutory Auditors
London
2 March 2023

Financial Statements

We're responding to the increasing need for higher-quality steel

Our customers are focused on producing the higher-quality steel needed for automotive and power generation where the consistency of the finished steel is critical. We have a wide product and service offering designed to support the production of high-technology steel throughout our broad, global manufacturing base.



Name: Andrew Bukala
Role: Quality Engineering Supervisor
Location: Cleveland

Name: Trisha Nandi
Role: S&OP Manager
Location: Kolkata

Group Income Statement

For the year ended 31 December 2022

	Notes	2022 Headline performance[1] £m	2022 Separately reported items[1] £m	2022 Total £m	2021 Headline performance[1] £m	2021 Separately reported items[1] £m	2021 Total £m
Revenue	4, 5	2,047.4	–	2,047.4	1,642.9	–	1,642.9
Manufacturing costs		(1,475.9)	–	(1,475.9)	(1,222.8)	–	(1,222.8)
Administration, selling and distribution costs		(344.3)	–	(344.3)	(277.7)	–	(277.7)
Trading profit[2]	5	227.2	–	227.2	142.4	–	142.4
Amortisation of acquired intangible assets	16	–	(10.4)	(10.4)	–	(9.7)	(9.7)
Operating profit	6	227.2	(10.4)	216.8	142.4	(9.7)	132.7
Finance expense		(20.8)	–	(20.8)	(13.7)	–	(13.7)
Finance income		9.4	–	9.4	7.3	–	7.3
Net finance costs	9	(11.4)	–	(11.4)	(6.4)	–	(6.4)
Share of post-tax profit of joint ventures and associates	33	1.2	–	1.2	1.3	–	1.3
Profit before tax		217.0	(10.4)	206.6	137.3	(9.7)	127.6
Income tax charge	10	(57.2)	39.1	(18.1)	(35.9)	16.2	(19.7)
Profit after tax		159.8	28.7	188.5	101.4	6.5	107.9
Profit attributable to:							
Owners of the Parent	11	152.4	28.7	181.1	95.6	6.5	102.1
Non-controlling interests		7.4	–	7.4	5.8	–	5.8
Profit after tax		159.8	28.7	188.5	101.4	6.5	107.9
Earnings per share – pence	11						
Total operations – basic				67.2			37.7
– diluted				66.7			37.5

1. Headline performance and Separately reported items are non-GAAP measures. Headline performance is defined in Note 4.1 and Separately reported items is defined in Note 2.5.
2. Trading profit is a non-GAAP measure and is defined in Note 4.4.

The above results were derived from continuing operations. The pre-tax separately reported items would form part of Administration, selling and distribution costs if classified within headline performance, which including these amounts would total £354.7m (2021: £287.4m).

Group Statement of Comprehensive Income

For the year ended 31 December 2022

	Notes	2022 £m	2021 £m
Profit		188.5	107.9
Items that will not subsequently be reclassified to Income Statement			
Remeasurement of defined benefit liabilities/assets	26.6	27.4	(80.6)
Income tax relating to items not reclassified	10.4	(8.2)	12.5
Items that may subsequently be reclassified to Income Statement			
Exchange differences on translation of the net assets of foreign operations		96.7	(31.4)
Exchange differences on translation of net investment hedges	23	(20.7)	14.4
Net change in costs of hedging		–	(1.2)
Change in the fair value of the hedging instrument		8.3	2.2
Amounts reclassified from the Income Statement		(7.5)	(0.7)
Other comprehensive income/(loss), net of income tax		96.0	(84.8)
Total comprehensive income		284.5	23.1
Total comprehensive income attributable to:			
Owners of the Parent		276.5	17.7
Non-controlling interests		8.0	5.4
Total comprehensive income		284.5	23.1

The above results were derived from continuing operations.

Group Statement of Cash Flows

For the year ended 31 December 2022

	Notes	2022 £m	2021 £m
Cash flows from operating activities			
Cash generated from operations	12	268.3	82.9
Interest paid		(15.6)	(11.9)
Interest received		6.3	4.3
Income taxes paid		(47.9)	(30.1)
Net cash inflow from operating activities		211.1	45.2
Cash flows from investing activities			
Capital expenditure		(89.2)	(45.5)
Proceeds from the sale of property, plant and equipment		3.1	1.2
Acquisition of subsidiaries and joint ventures, net of cash acquired	20	(3.5)	(43.7)
Dividends received from joint ventures		1.3	1.0
Net cash outflow from investing activities		(88.3)	(87.0)
Net cash inflow/(outflow) before financing activities		122.8	(41.8)
Cash flows from financing activities			
Proceeds from borrowings	14	18.7	89.4
Repayment of borrowings	14	(55.7)	(31.4)
Purchase of ESOP shares	22	(6.9)	(1.1)
Dividends paid to equity shareholders	24	(58.1)	(55.5)
Dividends paid to non-controlling shareholders		(3.2)	(2.2)
Net cash outflow from financing activities		(105.2)	(0.8)
Net increase/(decrease) in cash and cash equivalents	14	17.6	(42.6)
Cash and cash equivalents at 1 January		162.4	206.8
Effect of exchange rate fluctuations on cash and cash equivalents	14	(0.2)	(1.8)
Cash and cash equivalents at 31 December	13	179.8	162.4

Alternative performance measure (non-statutory):

	Notes	2022 £m	2021 £m
Free cash flow	4.11		
Net cash inflow from operating activities		211.1	45.2
Capital expenditure		(89.2)	(45.5)
Proceeds from the sale of property, plant and equipment		3.1	1.2
Dividends received from joint ventures		1.3	1.0
Dividends paid to non-controlling shareholders		(3.2)	(2.2)
Free cash flow	4.11	123.1	(0.3)

Group Balance Sheet
As at 31 December 2022

	Notes	2022 £m	2021 £m
Assets			
Property, plant and equipment	15	417.6	352.5
Intangible assets	16	737.5	696.8
Employee benefits – surpluses	26	26.2	25.1
Interests in joint ventures and associates	33	13.0	12.8
Investments		0.5	0.5
Deferred tax assets	10	110.6	104.2
Other receivables	18	33.7	16.2
Derivative financial instruments	25	2.7	–
Total non-current assets		1,341.8	1,208.1
Cash and short-term deposits	13	184.2	169.1
Inventories	19	316.0	299.4
Trade and other receivables	18	476.9	445.2
Income tax receivable	10	15.3	7.6
Derivative financial instruments	25	0.1	0.1
Total current assets		992.5	921.4
Total assets		2,334.3	2,129.5
Equity			
Issued share capital	21	27.8	27.8
Retained earnings	22	2,623.8	2,483.4
Other reserves	23	(1,391.4)	(1,467.6)
Equity attributable to the owners of the Parent		1,260.2	1,043.6
Non-controlling interests		59.4	54.6
Total equity		1,319.6	1,098.2
Liabilities			
Interest-bearing borrowings	25	327.2	329.9
Employee benefits – liabilities	26	82.3	102.1
Other payables	28	13.8	11.6
Provisions	30	49.3	32.6
Deferred tax liabilities	10	11.9	29.6
Derivative financial instruments	25	–	2.5
Total non-current liabilities		484.5	508.3
Interest-bearing borrowings	25	114.7	113.8
Trade and other payables	28	378.4	372.9
Income tax payable	10	19.6	18.1
Provisions	30	17.4	18.1
Derivative financial instruments	25	0.1	0.1
Total current liabilities		530.2	523.0
Total liabilities		1,014.7	1,031.3
Total equity and liabilities		2,334.3	2,129.5

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The financial statements on pages 161 to 218 were approved and authorised for issue by the Directors on 2 March 2023 and signed on their behalf by:

Patrick André
Chief Executive

Group Statement of Changes in Equity
For the year ended 31 December 2022

	Issued share capital £m	Other reserves £m	Retained earnings £m	Owners of the Parent £m	Non-controlling interests £m	Total equity £m
As at 1 January 2021	27.8	(1,451.3)	2,502.9	1,079.4	51.4	1,130.8
Profit	–	–	102.1	102.1	5.8	107.9
Remeasurement of defined benefit liabilities/assets	–	–	(80.6)	(80.6)	–	(80.6)
Income tax relating to items not reclassified	–	–	12.5	12.5	–	12.5
Exchange differences on translation of the net assets of foreign operations	–	(31.0)	–	(31.0)	(0.4)	(31.4)
Exchange differences on translation of net investment hedges	–	14.4	–	14.4	–	14.4
Net change in costs of hedging	–	(1.2)	–	(1.2)	–	(1.2)
Change in the fair value of the hedging instrument	–	2.2	–	2.2	–	2.2
Amounts reclassified from the Income Statement	–	(0.7)	–	(0.7)	–	(0.7)
Income tax relating to items that may be reclassified	–	–	–	–	–	–
Other comprehensive (loss) net of income tax	–	(16.3)	(68.1)	(84.4)	(0.4)	(84.8)
Total comprehensive income/(loss)	–	(16.3)	34.0	17.7	5.4	23.1
Recognition of share-based payments	–	–	3.1	3.1	–	3.1
Purchase of ESOP shares	–	–	(1.1)	(1.1)	–	(1.1)
Dividends paid (Note 24)	–	–	(55.5)	(55.5)	(2.2)	(57.7)
Total transactions with owners	–	–	(53.5)	(53.5)	(2.2)	(55.7)
As at 31 December 2021	27.8	(1,467.6)	2,483.4	1,043.6	54.6	1,098.2
As at 1 January 2022	27.8	(1,467.6)	2,483.4	1,043.6	54.6	1,098.2
Profit	–	–	181.1	181.1	7.4	188.5
Remeasurement of defined benefit liabilities/assets	–	–	27.4	27.4	–	27.4
Income tax relating to items not reclassified	–	–	(8.2)	(8.2)	–	(8.2)
Exchange differences on translation of the net assets of foreign operations	–	96.1	–	96.1	0.6	96.7
Exchange differences on translation of net investment hedges	–	(20.7)	–	(20.7)	–	(20.7)
Net change in costs of hedging	–	–	–	–	–	–
Change in the fair value of the hedging instrument	–	8.3	–	8.3	–	8.3
Amounts reclassified from the Income Statement	–	(7.5)	–	(7.5)	–	(7.5)
Income tax relating to items that may be reclassified	–	–	–	–	–	–
Other comprehensive income net of income tax	–	76.2	19.2	95.4	0.6	96.0
Total comprehensive income/(loss)	–	76.2	200.3	276.5	8.0	284.5
Recognition of share-based payments	–	–	5.1	5.1	–	5.1
Purchase of ESOP shares	–	–	(6.9)	(6.9)	–	(6.9)
Dividends paid (Note 24)	–	–	(58.1)	(58.1)	(3.2)	(61.3)
Total transactions with owners	–	–	(59.9)	(59.9)	(3.2)	(63.1)
As at 31 December 2022	27.8	(1,391.4)	2,623.8	1,260.2	59.4	1,319.6

Notes to the Group Financial Statements continued

1. General Information

Vesuvius plc ('Vesuvius' or 'the Company') is a public company limited by shares. It is incorporated and domiciled in England and Wales, United Kingdom, and listed on the London Stock Exchange. The nature of the operations and principal activities of the Company and its subsidiary and joint venture companies ('the Group') is set out in the Strategic Report on pages 1 to 85. The address of its registered office is 165 Fleet Street, London EC4A 2AE.

2. Basis of Preparation

2.1 Basis of accounting

The Group financial statements have been prepared in accordance with UK-adopted international accounting standards (IFRS) and with the requirements of the Companies Act 2006 as applicable to companies reporting under those standards. The financial statements have been prepared under the historical cost convention, with the exception of fair value measurement applied to defined benefit pension plans, investments and derivative financial instruments.

2.2 Basis of consolidation

The Group financial statements incorporate the financial statements of the Company and entities controlled directly and indirectly by the Company (its 'subsidiaries'). Control exists when the Company has the power to direct the relevant activities of an entity that significantly affect the entity's return so as to have rights to the variable return from its activities. In assessing whether control exists, potential voting rights that are currently exercisable are taken into account. The results of subsidiaries acquired or disposed of during the year are included in the Group Income Statement from the effective date of acquisition or up to the effective date of disposal, as appropriate.

The principal accounting policies applied in the preparation of these Group financial statements are set out in the Notes. These policies have been consistently applied to all of the years presented, unless otherwise stated. Where necessary, adjustments are made to the financial statements of subsidiaries to bring their accounting policies into line with those detailed herein to ensure that the Group financial statements are prepared on a consistent basis. All intra-Group transactions, balances, income and expenses are eliminated on consolidation.

Non-controlling interests in the net assets of consolidated subsidiaries are identified separately from the Group's interest therein. Non-controlling interests consist of the amount of those interests at the date of the original business combination together with the non-controlling interests' share of profit or loss, each component of other comprehensive income, less dividends paid since the date of the combination. Total comprehensive income is attributed to the non-controlling interests, even if this results in the non-controlling interests having a deficit balance.

2.3 Going concern

The Group's available committed liquidity stood at £494m at year-end 2022, up from £456m at year-end 2021, as a result of lower borrowings under the Group's committed facilities and an increase in recorded cash balances. The Directors have prepared cash flow forecasts for the Group for the period to 30 June 2024. These forecasts reflect an assessment of current and future end-market conditions, which are expected to be challenging in 2023 and to recover thereafter (as set out in the 'outlook' statement in the Chief Executive's Strategic Review in this document), and their impact on the Group's future trading performance.

The Directors have also considered a severe but plausible downside scenario, based on an assumed protracted COVID-19-related demand impact, despite emerging confidence that the worst of the pandemic may be behind us. This downside scenario assumes:

- a decline in business activity and profitability in 2023 and 2024 to the level achieved in H2 2020, the period most severely impacted by COVID-19,
- working capital as a percentage of sales in the downside case consistent with that in the base case, and
- dividends not paid in 2023 then reinstated.

On a full-year basis relative to 2022, this implies a 30% decline in sales and a c.57% decline in Trading Profit.

The Group has two covenants; net debt/EBITDA (under 3.25x) and an interest cover requirement of at least 4.0x. In this downside scenario, the forecasts show that the Group's maximum net debt/EBITDA (pre-IFRS 16 in-line with the covenant calculation) does not exceed 1.0x, compared to a leverage covenant of 3.25x, and the minimum interest cover reached is 9x compared to a covenant minimum of 4x.

The forecasts show that the Group will be able to operate within the current committed debt facilities and show continued compliance with the Company's financial covenants. On the basis of the exercise described above and the Group's available committed debt facilities, the Directors consider that the Group and the Company have adequate resources to continue in operational existence for a period of at least 12 months from the date of signing of these financial statements and that there is no material uncertainty in respect of going concern. Accordingly, they continue to adopt a going concern basis in preparing the financial statements of the Group and the Company.

2.4 Functional and presentation currency

The financial statements are presented in millions of pounds sterling, which is the functional currency of the Company, and rounded to one decimal place. Foreign operations are included in accordance with the policies set out in Note 25.1.

2. Basis of Preparation continued

2.5 Disclosure of 'separately reported items'

Columnar presentation

The Group has adopted a columnar presentation for its Group Income Statement, to separately identify headline performance results, as the Directors consider that this gives a useful view of the core results of the ongoing business. As part of this presentation format, the Group has adopted a policy of disclosing separately on the face of its Group Income Statement, within the column entitled 'Separately reported items', the effect of any components of financial performance for which the Directors consider separate disclosure would assist users both in a useful understanding of the financial performance achieved for a given year and in making projections of future results.

Separately reported items

Both materiality and the nature of the components of income and expense are considered in deciding upon such presentation. Such items may include, inter alia, the financial effect of exceptional items which occur infrequently, such as major restructuring activity (which may require more than one year to complete), significant movement in the Group's deferred tax balances, such as that caused by the material recognition of previously unrecognised deferred tax assets, items reported separately for consistency, such as amortisation charges relating to acquired intangible assets, profits or losses arising on the disposal of continuing or discontinued operations and the taxation impact of the aforementioned items reported separately.

The amortisation charge in respect of intangible assets recognised on business combinations is excluded from the trading results of the Group since they are non-cash charges and are not considered reflective of the core trading performance of the Group.

In its adoption of this policy, the Company applies an even-handed approach to both gains and losses and aims to be both consistent and clear in its accounting and disclosure of such items.

2.6 Consideration of climate change

In preparing the financial statements, we have considered the impact of climate change, particularly in the context of the disclosures included in the Strategic Report this year. There has not been a material impact on the financial reporting judgements and estimates arising from our considerations, consistent with our assessment that climate change is not expected to have a meaningful impact on the viability of the Group in the medium term. Specifically, we note that we have considered the impact of climate change on the carrying value and the estimation of useful lives of property, plant and equipment (see Note 15) and goodwill and intangibles (see Note 16). The impact of climate change on impairment of goodwill is disclosed in Note 17.2.

2.7 Changes in accounting policies

There have been no changes in accounting policies during the year.

2.8 New and revised IFRS

Certain new accounting standards and interpretations have been published that are not mandatory for 31 December 2022 reporting periods and have not been early adopted by the Group. The Group's assessment of the impact of these new standards and interpretations is that they are not expected to have a significant impact on the Group's financial position, performance, cash flows and disclosures.

Benchmark reform

The replacement of Libor with alternative interest rate benchmarks is now well progressed and the Group has reviewed the impact of this on its financial statements.

The £385m central bank facility signed on 5 July 2021 provides for the use of SONIA and EURIBOR for GBP and EUR drawdowns respectively. USD Libor remains quoted until June 2023; a replacement reference rate for USD drawdowns will be agreed by that date as provided for within the terms of the facility.

The Group's US Private Placement Notes, bilateral loan agreement and cross-currency interest rate swaps are not exposed to Libor rates and as a result are unaffected by the benchmark reform.

The Group concludes that benchmark reform has no material impact on its financial statements. The Group also confirms it has made no changes to its risk management strategy as a result of benchmark reform.

Hyperinflationary accounting in Turkey

Turkey became a hyperinflationary economy from 1 April 2022 and IAS 29 'Financial Reporting in Hyperinflationary Economies' is effective for periods ending on or after 30 June 2022. The Group operates in Turkey through its subsidiary, Vesuvius Istanbul Sanayi ve Ticaret AS. We have assessed the impact of applying hyperinflationary accounting in Turkey and it was not material so as to require an adjustment for the year ended 31 December 2022.

Notes to the Group Financial Statements continued

3. Critical Accounting Judgements and Estimates

Determining the carrying amount of some assets and liabilities and amounts recognised as reported profit requires judgement and/or estimation of the effect of uncertain future events. The major sources of judgement and estimation uncertainty that have a significant risk of resulting in a material adjustment to the carrying amounts of assets and liabilities and amounts recognised as reported profit are noted below. As part of the evaluation of critical accounting judgements and key sources of estimation uncertainty, the Group has considered the implications of climate change on its operations and activities. All other accounting policies are included within the respective Notes to the Financial Statements.

3.1 Separately reported items (judgement)

In accordance with IAS 1, the Group has adopted a policy of disclosing separately on the face of its Group Income Statement, within the column entitled 'Separately reported items', the effect of any components of financial performance for which the Directors consider separate disclosure would assist both in a useful understanding of the financial performance achieved for a given year and in making projections of future results. Both materiality and the nature of the components of income and expense are considered in deciding upon such presentation. Such items may include, inter alia, the financial effect of exceptional items which occur infrequently, such as major restructuring activity, and items reported separately for consistency, such as amortisation charges relating to acquired intangible assets, profits or losses arising on the disposal of continuing or discontinued operations and the taxation impact of the aforementioned exceptional items and other items reported separately.

3.2 Deferred tax asset recognition (judgement and estimate)

The Directors apply judgement in determining whether temporary differences, including historical tax losses, should be recognised as deferred tax assets. The judgement considers the future profitability of the relevant businesses from approved budgets and business plans and an extrapolation from them assuming that profits continue to grow at a rate consistent with those plans. These business plans include appropriate sensitivity analysis with further details of the outcomes included in Note 10.2 and Note 10.4. The availability of the deferred tax assets for carry-forward and the nature of the taxable income against which those assets can be offset are also reviewed in detail.

3.3 Operating segments for continuing operations (judgement)

The Group's operating segments are determined taking into consideration how the Group's components are reported to the Group's Chief Executive, who makes the key operating decisions and is responsible for allocating resources and assessing performance of the component. Taking into account the Group's management and internal reporting structure, the operating segments are Steel Flow Control, Steel Advanced Refractories, Steel Sensors & Probes, and the Foundry Division. The principal activities of each of these segments are described in the Strategic Report.

Steel Flow Control, Steel Advanced Refractories, and Steel Sensors & Probes operating segments are aggregated into the Steel reportable segment. In determining that aggregation is appropriate, judgement is applied which takes into account the economic characteristics of these operating segments, which include a similar nature of products, customers, production processes and margins.

3.4 Employee benefits (estimate)

The Group's financial statements include the costs and obligations associated with the provision of pension and other post-retirement benefits to current and former employees. It is the Directors' responsibility to set the assumptions used in determining the key elements of the costs of meeting such future obligations. These assumptions are set after consultation with the Group's actuaries and include those used to determine regular service costs and the financing elements related to the plans' assets and liabilities. Whilst the Directors believe that the assumptions used are appropriate, a change in the assumptions could affect the Group's profit and financial position. The pension obligations are most sensitive to a change in the discount rate and therefore could materially change in the next financial year if the discount rate changes significantly. Sensitivity disclosures are included in Note 26.3.

For the estimates below, the Group does not have any key assumptions concerning the future or other key sources of estimation uncertainty in the reporting period that are reasonably expected to have a significant risk of causing a material adjustment to the carrying amounts of assets/liabilities within the next financial year. Nonetheless, these estimates have the potential to materially vary over time and are therefore highlighted.

3.5 Impairment testing of goodwill (estimate)

Determining whether goodwill is impaired requires an estimation of the recoverable amount, which is the higher of Value in Use and fair value less cost to sell, of the cash-generating units to which these assets have been allocated. The Value in Use calculation requires estimation of future cash flows expected to arise for the cash-generating unit, the selection of suitable discount rates and the estimation of long-term growth rates. As determining such assumptions is inherently uncertain and subject to future factors, there is the potential these may differ in subsequent periods and therefore materially change the conclusions reached. In light of this, consideration is made each year as to whether sensitivity disclosures are required for reasonably possible changes to assumptions. Sensitivity disclosures are included in Note 17.2.

3. Critical Accounting Judgements and Estimates continued

3.6 Provisions (judgement and estimate)

Vesuvius has extensive international operations and is subject to various legal and regulatory regimes, including those covering taxation and environmental matters. Some of the Group's subsidiaries are parties to legacy matter and other lawsuits, certain of which are insured claims, which have arisen in the ordinary course of the operations of the company involved. Some of these provisions relate to businesses that are closed or have been disposed of. Provisions are made for the expected amounts payable in respect of known or probable costs resulting both from these third-party lawsuits or other regulatory requirements. To the extent insurance is in place, an asset is recognised in other receivables in respect of associated insurance reimbursements.

As the resolution of many of the potential obligations for which provision is made is subject to legal or other regulatory process, it requires estimation of the timing, quantum and amount of associated outflows, which are subject to some uncertainty. The Directors use their judgement, using historical evidence, current information and expert experience, to determine whether to recognise a provision, and make appropriate estimates of provisions in the financial statements for amounts relating to such matters. Associated assets for insurance recoverable are recognised, which involves assessing the likelihood of insurance being paid, which is a critical judgement. The Directors have considered the available cover and the historical evidence to determine whether this is virtually certain. Estimating the amount of provisions and insurance receivable is subject to estimation uncertainty. See Note 30 for further information.

4. Alternative Performance Measures

The Company uses a number of alternative performance measures (APMs) in addition to those reported in accordance with IFRS. The Directors believe that these APMs, listed below, are important when assessing the underlying financial and operating performance of the Group and its divisions, providing management with key insights and metrics in support of the ongoing management of the Group's performance and cash flow. A number of these align with Key Performance Indicators (KPIs) and other key metrics used in the business and therefore are considered useful to also disclose to the users of the financial statements. The following APMs do not have a standard definition prescribed by IFRS and therefore may not be directly comparable with similar measures presented by other companies.

4.1 Headline performance

Headline performance, reported separately on the face of the Group Income Statement, is from continuing operations and before items reported separately on the face of the Group Income Statement.

4.2 Underlying revenue, underlying trading profit and underlying return on sales

Underlying revenue, underlying trading profit and underlying return on sales are the headline equivalents of these measures after adjustments to exclude the effects of changes in exchange rates, business acquisitions and disposals. Reconciliations of underlying revenue and underlying trading profit can be found in the Financial review. Underlying revenue growth is one of the Group's KPIs and provides an important measure of organic growth of Group businesses between reporting periods by eliminating the impact of exchange rates, acquisitions and disposals.

4.3 Return on sales (ROS)

ROS is calculated as trading profit divided by revenue. It is one of the Group's KPIs and is used to assess the trading performance of Group businesses. ROS is disclosed in Note 5.3.

4.4 Trading profit/adjusted EBITA

Trading profit/adjusted EBITA is defined as operating profit before separately reported items. It is one of the Group's KPIs and is used to assess the trading performance of Group businesses. It is also used as one of the targets against which the annual bonuses of certain employees are measured.

4.5 Headline profit before tax

Headline profit before tax, reported separately on the face of the Group Income Statement, is calculated as the net total of trading profit, plus the Group's share of post-tax profit of joint ventures and total net finance costs associated with headline performance. It is one of the Group's KPIs and is used to assess the financial performance of the Group as a whole.

4.6 Headline effective tax rate (ETR)

The Group's headline ETR is calculated on the income tax costs associated with headline performance, divided by headline profit before tax and before the Group's share of post-tax profit of joint ventures and associates.

4.7 Headline earnings

Headline earnings is profit after tax before separately reported items attributable to owners of the Parent.

Notes to the Group Financial Statements continued

4. Alternative Performance Measures continued

4.8 Headline earnings per share

Headline earnings per share is calculated by dividing headline profit before tax less associated income tax costs, attributable to owners of the Parent by the weighted average number of ordinary shares in issue during the year. It is one of the Group's KPIs and is used to assess the earnings performance of the Group as a whole. It is also used as one of the targets against which the annual bonuses of certain employees are measured. Headline earnings per share is disclosed in Note 11.

4.9 Adjusted operating cash flow

Adjusted operating cash flow is cash generated from operations before restructuring and vacant site remediation costs but after deducting capital expenditure net of asset disposals. It is used in calculating the Group's cash conversion. In the prior year, net retirement benefit obligations were added back in this calculation; this has been discontinued as the management believes that these represent core cash flows of the Group.

	Notes	2022 £m	2021 £m
Cash generated from operations	12	268.3	82.9
Add: Outflows relating to restructuring charges		1.5	4.0
Less: Capital expenditure		(89.2)	(45.5)
Add: Vacant site remediation costs		1.8	3.0
Add: Proceeds from the sale of property, plant and equipment		3.1	1.2
Adjusted operating cash flow		185.5	45.6
Trading profit		227.2	142.4
Cash conversion		82%	32%

4.10 Cash conversion

Cash conversion is calculated as adjusted operating cash flow from continuing operations divided by trading profit. It is useful for measuring the rate at which cash is generated from trading profit. It is also used as one of the targets against which the annual bonuses of certain employees are measured. The calculation of cash conversion is detailed in Note 4.9 above.

4.11 Free cash flow

Free cash flow is defined as net cash flow from operating activities after net outlays for the purchase and sale of property, plant and equipment, dividends from joint ventures and dividends paid to non-controlling shareholders. It is one of the Group's KPIs and is used to assess the underlying cash generation of the Group and is one of the measures used in monitoring the Group's capital. A reconciliation of free cash flow is included underneath the Group Statement of Cash Flows.

4.12 Average trade working capital to sales ratio

The average trade working capital to sales ratio is calculated as the percentage of average trade working capital balances to the total revenue for the previous 12 months, at constant currency. Average trade working capital (comprising inventories, trade receivables and trade payables) is calculated as the average of the 13 previous month-end balances. It is one of the Group's KPIs and is useful for measuring the level of working capital used in the business and is one of the measures used in monitoring the Group's capital.

	2022 £m	2021 £m
Average trade working capital	487.3	344.2
Total revenue	2,047.4	1,642.9
Average trade working capital to sales ratio	23.8%	20.9%

4.13 Adjusted earnings before interest, tax, depreciation and amortisation (adjusted EBITDA)

Adjusted EBITDA is calculated as the total of trading profit before depreciation and amortisation of non-acquired intangible assets. It is used in the calculation of the Group's interest cover and net debt to adjusted EBITDA ratios. A reconciliation of adjusted EBITDA is included in Note 5.

4. Alternative Performance Measures continued

4.14 Net interest payable on borrowings

Net interest payable on borrowings is calculated as total interest payable on borrowings less finance income, excluding interest on net retirement benefit obligations, adjustments to discounts and any item separately reported. It is used in the calculation of the Group's interest cover ratio.

	Notes	2022 £m	2021 £m
Total interest payable on borrowings	9	18.3	13.0
Finance income	9	(8.8)	(6.7)
Net interest payable on borrowings		9.5	6.3

4.15 Interest cover

Interest cover is the ratio of adjusted EBITDA for the last 12 months to net interest payable on borrowings for the last 12 months. It is one of the Group's KPIs and is used to assess the financial position of the Group and its ability to fund future growth.

	Notes	2022 £m	2021 £m
Adjusted EBITDA	5	282.7	192.2
Net interest payable on borrowings		9.5	6.3
Interest cover		29.8x	30.5x

4.16 Net debt

Net debt comprises the net total of current and non-current interest-bearing borrowings (including IFRS 16 lease liabilities), cash and short-term deposits and derivative financial instruments. Net debt is a measure of the Group's net indebtedness to banks and other external financial institutions. A reconciliation of the movement in net debt is included in Note 14.

4.17 Net debt to adjusted EBITDA

Net debt to adjusted EBITDA is the ratio of net debt at the year-end to adjusted EBITDA for that year. It is one of the Group's KPIs and is used to assess the financial position of the Group and its ability to fund future growth and is one of the measures used in monitoring the Group's capital.

	Notes	2022 £m	2021 £m
Net debt	14	255.0	277.1
Adjusted EBITDA	5	282.7	192.2
Net debt to adjusted EBITDA		0.9x	1.4x

4.18 Return on invested capital (ROIC)

The Group has adopted ROIC as its key measure of return from the Group's invested capital. The RONA performance measure has been replaced with ROIC, which provides a more complete measure of Vesuvius' returns. ROIC is calculated as trading profit less amortisation of acquired intangibles plus share of post-tax profit of joint ventures and associates for the previous 12 months after tax, divided by the average (being the average of the opening and closing balance sheet) invested capital (defined as: total assets excluding cash plus non-interest-bearing liabilities), at the average foreign exchange rate for the year.

	2022 £m	2021 £m
Average invested capital	1,503.6	1,329.1
Trading profit (Note 4.4)	227.2	142.4
Amortisation of acquired intangible assets	(10.4)	(9.7)
Share of post-tax profit from joint ventures and associates	1.2	1.3
Tax on trading profit and amortisation of acquired intangible assets	(57.5)	(35.1)
	160.5	98.9
ROIC	10.7%	7.5%

Notes to the Group Financial Statements continued

4. Alternative Performance Measures continued

4.19 Constant currency

Figures presented at constant currency represent 2021 amounts retranslated at average 2022 exchange rates.

4.20 Liquidity

Liquidity is the Group's cash and short-term deposits plus undrawn committed debt facilities less cash used as collateral on loans and any gross up of cash in notional cash pools.

	2022 £m	2021 £m
Cash	184.2	169.1
Undrawn committed debt facilities	322.5	308.1
Cash used as collateral on loans	(13.0)	(21.0)
Gross up of cash in notional pools	(0.1)	(0.5)
Liquidity	493.6	455.7

4.21 Last twelve months (LTM)

Some results are presented or calculated using data from the last 12 months from the reference date.

5. Segment Information

The segment information contained in this Note refers to several alternative performance measures, definitions of which can be found in Note 4. The Group has considered climate change in making segmental and revenue disclosures. Opportunities and risks for the reported segments are further explained in the Sustainability section.

5.1 Business segments

Operating segments for continuing operations

The Group's operating segments are determined taking into consideration how the Group's components are reported to the Group's Chief Executive, who makes the key operating decisions and is responsible for allocating resources and assessing performance of the component. Taking into account the Group's management and internal reporting structure, the operating segments are Steel Flow Control, Steel Advanced Refractories, Steel Sensors & Probes, and the Foundry Division. The principal activities of each of these segments are described in the Strategic Report.

Steel Flow Control, Steel Advanced Refractories, and Steel Sensors & Probes operating segments are aggregated into the Steel reportable segment. In determining that aggregation is appropriate, judgement is applied which takes into account the economic characteristics of these operating segments which include a similar nature of products, customers, production processes and margins.

Segment revenue represents revenue from external customers (inter-segment revenue is not material). Trading profit includes items directly attributable to a segment as well as those items that can be allocated on a reasonable basis.

5.2 Accounting policy – revenue recognition

The Group derives all of its revenue from contracts with customers. The Group enters into contracts to provide one or multiple products to customers in the steel and foundry industries globally.

Revenue recognition at a point in time

Where the Group provides consumable products only, one performance obligation is present. The performance obligation is to deliver consumables to the customer and is satisfied upon delivery of these items. Similarly, where a contract is for the supply of standard equipment, there is one performance obligation and revenue is primarily recognised at a point in time, being upon delivery of these items. The form of a contract is typically a purchase order from a customer.

The Group also enters into some contracts with customers in the steel industry under which it primarily provides consumable items, but also equipment and/or technical assistance ('service contracts') to facilitate these customers' steel production processes. The Group applies judgement in assessing whether the performance obligations (i.e. provision of consumables, equipment and technical assistance) are distinct performance obligations or if these may be bundled when assessing the point at which the customer obtains control of or consumes the benefit of promised goods or services. The judgement takes into account whether:

– The equipment provided in these contracts remains the property of Vesuvius and is used by Vesuvius technicians at customer sites

– The customer benefits from the combined output of the contract, being the use of Vesuvius consumables, equipment and technicians to support the customer's production of steel

– The value of the equipment and technician support is minimal relative to the total value of the contract to the customer being the benefit from use of Vesuvius consumables

5. Segment Information continued

5.2 Accounting policy – revenue recognition continued

Revenue recognition at a point in time continued

Based on the above, the individual elements of the contract are not considered distinct and therefore the performance obligations are deemed to be bundled into a single performance obligation. Revenue is therefore recognised at a point in time, every time the customers purchase and consume materials as they produce steel. In the event this judgement was not applied and the performance obligations were not bundled, this would likely result in minor amounts of revenue being recognised earlier primarily in respect of the technician support.

Approximately 87% (2021: 89%) of the aforementioned revenue relates to the sale of consumables and equipment only. Approximately 13% (2021: 11%) of revenue relates to contracts that contain multiple performance obligations, which in the majority of cases are deemed to be bundled into a single performance obligation and revenue recognised over the course of the contract as the customer consumes and benefits from Vesuvius products.

Revenue recognition over time

The Group enters into bespoke equipment design and build (and installation in some cases) contracts with customers. Performance obligations are usually defined by milestones agreed with the customers in the contract. The customer usually does not have a right to a refund as work progresses towards achieving the milestones in the contract. Revenue is recognised over time by measuring the progress of completion or achievement of a milestone for each performance obligation identified within the contract, usually with reference to cost inputs incurred against overall estimated costs for the contract. This does not typically entail estimation or judgements as the contracts are usually not material in isolation and do not span more than 12 months. This approach to revenue recognition is considered to reflect faithfully the value and timing of goods or services transferred and the rights of Vesuvius to revenue.

Determining and allocating the transaction price to performance obligations

For revenue recognised at a point in time, the transaction price is determined and allocated with reference to the individual prices of consumables or equipment specified in the contract or customer purchase order. If a stand-alone selling price is not available, the Group will estimate the selling price with reference to the price that would be charged for the goods or services if they were sold separately. This estimate is not considered complex.

For service contracts the bundled performance obligation is deemed to be the provision of consumables and, in some cases, labour to facilitate production of customer steel. The transaction price is determined and allocated with reference to either an agreed price list for each of the consumables input or, for some contracts, the transaction price is determined and allocated as an amount per unit of customer steel output.

For revenue recognised over time, the transaction price is determined with reference to the prices set out in the contract. For bespoke equipment builds, the transaction price is allocated to performance obligations (milestones) within the contract and the payment schedules agreed with the customer that align to these milestones. For installations, the transaction price is allocated with reference to the progress of completion. Where payment schedules include customer advance payments (i.e. not aligned with a milestone/performance obligation), the amounts received are included within contract liabilities until the performance obligation to which they relate is satisfied.

Contracts are to be settled in cash. They do not typically contain any variable consideration, discounts, refunds, rebates, warranties or significant financing components.

Duration and costs of obtaining contracts

The duration of the Group's contracts with customers is typically less than one year and accordingly the Group has taken the practical expedient within IFRS 15 to not disclose the transaction price allocated to unsatisfied (whole or partially) performance obligations as of the end of the reporting period. Service contracts may span over more than one year as they remain in effect up to a specified level of customer production of steel. However, the choice to purchase from Vesuvius under the contract remains with the customer and therefore there is no commitment for the customer/Vesuvius to purchase/produce up to the specified level.

Costs of obtaining contracts are not considered significant and these are expensed as incurred.

Customer credit risk and payment terms

The Group assesses customer credit risk and recognises revenue when such risk is considered low and the consideration cash flows due are reasonably expected to flow to the Group. Typically, the Group will not transact with customers where credit risk concerns are identified and therefore there is no material unrecognised revenue as a result of credit risk. For trade receivables and contract assets in respect of revenue recognised, an expected credit loss allowance is determined.

Customer payment terms are set out in revenue contracts and do not exceed one year. Customer payments typically follow the satisfaction of performance obligations at which point revenue is recognised and invoiced. Accordingly, trade receivables and contract assets are expected to derive cash inflows for the Group within less than 12 months.

Notes to the Group Financial Statements continued

5. Segment Information continued

5.2 Accounting policy – revenue recognition continued

Contract assets and contract liabilities

A contract asset is recorded when revenue is recognised but an invoice has not been raised to the customer. Contract assets are short-term and typically are invoiced in the following month.

Customer advance payments are included in contract liabilities. These are typically not material and relate to over time revenue projects as set out further above.

Uncertainties

There are no uncertainties involving economic factors, estimation or judgements (other than as disclosed above) in respect of revenue recognition. Credit risk relating to the collection of cash inflows from revenue recognised is addressed through an allowance for expected credit losses, as set out in the trade and other receivables accounting policy.

The following table provides information about receivables, contract assets and contract liabilities from contracts with customers.

	2022 £m	2021 £m
Receivables, which are included in 'Trade and other receivables'	380.8	352.2
Contract assets, which are included in 'Trade and other receivables'	1.5	1.9
Contract liabilities, which are included in 'Trade and other payables'	2.5	3.3

Contract liabilities of £2.5m (2021: £3.3m) include advances received from a customer that precede the satisfaction of performance obligations by the Group. £3.3m of the contract liabilities recognised in the prior year was recognised as revenue in 2022.

5.3 Segmental analysis

The reportable segment results from continuing operations for 2022 and 2021 are presented below.

2022	Notes	Flow Control £m	Advanced Refractories £m	Sensors & Probes £m	Total Steel £m	Foundry £m	Total £m
Segment revenue		810.9	645.3	40.2	1,496.4	551.0	2,047.4
– at a point in time					*1,493.7*	*551.0*	*2,044.7*
– over time					*2.7*	*–*	*2.7*
Segment adjusted EBITDA					210.6	72.1	282.7
Segment depreciation and amortisation					(37.9)	(17.6)	(55.5)
Segment trading profit					172.7	54.5	227.2
Return on sales margin					*11.5%*	*9.9%*	*11.1%*
Amortisation of acquired intangible assets							(10.4)
Operating profit							216.8
Net finance costs							(11.4)
Share of post-tax profit of joint ventures							1.2
Profit before tax							206.6
Capital expenditure additions					85.2	18.7	103.9
Inventory	19				259.6	56.4	316.0
Trade debtors	18				288.0	92.8	380.8
Trade payables	28				(177.2)	(62.3)	(239.5)

5. Segment Information continued

5.3 Segmental analysis continued

2021	Notes	Flow Control £m	Advanced Refractories £m	Sensors & Probes £m	Total Steel £m	Foundry £m	Total £m
Segment revenue		648.7	489.1	33.7	1,171.5	471.4	1,642.9
– at a point in time					*1,169.9*	*471.4*	*1,641.3*
– over time					*1.6*	*–*	*1.6*
Segment adjusted EBITDA					135.9	56.3	192.2
Segment depreciation					(33.9)	(15.9)	(49.8)
Segment trading profit					102.0	40.4	142.4
Return on sales margin					*8.7%*	*8.6%*	*8.7%*
Amortisation of acquired intangible assets							(9.7)
Operating profit							132.7
Net finance costs							(6.4)
Share of post-tax profit of joint ventures							1.3
Profit before tax							127.6
Capital expenditure additions					47.2	20.2	67.4
Inventory	19				248.1	51.3	299.4
Trade debtors	18				267.5	84.7	352.2
Trade payables	28				(191.3)	(62.5)	(253.8)

The Chief Operating Decision Maker does not review non-current assets at a segmental level so these disclosures are not included.

5.4 Geographical analysis

	External revenue 2022 £m	External revenue 2021 £m	Non-current assets 2022 £m	Non-current assets 2021 £m
EMEA	741.6	644.8	500.0	452.1
Asia	565.2	492.2	237.2	223.8
North America	549.1	377.7	384.3	367.0
South America	191.5	128.2	44.3	35.9
Continuing operations	2,047.4	1,642.9	1,165.8	1,078.8

External revenue disclosed in the table above is based upon the geographical location from which the products and services are invoiced. Non-current assets exclude employee benefits net surpluses and deferred tax assets. Information relating to the Group's products and services is given in the Strategic Report. The Group is not dependent on any single customer for its revenue and no single customer, for either of the years presented in the table above, accounts for more than 10% of the Group's total external revenue. £70.9m (2021: £57.6m) of revenue was generated from the UK, and total non-current assets in the UK amounted to £93.9m (2021: £94.9m).

Notes to the Group Financial Statements continued

6. Operating Profit

6.1 Operating profit is stated after charging

	Notes	2022 £m	2021 £m
Cost of inventories recognised as an expense	19	1,417.0	1,168.5
Research and development		35.9	30.3
Employee expenses	8	441.3	396.8
Depreciation	15	55.2	49.8
Amortisation	16	10.7	10.1
Operating lease charges	29	2.3	2.9
Expected credit loss allowances charge/(credit)	18, 25.2	9.9	(0.5)

* 2021 comparatives for cost of inventories recognised as an expense have been restated following further review during 2022. This restatement did not impact the Income Statement or the balance sheet.

The expected credit loss allowance charge of £9.9m in 2022 (2021: credit of £0.5m) is largely due to increased allowance for Russia and Ukraine customers as a result of the conflict in the region and allowance for a specific customer in NAFTA.

6.2 Amounts payable to PricewaterhouseCoopers LLP and their associates

	2022 £m	2021 £m
Fees payable to the Company's auditors and their associates for the audit of the Parent Company and Consolidated Financial Statements	1.1	0.7
Fees payable to the Company's auditors and their associates for other services:		
Audit of the Company's subsidiaries	1.0	1.0
Audit-related assurance services	0.2	0.1
Total auditors' remuneration	2.3	1.8

Total auditors' remuneration of £2.3m in 2022 all related to continuing operations, of which £2.1m related to audit fees and £0.2m to non-audit fees, in respect of the Group's half-year financial statements, quarterly reviews and tax form audits in India (as required by regulation) (2021: £1.8m, including £1.7m of audit fees and £0.1m of non-audit fees, the latter in respect of the Group's half-year review fee and quarterly reviews and tax form audits in India along with review of an R&D claim in Italy). It is the Group's policy not to use the Group's auditors for non-audit services other than for audit-related services that are required to be performed by auditors.

6.3 Amounts payable to Mazars LLP

Mazars LLP acts as external auditors of the non-material entities and three material entities within the Group. Total remuneration for the audit of these entities was £0.9m (2021: £0.8m). This amount is not included in the table above.

7. Restructuring Charges

There were no restructuring charges in 2022 (2021: £nil).

Cash costs of £1.5m (2021: £4.0m) (Note 12) were incurred in the year in respect of previously announced restructuring programmes, leaving provisions made but unspent of £3.6m (Note 30) as at 31 December 2022 (2021: £5.0m).

8. Employees

8.1 Employee expenses

	Notes	2022 £m	2021 £m
Wages and salaries		365.8	329.1
Social security costs		54.0	48.0
Share-based payments	27	5.1	3.1
Pension costs – defined contribution pension plans	26	10.8	10.2
– defined benefit pension plans	26	5.2	6.0
Other post-retirement benefits	26	0.4	0.4
Total employee expenses		441.3	396.8

Included within wages and salaries is income from governments of £nil (2021: £0.4m) in respect of staff who had been furloughed due to the COVID-19 pandemic. This income falls within IAS 20 government grants as the Group receives income in return for meeting the conditions included within each of the relevant government schemes. The income approach has been applied and therefore the income is recognised when the wages and salaries expense which the schemes are intended to compensate is incurred. There are no unfulfilled conditions or other contingencies that have been recognised in respect of these schemes.

8.2 Monthly average number of employees

	2022 no.	2021* no.
Steel	8,720	8,380
Foundry	2,470	2,482
Total monthly average number of employees	11,190	10,862

* 2021 comparatives have been reclassified between Steel and Foundry following further review during 2022.

As at 31 December 2022, the Group had 11,134 employees (2021: 11,203).

8.3 Remuneration of key management personnel

The remuneration of the Directors, who are the key management personnel of the Group, is set out below in aggregate for each of the categories specified in IAS 24 Related Party Disclosures. Further information about the remuneration of individual Directors is provided in the audited part of the Directors' Remuneration Report on pages 116 to 143.

	2022 £m	2021 £m
Short-term employee benefits	1.9	2.5
Post-employment benefits	0.3	0.3
Share-based payments	0.6	–
Total remuneration of key management personnel	2.8	2.8

9. Net Finance Costs

	2022 £m	2021 £m
Interest payable on borrowings		
Loans and overdrafts	15.4	10.7
Interest on lease liabilities	1.9	1.5
Amortisation of capitalised arrangement fees	1.0	0.8
Total interest payable on borrowings	18.3	13.0
Interest on net retirement benefit obligations	1.4	(0.3)
Adjustment to discounts on provisions and other liabilities	1.1	0.7
Adjustment to discounts on receivables	(0.6)	(0.3)
Finance income	(8.8)	(6.7)
Total net finance costs	11.4	6.4

Within the table above, total finance costs are £20.8m (2021: £13.7m) and total finance income is £9.4m (2021: £7.3m).

Notes to the Group Financial Statements continued

10. Income Tax Charge

10.1 Accounting policy

Tax expense represents the sum of current tax and deferred tax. Current and deferred tax are recognised in profit or loss except to the extent that they relate to items charged or credited in the Group Statement of Comprehensive Income or Group Statement of Changes in Equity, in which case the associated tax is also recognised in those statements.

Current tax

Current tax is based on taxable profit for the year. Taxable profit differs from profit before tax as reported in the Group Income Statement because it excludes items of income or expense that are taxable or deductible in other years and it further excludes items that are never taxable or deductible. The Group's liability for current tax is calculated using tax rates and laws that have been enacted, or substantively enacted, by the balance sheet date.

A provision is recognised when the Group considers it has a present tax obligation as the result of a past event and it is probable that the Group will be required to settle that obligation. Provisions established for such uncertain tax positions are made using a best estimate of the tax expected to be paid, based on a qualitative and quantitative assessment of all relevant information. Such a provision is typically required where the underlying tax issue is subject to interpretation and remains to be agreed, and therefore is uncertain as to outcome. Principally, the uncertain tax positions for which a provision is made relate to the interpretation of tax legislation and guidance regarding transfer pricing arrangements that have been entered into in the normal course of business. In accordance with IAS 12, tax provisions are included as income tax payable on the face of the Group Balance Sheet, and movements in tax provisions are included within income tax charges or credits in the Group Income Statement.

In assessing any appropriate provision requirements for uncertain tax items, the Group considers progress made in discussions with the tax authorities, expert advice on the likely outcome and any recent developments in case law. Due to the uncertainty associated with such tax items, it is possible that at a future date, on conclusion of the open matters, the final outcome may vary materially. Any such variations will affect the financial results in the year in which such a determination is made.

Deferred tax

Deferred tax is recognised on differences between the carrying amounts of assets and liabilities in the financial statements and the corresponding tax bases used in the computation of taxable profit, and is accounted for using the balance sheet liability method. Deferred tax liabilities are generally recognised for all taxable temporary differences and deferred tax assets are recognised to the extent that it is probable that taxable profits will be available against which deductible temporary differences can be utilised. Such assets and liabilities are not recognised if the temporary difference arises from the initial recognition of goodwill or from the initial recognition (other than in a business combination) of other assets and liabilities in a transaction that affects neither the taxable profit nor the accounting profit. Deferred tax is calculated at the tax rates that are expected to apply in the period when the liability is settled or the asset is realised, based on tax rates and laws that have been enacted, or substantively enacted, by the balance sheet date.

Deferred tax liabilities are recognised for taxable temporary differences arising on investments in subsidiaries and interests in joint ventures, except where the Group is able to control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. The carrying amount of deferred tax assets is reviewed at each balance sheet date and reduced to the extent that it is no longer probable that sufficient taxable profits will be available to allow all or part of the asset to be recovered. Deferred tax assets and liabilities are offset when there is a legally enforceable right to set off current tax assets against current tax liabilities and when they relate to income taxes levied by the same taxation authority and the Group intends to settle its current tax assets and liabilities on a net basis.

10. Income Tax Charge continued

10.2 Income tax charge

		2022 £m	2021 £m
Current tax			
Overseas taxation		43.6	34.0
Adjustments in respect of prior years		(1.1)	(1.5)
Total current tax, continuing operations		42.5	32.5
Deferred tax			
Origination and reversal of temporary taxable differences		(23.6)	(11.6)
Adjustments in respect of prior years		(0.8)	(1.2)
Total deferred tax, continuing operations		(24.4)	(12.8)
Total income tax charge		18.1	19.7
Total income tax charge attributable to:			
Continuing operations	– headline performance	57.2	35.9
	– separately reported	(39.1)	(16.2)
Total income tax charge		18.1	19.7

Included in the Group's total income tax charge are charges and credits meeting the criteria set out in Note 2.5 to be treated as separately reported items, as analysed in the following table:

Separately reported items	2022 £m	2021 £m
Additional recognition of UK deferred tax asset	(37.8)	–
Amortisation and utilisation of acquired intangibles	(2.7)	(0.2)
Additional derecognition/(recognition) of US deferred tax asset	1.4	(16.0)
Total tax charge/(credit) separately reported	(39.1)	(16.2)

As a result of the expected future profitability of the UK business, the Group has decided to recognise certain UK deferred tax assets totalling £37.8m (2021: £nil) that have no expiry date. In recognising these assets, the Group has considered the future profitability of the UK business from approved budgets and business plans and an extrapolation from them if profits continue to grow at a rate consistent with those plans. The Group has also carried out an exercise to reflect scenarios where the business plan does not materialise as expected. The Group has modelled proportionate increases and decreases in relation to the expected taxable income based on the approved budget and the results do not have a material impact on the deferred tax asset balance. These assets are available for carry-forward indefinitely and can be offset against taxable income generated in the UK.

The net tax debit reflected in the Group Statement of Comprehensive Income in the year amounted to an £8.2m charge (2021: £13.0m credit), comprising a £6.7m charge (2021: £12.5m credit) related to tax on net actuarial gains and losses on the employee benefits plan, £nil (2021: £0.5m credit) related to exchange adjustments and a £1.5m charge (2021: £nil) relating to deferred tax rate changes.

The Group operates in a number of countries that have differing tax rates, laws and practices. Changes in any of these areas could, adversely or positively, impact the Group's tax charge in the future. Continuing losses, or insufficiency of taxable profit to absorb all expenses, in any subsidiary, could have the effect of increasing tax charges in the future as headline effective tax relief may not be available for those losses or expenses. Other significant factors affecting the tax charge are described in Notes 10.1 and 10.6.

10.3 Reconciliation of income tax charge to profit before tax

	2022 £m	2021 £m
Profit before tax	206.6	127.6
Tax at the UK corporation tax rate of 19.0% (2021: 19.0%)	39.2	24.2
Overseas tax rate differences	16.5	8.7
Withholding taxes	2.8	3.9
Expenses not deductible for tax purposes	0.8	0.3
Deferred tax assets not recognised	–	0.3
Utilisation of previously unrecognised tax losses	(0.8)	(0.3)
US deferred tax asset not previously recognised	(5.7)	(16.0)
UK deferred tax asset not previously recognised	(37.8)	–
Deferred tax rate changes	1.1	1.3
Adjustments in respect of prior years	2.0	(2.7)
Total income tax charge	18.1	19.7

Notes to the Group Financial Statements continued

10. Income Tax Charge continued

10.4 Deferred tax

	Interest £m	Other operating losses £m	Pension costs £m	Intangible assets £m	Other temporary differences £m	Total £m
As at 1 January 2021	22.0	18.9	0.8	(20.3)	30.8	52.2
Exchange adjustments/other	0.4	(0.1)	(0.8)	(0.3)	0.3	(0.5)
Acquisition	–	–	–	(2.9)	–	(2.9)
Other net credit to Group Statement of Comprehensive Income	–	–	12.5	0.5	–	13.0
Other net credit/(charge) to Group Income Statement	0.8	0.7	1.0	(0.6)	1.5	3.4
Other net credit/(charge) to Group Income Statement US	11.2	(4.0)	(0.1)	(0.2)	2.5	9.4
As at 31 December 2021	34.4	15.5	13.4	(23.8)	35.1	74.6
Exchange adjustments/other	4.1	1.3	1.2	(0.9)	2.2	7.9
Other net charge to Group Statement of Comprehensive Income	–	–	(6.7)	–	(1.5)	(8.2)
Other net credit/(charge) to Group Income Statement	0.1	37.2	0.2	2.9	(1.1)	39.3
Other net credit/(charge) to Group Income Statement US	2.7	(7.6)	(1.4)	(0.8)	(7.8)	(14.9)
As at 31 December 2022	41.3	46.4	6.7	(22.6)	26.9	98.7

	2022 £m	2021 £m
Recognised in the Group Balance Sheet as:		
Non-current deferred tax assets	110.6	104.2
Non-current deferred tax liabilities	(11.9)	(29.6)
Net total deferred tax assets	98.7	74.6

Included in these deferred tax assets and liabilities are amounts expected to be utilised in 2023 as follows:

	2022 £m	2021 £m
Deferred tax assets	18.2	9.6
Deferred tax liabilities	(2.7)	(2.3)

As a result of the expected future profitability of the UK business, the Group has decided to recognise certain UK deferred tax assets that have no expiry date. Included in non-current deferred tax assets is £37.8m (2021: £nil) in respect of the partial recognition of temporary differences arising in the UK computed in accordance with the policy set out in Note 10.1 above. In addition, for 2021 the Group decided to recognise certain US deferred tax assets as a result of the consistent profitability of the US business. The Group has also carried out an exercise to reflect scenarios where the business plan does not materialise as expected. The Group has modelled proportionate increases and decreases in relation to the expected taxable income based on the approved budget and the results do not have a material impact on the deferred tax asset balance. The Group remains confident of the recovery of these assets. £79.1m for UK and £nil for US (2021: £116.9m for UK and £3.0m for US) remains unrecognised as detailed in the tables below.

Tax loss carry-forwards and other temporary differences with a tax value of £44.5m (2021: £15.5m) were recognised by subsidiaries reporting a loss. Based on approved business plans of these subsidiaries, the Directors consider it probable that the tax loss carry-forwards and temporary differences can be offset against future taxable profits of these subsidiaries.

The total deferred tax assets not recognised as at 31 December 2022 were £175.1m (2021: £209.6m), as analysed below. In accordance with the accounting policy in Note 10.1, these items have not been recognised as deferred tax assets on the basis that their future economic benefit is not probable. In total, there was a decrease of £34.5m (2021: £27.1m increase) in net unrecognised deferred tax assets during the year, primarily driven by the recognition of UK deferred tax assets. All UK unrecognised deferred tax assets are now reported at the 25% rate.

	2022 £m	2021 £m
Operating losses (further described below)	100.6	135.2
Unrelieved US interest (may be carried forward indefinitely)	–	0.7
Capital losses available to offset future UK capital gains (may be carried forward indefinitely)	46.2	46.2
UK ACT credits (may be carried forward indefinitely)	19.3	19.3
US tax credits	–	2.2
Other temporary differences	9.0	6.0
Total deferred tax assets not recognised	175.1	209.6

10. Income Tax Charge continued

10.4 Deferred tax continued

The Group has significant net operating losses with a tax value of £147.0m (2021: £150.7m), only £46.4m (2021: £15.5m) of which meet the criteria set out in Note 10.1 to be recognised on the Group Balance Sheet.

	Operating losses recognised 2022 £m	Operating losses not recognised 2022 £m	Total 2022 £m	Operating losses recognised 2021 £m	Operating losses not recognised 2021 £m	Total 2021 £m
UK (may be carried forward indefinitely)	37.8	79.1	116.9	–	116.9	116.9
US (due to expire 2024–2031)	2.6	–	2.6	9.1	0.1	9.2
ROW (may be carried forward indefinitely)	6.0	21.5	27.5	6.4	18.2	24.6
ROW (due to expire within 5 years)	–	–	–	–	–	–
	46.4	100.6	147.0	15.5	135.2	150.7

The £27.5m (2021: £24.6m) operating losses available to set against future income in the rest of the world arise in a number of countries, reflecting the spread of the Group's operations.

A liability of £0.8m (2021: £1.0m) has been recognised in respect of withholding taxes that will be due on a repatriation of funds from the Group's Chinese subsidiaries.

Deferred tax is not recognised in respect of the value of the Group's investments in subsidiaries and interests in joint ventures where we are able to control the timing of the reversal of the temporary differences and it is probable that such differences will not reverse in the foreseeable future. The amount of these temporary differences for which deferred tax liabilities have not been recognised was £11.8m (2021: £14.6m).

10.5 Income tax payable and recoverable

	2022 £m	2021 £m
Liabilities for income tax payable	12.8	11.2
Provisions for uncertain tax positions	6.8	6.9
	19.6	18.1
Less: Income tax recoverable within one year	15.3	7.6
Net liability	4.3	10.5

Provisions for uncertain tax positions are calculated in accordance with the policy outlined in Note 10.1, and are treated as income tax payable in accordance with IAS 12.

These provisions cover litigated tax matters as well as provisions for other risks where the Group believes it is more likely than not that there would be a successful challenge by a tax authority to positions it has taken in its tax filings. By its nature, litigation can result in sharp fluctuations in cash flow, both in and out, relating to taxes. Currently, management does not expect any material adjustments to these provisions in 2023.

During the year the provisions for uncertain tax positions have reduced to £6.8m (2021: £6.9m). The decrease of £0.1m (2021: £1.6m) can be explained by the expiration of the statute of limitations on certain other exposures, £1.3m (2021: £1.2m), a £0.5m charge (2021: £nil) in relation to an Indonesian tax audit, a £0.4m charge (2021: £nil) on a Spanish tax audit and foreign exchange movements on the remaining balances, £0.3m charge (2021: £0.2m credit).

Notes to the Group Financial Statements continued

10. Income Tax Charge continued

10.6 Key factors impacting the sustainability of the headline effective tax rate are as follows:

Material changes in the geographic mix of profits

The Group's headline effective tax rate is sensitive to changes in the geographic mix of profits and level of profits and reflects a combination of higher rates in certain jurisdictions such as Brazil, China, Germany, India, Mexico and the US and a lower headline effective tax rate in jurisdictions like Poland and the UK.

Changes in tax rates, tax reform and its interpretation

Changes in tax rates and laws in the jurisdictions in which the Group operates could have a material effect on the Group's headline effective tax rate.

Availability of tax advantaged rates

Vesuvius in China qualifies for a tax advantaged rate of 15% (rather than the headline rate of 25%) on part of its profits due to the high-technology nature of its business. Eligibility for this rate is reviewed on a regular basis by the Chinese tax authority and was worth approximately £0.4m in 2022 (2021: £0.7m). Without that benefit, the Group's headline effective tax rate on headline performance would have been 0.2% higher in 2022 (2021: 0.5%).

Resolution of tax judgements

At any one time, the Group can be subject to a number of challenges by tax authorities in the jurisdictions in which it operates. The outcome of these challenges is inherently uncertain, potentially resulting in a different tax charge from the amounts initially provided.

11. Earnings per Share (EPS)

11.1 Earnings for EPS

Basic and diluted EPS from continuing operations are based upon the profit attributable to owners of the Parent, as reported in the Group Income Statement. The table below reconciles these different profit measures.

	2022 £m	2021 £m
Profit attributable to owners of the Parent	181.1	102.1
Adjustments for separately reported items:		
Amortisation of acquired intangible assets	10.4	9.7
Restructuring charges	–	–
Vacant site remediation costs	–	–
Guaranteed minimum pensions (GMP) equalisation charge	–	–
Income tax (credit)/charge	(39.1)	(16.2)
Headline profit attributable to owners of the Parent	152.4	95.6

11.2 Weighted average number of shares

	2022 millions	2021 millions
For calculating basic and headline EPS	269.6	270.5
Adjustment for potentially dilutive ordinary shares	1.9	1.8
For calculating diluted and diluted headline EPS	271.5	272.3

For the purposes of calculating diluted and diluted headline EPS, the weighted average number of ordinary shares is adjusted to include the weighted average number of ordinary shares that would be issued on the conversion of all potentially dilutive ordinary shares expected to vest, relating to the Company's share-based payment plans. Potential ordinary shares are only treated as dilutive when their conversion to ordinary shares would decrease EPS or increase loss per share.

11. Earnings per Share (EPS) continued

11.3 Per share amounts

	2022 pence	2021 pence
Earnings per share		
– basic	67.2	37.7
– diluted	66.7	37.5
– headline	56.5	35.3
– diluted headline	56.1	35.1

12. Cash Generated from Operations

	Notes	2022 £m	2021 £m
Operating profit		216.8	132.7
Adjustments for:			
Amortisation of acquired intangible assets	16	10.4	9.7
Restructuring charges		–	–
Vacant site remediation costs		–	–
Guaranteed minimum pensions (GMP) equalisation charge		–	–
Trading profit		227.2	142.4
Loss on disposal of non-current assets		(0.1)	0.4
Depreciation and amortisation	15	55.5	49.8
Defined benefit retirement plans net charge		5.6	6.4
Net decrease/(increase) in inventories	19	2.2	(113.5)
Net increase in trade receivables	18	(9.2)	(53.5)
Net (decrease)/increase in trade payables	28	(28.0)	70.6
Net decrease/(increase) in other working capital		24.7	(5.5)
Outflow related to restructuring charges	7	(1.5)	(4.0)
Defined benefit retirement plans cash outflows	26	(6.3)	(7.2)
Vacant site remediation costs paid		(1.8)	(3.0)
Cash generated from operations		268.3	82.9

13. Cash and Cash Equivalents

13.1 Accounting policy

Cash and short-term deposits in the Group balance sheet consist of cash at bank and in hand, and short-term deposits with original maturity of three months or less. Bank overdrafts that are repayable on demand and form an integral part of the Group's cash management are included as a component of cash and cash equivalents for the purpose of the Group Statement of Cash Flows.

	2022 £m	2021 £m
Cash at bank and in hand	184.2	169.1
Short-term deposits	–	–
Cash and short-term deposits	184.2	169.1
Bank overdrafts	(4.4)	(6.7)
Cash and cash equivalents in the Group Statement of Cash Flows	179.8	162.4

Cash is held both centrally and in operating territories. There is no restricted cash. For certain territories including Argentina, China, India and Russia cash is more readily used locally than for broader Group purposes.

Notes to the Group Financial Statements continued

14. Reconciliation of Movement in Net Debt

	Balance as at 1 January 2022 £m	Foreign exchange adjustments £m	Fair value gains £m	Non-cash movements* £m	Cash flow £m	Balance as at 31 December 2022 £m
Cash and cash equivalents						
Cash at bank and in hand	169.1	0.1	–	–	15.0	184.2
Short-term deposits	–	–	–	–	–	–
Bank overdrafts	(6.7)	(0.3)	–	–	2.6	(4.4)
	162.4	(0.2)	–	–	17.6	179.8
Borrowings, excluding bank overdrafts	(440.3)	(25.4)	–	(11.5)	37.0	(440.2)
Capitalised arrangement fees	3.3	–	–	(0.6)	–	2.7
Derivative financial instruments	(2.5)	–	5.2	–	–	2.7
Net debt	(277.1)	(25.6)	5.2	(12.1)	54.6	(255.0)

	Balance as at 1 January 2021 £m	Foreign exchange adjustments £m	Fair value gains £m	Non-cash movements* £m	Cash flow £m	Balance as at 31 December 2021 £m
Cash and cash equivalents						
Cash at bank and in hand	169.7	(1.9)	–	–	1.3	169.1
Short-term deposits	40.0	–	–	–	(40.0)	–
Bank overdrafts	(2.9)	0.1	–	–	(3.9)	(6.7)
	206.8	(1.8)	–	–	(42.6)	162.4
Borrowings, excluding bank overdrafts	(376.5)	11.3	–	(17.1)	(58.0)	(440.3)
Capitalised arrangement fees	1.4	–	–	1.9	–	3.3
Derivative financial instruments	(6.8)	–	4.3	–	–	(2.5)
Net debt	(175.1)	9.5	4.3	(15.2)	(100.6)	(277.1)

* £11.5m (2021: £17.1m) of new leases were entered into during the year.

Net debt is a measure of the Group's net indebtedness to banks and other external financial institutions and comprises the total of cash and short-term deposits, current and non-current interest-bearing borrowings and derivative financial instruments.

£37.0m of borrowings cash flow, excluding bank overdrafts, represents the net of proceeds and repayments of borrowings (including lease liabilities).

£18.7m proceeds from borrowings, shown in the Group Statement of Cash Flows, includes £18.7m of euro drawings under the UK syndicated bank facility.

£55.7m repayment of borrowings, shown in the Group Statement of Cash Flows, includes £35.0m of sterling drawings repaid under the UK syndicated bank facility, £8.0m of sterling drawings repaid under the collateralised bilateral loan facility (see Note 25) and net lease repayments of £12.7m.

15. Property, Plant and Equipment

15.1 Accounting policy

Freehold land and construction in progress are carried at cost less accumulated impairment losses. Other items of property, plant and equipment are carried at cost less accumulated depreciation and accumulated impairment losses. Costs are capitalised only when it is probable that they will result in future economic benefits flowing to the Group and when they can be measured reliably. Costs are capitalised to construction in progress where an asset is being developed. This is then transferred to the relevant asset class and depreciated when the asset is ready for use. All other repairs and maintenance expenditures are charged to the Group Income Statement in the period in which they are incurred.

Freehold land is not depreciated as it has an infinite life. Depreciation on other items of property, plant and equipment begins when the asset is available for use and is charged to the Group Income Statement on a straight-line basis so as to write off the cost less the estimated residual value of the asset over its estimated useful life as follows:

15. Property, Plant and Equipment continued

15.1 Accounting policy continued

Asset category	Estimated useful life
Freehold property	between 10 and 50 years
Leasehold property	the term of the lease
Right-of-use assets	shorter of the asset's useful life and lease term
Plant and equipment – motor vehicles and information technology equipment	between 1 and 5 years
– other	between 3 and 15 years

The depreciation method used, residual values and estimated useful lives are reviewed annually and changed, if appropriate. As described in Note 17.1, an asset's carrying amount is immediately written down to its recoverable amount if its carrying amount is greater than its estimated recoverable amount. Gains and losses arising on disposals are determined by comparing sales proceeds with carrying amount and are recognised in the Group Income Statement.

15.2 Movement in net book value

	Freehold property £m	Leasehold property £m	Right-of-use assets – land & buildings (Note 29.2) £m	Right-of-use assets – plant & equipment (Note 29.2) £m	Plant and equipment £m	Construction in progress £m	Total[1] £m
Cost							
As at 31 December 2020 and 1 January 2021	241.1	0.9	30.8	26.7	586.3	32.6	918.4
Exchange adjustments	(5.4)	–	(0.9)	(1.0)	(14.0)	(1.1)	(22.4)
Capital expenditure additions	2.3	–	9.9	7.2	17.0	29.1	65.5
Acquisitions through business combinations	6.6	–	–	–	4.3	0.5	11.4
Disposals	(4.5)	(0.1)	(0.7)	(3.3)	(31.9)	(0.7)	(41.2)
Assets reclassified from held for sale	0.9	–	–	–	–	–	0.9
Reclassifications	4.0	(0.1)	–	(0.6)	11.0	(19.2)	(4.9)
As at 31 December 2021 and 1 January 2022	**245.0**	**0.7**	**39.1**	**29.0**	**572.7**	**41.2**	**927.7**
Exchange adjustments	**16.0**	**(0.0)**	**1.7**	**1.9**	**37.1**	**3.8**	**60.5**
Capital expenditure additions	**7.3**	**–**	**3.3**	**8.1**	**20.8**	**59.9**	**99.4**
Acquisitions through business combinations	**1.1**	**–**	**2.2**	**–**	**0.2**	**–**	**3.5**
Disposals	**(1.6)**	**–**	**(1.1)**	**(3.4)**	**(14.9)**	**(0.5)**	**(21.5)**
Assets reclassified from held for sale	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Reclassifications	**1.3**	**–**	**–**	**(0.2)**	**27.4**	**(28.6)**	**(0.1)**
As at 31 December 2022	**269.1**	**0.7**	**45.2**	**35.4**	**643.3**	**75.8**	**1,069.5**
Accumulated depreciation and impairment losses							
As at 31 December 2020 and 1 January 2021	118.5	0.8	6.6	13.2	441.8	–	580.9
Exchange adjustments	(2.8)	–	(0.4)	(0.7)	(9.3)	–	(13.2)
Depreciation charge	6.4	–	4.6	6.2	32.6	–	49.8
Impairment	(2.9)	–	–	–	–	–	(2.9)
Disposals	(1.6)	–	(0.7)	(2.6)	(31.8)	–	(36.7)
Assets reclassified from held for sale	0.1	–	–	–	–	–	0.1
Reclassifications	0.1	(0.1)	–	–	(2.8)	–	(2.8)
As at 31 December 2021 and 1 January 2022	**117.8**	**0.7**	**10.1**	**16.1**	**430.5**	**–**	**575.2**
Exchange adjustments	**8.0**	**–**	**0.4**	**1.0**	**29.0**	**–**	**38.4**
Depreciation charge	**7.3**	**–**	**5.7**	**6.8**	**35.4**	**–**	**55.2**
Impairment	**0.9**	**–**	**0.5**	**–**	**0.1**	**–**	**1.5**
Disposals	**(0.4)**	**–**	**(1.1)**	**(2.9)**	**(13.9)**	**–**	**(18.3)**
Assets reclassified from held for sale	**–**	**–**	**–**	**–**	**–**	**–**	–
Reclassifications	**3.9**	**–**	**–**	**(0.1)**	**(3.9)**	**–**	**(0.1)**
As at 31 December 2022	**137.5**	**0.7**	**15.6**	**20.9**	**477.2**	**–**	**651.9**
Net book value as at 31 December 2022	**131.6**	**–**	**29.6**	**14.5**	**166.1**	**75.8**	**417.6**
Net book value as at 31 December 2021	127.2	–	29.0	12.9	142.2	41.2	352.5
Net book value as at 31 January 2020	122.6	0.1	24.2	13.5	144.5	32.6	337.5

1. 2020 opening balances for cost and depreciation have been grossed up/brought down by £0.3m for identified fixed assets previously written off (£nil net book value).

Notes to the Group Financial Statements continued

15. Property, Plant and Equipment continued

15.2 Movement in net book value continued

Capital expenditure on customer-installation assets was £7.5m (2021: £5.7m).

Capital commitments as at 31 December 2022 were £nil (31 December 2021: £nil).

The impact of climate change has been considered in the review of carrying values to consider whether there are indications of material impairment arising from the potential physical risks arising from climate change. We have not impaired any assets this year as a result of this exercise. We have also considered the impact of climate change on the estimation of useful lives and no material impacts were noted.

16. Intangible Assets

Intangible assets comprise goodwill, other intangible assets that have been acquired through business combinations, and software costs.

16.1 Accounting policy

(a) Goodwill

Goodwill arising in a business combination is initially recognised as an asset at cost, measured as the excess of the aggregate of the acquisition-date fair value of the consideration transferred and the amount of any non-controlling interest acquired over the net of the acquisition-date fair value amounts of the identifiable assets acquired and liabilities assumed. When the excess is negative, a bargain purchase gain is recognised immediately in profit or loss. Goodwill is subsequently measured at cost less accumulated impairment losses, with impairment testing carried out annually, or more frequently when there is an indication that the cash-generating unit (CGU) to which the goodwill has been allocated may be impaired. On disposal of a business, the attributable amount of goodwill is included in the calculation of the profit or loss on disposal.

(b) Other intangible assets

Intangible assets other than goodwill are recognised on business combinations if they are separable, or if they arise from contractual or other legal rights, and their value can be measured reliably. They are initially measured at cost, which is equal to the acquisition-date fair value, and subsequently measured at cost less accumulated amortisation charges and accumulated impairment losses. Other intangible assets are subject to impairment testing when there is an indication that an impairment loss may have been incurred and are amortised over their estimated useful lives.

(c) Research and development costs

The Group's research activity involves long-range, 'blue sky' investigation, the findings from which may be used in the future to develop new or substantially improved products. Expenditure on research activities is recognised in the Group Income Statement as an expense in the year in which it is incurred.

Development is the application of research findings for the production of new or substantially improved products, processes and services before the start of commercial production. Development expenditure is capitalised only if the expenditure can be measured reliably, the product or process is technically and commercially feasible, future economic benefits are probable and the Group intends to and has sufficient resources to complete development and to use or sell the asset. Otherwise, it is recognised in the Group Income Statement as an expense in the year in which it is incurred. Capitalised development expenditure, where there is any, is stated at cost less accumulated amortisation and impairment losses.

In determining whether development expenditure is capitalised as an intangible asset, management considers whether the strict intangible asset recognition criteria set out in IAS 38 Intangible Assets have been met at the time the expenditure is incurred. In making this determination, management recognises that a significant amount of the development expenditure undertaken by the Group is focused on dealing with local customer technical support issues and incremental developments to existing products as opposed to new or substantially improved products, and that at the time the feasibility of the project is determined, a significant proportion of the development expenditure for that project has already been incurred. In 2022 and 2021 no projects met the criteria for IAS 38 capitalisation.

(d) Software

The costs of ERP system implementations, including the purchase cost of the software and the time costs of employees directly involved in the implementation work is capitalised and amortised over a period of no more than ten years.

16. Intangible Assets continued

16.2 Movement in net book value

	Notes	Goodwill £m	Other acquired intangible assets £m	Software £m	2022 total £m	Goodwill £m	Other acquired intangible assets £m	Software £m	2021 total £m
Cost									
As at 1 January		614.2	285.7	6.7	906.6	617.6	279.4	–	897.0
Reclassification of non-compete agreements to goodwill*		0.9	(0.9)	–	–	–	–	–	–
Exchange adjustments		42.4	8.1	0.5	51.0	(16.7)	(5.9)	(0.1)	(22.7)
Capital expenditure additions		–	–	4.5	4.5	–	–	1.9	1.9
Disposals		–	–	(0.9)	(0.9)	–	–	–	–
Business combinations	20	0.4	–	–	0.4	13.3	12.2	–	25.5
Reclassifications		–	–	–	–	–	–	4.9	4.9
As at 31 December		657.9	292.9	10.8	961.6	614.2	285.7	6.7	906.6
Accumulated amortisation and impairment losses									
As at 1 January		–	206.7	3.1	209.8	–	200.9	–	200.9
Exchange adjustments		–	4.0	0.2	4.2	–	(3.9)	(0.1)	(4.0)
Amortisation charge for the year		–	10.4	0.3	10.7	–	9.7	0.4	10.1
Impairment		–	–	0.3	0.3				
Disposals		–	–	(0.9)	(0.9)	–	–	–	–
Reclassifications		–	–	–	–	–	–	2.8	2.8
As at 31 December		–	221.1	3.0	224.1	–	206.7	3.1	209.8
Net book value as at 31 December		657.9	71.8	7.8	737.5	614.2	79.0	3.6	696.8

* The values and useful lives of URI intangibles in the 2021 Annual Report and Financial Statements were provisional. Further valuation work determined that there were no non-compete agreements that could be separately identified from goodwill (Note 20.2).

Of the £10.8m (2021: £6.7m) software cost as at 31 December 2022, £6.8m (2021: £3.0m) was in the course of construction.

Amortisation charge of £10.4m (2021: £9.7m) in respect of other acquired intangible assets includes £5.4m (2021: £5.4m) recognised in respect of Foseco customer relationships, £3.6m (2021: £3.6m) in respect of the Foseco trade name and £1.4m (2021: £0.7m) in respect of North American Advanced Refractories intangible assets.

The impact of climate change has been considered in the review of carrying values to consider whether there are indications of material impairment arising from risks arising from climate change. We have not impaired any intangible assets this year as a result of this exercise. We have also considered the impact of climate change on the estimation of useful lives and no material impacts were noted.

16.3 Analysis of goodwill by cash-generating unit (CGU)

Goodwill acquired in a business combination is allocated to each of the Group's CGUs expected to benefit from the synergies of the combination. For the purposes of impairment testing, the Directors consider that the Group has four CGUs: Steel Advanced Refractories, Steel Flow Control, Steel Sensors & Probes, and the Foundry Division. These CGUs represent the lowest level within the Group at which goodwill is monitored (Note 17.2).

	2022 £m	2021 £m
Steel Flow Control	286.8	269.0
Steel Advanced Refractories	152.5	140.2
Foundry	218.6	205.0
Total goodwill	657.9	614.2

Notes to the Group Financial Statements continued

16. Intangible Assets continued

16.4 Analysis of other acquired intangible assets

Other acquired intangible assets are amortised on a straight-line basis over their estimated useful lives. The assets acquired and their remaining useful lives are shown below.

	Remaining useful life years	Net book value as at 31 Dec 2022 £m	Net book value as at 31 Dec 2021 £m
Foseco			
– customer relationships (useful life: 20 years)	5.3	**28.9**	32.9
– trade name (useful life: 20 years)	5.3	**19.0**	22.6
Universal Refractories, Inc. (URI)			
– customer relationships (useful life: 20 years)	19.0	**6.6**	6.2
– know-how (useful life: 20 years)	19.0	**5.2**	5.0
– non-compete agreements (useful life: 5 years)	n/a	**–**	0.8
CCPI			
– customer relationships (useful life: 20 years)	16.2	**12.1**	11.5
Total		**71.8**	79.0

16.5 Analysis of software

Software comprises Enterprise Resource Planning tools in use and being developed. The software is installed on Vesuvius' servers and the Group has complete ownership of the assets.

17. Impairment of Tangible and Intangible Assets

17.1 Accounting policy

The Directors regularly review the performance of the business and the external business environment to determine whether there is any indication that the Group's tangible and intangible assets have suffered an impairment loss. If such indication exists, the higher of the Value in Use and the fair value less costs to sell off the asset is estimated and compared with the carrying value in order to determine the extent, if any, of the impairment loss. Where it is not feasible to estimate the recoverable amount of an individual asset, the Directors estimate the recoverable amount of the CGU to which the asset belongs. In addition, goodwill is tested for impairment on an annual basis. Goodwill acquired in a business combination is allocated to each of the Group's CGUs expected to benefit from the synergies of the combination and the Directors carry out annual impairment testing of the carrying value of each CGU, to assess the need for any impairment of the carrying value of the associated goodwill and other intangible and tangible assets.

For the purpose of impairment testing, the recoverable amount of an asset or CGU is the higher of (i) its fair value less costs to sell and (ii) its Value in Use. If the recoverable amount of a CGU is less than its carrying amount, the resulting impairment loss is allocated first to reduce the carrying amount of any goodwill allocated to the CGU and then to the other assets of the CGU pro rata on the basis of the carrying amount of each asset in the CGU. An impairment loss recognised for goodwill is not reversed in a subsequent period. An impairment loss recognised in a prior year for an asset other than goodwill may be reversed where there has been a sustained change in the estimates used to measure the asset's recoverable amount since the impairment loss was recognised.

17.2 Key assumptions and methodology

The key assumptions in determining Value in Use are projected cash flows, growth rates and discount rates. These are disclosed as critical accounting estimates in Note 3.5.

Projected cash flows for the next three years have been based on the latest Board-approved budgets and strategic plans. They reflect management's expectations of revenue, EBITDA growth, capital expenditure, working capital and adjusted operating cash flows, based on past experience and future expectations of business performance, and take into account the cyclicality of the business in which the CGU operates. Cash flows beyond the period of the strategic plans have been extrapolated using a perpetuity growth rate of 2.5% (2021: 2.5%). The growth rate has been calculated using GDP growth forecasts published by the International Monetary Fund for the Group's end-markets. These GDP growth forecasts have been weighted to reflect the Group's weighted average sales in each end-market during 2022.

17. Impairment of Tangible and Intangible Assets continued

17.2 Key assumptions and methodology continued

The cash flows have been discounted to their current value using pre-tax discount rates, which represent each CGU's weighted average cost of capital (WACC). The assumptions used in the calculation of the WACC for each CGU have been benchmarked to externally available data. These are industry-specific beta coefficients, risk-free rates and equity risk premiums. The pre-tax discount rate used for the Steel Flow Control, Steel Advanced Refractories and Steel Sensors & Probes CGUs was 15.0% (2021: 12.4%) and for the Foundry CGU was 14.9% (2021: 11.6%). The increase in the pre-tax discount rates has been driven by an increase in equity risk premiums and risk-free rates – these changes are not specific to Vesuvius.

The Group carried out its annual goodwill impairment test as at 31 October 2022 (2021: 31 October 2021). The recoverable amount of each CGU significantly exceeded its carrying value, therefore no impairment charges have been recognised. The recoverable amount of each CGU was also checked against its carrying value as at 31 December 2022 and no impairment triggers were identified.

The Directors have considered the impact of climate change on expected future cash flows (including the modelling of impact of climate change scenarios set out in the Sustainability section in the Strategic Report and expected capital expenditure required to achieve the Group's Net Zero targets) and other assumptions used for goodwill impairment testing. This did not result in an impairment scenario for goodwill.

Sensitivity of impairment reviews

Steel Flow Control (FC), Steel Advanced Refractories (AR) and the Foundry Division are the key CGUs. There were no intangible assets in the Steel Sensors & Probes CGU. The recoverable amount of all CGUs exceeded their carrying value on the basis of the assumptions set out above and any reasonably possible changes thereof. A sensitivity analysis was carried out using reasonably possible changes to the key assumptions as set out in the table below. The following decreases to the recoverable amount of the Group's goodwill and intangible assets were observed:

Key assumption	Relevant CGUs	Assumption	Sensitivity	Decrease in recoverable value, £m	Impairment arising
Free cash flow average annual growth rate (3 year)	FC, AR, Foundry	6.8%–29.4%	Decrease the free cash flows of each individual GCU by 20%	(441.1)	None
Pre-tax discount rate	FC, AR	15.0%	Increase by 1%	(106.6)	None
Pre-tax discount rate	Foundry	14.9%	Increase by 1%	(55.9)	None
Long-term growth rate	FC, AR, Foundry	2.5%	Decrease by 1.5%	(199.3)	None

18. Trade and Other Receivables

18.1 Accounting policy

Trade and other receivables are initially recognised at fair value and subsequently measured at amortised cost, using the effective interest method, less impairment losses. Details on impairment of financial assets are disclosed in Note 25.

18.2 Analysis of trade and other receivables (current)

	2022				2021			
	Gross £m	ECL provision £m	Net £m	ECL provision coverage[1]	Gross £m	ECL provision £m	Net £m	ECL provision coverage[1]
Trade receivables								
– current	**305.4**	**(2.3)**	**303.1**	**0.8%**	292.1	(0.4)	291.7	0.1%
– 1 to 30 days past due	**51.4**	**(1.6)**	**49.8**	**3.1%**	38.5	(0.1)	38.4	0.3%
– 31 to 60 days past due	**14.1**	**(0.6)**	**13.5**	**4.3%**	10.5	(0.1)	10.4	1.0%
– 61 to 90 days past due	**7.3**	**(0.2)**	**7.1**	**2.7%**	4.6	–	4.6	0.0%
– over 90 days past due	**35.4**	**(28.1)**	**7.3**	**79.4%**	29.2	(22.1)	7.1	75.7%
Trade receivables	**413.6**	**(32.8)**	**380.8**		374.9	(22.7)	352.2	
Other receivables			**65.3**				65.4	
Prepayments			**30.8**				27.6	
Total trade and other receivables			**476.9**				445.2	

1. ECL provision coverage is expected credit loss provision divided by gross trade receivables.

Notes to the Group Financial Statements continued

18. Trade and Other Receivables continued

18.2 Analysis of trade and other receivables (current) continued

There is no significant difference between the fair value of the Group's trade and other receivables balances and the amount at which they are reported in the Group Balance Sheet.

Historical experience has shown that the Group's trade receivable provisions are maintained at levels that are sufficient to absorb actual bad debt write-offs, without being excessive. The Group considers the credit quality of financial assets that are neither past due nor impaired as good.

Included within Other receivables are promissory notes of £32.5m (2021: £22.0m). The majority of these notes relate to customers in China and have typical maturities of six months from the issuing date. The full amount of revenue is recognised from the customer when performance obligations are satisfied in accordance with IFRS 15. Other receivables also include VAT receivables of £23.3m (2021: £32.5m) and insurance reimbursements (see Note 30.2) of £1.7m (2021: £2.0m).

18.3 Other receivables (non-current)

Non-current other receivables of £33.7m (2021: £16.2m) include insurance reimbursements (see Note 30.2) of £25.1m (2021: £12.4m) and prepaid taxes of £1.8m (2021: £1.6m).

The Group applies the expected credit loss model under IFRS 9 to these other receivables. The expected credit loss for other receivables is immaterial.

The maximum exposure to credit risk at the end of the reporting period is the net carrying amount of these trade and other receivables.

18.4 Impairment of trade and other receivables

Details relating to the impairment of trade receivables are disclosed in Note 25.

19. Inventories

19.1 Accounting policy

Inventories are stated at the lower of cost and net realisable value. Cost comprises expenditure incurred in purchasing or manufacturing inventories together with all other costs directly incurred in bringing the inventory to its present location and condition and, where appropriate, attributable production overheads based on normal activity levels.

The standard cost method is used for measurement of the cost of inventories in some locations. Standard costs are regularly reviewed and, if necessary, revised in light of current conditions. Other locations measure the cost of inventories using actual costs. Net realisable value represents the estimated selling price less all estimated costs of completion and costs to be incurred in marketing, selling and distribution. The amount of any write-down of inventories to net realisable value is recognised as an expense in the year in which the write-down occurs.

The Group differentiates between work in progress (inventory that will be used in manufacturing processes and is not normally sold to third parties) and semi-finished goods (inventory that is considered as partially complete in end to end manufacturing processes and can be sold to a third party in its current state or used for further manufacturing).

19.2 Analysis of inventories

	2022 £m	2021 £m
Raw materials	104.6	105.6
Work in progress	22.0	19.2
Semi-finished goods	21.4	14.6
Finished goods	168.0	160.0
Total inventories	316.0	299.4

The cost of inventories recognised as an expense and included in manufacturing costs of continuing operations in the Group Income Statement during the year was £1,417.0m (2021: £1,168.5m).

The net inventories of £316.0m include a provision for obsolete stock of £20.5m (2021: £12.5m). There were inventory write-downs of £7.7m (2021: write-downs of £0.9m).

20. Acquisitions and Divestments

20.1 Yingkou YingWei Magnesium

On 8 October 2022 Vesuvius plc acquired the trade and assets of Yingkou YingWei Magnesium Co. Ltd, a basic monolithic refractory plant in China, for cash consideration of RMB 33.0m (£4.0m). It has become part of the Group's Steel Advanced Refractories Business Unit. Vesuvius acquired net assets with fair value of RMB 29.0m (£3.5m). There were no material identifiable intangible assets acquired. There were no contingency related arrangements arising from the acquisition. The goodwill upon acquisition was RMB 4.0m (£0.5m).

20. Acquisitions and Divestments continued

20.2 Universal Refractories

On 6 December 2021 Vesuvius plc acquired the trade and assets of Universal Refractories, Inc. (URI), a specialty refractory producer based in Pennsylvania, USA, which is focused on tundish (steel continuous casting) applications as well as consumable products for the foundry industry. It has become part of the Group's Steel Advanced Refractories Business Unit, with the exception of the ladle liners business, which has been absorbed by our Foundry Division (<10% of sales). The transaction valued URI at an enterprise value of $57.1m (£42.6m) on a cash and debt-free basis and was funded from Vesuvius' internal resources.

The fair values of the assets and liabilities recognised as a result of the acquisition have been updated during the year ended 31 December 2022. There was a decrease of £1.1m to net identifiable assets acquired, largely due to a reduction in non-compete intangible assets of £0.9m (Note 16.2). There was also a decrease of £0.5m to consideration.

	Book value £m	Fair value adjustments £m	Adjusted value £m
Property, plant and equipment	4.5	6.9	11.4
Intangible assets (customer relationships and know-how)	–	11.3	11.3
Inventories	5.0	1.3	6.3
Receivables	5.5	–	5.5
Payables	(1.9)	(0.6)	(2.5)
Borrowings	(5.4)	–	(5.4)
Deferred tax	–	(2.8)	(2.8)
Net identifiable assets acquired	7.7	16.1	23.8
Goodwill			13.9
Consideration			37.7

The goodwill is attributable to URI's reputation in the marketplace and the synergies that Vesuvius expects to gain from its integration. It is expected to be tax deductible.

Included within the property, plant and equipment acquired were right-of-use leased assets of £0.2m.

The decision to acquire URI was driven by its long-standing customer relationships and know-how. The identifiable intangible assets acquired are customer relationships and know-how. A deferred tax liability of £2.8m has been provided in relation to these fair value adjustments.

On acquisition, URI was subsumed into the Steel Advanced Refractories Business Unit and the Foundry Division and goodwill is monitored at the level of the Steel Advanced Refractories operating segment.

The net cash outflow on acquisition was £43.1m, including related excess working capital payment; the business was acquired on a cash and debt-free basis. In accordance with IFRS 3, we disclose the above consideration of £37.7m and borrowings repaid immediately prior to acquisition of £5.4m.

20.3 Other acquisitions

The Group did not acquire any material interests in any other companies during the year ended 31 December 2022.

There was no contingent consideration paid during the year ended 31 December 2022. Contingent consideration of £0.1m was paid during 2021 in respect of the previous acquisition of Ecil Met Tec.

21. Issued Share Capital

21.1 Accounting policy

Equity instruments issued by the Company are recorded as the proceeds received, net of direct issue costs.

21.2 Analysis of issued share capital

The allotted, issued and fully paid ordinary share capital of the Company as at 1 January 2022 and 31 December 2022 was 278,485,071 shares of 10 pence each. Further information relating to the Company's share capital is given in Note 9 to the Company's Financial Statements.

Notes to the Group Financial Statements continued

22. Retained Earnings

	Notes	Reserve for own shares £m	Share option reserve £m	Other retained earnings £m	Total retained earnings £m
As at 31 December 2020 and 1 January 2021		(35.9)	3.5	2,535.3	2,502.9
Profit for the year		–	–	102.1	102.1
Remeasurement of defined benefit liabilities/assets		–	–	(80.6)	(80.6)
Recognition of share-based payments		–	3.1	–	3.1
Release of share option reserve on exercised and lapsed options		2.5	(2.5)	–	–
Income tax on items recognised in other comprehensive income		–	–	12.5	12.5
Purchase of ESOP shares		(1.1)	–	–	(1.1)
Dividends paid	24	–	–	(55.5)	(55.5)
As at 31 December 2021 and 1 January 2022		**(34.5)**	**4.1**	**2,513.8**	**2,483.4**
Profit for the year		**–**	**–**	**181.1**	**181.1**
Remeasurement of defined benefit liabilities/assets		**–**	**–**	**27.4**	**27.4**
Recognition of share-based payments		**–**	**5.1**	**–**	**5.1**
Release of share option reserve on exercised and lapsed options		**1.2**	**(1.2)**	**–**	**–**
Income tax on items recognised in other comprehensive income		**–**	**–**	**(8.2)**	**(8.2)**
Purchase of ESOP shares		**(6.9)**	**–**	**–**	**(6.9)**
Dividends paid	24	**–**	**–**	**(58.1)**	**(58.1)**
As at 31 December 2022		**(40.2)**	**8.0**	**2,656.0**	**2,623.8**

23. Other Reserves

	Other reserves £m	Cash flow hedge reserve £m	Translation reserve £m	Total other reserves £m
As at 31 December 2020 and 1 January 2021	(1,499.3)	(1.4)	49.4	(1,451.3)
Exchange differences on translation of the net assets of foreign operations	–	–	(31.0)	(31.0)
Exchange differences on translation of net investment hedges	–	–	14.4	14.4
Net change in costs of hedging	–	(1.2)	–	(1.2)
Change in the fair value of the hedging instrument	–	2.2	–	2.2
Amounts reclassified from the Income Statement	–	(0.7)	–	(0.7)
As at 31 December 2021 and 1 January 2022	**(1,499.3)**	**(1.1)**	**32.8**	**(1,467.6)**
Exchange differences on translation of the net assets of foreign operations	**–**	**–**	**96.1**	**96.1**
Exchange differences on translation of net investment hedges	**–**	**–**	**(20.7)**	**(20.7)**
Net change in costs of hedging	**–**	**–**	**–**	**–**
Change in the fair value of the hedging instrument	**–**	**8.3**	**–**	**8.3**
Amounts reclassified from the Income Statement	**–**	**(7.5)**	**–**	**(7.5)**
As at 31 December 2022	**(1,499.3)**	**(0.3)**	**108.2**	**(1,391.4)**

Within other reserves as at 31 December 2022 is £1,499.0m (2021: £1,499.0m) arising from the demerger of Cookson Group plc, being the excess of the Vesuvius plc share capital of £1,777.9m over the total share capital and share premium of Cookson Group plc as at 14 December 2012 of £278.9m.

The translation reserve in the table above comprises foreign exchange differences attributable to the owners of the Parent. These exchange differences arise from the translation of the financial statements of foreign operations and from the translation of financial instruments that hedge the Group's net investment in foreign operations. In addition to foreign exchange differences attributable to the owners of the Parent, the Group Statement of Comprehensive Income includes foreign exchange differences attributable to non-controlling interests.

Of the closing balance in the translation reserve, a £7.7m debit (2021: £3.0m debit) relates to net investment hedging arrangements put in place on or after 1 January 2018 but discontinued as at the date of the Balance Sheet. The full closing balance in the cash flow hedge reserve relates to continuing hedges.

Cash flow hedge reserve balance includes cost of hedging balance of £0.9m debit (2021: £0.8m debit).

24. Dividends paid to Equity Shareholders

	2022 £m	2021 £m
Amounts recognised as dividends and paid to equity shareholders during the year		
Final dividend for the year ended 31 December 2020 of 14.3p per ordinary share	**–**	38.7
Interim dividend for the year ended 31 December 2021 of 6.2p per ordinary share	**–**	16.8
Final dividend for the year ended 31 December 2021 of 15.0p per ordinary share	**40.5**	–
Interim dividend for the year ended 31 December 2022 of 6.5p per ordinary share	**17.6**	–
	58.1	55.5

A proposed final dividend for the year ended 31 December 2022 of £42.3m (2021: £40.5m), equivalent to 15.75 pence (2021: 15.0 pence) per ordinary share, is subject to approval by shareholders at the Company's Annual General Meeting on 18 May 2023 and has not been included as a liability in these financial statements. If approved by shareholders, the dividend will be paid on 31 May 2023 to holders of ordinary shares on the register on 21 April 2023.

25. Financial Risk Management

25.1 Accounting policy

(a) Valuation of financial assets and liabilities

The Group's financial assets and liabilities are measured as appropriate either at amortised cost or at fair value through other comprehensive income or at fair value through profit and loss.

IFRS 13 Fair Value Measurement requires classification of financial instruments within a hierarchy that prioritises the inputs to fair value measurement. The three levels of the fair value hierarchy are:

Level 1 – Unadjusted quoted prices in active markets for identical assets or liabilities.

Level 2 – Inputs other than quoted prices that are observable for the asset or liability, either directly or indirectly.

Level 3 – Inputs that are not based on observable market data.

Trade receivables are amounts due from customers for goods sold or services performed in the ordinary course of business. Trade receivables are recognised initially at their fair value, which is the amount of consideration that is unconditional. The Group holds the trade receivables with the objective of collecting the contractual cash flows (held to collect) and therefore measures them subsequently at amortised cost using the effective interest method.

Derivatives which do not meet the hedge accounting criteria are classified as fair value through profit and loss (held for trading).

The cross-currency interest rate swaps (see Note 25.2) which meet the hedging criteria are measured at fair value through other comprehensive income.

Loans and borrowings are initially recognised at fair value net of directly attributable transaction costs. After initial recognition, they are measured at amortised cost, using the effective interest method.

(b) Foreign currencies

The individual financial statements of each Group entity are prepared in their functional currency, which is the currency of the primary economic environment in which that entity operates. For the purpose of the Group Financial Statements, the results and financial position of each entity are translated into pounds sterling, which is the presentational currency of the Group.

Reporting foreign currency transactions in functional currency

Transactions in currencies other than the entity's functional currency are initially recorded at the rates of exchange prevailing at the end of the preceding month or on the date of the transaction itself. At each subsequent balance sheet date:

(i) Foreign currency monetary items are retranslated at the rates prevailing at the balance sheet date. Exchange differences arising on the settlement or retranslation of monetary items are recognised either in the Group Income Statement or the Group Statement of Comprehensive Income

(ii) Non-monetary items measured at historical cost in a foreign currency are not retranslated

Translation from functional currency to presentational currency

When the functional currency of a Group entity is different from the Group's presentational currency (pounds sterling), its results and financial position are translated into the presentational currency as follows:

(i) Assets and liabilities are translated using exchange rates prevailing at the balance sheet date

(ii) Income and expense items are translated at average exchange rates for the year, except where the use of such average rates does not approximate the exchange rate at the date of a specific transaction, in which case the transaction rate is used

Notes to the Group Financial Statements continued

25. Financial Risk Management continued

25.1 Accounting policy continued

(b) Foreign currencies continued

Translation from functional currency to presentational currency continued

(iii) All resulting exchange differences are recognised in other comprehensive income and presented in the translation reserve in equity and are reclassified to profit or loss in the period in which the foreign operation is disposed of

Net investment in foreign operations

Exchange differences arising on a monetary item that forms part of a reporting entity's net investment in a foreign operation are initially recognised in other comprehensive income and presented in the translation reserve in equity and reclassified to profit or loss on disposal of the net investment.

Financial reporting in hyperinflationary economies

In hyperinflationary economies, when translating the results of operations into GBP, assets, liabilities, Income Statement and equity accounts are translated at the rate prevailing on the balance sheet date. Any gain or loss on net monetary assets/liabilities is recognised in the Consolidated Income Statement. The effect of inflation on non-monetary assets/liabilities is recognised in other comprehensive income within equity.

(c) Derivative financial instruments

The Group uses derivative financial instruments ('derivatives') to manage the financial risks associated with its underlying activities and the financing of those activities. Derivatives are measured at fair value using market prices at the balance sheet date. Any derivatives which form part of a hedge accounting relationship are designated as such on the date on which they are executed. Any derivatives which do not form part of a designated hedge accounting relationship are classified as 'held for trading' for accounting purposes and are accounted for at fair value through profit or loss. They are presented as current assets or liabilities to the extent they are expected to be settled within 12 months after the end of the reporting period.

(d) Cash flow hedges

Changes in the fair value of derivatives designated as cash flow hedges are recognised in other comprehensive income to the extent that the hedges are effective. Any ineffective portion would immediately be recognised in net finance costs in the profit or loss. If a forecast transaction is no longer expected to occur, the amounts previously recognised in other comprehensive income would be transferred to net finance costs in the profit or loss.

(e) Net investment hedges

The Group designates certain of its borrowings and derivatives as net investment hedges of its foreign operations. As with cash flow hedges, the effective portion of the gain or loss on hedging instruments is recognised in other comprehensive income whilst any ineffective portion would immediately be recognised in net finance costs in the profit or loss. In the event a foreign operation is disposed of or liquidated, amounts recognised in other comprehensive income are reclassified from equity to profit or loss.

25.2 Financial risk factors

The Group's Treasury department, acting in accordance with policies approved by the Board, is principally responsible for managing the financial risks faced by the Group. The Group's activities expose it to a variety of financial risks, the most significant of which are market risk and liquidity risk.

Analysis of financial instruments

The following table summarises Vesuvius' financial instruments measured at fair value and shows the level within the fair value hierarchy in which the financial instruments have been classified.

	2022 Assets £m	2022 Liabilities £m	2021 Assets £m	2021 Liabilities £m
Investments (Level 2)	0.5	–	0.5	–
Derivatives not designated for hedge accounting purposes (Level 2)	0.1	(0.1)	0.1	(0.3)
Derivatives designated for hedge accounting purposes (Level 2)	2.7	–	–	(2.3)

(a) Derivative financial instruments

The Group uses derivatives in the form of forward foreign currency contracts to manage the effects of its exposure to foreign exchange risk on trade receivables, trade payables and cash. Derivatives are only used for economic hedging purposes and not as speculative investments.

In June 2020, the Group executed a US$86m cross-currency interest rate swap (CCIRS). The effect of this is to convert the $86m Private Placement Notes issued in June 2020 into €76.6m. The timing and amount of the US dollar cash flows under the CCIRS exactly mirror those of the Private Placement Notes and the maturity date of the CCIRS also matches the repayment date of the Notes. The CCIRS would by default be revalued through the Income Statement; however, as it is in a designated hedging relationship, it is instead revalued through other comprehensive income. More specifically, the US dollar exposure is designated as a cash flow hedge of the underlying Private Placement Notes and the euro exposure is designated as a net investment hedge of part of the Group's foreign operations. The CCIRS is presented as a non-current asset or liability as it is expected to be settled more than 12 months after the end of the reporting period.

25. Financial Risk Management continued

25.2 Financial risk factors continued

(a) Derivative financial instruments continued

With the exception of the CCIRS, the fair value of derivatives outstanding at the year-end has been booked through the Income Statement in 2022. All of the fair values shown in the table above are classified under IFRS 13 as Level 2 measurements which have been calculated using quoted prices from active markets, where similar contracts are traded and the quotes reflect actual transactions in similar instruments. All of the derivative assets and liabilities not designated for hedge accounting purposes reported in the table above will mature within a year of the balance sheet date.

Derivative financial instruments are subject to International Swaps and Derivatives Association (ISDA) agreements. Derivatives designated for hedge accounting purposes are presented net £2.7m (2021: £2.3m), of which all individual instruments are assets (2021: gross assets £3.7m and gross liabilities £6.0m).

(b) Market risk

Market risk is the risk that either the fair values or the cash flows of the Group's financial instruments may fluctuate because of changes in market prices. The Group is principally exposed to market risk through fluctuations in exchange rates and interest rates.

Currency risk

The Group Income Statement is exposed to currency risk on monetary items that are denominated in currencies other than the functional currency of the companies in which they are held. The currency profile of these financial assets and financial liabilities is shown in the table below.

	2022 Euro £m	2022 US dollar £m	2022 Other £m	2021 Euro £m	2021 US dollar £m	2021 Other £m
Trade receivables	82.0	58.7	9.3	70.7	38.7	28.3
Cash at bank	10.1	9.8	0.7	5.2	8.3	15.7
Trade payables	(52.6)	(47.4)	(16.2)	(40.4)	(36.8)	(19.9)
Private Placement Notes	(175.2)	(120.7)	–	(166.4)	(107.9)	–
Bank loans and overdrafts	(44.8)	(0.1)	(0.1)	(23.1)	–	–
Lease liabilities	(1.5)	(0.3)	(0.8)	(0.6)	–	(0.9)
Cross-currency interest rate swaps	(67.8)	71.1	–	(64.4)	63.6	–
Foreign currency forward contracts						
– Buy foreign currency	0.9	4.8	–	0.9	5.5	–
– Sell foreign currency	(16.9)	(22.3)	–	(20.1)	(21.2)	(0.6)
	(265.8)	(46.4)	(7.1)	(238.2)	(49.8)	22.6

The Group has £(1.4)m (2021: £(1.8)m) of exchange differences recognised in the Income Statement of which £(1.8)m arose on the revaluation of derivatives (2021: £(0.9)m).

The tables below show the net unhedged monetary assets and liabilities of Group companies that are not denominated in their functional currency and which could give rise to exchange gains and losses in the Group Income Statement.

	Net unhedged monetary (liabilities)/assets			
	Euro £m	US dollar £m	Other £m	Total £m
Functional currency				
Sterling	(286.9)	(49.3)	1.1	(335.1)
Other	21.0	2.9	(8.0)	15.9
As at 31 December 2022	(265.9)	(46.4)	(6.9)	(319.2)

	Net unhedged monetary (liabilities)/assets			
	Euro £m	US dollar £m	Other £m	Total £m
Functional currency				
Sterling	(252.3)	(42.3)	5.2	(289.4)
Other	14.1	(7.5)	17.4	24.0
As at 31 December 2021	(238.2)	(49.8)	22.6	(265.4)

The Group finances its operations partly by obtaining funding through external borrowings. Where these borrowings are not in sterling, they may be designated as net investment hedges. This enables gains and losses arising on retranslation to be charged to other comprehensive income, providing a partial offset in equity against the gains and losses arising on translation of overseas net assets.

As at 31 December 2022, €246.0m and $60.0m of borrowings were designated as hedges of net investments in €246.0m and $60.0m worth of overseas foreign operations. In addition, the €76.6m CCIRS liability has been designated as a net investment hedge of a further €76.6m worth of overseas foreign operations.

Notes to the Group Financial Statements continued

25. Financial Risk Management continued

25.2 Financial risk factors continued

(b) Market risk continued

As the value of the borrowings and the CCIRS liability exactly matches the designated hedged portion of the net investments, the relevant hedge ratio is 1:1. The net investment hedges are therefore highly effective. It is noted that hedge ineffectiveness would arise in the event there were insufficient euro-denominated overseas foreign operations to be matched against the €76.6m CCIRS liability.

The total retranslation impact of the borrowings and CCIRS designated as net investment hedges was a loss of £20.7m (2021: a gain of £14.4m).

The $86.0m CCIRS asset has been designated as a cash flow hedge of the $86.0m USPP Notes issued in 2020. As all principal and interest cash flows under the CCIRS exactly mirror those under the USPP Notes, the cash flow hedge is highly effective. It is noted that hedge ineffectiveness would arise in the event there was a change in the contractual terms of either the USPP Notes or the CCIRS.

Hedge effectiveness is determined at inception of the hedge relationship and through periodic effectiveness assessments, to ensure that an economic relationship exists between the hedged item and hedging instrument.

Interest rate risk

The Group's interest rate risk principally arises in relation to its borrowings. Where borrowings are held at floating rates of interest, fluctuations in interest rates expose the Group to variability in the cash flows associated with its interest payments, and where borrowings are held at fixed rates of interest, fluctuations in interest rates expose the Group to changes in the fair value of its borrowings. The Group's policy is to maintain an appropriate mix of fixed and floating rate borrowings based on the Vesuvius trading environment, market conditions and other economic factors.

As at 31 December 2022, the Group had $146.0m, €198.0m and £28.0m (£323.9m in total) of US Private Placement (USPP) Notes outstanding, which carry a fixed rate of interest, representing 81% of the Group's total borrowings outstanding at that date. The interest rate profile of the Group's borrowings is detailed in the tables below.

	Financial liabilities (gross borrowings)		
	Fixed rate £m	Floating rate £m	Total £m
Sterling	28.0	33.3	61.3
US dollar	120.7	1.9	122.6
Euro	175.2	44.8	220.0
Capitalised arrangement fees	(0.9)	(1.8)	(2.7)
As at 31 December 2022	323.0	78.2	401.2

	Financial liabilities (gross borrowings)		
	Fixed rate £m	Floating rate £m	Total £m
Sterling	28.0	76.4	104.4
US dollar	107.9	1.2	109.1
Euro	166.4	27.2	193.6
Capitalised arrangement fees	(1.2)	(2.1)	(3.3)
As at 31 December 2021	301.1	102.7	403.8

Information in respect of the currency risk management of $86.0m of US dollar-denominated fixed rate financial liabilities is provided above.

The floating rate financial liabilities shown in the tables above bear interest at a market convention reference rate appropriate to each currency plus a margin. The fixed rate financial liabilities of £323.9m (2021: £302.3m) have a weighted average interest rate of 3.2% (2021: 3.2%) and a weighted average period for which the rate is fixed of 5.2 years (2021: 6.2 years).

The financial assets attract floating rate interest.

Based upon the interest rate profile of the Group's financial liabilities shown in the tables above, a 1% increase in market interest rates would increase both the finance costs charged in the Group Income Statement and the interest paid in the Group Statement of Cash Flows by £0.8m (2021: £1.0m), and a 1% reduction in market interest rates would decrease both the finance costs charged in the Group Income Statement and the interest paid in the Group Statement of Cash Flows by £0.8m (2021: £1.0m).

25. Financial Risk Management continued

25.2 Financial risk factors continued

(c) Credit risk

Credit risk arises from cash and cash equivalents, derivative financial assets and deposits with banks and financial institutions, as well as credit exposures to customers, including outstanding receivables.

(i) Risk management

For banks and financial institutions, apart from certain limited circumstances, Group policy is that only independently rated entities with a minimum rating of 'A-' are accepted as counterparties. In addition, the Group's operating companies have policies and procedures in place to assess the creditworthiness of the customers with whom they do business.

(ii) Impairment of financial assets

The Group subjects trade receivables from sales of inventory and from the provision of services to the expected credit loss model.

Whilst cash and cash equivalents are also subject to the impairment requirements of IFRS 9, the identified impairment loss was immaterial.

The Group applies the IFRS 9 simplified approach to measuring expected credit losses, which uses a lifetime expected loss allowance for all trade receivables and contract assets. The expected loss rates are based on the payment profiles of sales over a period of 60 months before 31 December 2021 and the corresponding historical credit losses experienced within this period. The historical loss rates are adjusted to reflect current and forward-looking information on macroeconomic factors affecting the ability of the customers to settle the receivables. The Group has identified the current state of the economy (such as market interest rates or growth rates) and particular industry issues in the countries in which it sells its goods and services to be the most relevant factors, and accordingly adjusts the historical loss rates based on expected changes in these factors.

Regardless of the analysis above, a significant increase in credit risk is presumed if a debtor is more than 30 days past due in making a contractual payment. Where objective evidence exists that a trade receivable balance may be impaired, provision is made for the difference between its carrying amount and the present value of the estimated cash that will be recovered.

Evidence of impairment may include such factors as a change in credit risk profile of the customer, the customer being in default on a contract, or the customer entering bankruptcy or financial reorganisation proceedings. All significant balances are reviewed individually for evidence of impairment.

Trade receivables and contract assets are written off when there is no reasonable expectation of recovery. Indicators that there is no reasonable expectation of recovery include, amongst others, the failure of a debtor to engage in a repayment plan with the Group, and a failure to make contractual payments for a period of greater than 120 days past due. Where loans or receivables have been written off, the Company continues to engage in enforcement activity to attempt to recover the receivable due.

Where recoveries are made, these are recognised within the Income Statement.

The closing expected credit loss allowance for trade receivables as at 31 December 2022 reconciles to the opening loss allowances as follows:

	2022 £m	2021 £m
As at 1 January	22.7	24.0
(Decrease)/increase in expected credit loss allowance recognised in profit or loss during the year	9.9	(0.5)
Receivables written off during the year as uncollectable	(0.7)	(0.3)
Exchange adjustments	0.9	(0.5)
As at 31 December	32.8	22.7

The debit for the year shown in the table above is recorded within administration, selling and distribution costs in the Group Income Statement.

Historical experience has shown that the Group's trade receivable provisions are maintained at levels that are sufficient to absorb actual bad debt write-offs, without being excessive. The Group considers the credit quality of financial assets that are neither past due nor impaired as good.

The Group also applies the expected credit loss model under IFRS 9 to other receivables. If, at the reporting date, the credit risk of the receivables has not increased significantly since initial recognition, the Group measures the loss allowance at an amount equal to 12-month expected credit losses. If the credit risk on that receivable has increased significantly since initial recognition, the Group measures the loss allowance at an amount equal to the lifetime expected credit losses. The expected credit loss on other receivables is not material.

Notes to the Group Financial Statements continued

25. Financial Risk Management continued

25.2 Financial risk factors continued

(d) Liquidity risk

Liquidity risk is the risk that the Group might have difficulties in meeting its financial obligations. The Group manages this risk by ensuring that it maintains sufficient levels of committed borrowing facilities and cash and cash equivalents to ensure that it can meet its operational cash flow requirements and any maturing financial liabilities, whilst at all times operating within its financial covenants. The level of operational headroom provided by the Group's committed borrowing facilities is reviewed at least annually as part of the Group's three-year planning process. Where this process indicates a need for additional finance, this is addressed on a timely basis by means of either additional committed bank facilities or raising finance in the capital markets.

In July 2022 the Group exercised its option to request a one-year extension to the maturity of its £385m committed bank facility. Following this request £346.5m of the facility matures in August 2026 with £38.5m maturing in July 2025.

As at 31 December 2022, the Group had committed borrowing facilities of £721.9m (2021: £706.3m), of which £322.5m (2021: £308.1m) were undrawn. 90% of these undrawn facilities are due to expire in August 2026. The Group's borrowing requirements are met by USPP, a multi-currency committed syndicated bank facility of £385.0m (2021: £385.0m) and a bilateral bank facility of £13.0m (2021: £21.0m) which is fully collateralised against a portion of the Group's cash balance in China.

USPP Notes issued as at 31 December 2022 amounted to £323.9m ($146.0m, €198.0m and £28.0m) and had a weighted average period to maturity of 5.2 years. $30.0m is repayable in December 2023, €15.0m and $60.0m in 2025, €100.0m and $26.0m in 2027, $30.0m in 2028, €50.0m in 2029 and €33.0m and £28.0m in 2031. The maturity analysis of the Group's gross borrowings (including interest) is shown in the tables below. The cash flows shown are undiscounted.

As at 31 December 2022	Within 1 year £m	Between 1 and 2 years £m	Between 2 and 5 years £m	Over 5 years £m	Total contractual cash flows £m	Carrying amount £m
Trade payables	239.5	–	–	–	239.5	239.5
Loans and overdrafts	52.6	9.2	255.3	133.4	450.5	403.8
Lease liabilities	12.3	9.2	13.2	13.5	48.2	40.8
Capitalised arrangement fees	–	–	–	–	–	(2.7)
Derivative liability	0.1	–	–	–	0.1	0.1
Total financial liabilities	304.5	18.4	268.5	146.9	738.3	681.5

As at 31 December 2021	Within 1 year £m	Between 1 and 2 years £m	Between 2 and 5 years £m	Over 5 years £m	Total contractual cash flows £m	Carrying amount £m
Trade payables	253.8	–	–	–	253.8	253.8
Loans and overdrafts	37.4	9.6	178.2	235.0	460.2	407.1
Lease liabilities	11.6	9.2	13.4	13.2	47.4	39.9
Capitalised arrangement fees	–	–	–	–	–	(3.3)
Derivative liability	(0.6)	(0.6)	(0.6)	0.2	(1.6)	2.6
Total financial liabilities	302.2	18.2	191.0	248.4	759.8	700.1

Capitalised arrangement fees shown in the tables above, which have been recognised as a reduction in borrowings in the Financial Statements, amounted to £2.7m as at 31 December 2022 (31 December 2021: £3.3m), of which £0.9m (2021: £1.2m) related to the USPP and £1.8m (2021: £2.1m) related to the Group's syndicated bank facility.

The carrying amount of lease liabilities falling due within one year was £12.3m (2021: 11.6m). The carrying amount of lease liabilities falling due after more than one year was £28.5m (2021: £28.3m).

25. Financial Risk Management continued

25.3 Capital management

The Company considers its capital to be equal to the sum of its total equity, disclosed on the Group Balance Sheet, and net debt (Note 14). It monitors its capital using a number of KPIs, including free cash flow, average working capital to sales ratios, net debt to EBITDA ratios and ROIC (Note 4). The Group's objectives when managing its capital are:

- To ensure that the Group and all of its businesses are able to operate as going concerns and ensure that the Group operates within the financial covenants contained within its debt facilities
- To have available the necessary financial resources to allow the Group to invest in areas that may deliver acceptable future returns to investors
- To maintain sufficient financial resources to mitigate against risks and unforeseen events
- To maximise shareholder value through maintaining an appropriate balance between the Group's equity and net debt

The Group operated within the requirements of its debt covenants throughout the year and has sufficient liquidity headroom within its committed debt facilities. Details of the Group's covenant compliance and committed debt facilities can be found in the Strategic Report on page 31.

26. Employee Benefits

26.1 Accounting policy

The net liability or net surplus recognised in the Group Balance Sheet for the Group's defined benefit plans is the present value of the defined benefit obligation at the balance sheet date, less the fair value of the plan assets. The defined benefit obligation is calculated by independent actuaries using the projected unit credit method and by discounting the estimated future cash flows using interest rates on high-quality corporate bonds that have durations approximating the terms of the related pension liability.

Any asset recognised in respect of a surplus arising from this calculation is limited to the asset ceiling, where this is the present value of any economic benefits available in the form of refunds or reductions in future contributions in respect of the plans. The Group has an unconditional right to a refund of the UK surplus, as defined under IFRIC 14, and considers that the possibility that a surplus could be reduced or extinguished by discretionary actions by the Trustee does not affect the existence of the asset at the end of the reporting period. The Group therefore recognises a pension asset with respect to the scheme valued on an IAS 19 basis. No liability is recognised with respect to further funding contributions.

The expense for the Group's defined benefit plans is recognised in the Group Income Statement as shown in Note 26.8. Actuarial gains and losses arising on the assets and liabilities of the plans are reported within the Group Statement of Comprehensive Income; and gains and losses arising on settlements and curtailments are recognised in the Group Income Statement in the same line as the item that gave rise to the settlement or curtailment or, if material, separately reported as a component of operating profit.

Notes to the Group Financial Statements continued

26. Employee Benefits continued

26.2 Group post-retirement plans

The Group operates a number of pension plans around the world, both defined benefit and defined contribution, and accounts for them in accordance with IAS 19. There are also some jubilee arrangements (other long-term benefits plans) which, while they do not need to be included in the detailed disclosures under IAS 19, have been included in the analysis below.

The Group's principal defined benefit pension plans are in the UK and the US, the benefits of which are based upon the final pensionable salaries of plan members. The assets of these plans are held separately from the Group in trustee-administered funds. The Trustees are required to act in the best interests of the plans' beneficiaries. The Group also has defined benefit pension plans in other territories but, except for those in Germany, these are not individually material in relation to the Group.

(a) Defined benefit pension plans – UK

The Group's main defined benefit pension plan in the UK ('the UK Plan') is closed to new members and to future benefit accrual. The existing plan was established under a trust deed and is subject to the Pensions Act 2004 and guidance issued by the UK Pensions Regulator.

In November 2021, the Trustee of the Vesuvius Pension Plan signed a pension insurance buy-in agreement with Pension Insurance Corporation plc (PIC). This buy-in secured an insurance asset from PIC that matches the remaining pension liabilities of the UK Plan, with the result that the Company no longer bears any investment, longevity, interest rate or inflation risks in respect of the UK Plan. All benefits in the UK Plan (with the exception of a small amount of benefits expected to arise in future as a result of guaranteed minimum pensions (GMP) equalisation) are now insured with PIC.

There is a 'long-term scheme-specific funding standard' in Part 3 of the Pensions Act 2004. In terms of Part 3, the UK Plan is subject to a requirement ('the statutory funding objective') that it must have sufficient and appropriate assets to cover its technical provisions. Such technical provisions are determined as part of the triennial valuation. Under the rules of the UK Plan, the Trustee, after consultation with the Company, has the power to set the funding contributions taking into account the results of the triennial valuation and the Pension Act 2004 legislation. Following the buy-in referred to above, no further contributions are expected to be paid to the UK Plan by the Company, and the cost of GMP equalisation will be met out of the surplus UK Plan assets.

(b) Defined benefit pension plans – US

The Group has several defined benefit pension plans in the US, providing retirement benefits based on final salary or a fixed benefit. The Group's principal US defined benefit pension plans are closed to new members and to future benefit accrual for existing members. Actuarial valuations of the US defined benefit pension plans are carried out every year and the last full valuation was carried out as at 31 December 2022. At that date, the market value of the plan assets was $45.2m, representing a funding level of 71.7% of funded accrued plan benefits at that date (using the projected unit method of valuation) of $63.0m. Funding levels for the Group's US defined benefit pension plans are based upon annual valuations carried out by independent qualified actuaries and are governed by US Government regulations.

The Group's US qualified defined benefit pension plan is subject to the minimum contribution requirements of the Internal Revenue Code Sections 412 and 430. Contributions are determined by trustees, in consultation with the Company, based on the annual valuations which are submitted to the Internal Revenue Service. During the fiscal year beginning 1 January 2022, total minimum required contributions were $nil. Under these funding laws and based on the plan deficit, the required minimum annual contribution for the 2023 fiscal year is expected to be $nil and the required annual contributions for the period 2024–2025 are expected to be in the $2.5m to $3.5m range. Contributions of $nil were made during 2022.

(c) Defined benefit pension plans – Germany

The Group has several defined benefit pension arrangements in Germany which are unfunded, as is common practice in that country. The main plan was closed to new entrants on 31 December 2016 and replaced by a defined contribution plan for new joiners. The German defined benefit plan contains mainly direct pension promises based on works council agreements as well as on some individual pension promises. The legal framework is the German Company Pensions Act ('Betriebsrentengesetz'). The plan is unfunded (book reserved) and the company pays all benefit payments when they fall due.

(d) Defined benefit pension plans – rest of the world and other post-retirement benefits

The Group has several defined benefit pension arrangements across the rest of the world (ROW), the largest of which are in Belgium. The net liability of the ROW plans at 31 December 2022 was £9.2m (2021: £16.9m). The Group also has liabilities relating to medical insurance arrangements and termination plans which provide for benefit to be paid to employees on retirement. The net liability of these other post-retirement benefits as at 31 December 2022 was £9.4m (2021: £7.0m).

(e) Defined contribution pension plans

The total expense for the Group's defined contribution plans in the Group Income Statement amounted to £10.8m (2021: £10.2m) and represents the contributions payable for the year by the Group to the plans.

26. Employee Benefits continued

26.2 Group post-retirement plans continued

(f) Multi-employer plans

Due to collective agreements, Vesuvius in the US participates, together with other enterprises, in union-run multi-employer pension plans for temporary workers hired on sites. These are accounted for as defined contribution plans. The bulk of the multi-employer pension plans related to BMI, which was disposed in 2018. The BMI sale transaction was structured to ensure as best as possible that any pension liability would go to the acquiring company. There is a five-year window where Vesuvius US could still have some liability for any shortfall in the BMI plans should the buyer cease to exist.

26.3 Post-retirement liability valuation

The main assumptions used in calculating the costs and obligations of the Group's defined benefit pension plans, as detailed below, are set by the Directors after consultation with independent professionally qualified actuaries and include those used to determine regular service costs and the financing elements related to the plans' assets and liabilities. It is the Directors' responsibility to set the assumptions used in determining the key elements of the costs of meeting such future obligations. Whilst the Directors believe that the assumptions used are appropriate, a change in the assumptions used could affect the Group's profit and financial position.

(a) Mortality assumptions

The mortality assumptions used in the actuarial valuations of the Group's UK, US and German defined benefit pension liabilities are summarised in the table below and have been selected to reflect the characteristics and experience of the membership of those plans.

For the UK Plan, the assumptions used have been derived from the Self-Administered Pension Schemes ('SAPS S3') All table, with future longevity improvements in line with the 'core' mortality improvement tables published in 2021 by the Continuous Mortality Investigation (CMI), with a long-term rate of improvement of 1.25% per year. For the Group's US plans, the assumptions used have been based on the Pri-2012 mortality tables and MP-2021 projection scale. The Group's major plans in Germany have been valued using the modified Heubeck Richttafeln 2018G mortality tables. In respect of the life expectancy tables below, current pensioners are assumed to be 65 years old, while future pensioners are assumed to be 45 years old.

	2022			2021		
Life expectancy of pension plan members	UK years	US years	Germany years	UK years	US years	Germany years
Age to which current pensioners are expected to live:						
– Men	87.2	85.0	85.6	87.2	85.0	85.5
– Women	89.0	87.0	89.0	88.9	87.0	88.9
Age to which future pensioners are expected to live:						
– Men	87.5	86.5	88.4	87.5	86.5	88.2
– Women	90.5	88.4	91.3	90.4	88.4	91.1

(b) Other main actuarial valuation assumptions

	2022			2021		
	UK % p.a.	US % p.a.	Germany % p.a.	UK % p.a.	US % p.a.	Germany % p.a.
Discount rate	4.80	4.90	3.70	2.00	2.45	1.20
Price inflation – using RPI for UK	3.25	2.50	2.35	3.25	2.25	2.00
– using CPI for UK	2.35	n/a	n/a	2.45	n/a	n/a
Rate of increase in pensionable salaries	n/a	n/a	3.10	n/a	n/a	2.75
Rate of increase to pensions in payment	3.00	n/a	2.35	3.15	n/a	2.00

The discount rate used to determine the liabilities of the UK Plan for IAS 19 accounting purposes is required to be determined by reference to market yields on high-quality corporate bonds. The UK discount rate in the above table is based on analysis using the expected future cash flows of the Vesuvius Pension Plan and the AON AA yield curve; the US discount rate is based on the FTSE (formerly Citigroup) pension discount curve; and the Germany discount rate is based on AA corporate bond yields included in the iBoxx Euro AA corporate bond indices.

The assumptions for UK price inflation are set by reference to the difference between yields on longer-term conventional government bonds and index-linked bonds, except for CPI, for which no appropriate bonds exist, which is assumed to be 0.9 points lower (2021: 0.8 points lower) than RPI-based inflation.

Notes to the Group Financial Statements continued

26. Employee Benefits continued

26.3 Post-retirement liability valuation continued

(c) Sensitivity analysis of the impact of changes in significant IAS 19 actuarial assumptions

The UK Plan Trustee has entered into a pension insurance buy-in agreement with the Pension Insurance Corporation (PIC). The US pensions are not inflation linked. The rate of increase in pensionable salaries and of pensions in payment is therefore not significant to the valuation of the Group's overall pension liabilities.

The sensitivity of the defined benefit obligation to changes in the weighted principal assumptions is:

Assumption	Change in assumption	UK	US	Germany
Discount rate	Increase/decrease by 0.1%			
	– impact on plan liabilities	Decrease/ increase by £3.7m	Decrease/increase by £0.5m	Decrease/increase by £0.6m
	– impact on plan assets	Decrease/increase by £3.7m	n/a	n/a
Price inflation	Increase/decrease by 0.1%			
	– impact on plan liabilities	Increase/ decrease by £2.4m	n/a	Increase/decrease by £0.2m
	– impact on plan assets	Increase/decrease by £2.4m	n/a	n/a
Mortality	Increase by one year			
	– impact on plan liabilities	Increase by £15.5m	Increase by £2.1m	Increase by £1.2m
	– impact on plan assets	Increase by £15.5m	n/a	n/a

26.4 Defined benefit obligation

The average duration of the obligations to which the liabilities of the Group's principal pension plans relate is 12 years for the UK, 16 years for Germany and 9 years for the US.

	Defined benefit pension plans					Other post-retirement & long-term benefit plans	
	UK £m	US £m	Germany £m	ROW £m	Total £m	£m	Total £m
Present value as at 1 January 2022	464.3	70.2	53.3	48.3	636.1	7.0	643.1
Reclassification to other post-retirement & long-term benefit plans*	–	–	–	(2.0)	(2.0)	2.0	–
Exchange differences	–	7.9	2.2	1.7	11.8	0.7	12.5
Current service cost	–	–	1.0	3.0	4.0	0.8	4.8
Interest cost	9.0	1.8	0.7	0.7	12.2	0.3	12.5
Gains arising over the year that are recognised in P&L	–	–	–	–	–	(0.4)	(0.4)
Remeasurement of liabilities:							
– demographic changes	(6.1)	–	–	(0.1)	(6.2)	–	(6.2)
– financial assumptions	(148.5)	(15.0)	(18.3)	(6.8)	(188.6)	(0.5)	(189.1)
– experience losses/(gains)	28.9	(0.5)	1.1	0.8	30.3	0.3	30.6
Benefits paid	(22.4)	(4.5)	(1.6)	(2.3)	(30.8)	(0.8)	(31.6)
Present value as at 31 December 2022	325.2	59.9	38.4	43.3	466.8	9.4	476.2

* A jubilee arrangement (other long-term benefits plan) previously recorded in the ROW disclosure has been reclassified into other post-retirement & long-term benefits for consistency of placement with all other jubilee arrangements.

26. Employee Benefits continued

26.4 Defined benefit obligation continued

	Defined benefit pension plans					Other post-retirement & long-term benefit plans	
	UK £m	US £m	Germany £m	ROW £m	Total £m	£m	Total £m
Present value as at 1 January 2021	501.8	74.3	63.1	52.1	691.3	7.0	698.3
Exchange differences	–	0.7	(3.7)	(3.0)	(6.0)	(0.2)	(6.2)
Current service cost	–	–	1.7	3.1	4.8	0.4	5.2
Interest cost	6.8	1.5	0.3	0.5	9.1	0.2	9.3
Remeasurement of liabilities:							
– demographic changes	(0.4)	0.2	–	0.1	(0.1)	–	(0.1)
– financial assumptions	(24.8)	(2.9)	(5.7)	(0.6)	(34.0)	–	(34.0)
– experience gains	5.0	0.5	(0.9)	(0.8)	3.8	0.1	3.9
Benefits paid	(24.1)	(4.1)	(1.5)	(3.1)	(32.8)	(0.5)	(33.3)
Present value as at 31 December 2021	464.3	70.2	53.3	48.3	636.1	7.0	643.1

26.5 Fair value of plan assets

	2022				2021			
	UK £m	US £m	ROW £m	Total £m	UK £m	US £m	ROW £m	Total £m
As at 1 January	486.4	48.3	31.4	566.1	616.4	48.4	31.4	696.2
Exchange differences	–	5.5	1.2	6.7	–	0.4	(2.0)	(1.6)
Interest income	9.5	1.2	0.4	11.1	8.4	1.0	0.2	9.6
Return on plan assets	(124.4)	(13.4)	0.5	(137.3)	(113.7)	1.3	1.6	(110.8)
Contributions from employer	–	–	2.7	2.7	0.1	0.9	2.7	3.7
Administration expenses paid	(0.6)	(0.6)	–	(1.2)	(0.7)	(0.5)	–	(1.2)
Benefits paid	(22.3)	(3.6)	(2.1)	(28.0)	(24.1)	(3.2)	(2.5)	(29.8)
As at 31 December	348.6	37.4	34.1	420.1	486.4	48.3	31.4	566.1

The Group's pension plans in Germany are unfunded, as is common practice in that country, and accordingly there are no assets associated with these plans.

26.6 Remeasurement of defined benefit liabilities/assets

	2022 total £m	2021 total £m
Remeasurement of liabilities/assets:		
– demographic changes	6.2	0.1
– financial assumptions	189.1	34.0
– experience losses	(30.6)	(3.9)
Return on plan assets	(137.3)	(110.8)
Total movement	27.4	(80.6)

The remeasurement of defined benefit liabilities and assets is recognised in the Group Statement of Comprehensive Income.

Notes to the Group Financial Statements continued

26. Employee Benefits continued

26.7 Balance sheet recognition

The amount recognised in the Group Balance Sheet in respect of the Group's defined benefit pension plans and other post-retirement & long-term benefit plans is analysed in the following tables, which all relate to continuing operations. All equity securities and bonds have quoted prices in active markets.

	Defined benefit pension plans					Other post-retirement & long-term benefit plans	
	UK £m	US £m	Germany £m	ROW £m	Total £m	£m	2022 total £m
Equities	12.1	0.5	–	2.3	14.9	–	14.9
Bonds	–	35.6	–	3.0	38.6	–	38.6
Annuity insurance contracts	318.1	–	–	24.7	342.8	–	342.8
Other assets	18.4	1.3	–	4.1	23.8	–	23.8
Fair value of plan assets	348.6	37.4	–	34.1	420.1	–	420.1
Present value of funded obligations	(324.1)	(51.7)	–	(40.2)	(416.0)	–	(416.0)
	24.5	(14.3)	–	(6.1)	4.1	–	4.1
Present value of unfunded obligations	(1.1)	(8.2)	(38.4)	(3.1)	(50.8)	(9.4)	(60.2)
Total net surpluses/(liabilities)	23.4	(22.5)	(38.4)	(9.2)	(46.7)	(9.4)	(56.1)
Recognised in the Group Balance Sheet as:							
Net surpluses	24.5	–	–	1.7	26.2	–	26.2
Net liabilities	(1.1)	(22.5)	(38.4)	(10.9)	(72.9)	(9.4)	(82.3)
Total net surpluses/(liabilities)	23.4	(22.5)	(38.4)	(9.2)	(46.7)	(9.4)	(56.1)

	Defined benefit pension plans					Other post-retirement & long-term benefit plans	
	UK £m	US £m	Germany £m	ROW £m	Total £m	£m	2021 total £m
Equities	9.8	3.3	–	2.4	15.5	–	15.5
Bonds	–	44.0	–	3.0	47.0	–	47.0
Annuity insurance contracts	456.7	–	–	22.5	479.2	–	479.2
Other assets	19.9	1.0	–	3.5	24.4	–	24.4
Fair value of plan assets	486.4	48.3	–	31.4	566.1	–	566.1
Present value of funded obligations	(462.7)	(59.9)	–	(43.3)	(565.9)	–	(565.9)
	23.7	(11.6)	–	(11.9)	0.2	–	0.2
Present value of unfunded obligations	(1.6)	(10.3)	(53.3)	(5.0)	(70.2)	(7.0)	(77.2)
Total net surpluses/(liabilities)	22.1	(21.9)	(53.3)	(16.9)	(70.0)	(7.0)	(77.0)
Recognised in the Group Balance Sheet as:							
Net surpluses	23.7	–	–	1.4	25.1	–	25.1
Net liabilities	(1.6)	(21.9)	(53.3)	(18.3)	(95.1)	(7.0)	(102.1)
Total net surpluses/(liabilities)	22.1	(21.9)	(53.3)	(16.9)	(70.0)	(7.0)	(77.0)

(a) UK Plan asset allocation

As at 31 December 2022, of the UK Plan's total assets, 91.4% (2021: 93.9%) were represented by the annuity insurance contracts covering the UK Plan's pension liabilities; 3.4% (2021: 2.0%) were allocated to equities and 5.2% (2021: 4.1%) to cash.

The UK Plan Trustee has entered into a pension insurance buy-in agreement with the Pension Insurance Corporation (PIC), whereby the UK Plan Trustee has paid insurance premiums to PIC to insure all of the UK Plan's liabilities. Under this arrangement, the value of the PIC insurance contract matches the value of the liabilities for current benefits because the inflation, interest rate, investment and longevity risks for Vesuvius in respect of these liabilities are eliminated. The buy-in agreement ensures that the UK pension plan obligations in respect of all its members and their approved dependants are insured.

As at 31 December 2022, the IAS 19 valuation of the PIC insurance contract value associated with the bought-in liabilities was £318.1m (2021: £456.7m). The policy and the associated valuation are updated annually to reflect retirements and mortality.

26. Employee Benefits continued

26.7 Balance sheet recognition continued

(b) US Plan asset allocation

All of the assets in the main US Plan have a quoted market price in an active market. The Plan mitigates exposure to interest rates by employing a liability matching investment strategy. All non-derivative assets are invested in liability matching bonds with a similar average duration to the liabilities of the Plan. Since 2018, the investment allocation has been de-risked from an allocation of 72% liability matching and 28% return seeking assets, to an allocation of 100% liability matching. The Plan retains equity risk through use of equity derivative contracts, which provide equity market exposure with some level of equity downside protection.

(c) Defined benefit contributions in 2022

In 2023, the Group is expected to make contributions into its defined benefit pension and other post-retirement & long-term benefits plans of around £6.6m with specific contributions of approximately £1.1m, £1.8m and £1.9m anticipated for the US Plans, German Plans and Belgian Plans respectively.

26.8 Income statement recognition

The expense recognised in the Group Income Statement in respect of the Group's defined benefit retirement plans and other post-retirement & long-term benefit plans is shown below:

	2022			2021		
	Defined benefit pension plans £m	Other post-retirement & long-term benefit plans £m	Total £m	Defined benefit pension plans £m	Other post-retirement & long-term benefit plans £m	Total £m
Current service cost	4.0	0.8	4.8	4.8	0.4	5.2
Gains arising over the year that are recognised in P&L	–	(0.4)	(0.4)	–	–	–
Administration expenses	1.2	–	1.2	1.2	–	1.2
Net interest cost/(gain)	1.1	0.3	1.4	(0.5)	0.2	(0.3)
Total net charge	6.3	0.7	7.0	5.5	0.6	6.1

The total net charge of £7.0m (2021: £6.1m), recognised in the Group Income Statement in respect of the Group's defined benefit pension plans and other post-retirement & long-term benefits plans, is analysed in the following table:

		2022 £m	2021 £m
In arriving at trading profit	– within other manufacturing costs	1.7	1.8
	– within administration, selling and distribution costs	3.9	4.6
In arriving at profit before tax	– within net finance costs	1.4	(0.3)
Total net charge		7.0	6.1

GMP equalisation

A UK High Court ruling was made on 26 October 2018 in respect of the gender equalisation of guaranteed minimum pensions (GMPs) for occupational pension schemes. The impact of GMP equalisation as at 31 December 2018 was estimated to be £4.5m.

A second UK High Court GMP equalisation ruling was issued on 20 November 2020. This second ruling considered the treatment of historical transfers out, i.e. those members who had transferred out before 26 October 2018. The 2020 ruling covers both individual and bulk transfers out. It does not revisit any of the issues addressed in the 2018 ruling. The impact of GMP equalisation for the second ruling was estimated to be £0.8m as at 31 December 2020.

The increase in pension liabilities resulting from these judgements have been treated for IAS 19 purposes as plan amendments and resulted in an increase in the pension deficit in the balance sheet and a corresponding past service cost in the Income Statement. These amendments have previously been treated as separately reported items so that there has been no impact on headline performance. We are working with the Trustees of our UK pension plan and our actuarial and legal advisers to understand the extent to which these judgements crystallise additional liabilities for the UK pension plan.

Notes to the Group Financial Statements continued

26. Employee Benefits continued

26.9 Risks to which the defined benefit pension plans expose the Group

The principal risks faced by these plans comprise: (i) the risk that the value of the plan assets is not sufficient to meet all plan liabilities as they fall due; (ii) the risk that plan beneficiaries live longer than envisaged, causing liabilities to exceed the available plan assets; and (iii) the risk that the market-based factors used to value plan liabilities and assets change materially adversely to increase plan liabilities over the value of available plan assets. Further details are given below.

Following the UK Plan pension insurance buy-in agreement, the inflation, interest rate, investment and longevity risks for Vesuvius in respect of the UK Plan are eliminated. The following risks relate to the other plans operated by the Group:

Counterparty risk

This is mitigated by using a diversified range of counterparties of high standing and ensuring positions are collateralised as required.

Asset volatility

The liabilities are calculated using a discount rate set with reference to corporate bond yields; if assets underperform against this yield, this will create a deficit. To reduce this risk, the pension plans are largely invested in government and corporate bonds.

Changes in bond yields

A decrease in corporate bond yields will increase the scheme liabilities, although this will be partially offset by an increase in the value of the schemes' bond holdings.

Inflation risk

Much of the plans' benefit obligations outside the US are linked to inflation, and higher inflation will lead to higher liabilities.

Life expectancy

The majority of the plans' obligations are to provide benefits for the life of the member and in some cases their spouse on death of the member, so increases in life expectancy will result in an increase in the liabilities.

In August 2016, the pensions for the majority of current pensioners in the US main plan were bought out with an insurance company, removing all responsibility and risk related to these pensions from the Group. In recent years, a number of further exercises have been carried out to buy out US benefits.

27. Share-based Payments

27.1 Accounting policy

The Group operates an equity-settled share-based payment arrangement for its employees. Equity-settled share-based payments are measured at fair value at the date of grant. For grants with market-based conditions attached to them, such as total shareholder return, fair value is measured using a form of stochastic option pricing model. For grants with non-market-based conditions, such as growth in return on invested capital (ROIC), environmental, social and governance criteria (ESG) and headline earnings per share (EPS), fair value is measured using the Black-Scholes option pricing model. The fair value is expensed on a straight-line basis over the vesting period with a corresponding increase in equity. The cumulative expense recognised is adjusted for the best estimate of the shares that will eventually vest.

27. Share-based Payments continued

27.2 Income statement recognition

The total expense recognised in the Group Income Statement is shown below:

	2022 £m	2021 £m
Long-Term Incentive Plan	**0.9**	0.2
Other plans	**4.2**	2.9
Total expense	**5.1**	3.1

The Group operates a number of different share-based payment plans, the most significant of which is the Long-Term Incentive Plan (LTIP), details of which can be found in the Directors' Remuneration Report.

27.3 Details of outstanding options

	Number of outstanding awards					
	As at 1 Jan 2022	Granted	Exercised	Forfeited/ lapsed	Expired	As at 31 Dec 2022
LTIP	**1,939,964**	**981,558**	**nil**	**(776,187)**	**nil**	**2,145,335**
Weighted average exercise price	**nil**	**nil**	**nil**	**nil**	**nil**	**nil**
Other plans	**549,033**	**1,513,457**	**(228,175)**	**(111,626)**	**nil**	**1,722,689**
Weighted average exercise price	**nil**	**nil**	**nil**	**nil**	**nil**	**nil**

For the awards exercised during 2022, the market value at the date of exercise ranged from 293.0 pence to 395.5 pence per share.

	Number of outstanding awards					
	As at 1 Jan 2021	Granted	Exercised	Forfeited/ lapsed	Expired	As at 31 Dec 2021
LTIP	1,717,225	702,982	(31,637)	(448,606)	nil	1,939,964
Weighted average exercise price	nil	nil	nil	nil	nil	nil
Other plans	635,031	391,769	(437,328)	(40,439)	nil	549,033
Weighted average exercise price	nil	nil	nil	nil	nil	nil

For the options exercised during 2021, the market value at the date of exercise ranged from 473 pence to 574 pence.

Details of market performance conditions are included in the Directors' Remuneration Report.

	2022			2021		
	Awards exercisable as at 31 Dec 2022 no.	Weighted average outstanding contractual life of awards years	Range of exercise prices pence	Awards exercisable as at 31 Dec 2021 no.	Weighted average outstanding contractual life of awards years	Range of exercise prices pence
LTIP	**–**	**8.3**		–	8.3	
Weighted average exercise price	**–**		**n/a**	–		n/a
Other plans	**–**	**0.9**		–	0.9	
Weighted average exercise price	**–**		**n/a**	–		n/a

Notes to the Group Financial Statements continued

27. Share-based Payments continued

27.4 Options granted during the year

	2022		
	LTIP ROIC/ ESG element	LTIP TSR element	Other plans
Fair value of options granted	385p	217p	385p
Share price on date of grant	385p	385p	385p
Expected volatility	n/a	39.3%	n/a
Risk-free interest rate	n/a	1.28%	n/a
Exercise price (per share)	nil	nil	nil
Expected term (years)	3	3	2
Expected dividend yield	nil	nil	nil

	2021		
	LTIP EPS element	LTIP TSR element	Other plans
Fair value of options granted	538p	340p	538p
Share price on date of grant	538p	538p	538p
Expected volatility	n/a	39.2%	n/a
Risk-free interest rate	n/a	0.2%	n/a
Exercise price (per share)	nil	nil	nil
Expected term (years)	3	3	2
Expected dividend yield	nil	nil	nil

For the LTIP awards issued in 2020 and 2021, vesting of 50% of shares awarded is based on the Group's three-year total shareholder return (TSR) performance relative to that of the constituent companies of the FTSE 250 (excluding investment trusts) and vesting of the remaining 50% of shares awarded is based on headline EPS growth.

For the LTIP awards issued in 2022, vesting of 40% of shares awarded is based on the Group's three-year total shareholder return (TSR) performance relative to that of the constituent companies of the FTSE 250 (excluding investment trusts) and vesting of the remaining 60% of shares awarded is based on ROIC and ESG targets.

Expected volatility was determined by calculating the historical volatility of the Group's share price over the 2.8 years (2021: 2.8 years) prior to the grant date for the March 2022 grant. The risk-free rate of return was assumed to be the yield to maturity on a UK fixed gilt with the term to maturity equal to the expected life of the option. At the discretion of the Remuneration Committee, award holders receive the value of dividends that would have been paid on their vested shares in the period between grant and vesting. Accordingly, there is no discount to the valuation for dividends foregone during the vesting period.

28. Trade and Other Payables

28.1 Accounting policy

Trade and other payables are initially recognised at fair value and subsequently measured at amortised cost, using the effective interest method.

28.2 Analysis of trade and other payables

	2022 £m	2021 £m
Non-current		
Accruals and other payables	13.8	11.6
Total non-current other payables	13.8	11.6
Current		
Trade payables	239.5	253.8
Other taxes and social security	38.1	33.5
Accruals and other payables	100.8	85.6
Total current trade and other payables	378.4	372.9

There is no significant difference between the fair value of the Group's trade and other payables balances and the amount at which they are reported in the Group Balance Sheet.

Included within trade payables in the table above is £29.7m (2021: £27.8m) subject to supplier financing agreements entered into with certain of the Group's banks. Under the terms of the agreements, the Group's suppliers in certain countries can elect to be paid earlier than the terms of their agreement with Vesuvius by requesting discounted early settlement from the arranging bank. This early settlement is effected between the bank and the supplier; from the perspective of the Group, the terms of each payable remain unchanged. The Group is not charged any interest cost or fee in respect of the agreements.

29. Leases

29.1 Accounting policy

Lease liabilities are recognised at the present value of the remaining lease payments, discounted using the interest rate implicit in the lease if that rate can be readily determined. If that rate cannot be readily determined, the lessee's incremental borrowing rate is used, calculated as the local government bond rate plus an interest rate spread. In cases where there was an option to terminate or extend a lease, the duration of the lease assumed for this purpose reflected the Group's existing intentions regarding such options. Lease liabilities include the net present value of the following lease payments:

- Fixed payments (including in-substance fixed payments), less any lease incentives receivable
- Variable lease payments that are based on an index or a rate
- Amounts expected to be payable by the lessee under residual value guarantees
- The exercise price of a purchase option if the lessee is reasonably certain to exercise that option
- Payments of penalties for terminating the lease, if the lease term reflects the lessee exercising that option

Cash flows from leases are presented within 'Repayments of borrowings' in the Group Statement of Cash Flows.

Leases of low-value assets and short-term leases (shorter than 12 months) are classified as operating leases and neither the asset nor the corresponding liability to the lessor is recognised in the Group Balance Sheet. Rentals payable under operating leases are charged to the Group Income Statement on a straight-line basis over the term of the lease. Benefits received and receivable as an incentive to enter an operating lease are also spread on a straight-line basis over the lease term.

29.2 Lease liabilities

The lease liabilities at 31 December 2022 were £40.8m (2021: £39.9m). The cash payments for leases during the year were £14.6m (2021: £14.1m). The maturity analysis of the lease liabilities is disclosed in Note 25.2 (d).

The net book value of the Group's property, plant and equipment assets held as right-of-use assets under lease contracts at 31 December 2022 was £44.1m (2021: £41.9m) (Note 15). The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis.

29.3 Operating lease commitments

The future aggregate minimum lease payments under non-cancellable operating leases are payable as follows:

	2022 £m	2021 £m
Not later than one year	0.5	0.5
Later than one year and not later than five years	0.2	0.2
Later than five years	–	–
Total operating lease commitments	0.7	0.7

The cost incurred by the Group in the year in respect of assets held under operating leases, all of which was charged within trading profit, amounted to £2.3m (2021: £2.9m), of which £1.7m (2021: £2.2m) related to short-length leases and £0.6m (2021: £0.7m) related to leases of low-value items.

Notes to the Group Financial Statements continued

30. Provisions

30.1 Accounting policy

Provisions are recognised when the Group has a present obligation as a result of a past event and it is probable that the Group will be required to settle that obligation. Provisions are measured at the Directors' best estimate of the expenditure required to settle the obligation at the balance sheet date. Where the effect of the time value of money is material, provisions are discounted using a pre-tax discount rate that reflects both the current market assessment of the time value of money and the specific risks associated with the obligation. Where discounting is used, the increase in the provision due to the passage of time is recognised as a finance cost.

30.2 Analysis of provisions

	Disposal, closure and environmental costs £m	Restructuring charges £m	Other £m	Total £m
As at 31 December 2020 and 1 January 2021	42.2	9.2	5.4	56.8
Exchange adjustments	0.3	(0.2)	–	0.1
Charge to Group Income Statement – trading profit	7.4	–	9.2	16.6
Adjustment to discount	0.7	–	–	0.7
Cash spend	(8.9)	(4.0)	(10.6)	(23.5)
As at 31 December 2021 and 1 January 2022	**41.7**	**5.0**	**4.0**	**50.7**
Exchange adjustments	**5.0**	**0.6**	**0.3**	**5.9**
Charge to Group Income Statement – trading profit	**16.7**	**–**	**11.4**	**28.1**
Adjustment to discount	**1.1**	**–**	**–**	**1.1**
Cash spend	**(6.8)**	**(1.5)**	**(10.3)**	**(18.6)**
Transferred (to)/from other balance sheet accounts	**–**	**(0.5)**	**–**	**(0.5)**
As at 31 December 2022	**57.7**	**3.6**	**5.4**	**66.7**

Of the total provision balance as at 31 December 2022 of £66.7m (2021: £50.7m), £49.3m (2021: £32.6m) is recognised in the Group Balance Sheet within non-current liabilities and £17.4m (2021: £18.1m) within current liabilities.

Disposal, closure and environmental charges

The provision for disposal, closure and environmental costs includes the Directors' current best estimate of the amounts to be payable in respect of known or probable costs resulting from third-party claims, including legacy matter lawsuits.

There remains inherent uncertainty associated with estimating the future costs of legacy matter lawsuits. In assessing the probable costs and realisation certainty of these provisions, or related assets, management has made reasonable assumptions, including projections of the number of future claims, the approximate average cost of those claims (including legal costs and infrequent larger value claims) and the length of time taken to resolve such claims. The provision reflects the Directors' best estimate of the future liability and the value of the corresponding asset. By nature, these assumptions are uncertain and therefore changes to the assumptions used could significantly alter the Directors' assessment of the value, volume of claims, timing or certainty of the costs or related amounts. Sensitivity analyses have been conducted using variations to the key assumptions listed above and indicatively show:

- A 10% change in the average cost of claims, combined with an increase in the proportion of higher value claims, would impact the gross provision by approximately £6.9m and the corresponding asset for insurance cover by approximately £6.5m
- A 60% change in the expected duration of claims would impact the gross provision by approximately £4.8m and the corresponding asset for insurance cover by approximately £4.2m

Changes in discount rates , such as those observed in 2022, may have a significant impact on gross provisions and related assets for insurance cover.

Assumptions are determined with reference to historical information and trends experienced to date, combined with specialist views on future outlook. As assumptions can vary individually or in combination, over the longer term there can be no guarantee that the assumptions used to estimate the provision will result in an accurate prediction of the actual costs that may be incurred.

30. Provisions continued

30.2 Analysis of provisions continued

Disposal, closure and environmental charges continued

As the resolution of many of the obligations for which provision is made is subject to legal or other regulatory process, the timing of the associated cash outflows is also subject to some uncertainty. However, the majority of the amounts provided are expected to be utilised over the next ten years. The provision, underlying estimates of costs and associated insurance estimates are regularly assessed, to reflect any changed circumstances with regard to individual matters. Any movements impacting the Income Statement are included within headline performance.

As set out above, where insurance cover exists for any of these known or probable costs, a related asset is recognised in the Group Balance Sheet only when its value can be reliably measured and reimbursement is considered to be virtually certain by management. As at 31 December 2022, £26.8m (2021: £14.4m) was recorded in other receivables in respect of associated insurance reimbursements, of which £25.1m (2021: £12.4m) is non-current. A credit of £12.6m was recorded during 2022 (2021: £6.2m) to reflect the increase in assets for insurance cover which is included in the 'Administration, selling and distribution costs' line in the Income Statement. This is offset by a debit of £12.6m in 2022 (2021: £6.2m) to reflect an increase in provisions for related claims in the same line of the Income Statement.

In addition, this provision covers the estimate of costs to be payable both in the fulfilment of obligations incurred in connection with former Group businesses, resulting from either disposal or closure, together with those related to the demolition and clean-up of closed sites.

Restructuring charges provisions

The provision for restructuring charges includes the costs to complete the Group's major restructuring programmes. The majority of this balance of £3.6m as at 31 December 2022 (2021: £5.0m) is expected to be paid out over the next year.

Other

Other provisions comprise amounts payable in respect of known or probable costs resulting both from legal or other regulatory requirements, workers' compensation and medical claims, and from third-party claims. As the settlement of many of the obligations for which provision is made is subject to reasonable assumptions, legal or other regulatory process, the timing of the associated outflows is subject to some uncertainty, but the majority of amounts provided are expected to be utilised over the next two years and the underlying estimates of costs are regularly updated to reflect changed circumstances with regard to individual matters. During 2022, the Group recognised net charges of £11.4m (2021: £9.2m) in the Group Income Statement to provide for various medical benefits and other claims.

The Group has considered the impact of climate change on provisions including decommissioning or environmental rehabilitation and there have been no material changes needed to amounts already provided.

31. Off-Balance Sheet Arrangements

In compliance with current reporting requirements, certain arrangements entered into by the Group in its normal course of business are not reported in the Group Balance Sheet. Of such arrangements, the largest amounts are future lease payments in relation to assets used by the Group under non-cancellable operating leases (Note 29).

32. Contingent Liabilities

Details of guarantees given by the Company, on behalf of the Group, are given in Note 11 to the Company Financial Statements.

Vesuvius has extensive international operations and is subject to various legal and regulatory regimes, including those covering taxation and environmental matters.

Certain of Vesuvius' subsidiaries are subject to legacy matter lawsuits, predominantly in the US, relating to a small number of products containing asbestos manufactured prior to the acquisition of those subsidiaries by Vesuvius. These suits usually also name many other product manufacturers. To date, Vesuvius is not aware of there being any liability verdicts against any of these subsidiaries. Each year, a number of these lawsuits are withdrawn, dismissed or settled.

As the settlement of many of the obligations for which reserve is made is subject to legal or other regulatory process, the timing and amount of the associated outflows is subject to some uncertainty (see Note 30 for further information). The amount paid, including costs in relation to this litigation, has not had a material effect on Vesuvius' financial position or results of operations in the current year.

Notes to the Group Financial Statements continued

33. Investments in Subsidiaries, Joint Ventures and Associates

33.1 Investment in subsidiaries

A subsidiary is an entity over which the Group has control. The Group controls an entity when the Group is exposed to, or has rights to, variable returns from its involvement with the entity and can affect those returns through its power over the entity. Subsidiaries are fully consolidated from the date on which control is transferred to the Group.

The subsidiaries, joint ventures and associates of Vesuvius plc and the countries in which they are incorporated are set out below. With the exception of Vesuvius Holdings Limited, whose ordinary share capital was directly held by Vesuvius plc, the ordinary capital of the companies listed below was wholly owned by a Vesuvius plc subsidiary as at 31 December 2022.

Company legal name	Registered office address	Jurisdiction
Advent Process Engineering Inc.	333 Prince Charles Drive, Welland, Ontario, L3B 5P4, Canada	Canada (Ontario)
BMI Refractory Services Inc.	600 N 2nd Street, Suite 401, Harrisburg, PA 17101-1071, United States	US (Pennsylvania)
Brazil 1 Limited	165 Fleet Street, London, EC4A 2AE, England	England
CCPI Inc.	Suite 201, 910 Foulk Road, Wilmington, New Castle, DE 19803, United States	US (Delaware)
Cookson Dominicana, SRL	Km 7 1/2, Autopista San Isidro, Edificio Modelo A, Zona Franca San Isidro, Santo Domingo Oeste, Dominican Republic	Dominican Republic
East Moon Investment (HK Holding) Company Limited	Unit 01, 82/F, International Commerce Centre, 1 Austin Road West, Kowloon, Hong Kong	Hong Kong
Flo-Con Holding, Inc.	CT Corporation, 1209 Orange Street, The Corporation Trust Company, Wilmington, DE 19801, United States	US (Delaware)
Foseco (FS) Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
Foseco (Jersey) Limited	44 Esplanade, St Helier, JE4 9WG, Jersey	Jersey
Foseco (UK) Limited	165 Fleet Street, London, EC4A 2AE, England	England
Foseco Canada Limited	181 Bay Street, Suite 1800, Toronto, Ontario, M5J 2T9, Canada	Canada (Ontario)
Foseco Espanola S.A.	5, Barrio Elizalde, Izurza, Bizkaia, 48213, Spain	Spain
Foseco Foundry (China) Co Limited	Room 819, Shekou Zhaoshang Building, Nanshan District, Shenzhen, Guangdong, 518067, China	China
Foseco Fundición Holding (Espanola), S.L.	5, Barrio Elizalde, Izurza, Bizkaia, 48213, Spain	Spain
Foseco Holding (Europe) Limited	165 Fleet Street, London, EC4A 2AE, England	England
Foseco Holding (South Africa) (Pty) Limited	12 Bosworth Street, Alrode, Alberton, 1449, South Africa	South Africa
Foseco Holding BV	Rivium Boulevard 301, Capelle aan den Ijssel, Rotterdam 2909LK, Netherlands	Netherlands
Foseco Holding International Limited	165 Fleet Street, London, EC4A 2AE, England	England
Foseco Holding Limited	165 Fleet Street, London, EC4A 2AE, England	England

Company legal name	Registered office address	Jurisdiction
Foseco Industrial e Comercial Ltda	Km 15, Rodovia Raposo Tavares, Butanta Cep, São Paulo, 05577-100, Brazil	Brazil
Foseco International Holding (Thailand) Limited	170/69, 22nd Floor Ocean Tower 1, Ratchadapisek Road, Klongtoey, Bangkok, 10110, Thailand	Thailand
Foseco International Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
Foseco Japan Limited	9th Floor, Orix Kobe Sannomiya Building, 6-1-10, Goko dori, Chuo-ku, Kobe Hyogo, 651-0087, Japan	Japan
Foseco Korea Limited	74 Jeongju-ro, Bucheon-si, Gyeonggi-do, 14523, South Korea	South Korea
Foseco Limited	165 Fleet Street, London, EC4A 2AE, England	England
Foseco Metallurgical Inc.	CT Corporation, 1209 Orange Street, The Corporation Trust Company, Wilmington, DE 19801, United States	US (Delaware)
Foseco Nederland BV	Binnenhavenstraat 20, 7553 GJ Hengelo (OV), Netherlands	Netherlands
Foseco Overseas Limited	165 Fleet Street, London, EC4A 2AE, England	England
Foseco Philippines Inc.	c/o Accra Law Office, 22/F Accra Law Tower, Second Ave cor 30th St, Crescent Park West, Bonifacio Global City Taguig City, 1635 Philippines	Philippines
Foseco Portugal Produtos Para Fundição Lda	Rua Manuel Pinto de Azevedo, No 626 4100-320 Porto, Portugal	Portugal
Foseco S.A.S.	Le Newton C, 7 Mail Barthélémy Thimonnier, 77185 Lognes, France	France
Foseco Steel (UK) Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
Foseco Technology Limited	165 Fleet Street, London, EC4A 2AE, England	England
J.H. France Refractories Company	CT Corporation, 1209 Orange Street, The Corporation Trust Company, Wilmington, DE 19801, United States	US (Delaware)
John G. Stein & Company Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
Mainsail Insurance Company Limited	Victoria Place, 5th floor, 31 Victoria Street, Pembroke, Hamilton, HM 10, Bermuda	Bermuda
Mascinco Empreendimentos e Participações Ltda	Avenida Brasil, 49550 – parte, Distrito Industrial de Palmares – Campo, Grande – Cep: 23065-480, Rio de Janeiro, RJ, Brazil	Brazil

33. Investments in Subsidiaries, Joint Ventures and Associates continued

33.1 Investment in subsidiaries continued

Company legal name	Registered office address	Jurisdiction
Mastercodi Industrial Ltda	Rodovia Raposo Tavares, KM15, Butantã, 05577-100, Butantã, São Paulo, Brazil	Brazil
Mercajoya, S.A.	Capitán Haya, 56 – 1ºH, 28020 Madrid, Spain	Spain
Metal Way Equipamentos Metalurgicos Ltda	Estrada Santa Isabel, 7655 KM37, Bairro Do Una, Itaquaquecetuba, São Paulo – SP, CEP: 08580 000, Brazil	Brazil
New Foseco (UK) Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
Process Metrix, LLC	6622 Owens Drive, Pleasanton, CA 94588, United States	US (California)
PT Foseco Indonesia	Jl Rawa Gelam 2/5, Kawasan Industri, Pulogadung, Jakarta, 13930, Indonesia	Indonesia
PT Foseco Trading Indonesia	Jl Rawa Gelam 2/5, Kawasan Industri, Pulogadung, Jakarta, 13930, Indonesia	Indonesia
Realisations 789, LLC	CT Corporation, 1209 Orange Street, The Corporation Trust Company, Wilmington, DE 19801, United States	US (Delaware)
S G Blair & Company Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
SIDERMES Inc. Vesuvius Sensors and Probes	175 montée, Calixa-Lavallée Verchêres, Québec J0L2R0, Canada	Canada
SIDERMES S.A.	Urquiza 919 Piso 2 Rosario, Santa Fe, CP 2000, Argentina	Argentina
SIR Feuerfestprodukte GmbH	Siegener Strasse 152, Kreuztal, D-57223, Germany	Germany
SOLED S.A.S. Vesuvius Sensors and Probes France	Centre d'Activités Economiques Zone Industrielle de Franchepré 54240 Joeuf, France	France
Veservice Ltda	Av Brasil, 49550, Distrito Industrial de Palmares, Campo Grande, Rio de Janeiro, 23065-480, Brazil	Brazil
Vesuvius (Thailand) Co., Limited	170/69, 22nd Floor Ocean Tower 1, Ratchadapisek Road, Klongtoey, Bangkok, 10110, Thailand	Thailand
Vesuvius (V.E.A.R.) S.A.	Street Urquiza, 919,Floor 2, Rosario, Provincia de Santa Fé, Argentina	Argentina
Vesuvius Advanced Ceramics (Anshan) Co., Limited	Xiaotaizi Village, Ningyuan Town, Qianshan District, Anshan, Liaoning Province, 114011, China	China
Vesuvius Advanced Ceramics (China) Co., Limited	221 Xing Ming Street, China-Singapore Suzhou Ind Park, Suzhou, Jiangsu Province, 215021, China	China
Vesuvius America, Inc.	1209 Orange Street, Wilmington, DE 19801, United States	US (Delaware)
Vesuvius Australia (Holding) Pty Limited	40-46 Gloucester Boulevarde, Port Kembla, NSW, 2505, Australia	Australia
Vesuvius Australia Pty Limited	40-46 Gloucester Boulevarde, Port Kembla, NSW, 2505, Australia	Australia
Vesuvius Belgium N.V.	Zandvoordestraat 366, Oostende, B-8400, Belgium	Belgium

Company legal name	Registered office address	Jurisdiction
Vesuvius Canada Inc	181 Bay Street, Suite 1800, Toronto, Ontario, M5J 2T9, Canada	Canada
Vesuvius Ceramics Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius China Holdings Co. Limited	Unit 01, 82/F International Commerce Centre, 1 Austin Road West, Kowloon, Hong Kong	Hong Kong
Vesuvius China Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Colombia S.A.S.	Calle 26 No. 102-20 Floor 3, Bogota, Colombia	Colombia
Vesuvius Corporation S.A.	Via Nassa 17, Lugano, CH 6900, Switzerland	Switzerland
Vesuvius CSD Sp z.o.o.	ul. Jasnogórska 11, Kraków, 31-358, Poland	Poland
Vesuvius Emirates FZE	Warehouse No: 1J-09/3, P O Box 49261, Hamriyah Free Zone, Sharjah, United Arab Emirates	United Arab Emirates
Vesuvius Europe Beteiligungs GmbH	Geschaftsanschrift, Schieferbank 2-16, 45472 Mülheim an der Ruhr, Germany	Germany
Vesuvius Europe GmbH & Co KG	Geschaftsanschrift, Schieferbank 2-16, 45472 Mülheim an der Ruhr, Germany	Germany
Vesuvius Europe S.A.	17 Rue de Douvrain, Ghlin, 7011, Belgium	Belgium
Vesuvius Europe S.A.S.	3, Avenue De L'europe, Parc Les Pivolles, 69150 Décines-Charpieu, France	France
Vesuvius Financial 1 Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Finland OY	Pajamäentie 8D7, 00360 Helsinki, Finland	Finland
Vesuvius Foundry Products (Suzhou) Co. Limited	12 Wei Wen Road, China-Singapore Suzhou Ind Park, Suzhou, Jiangsu Province, 215122, China	China
Vesuvius Foundry Technologies (Jiangsu) Co. Limited	2 Changchun Road, Economic Development Area, Changshu, Jiangsu, 215537, China	China
Vesuvius France S.A.	Rue Paul Deudon 68, Boite Postale 19, Feignies 59750, France	France
Vesuvius GmbH	Gelsenkirchener Strasse 10, Borken, D-46325, Germany	Germany
Vesuvius Group Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Group S.A.	17 Rue de Douvrain, Ghlin, 7011, Belgium	Belgium
Vesuvius Holding Deutschland GmbH	Gelsenkirchener Strasse 10, Borken, D-46325, Germany	Germany
Vesuvius Holding France S.A.S.	68 Rue Paul Deudon, Boite Postale 19, Feignies 59750, France	France
Vesuvius Holding Italia – Società a Responsabilità Limitata	Via Mantova 10, 20835 Muggio MB, Italy	Italy

Notes to the Group Financial Statements continued

33. Investments in Subsidiaries, Joint Ventures and Associates continued

33.1 Investment in subsidiaries continued

Company legal name	Registered office address	Jurisdiction
Vesuvius Holdings Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Ibérica Refractarios S.A.	Capitán Haya, 56 – 1ºH, 28020 Madrid, Spain	Spain
Vesuvius International Corporation	CT Corporation, 1209 Orange Street, The Corporation Trust Company, Wilmington, DE 19801, United States	US (Delaware)
Vesuvius Investments Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Istanbul Refrakter Sanayi ve Ticaret AS	Gebze OSB2 Mh. 1700., Sok No:1704/1, Cayirova, Kocaeli, 41420, Turkey	Turkey
Vesuvius Italia S.p.A.	Via Mantova 10, 20835 Muggio MB, Italy	Italy
Vesuvius Japan Inc.	9th Floor, Orix Kobe Sannomiya Building 6-1-10, Goko dori, Chou-ku,Kobe Hyogo, 651-0087, Japan	Japan
Vesuvius K.S.R. Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire S43 4XA, England	England
Vesuvius Life Plan Trustee Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius LLC	502, 5th floor, 1 Myasicsheva str., Zhukovsky, Moscow region, 140180, Russian Federation	Russia
Vesuvius Malaysia Sdn Bhd	Unit 30-01, Level 30 Tower A, Vertical Business Suite Avenue 3, Bangsar South, No 8 Jalan Kirinchi, Kuala Lumpur Wilayah Persekutuan, 59200, Malaysia	Malaysia
Vesuvius Management Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Management Services Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Mexico S.A. de C.V.	Av. Ruiz Cortinez, Num. 140, Colonia Jardines de San Rafael, Guadalupe, Nuevo León, CP 67119, Mexico	Mexico
Vesuvius Mid-East Limited	56, rd 15, Apt 103, Maadi, Cairo, Egypt	Egypt
Vesuvius Moravia, s.r.o.	Konska c.p. 740, Trinec, 739 61, Czech Republic	Czech Republic
Vesuvius Mulheim Beteiligungs GmbH	Geschaftsanschrift, Schieferbank 2-16, 45472 Mülheim an der Ruhr, Germany	Germany
Vesuvius Mulheim GmbH & Co KG	Geschaftsanschrift, Schieferbank 2-16, 45472 Mülheim an der Ruhr, Germany	Germany
Vesuvius NC, LLC	Corporation Trust Center, 1209 Orange Street, Wilmington, New Castle County, DE 19801, United States	US (Delaware)
Vesuvius New Zealand Limited	Bell Gully, Level 22, Vero Centre, 48 Shortland Street, Auckland, 1010 New Zealand	New Zealand
Vesuvius Overseas Investments Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Overseas Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Penn Corporation	CT Corporation, 1209 Orange Street, Wilmington, DE 19801, United States	US (Delaware)
Vesuvius Pension Plans Trustees Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Peru SAC	Jiron Saenz Pena 185, Magdalena del Mar, Lima, Peru	Peru
Vesuvius Poland Sp z.o.o.	Ul Tyniecka 12, Skawina, 32-050, Poland	Poland
Vesuvius Ras Al Khaimah FZ-LLC	Street No. F14, RAK Investment Authority Free Zone, Al Hamra, Ras Al Khaimah, PO Box 86408, United Arab Emirates	United Arab Emirates
Vesuvius Refractarios de Chile S.A.	Street San Martin 870, Room 308, Tower B, Concepcion, Chile	Chile
Vesuvius Refractories S.r.l.	Galati, Marea Unire avenue 107, Galati county, 800329, Romania	Romania
Vesuvius Refractory India Private Limited	Room No. 9, 3rd Floor, 7 Ganesh Chandra Avenue, Kolkata, WB 700013, India	India
Vesuvius Refratários Ltda	AV Brasil 49550, Distrito Industrial de Palmares, Campo Grande, Rio de Janeiro, 23065-480, Brazil	Brazil
Vesuvius Scandinavia AB	4, Forradsgatan, Amal, S-662 34, Sweden	Sweden
Vesuvius Sensors & Probes Europe S.p.A.	10 Via Mantova, Muggio, Monza e Brianza, 20835, Italy	Italy
Vesuvius-SERT S.A.S.	3, Avenue de l'Europe, Parc, Les Pivolles, Decines-Charpieu 69150, France	France
Vesuvius Solar Crucible (Suzhou) Co., Ltd	1/F, building 3, No. 12, Weiwen Road China-Singapore Suzhou Ind Park, Suzhou, Jiangsu Province, 215122, China	China
Vesuvius South Africa (Pty) Limited	Pebble Lane, Private Bag X2, Olifantsfontein, Gauteng Province, 1665, South Africa	South Africa
Vesuvius Sp z.o.o.	ul. Jasnogórska 11, Kraków, 31-358, Poland	Poland
Vesuvius SSC Sp z.o.o.	ul. Jasnogórska 11, Kraków, 31-358, Poland	Poland
Vesuvius UK Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
Vesuvius Ukraine LLC	27, Udarnykiv Street, City of Dnipropetrovsk, 49000, Ukraine	Ukraine
Vesuvius USA Corporation	CT Corporation, 208 South LaSalle Street, Chicago, Cook County, IL 60604, United States	US (Illinois)
Vesuvius VA Limited	165 Fleet Street, London, EC4A 2AE, England	England
Vesuvius Vietnam Limited	7th Floor, Peakview Tower Building, No.36 Hoang Cau Street, O Cho Dua Ward, Don Da District, Hanoi City, Vietnam	Vietnam
Vesuvius Zyarock Ceramics (Suzhou) Co., Limited	1/F, building 3, No. 12, Weiwen Road China-Singapore Suzhou Ind Park, Suzhou, Jiangsu Province, 215122, China	China

33. Investments in Subsidiaries, Joint Ventures and Associates continued

33.1 Investment in subsidiaries continued

Company legal name	Registered office address	Jurisdiction
Vesuvius-Premier Refractories (Holdings) Limited	1 Midland Way, Central Park, Barlborough Links, Derbyshire, S43 4XA, England	England
Vesv Distribution (Private) Limited	R Tech Park, 13th Floor Western Express Highway, Goregaon (East) Mumbai, Mumbai City, MH 400063, India	India
Wilkes-Lucas Limited	165 Fleet Street, London, EC4A 2AE, England	England
Yingkou Bayuquan Refractories Co., Limited	Cui Tun Village, Hai Dong Office, Bayuquan District, Liaoning Province, YingKou, 115007, China	China
Yingkou YingWei Magnesium Co., Ltd	50 Wanghai New District, Bayuquan District, Yinkou City, Liaoning Province, 115007, China	China

The following subsidiary companies have branches registered in the named countries: Foseco (Jersey) Limited in England, Foseco Holding BV in England, Vesuvius LLC in Kazakhstan, Vesuvius UK Limited in Taiwan and Republic of Korea, and Vesuvius Refratarios Ltda. in Brazil. Vesuvius International Corporation's branch in Belgium was dissolved on 17 November 2022.

33.2 Investment in joint ventures and associates

A joint venture is a type of joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the joint venture. Joint control is the contractually agreed sharing of control of the arrangement, which exists only when decisions about the relevant activities require unanimous consent of the parties sharing control. An associate is an entity over which the Group has significant influence. Significant influence is the power to participate in the financial and operating policy decisions of an entity, but is not control or joint control over those policies.

The Group's investments in its associates and joint ventures are accounted for using the equity method from the date significant influence/joint control is deemed to arise until the date on which significant influence/joint control ceases to exist or when the interest becomes classified as an asset held for sale. The Group Income Statement reflects the Group's share of profit after tax of the related associates and joint ventures. Investments in associates and joint ventures are carried in the Group Balance Sheet at cost adjusted in respect of post-acquisition changes in the Group's share of net assets, less any impairment in value.

	2022 £m	2021 £m
As at 1 January	**12.8**	12.1
Share of post-tax profit of joint ventures and associates	**1.2**	1.3
Dividends received from joint ventures and associates	**(1.3)**	(1.0)
Foreign exchange	**0.3**	0.4
As at 31 December	**13.0**	12.8

The investment in joint ventures and associates includes £12.5m (2021: £12.3m) in respect of joint ventures and £0.5m (2021: £0.5m) in respect of associates. Dividends received from joint ventures consists of £0.2m (2021: £0.2m) from Wuhan Wugang-Vesuvius Advanced CCR Co., Limited and £1.1m (2021: £0.8m) from Wuhan Wugang-Vesuvius Advanced Ceramics Co., Limited.

Joint ventures

Set out below is the summarised financial information in respect of joint ventures.

	2022 £m	2021 £m
Revenue	**50.9**	48.8
Trading profit	**3.2**	3.6
Net finance costs	**–**	–
Profit before tax	**3.2**	3.6
Income tax expense	**(0.8)**	(0.9)
Profit after tax	**2.4**	2.7
Non-current assets	**7.3**	7.6
Current assets	**22.6**	25.0
Non-current liabilities	**–**	–
Current liabilities	**(6.1)**	(9.2)
Net assets	**23.8**	23.4

Notes to the Group Financial Statements continued

33. Investments in Subsidiaries, Joint Ventures and Associates continued

33.2 Investment in joint ventures and associates continued

Set out below is the summarised financial information for Wuhan Wugang-Vesuvius Advanced Ceramics Co., Limited, a joint venture that has transactions and balances which are material to the Group.

	2022 £m	2021 £m
Revenue	44.5	42.7
Depreciation	1.0	(0.9)
Trading profit	2.8	3.0
Net finance costs	–	–
Profit before tax	2.8	3.0
Income tax expense	(0.7)	(0.8)
Profit after tax	2.1	2.2
Non-current assets	7.0	7.3
Current assets[1]	14.5	16.6
Non-current liabilities	–	–
Current liabilities	(5.0)	(7.8)
Net assets	16.5	16.1

1. Included in current assets are cash and cash equivalents of £3.6m (2021: £3.2m).

The purpose of the Chinese joint venture companies is to research, develop, manufacture and sell refractory products. The role of Vesuvius is to provide technical personnel, training and access to the Group's international sales network.

Name of entity	Registered address	Jurisdiction	2022 % ownership	2021 % ownership
Wuhan Wugang-Vesuvius Advanced CCR Co., Limited	Gongnong Village Qingshan District, Wuhan, Hubei Province, 430082, China	China	50	50
Wuhan Wugang-Vesuvius Advanced Ceramics Co., Limited	Gongnong Village Qingshan District, Wuhan, Hubei Province, 430082, China	China	50	50

Associates

Name of entity	Registered address	Jurisdiction	2022 % ownership	2021 % ownership
Sapotech Oy	Paavo Havaksen tie 5 D, 90570 Oulu, Finland	Finland	14.9	14.9
Newshelf 480 Proprietary Limited	144 Oxford Road, Rosebank, Melrose, Johannesburg, 2196, South Africa	South Africa	45	45

The Group is considered to hold significant influence over Sapotech Oy despite holding less than 20% of its shares because the agreement under which the Group invested in Sapotech Oy provides that the Group holds one of the four seats on the company's board. This allows the Group to participate in policy-making processes and have additional controls over Sapotech Oy's major decision-making that do not amount to control but give significant influence.

33.3 Non-controlling interests

Non-controlling interests represent the portion of the equity of a subsidiary not attributable either directly or indirectly to the Parent Company and are presented separately in the Group Income Statement and within equity in the Group Balance Sheet, distinguished from Parent Company shareholders' equity.

The total profit attributable to non-controlling interests for the year ended 31 December 2022 is £7.4m (2021: £5.8m) of which £5.4m relates to Vesuvius India Limited (2021: £3.1m). The profit attributable to non-controlling interests in respect of the Group's other subsidiaries is not considered to be material.

Name of entity	Registered address	Jurisdiction	2022 % ownership	2021 % ownership
Vesuvius India Limited	P-104 Taratala Road, Kolkata, 700 088, India	India	55.57	55.57
Foseco India Limited	922/923, Gat, Sanaswadi, Taluka, Shirur, Pune, 412208, India	India	74.98	74.98
Foseco Golden Gate Company Limited	6 Kung Yeh 2nd Road, Ping Tung Dist, Ping Tung, 90049, Taiwan	Taiwan	51	51
Foseco (Thailand) Limited	170/69, 22nd Floor Ocean Tower 1, Ratchadapisek Road, Klongtoey, Bangkok, 10110, Thailand	Thailand	74	74
Vesuvius Ceska Republika, a.s.	Prumyslová 726, Konská, Trinec, 739 61, Czech Republic	Czech Republic	60	60

33. Investments in Subsidiaries, Joint Ventures and Associates continued

33.3 Non-controlling interests continued

As with Vesuvius plc, all of the above companies have a 31 December year-end. The summarised financial information for Vesuvius India Limited is presented below:

	2022 £m	2021 £m
Summarised balance sheet		
Current assets	105.2	99.4
Current liabilities	(28.8)	(24.9)
Current net assets	76.4	74.5
Non-current assets	26.1	17.0
Non-current liabilities	(2.6)	(2.4)
Non-current net assets	23.5	14.6
Net assets	99.9	89.1
Accumulated NCI	(44.7)	(39.9)
Summarised statement of comprehensive income		
Revenue	137.7	102.5
Profit after tax	12.1	6.9
Profit allocated to NCI	5.4	3.1
Dividends paid to NCI	(0.7)	(0.6)
Summarised cash flows		
Cash flows from operating activities	13.8	4.0
Cash flows from investing activities	(11.6)	(3.1)
Cash flows from financing activities	(0.7)	(1.4)
Net increase/decrease in cash and cash equivalents	1.5	(0.5)

34. Related Parties

All transactions with related parties are conducted on an arm's-length basis and in accordance with normal business terms. Transactions between related parties that are Group subsidiaries are eliminated on consolidation.

The related parties identified by the Directors include joint ventures, associates and key management personnel. To enable users of our financial statements to form a view on the effects of related party relationships on the Group, we disclose the related party relationship irrespective of whether there have been transactions between the related parties.

34.1 Transactions with joint ventures and associates

All transactions with joint ventures and associates are in the normal course of business. Transactions between the Group and its joint ventures and associates are disclosed below:

	2022 £m	2021 £m
Sales to joint ventures	5.3	4.8
Purchases from joint ventures	32.3	31.5
Purchases from associates	–	–
Dividends received	1.3	1.0
Trade payables owed to joint ventures	6.7	10.3
Trade receivables due from joint ventures	0.7	1.3

Trade payables owed to joint ventures are settled net of trade receivables due from joint ventures 60 days after the delivery of goods or services. There are no loans to and from joint ventures.

Notes to the Group Financial Statements continued

34. Related Parties continued

34.2 Transactions with key management personnel

There have been no transactions with key management personnel of the Group other than the Directors' remuneration.

Directors' remuneration is disclosed in Note 8 to the Group Financial Statements and in the Directors' Remuneration Report.

34.3 Transactions with other related parties

There are no controlling shareholders of the Group as defined by IFRS. There have been no material transactions with the shareholders of the Group.

Pension contributions to Group schemes are disclosed in Note 26 to the Group Financial Statements.

Other than the parties disclosed above, the Group has no other material related parties.

35. Events after the Balance Sheet date

Cyber incident

We informed the market on 6 February 2023 that we had suffered a cyber security incident. In order to contain the threat, we voluntarily shutdown our systems on a precautionary basis. During this period our sites instigated manual procedures and work arounds to maintain production, shipping and invoicing which minimised the disruption. The initial period of disruption has been short, and all significant systems are now fully operational. There has been no impact on the financial results reported for the year ended 31 December 2022 and we expect that the impact on the 2023 financial results will not be material.

Company Balance Sheet

As at 31 December 2022

	Notes	2022 total £m	2021 total £m
Fixed assets			
Investments	7	1,778.0	1,778.0
Total fixed assets		1,778.0	1,778.0
Current assets			
Debtors – amounts falling due within one year		4.6	4.7
Cash at bank and in hand		–	–
Total current assets		4.6	4.7
Creditors – amounts falling due within one year			
Bank loans and overdraft		(0.2)	–
Other creditors including taxation and social security	8	(1,012.5)	(979.8)
Net current liabilities		(1,008.1)	(975.1)
Total assets less current liabilities		769.9	802.9
Net assets		769.9	802.9
Equity capital and reserves			
Called up share capital	9	27.8	27.8
Retained earnings	9	742.1	775.1
Total shareholders' funds		769.9	802.9

Company number 8217766

Under Section 408 of the Companies Act 2006, the Company is exempt from the requirement to present its own Income Statement. During 2022, the Company recognised a profit of £26.9m (2021: £32.7m profit).

The Financial Statements on pages 219 to 226 were approved and authorised for issue by the Directors on 2 March 2023 and signed on their behalf by:

Patrick André
Chief Executive

Company Statement of Changes in Equity

For the year ended 31 December 2022

	Notes	Called up share capital £m	Retained earnings £m	Total shareholders' funds £m
As at 1 January 2021		27.8	795.9	823.7
Comprehensive income recognised for the year		–	32.7	32.7
Recognition of share-based payments	10	–	3.1	3.1
Purchase of ESOP shares		–	(1.1)	(1.1)
Dividend paid	6	–	(55.5)	(55.5)
As at 31 December 2021		**27.8**	**775.1**	**802.9**
As at 1 January 2022		27.8	775.1	802.9
Comprehensive income recognised for the year		–	26.9	26.9
Recognition of share-based payments	10	–	5.1	5.1
Purchase of ESOP shares		–	(6.9)	(6.9)
Dividend paid	6	–	(58.1)	(58.1)
As at 31 December 2022		**27.8**	**742.1**	**769.9**

Notes to the Company Financial Statements

1. General Information

Vesuvius plc ('Vesuvius' or 'the Company') is a public company limited by shares. It is incorporated and domiciled in England and Wales, United Kingdom, and listed on the London Stock Exchange. The nature of the company is a holding company. The address of its registered office is 165 Fleet Street, London EC4A 2AE.

2. Basis of Preparation

2.1 Basis of accounting

The financial statements of the Company have been prepared in accordance with Financial Reporting Standard 101 Reduced Disclosure Framework (FRS 101) and the Companies Act 2006 as applicable to companies using FRS 101. The financial statements have been prepared under the historical cost convention.

The results of the Company are included in the preceding Group Financial Statements.

In these financial statements, the Company has applied the exemptions available under FRS 101 in respect of the following disclosures:

- A cash flow statement and related notes (IAS 1 para 10(d) and IAS 7)
- Disclosures in respect of capital management and financial instruments (IAS 1 paras 134–136 and IFRS 7)
- Disclosures in respect of related party transactions with wholly owned members of the Vesuvius plc Group (IAS 24)
- Disclosures in respect of the compensation of key management personnel (IAS 24 para 17)
- Disclosures in respect of fair value measurements (IFRS 13 paras 91–99)
- The effects of new but not yet effective IFRSs (IAS 8 paras 30–31)

Under Section 408 of the Companies Act 2006, the Company is exempt from the requirement to present its own profit and loss account.

The accounting policies set out below have, unless otherwise stated, been applied consistently to all periods presented in these financial statements.

2.2 Going concern

The Directors have a reasonable expectation that the Group and the Company have adequate resources to continue in operational existence for a period of at least 12 months from the date of approval of these financial statements (disclosed in Note 2.3 to the Group Financial Statements) and that there is no material uncertainty in respect of going concern. The net current liabilities are due to amounts owed to subsidiary undertakings, therefore the Directors do not believe that they will affect the Company's ability to continue in operational existence. Accordingly, they continue to adopt a going concern basis in preparing the financial statements of the Group and the Company.

2.3 Accounting policy

Taxation

Both current and deferred tax are calculated using tax rates and laws that have been enacted, or substantively enacted, by the balance sheet date.

Current tax payable is based on the taxable result for the year. Deferred taxation is recognised, without discounting, in respect of all temporary differences that have originated, but not reversed, at the balance sheet date, with the exception that deferred taxation assets are only recognised if it is considered more likely than not that there will be suitable future profits from which the reversal of the underlying temporary differences can be deducted. Provision is made for the tax that would arise on remittance of the retained earnings of overseas subsidiaries only to the extent that, at the balance sheet date, dividends have been accrued as receivable. All other accounting policies are set out within the respective notes.

Notes to the Company Financial Statements continued

3. Critical Accounting Judgements and Estimates

Impairment of investment in subsidiaries and other companies (estimate and judgement)

For the below estimate, the Group does not have any key assumptions concerning the future, or other key sources of estimation uncertainty in the reporting period, that are reasonably expected to have a significant risk of causing a material adjustment to the carrying amounts of assets/liabilities within the next financial year. Nonetheless, this estimate has the potential to materially vary over time and is therefore highlighted.

The Company assesses its investments in subsidiaries and other companies for impairment shortly before the Company's year-end or whenever events or changes in circumstances indicate that the recoverable amount of the investment could be less than the carrying amount of the investment. If this is the case, the investment is considered to be impaired and is written down to its recoverable amount. Judgement is required in the determination of the recoverable amount as the Company evaluates various factors related to the operational and financial position of the relevant investee business, appropriate discounting and long-term growth rates. The annual investment impairment test is described in Note 7.3 below.

4. Employee Benefits Expense

	2022 £m	2021 £m
Wages and salaries	3.3	2.8
Social security costs	0.5	0.4
Share-based payments	0.7	0.1
Total employee benefits expense	4.5	3.3

The total average number of employees for 2022 was 3 (2021: 3). As at 31 December 2022, the Company had 3 (2021: 3) employees.

Details of the Directors' remuneration are disclosed in the Directors' Remuneration Report on pages 116 to 143.

5. Audit and Non-Audit Fees

Amounts payable to PricewaterhouseCoopers LLP in relation to audit and non-audit fees are disclosed within Note 6 to the Group Financial Statements.

6. Dividend Paid

	2022 £m	2021 £m
Amounts recognised as dividends and paid to equity shareholders during the year		
Final dividend for the year ended 31 December 2020 of 14.3p per ordinary share	–	38.7
Interim dividend for the year ended 31 December 2021 of 6.2p per ordinary share	–	16.8
Final dividend for the year ended 31 December 2021 of 15.0p per ordinary share	40.5	–
Interim dividend for the year ended 31 December 2022 of 6.5p per ordinary share	17.6	–
	58.1	55.5

A proposed final dividend for the year ended 31 December 2022 of £42.3m (2021: £40.5m), equivalent to 15.75 pence (2021: 15.0 pence) per ordinary share, is subject to approval by shareholders at the Company's Annual General Meeting on 18 May 2023 and has not been included as a liability in these financial statements. If approved by shareholders, the dividend will be paid on 31 May 2023 to holders of ordinary shares on the register on 21 April 2023.

7. Investments

7.1 Accounting policy

Shares in subsidiaries, associates and joint ventures are stated at cost less any impairment in value. Impairment is assessed in accordance with Note 17.1 to the Group Financial Statements.

7.2 Analysis of investments

	Shares in subsidiaries £m
As at 1 January 2022 and 31 December 2022	1,778.0

The subsidiaries, joint ventures and associates of Vesuvius plc, their country of incorporation and percentage ownership are set out in Note 33 to the Group Financial Statements. With the exception of Vesuvius Holdings Limited, whose ordinary share capital was directly held by Vesuvius plc, the ordinary share capital of the other companies was owned by a Vesuvius plc subsidiary as at 31 December 2022.

7.3 Impairment of investment in subsidiaries, associates and joint ventures

The Group carried out its investment impairment test as at 31 October 2022. The recoverable amount of the investment exceeded its carrying value, therefore no impairment charges have been recognised. No further impairment indicators were identified up to 31 December 2022.

The cash flow predictions are based on financial budgets and strategic plans approved by the Board. These assume a level of revenue and profits which are based on both past performance and expectations for future market development and take into account the cyclicality of the business in which the Group operates. In assessing the cash flows of the Parent's investment in its subsidiaries, the amounts payable by the Parent to subsidiaries are also taken into account. A sensitivity analysis was carried out using reasonably possible changes to the key assumptions set out in Note 17.2 to the Group Financial Statements. No scenarios of impairment were identified.

8. Other Creditors including Taxation and Social Security

	2022 £m	2021 £m
Amounts owed to subsidiary undertakings	1,009.8	977.4
Accruals and other creditors	2.7	2.4
Total amounts falling due within one year	1,012.5	979.8

Interest on the loan from another UK company within the Vesuvius Group is charged at Bank of England base rate +2% and the balance is repayable on demand.

9. Called Up Share Capital and Retained Earnings

9.1 Accounting policy

Equity instruments issued by the Company are recorded at the proceeds received, net of direct issue costs.

9.2 Analysis of called up share capital

The allotted, issued and fully paid ordinary share capital of the Company as at 1 January 2022 and 31 December 2022 was 278,485,071 shares of £0.10 each. 7,271,174 (2021: 7,271,174) shares of £0.10 each were held in Treasury and therefore carry no right to receive dividends or other distributions and have no voting rights. The total number of shares with rights including in relation to voting at General Meetings of the Company, distribution of dividends and repayment of capital voting and dividend rights is 271,213,897 and all shareholders enjoy the same rights in relation to these shares. Included in this number are 2,454,110 (2021: 884,856) shares held by the Vesuvius Group employee share ownership plan trust (ESOP) and the ESOP elects to waive the right to receive dividends on these shares.

9.3 Distributable reserves

The Company had distributable reserves in excess of £732m as at 31 December 2022 (2021: in excess of £765m), subject to filing these financial statements with Companies House. When making a distribution to shareholders, the Directors determine profits available for distribution by reference to guidance on realised and distributable profits under the Companies Act 2006 issued by the Institute of Chartered Accountants in England and Wales and the Institute of Chartered Accountants of Scotland in April 2017. The profits of the Company have been received in the form of dividends from subsidiaries and through court-approved capital reduction. The availability of distributable reserves in the Company is dependent on those dividends meeting the definition of qualifying consideration within the guidance and on available cash resources of the Group and other accessible sources of funds. The distributable reserves are subject to any future restrictions or limitations at the time such distribution is made.

Notes to the Company Financial Statements continued

10. Recognition of Share-based Payments

10.1 Accounting policy

The Company operates an equity-settled share-based payment arrangement for its employees. Equity-settled share-based payments are measured at fair value at the date of grant. For grants with market-based conditions attached to them, such as total shareholder return, fair value is measured using a form of stochastic option pricing model. For grants with non-market-based conditions, such as growth in return on invested capital (ROIC), environmental, social and governance criteria (ESG) and headline earnings per share (EPS), fair value is measured using the Black-Scholes option pricing model. The fair value is expensed on a straight-line basis over the vesting period with a corresponding increase in equity. The cumulative expense recognised is adjusted for the best estimate of the shares that will eventually vest.

The Company recharges its subsidiaries for the IFRS 2 expense relating to their employees on an annual basis.

10.2 Profit and loss account recognition

The Company operates a number of different share-based payment schemes, the main features of which are detailed in the Directors' Remuneration Report and Note 27 to the Group Financial Statements. A total of £0.7m was charged to the profit and loss account in the year with regard to share-based payments (2021: £0.1m).

10.3 Details of outstanding options

	Number of outstanding awards								
	As at 1 Jan 2022	Granted	Exercised	Forfeited/ lapsed	Expired	As at 31 Dec 2022	Awards exercisable as at 31 Dec 2022	Weighted average outstanding contractual life of awards years	Range of exercise prices pence
LTIP	1,200,584	551,242	nil	(327,560)	nil	1,424,266	–	8.3	n/a
Weighted average exercise price	nil	nil	nil	nil	nil	nil	–		n/a
Other plans	76,586	121,442	(48,674)	nil	nil	149,354	–	1.9	n/a
Weighted average exercise price	nil	nil	nil	nil	nil	nil	–		n/a

For the awards exercised during 2022, the market value at the date of exercise was 395.5 pence per share.

	Number of outstanding awards								
	As at 1 Jan 2021	Granted	Exercised	Forfeited/ lapsed	Expired	As at 31 Dec 2021	Awards exercisable as at 31 Dec 2021	Weighted average outstanding contractual life of awards years	Range of exercise prices pence
LTIP	1,110,699	391,786	(5,955)	(295,946)	nil	1,200,584	–	8.3	n/a
Weighted average exercise price	nil	nil	nil	nil	nil	nil	–		n/a
Other plans	89,309	15,523	(28,246)	nil	nil	76,586	–	0.8	n/a
Weighted average exercise price	nil	nil	nil	nil	nil	nil	–		n/a

For options exercised during 2021, the market value at the date of exercise was 531 pence per share.

Details of market performance conditions are included in the Directors' Remuneration Report.

As at 31 December 2022, the total options exercisable by all Group employees over the £0.10 ordinary shares and capable of being satisfied through new allotments of shares or through shares held by the Company's ESOP were as follows:

2022	Years of award/grant	Option prices	Latest year of exercise/ vesting	Number of options/ allocations outstanding
Long-Term Incentive Plan	2020–2022	nil	2032	1,424,266
Deferred Share Bonus Plan	2020–2022	nil	2025	149,354

10. Recognition of Share-based Payments continued

10.3 Details of outstanding options continued

Fair value of options granted under the LTIP during the year:

	2022		2021	
	ROIC/ESG element	TSR element	EPS element	TSR element
Fair value of options granted	385p	217p	538p	340p
Share price on date of grant	385p	385p	538p	538p
Expected volatility	n/a	39.3%	n/a	39.2%
Risk-free interest rate	n/a	1.3%	n/a	0.2%
Exercise price (per share)	nil	nil	nil	nil
Expected term (years)	3	3	3	3
Expected dividend yield	nil	nil	nil	nil

For the LTIP awards issued in 2020 and 2021, vesting of 50% of shares awarded is based on the Group's three-year total shareholder return (TSR) performance relative to that of the constituent companies of the FTSE 250 (excluding investment trusts) and vesting of the remaining 50% of shares awarded is based on headline EPS growth.

For the LTIP awards issued in 2022, vesting of 40% of shares awarded is based on the Group's three-year total shareholder return (TSR) performance relative to that of the constituent companies of the FTSE 250 (excluding investment trusts) and vesting of the remaining 60% of shares awarded is based on ROIC and ESG targets.

Expected volatility was determined by calculating the historical volatility of the Group's share price over the 2.8 years (2021: 2.8 years) prior to the grant date for the March 2022 grant. The risk-free rate of return was assumed to be the yield to maturity on a UK fixed gilt with the term to maturity equal to the expected life of the option. At the discretion of the Remuneration Committee, award holders receive the value of dividends that would have been paid on their vested shares in the period between grant and vesting. Accordingly, there is no discount to the valuation for dividends foregone during the vesting period.

11. Contingent Liabilities

Where the Company enters into financial guarantee contracts to guarantee the indebtedness of other companies within its Group, the Company treats the guarantee contract as a contingent liability until such time as it becomes probable that the Company will be required to make a payment under the guarantee. Guarantees provided by the Company as at 31 December 2022 in respect of the liabilities of its subsidiary companies amounted to £386.5m (2021: £418.8m), which includes guarantees of $146.0m, €198.0m and £28.0m (2021: $146.0m, €198.0m and £28.0m) in respect of US Private Placement Loan Notes; £62.5m (2021: £76.9m) in respect of drawings under the syndicated bank facility; £nil (2021: £32.9m) in respect of a guarantee provided to the Company's UK subsidiary which acts as Trustee for the Group's UK pension plan; £0.1m (2021: £2.6m) in respect of guarantees issued to certain banks covering their exposure on derivative contracts governed by ISDA agreements; and £nil (2021: 4.1m) in respect of overdraft facilities utilised by certain of the Company's subsidiary companies.

Vesuvius has extensive international operations and is subject to various legal and regulatory regimes, including those covering taxation and environmental matters. Several of the Company's subsidiaries are parties to legal proceedings, certain of which are insured claims arising in the ordinary course of the operations of the company involved, and are aware of a number of issues which are, or may be, the subject of dispute with tax authorities. Whilst the outcome of litigation and other disputes can never be predicted with certainty, having regard to legal advice received and the insurance arrangements of the Company and its subsidiaries, the Directors believe that none of these matters will, either individually or in the aggregate, have a materially adverse effect on the Company's financial condition or results of operations.

Notes to the Company Financial Statements continued

12. Related Parties

All transactions with related parties are conducted on an arm's-length basis and in accordance with normal business terms. Transactions between related parties that are wholly owned Company subsidiaries are not disclosed in this Note.

The related parties identified by the Directors include joint ventures, associates and key management personnel. To enable users of our financial statements to form a view on the effects of related party relationships on the Company, we disclose the related party relationship, irrespective of whether there have been transactions between the related parties.

Transactions with joint ventures and associates

All transactions with joint ventures and associates are in the normal course of business. Further details of joint ventures and associates are included in Note 33 to the Group Financial Statements.

Transactions with key management personnel

There have been no transactions with key management personnel of the Company other than the Directors' remuneration.

Directors' remuneration is disclosed in the Annual Report on Directors' Remuneration.

Transactions with other related parties

There are no controlling shareholders of the Company as defined by IFRS. There have been no material transactions with the shareholders of the Company.

Pension contributions are disclosed in Note 26 to the Group Financial Statements.

Other than the parties disclosed above, the Company has no other material related parties.

Five-Year Summary: Divisional Results from Continuing Operations

		2022	2021	2020	2019	2018
Steel Division						
Revenue	£m	**1,496.4**	1,171.5	1,045.4	1,195.3	1,236.7
Trading profit	£m	**172.7**	102.0	76.4	120.1	128.3
Return on sales	%	**11.5**	8.7	7.3	10.0	10.4
Employees: year-end	no.	**8,719**	8,323	7,619	7,677	7,766
Foundry Division						
Revenue	£m	**551.0**	471.4	412.9	515.1	561.3
Trading profit	£m	**54.5**	40.4	25.0	61.3	68.9
Return on sales	%	**9.9**	8.6	6.1	11.9	12.3
Employees: year-end	no.	**2,415**	2,881	2,735	2,819	3,043

Shareholder Information (Unaudited)

Enquiries

The share register is managed by Equiniti, who can be contacted if you have any Vesuvius shareholding queries.

Equiniti Limited
Aspect House, Spencer Road
Lancing, West Sussex, BN99 6DA
United Kingdom

Telephone*
0371 384 2335 (UK only)
+44 371 384 2335 (Outside the UK)

Website: www.shareview.co.uk

Email: customer@equiniti.com

For the hard of hearing, Equiniti can also be contacted using the Relay UK website at www.relayuk.bt.com

Any shareholder enquiries not related to the share register should be sent by email to shareholder.information@vesuvius.com or by letter to the Company Secretary at the registered office.

Registered Office and Group Head Office

Vesuvius plc
165 Fleet Street
London EC4A 2AE
United Kingdom

Telephone: +44 (0)20 7822 0000

Registered in England and Wales No. 8217766
LEI: 213800ORZ521W585SY02

Vesuvius Website

Shareholder and other information about the Company, including details of the current and historical share price, can be accessed on the Vesuvius website: www.vesuvius.com.

You can view the online Annual Report 2022 on the website.

Shareview and Electronic Communication

Equiniti's website, www.shareview.co.uk, enables shareholders to register online to view details of their shareholdings. To access online information on your shareholding, you will require your shareholder reference number, which can be found at the top of your share certificate or on your dividend confirmation. The Shareview website provides answers to frequently asked questions and information useful for the management of investments, including indicative share valuations and dividend payment details.

Shareholders can register on Shareview to receive shareholder communications electronically, including the Company's Annual Report and Financial Statements, rather than receiving them in paper form. The registration process requires shareholders to input their shareholder reference number. To receive shareholder communications in electronic form, shareholders should select 'email' as their mailing preference. Once registered, shareholders will receive an email notifying them each time a shareholder communication has been published on the Vesuvius website.

Share Dealing Service

The Company's shares can be traded through most banks, building societies or stockbrokers. UK resident shareholders can also buy and sell shares by telephone or online using Equiniti's Shareview dealing service.

Telephone 0345 603 7037 between 8.00 am and 4.30 pm on any business day (excluding public holidays in England and Wales).

Website: www.shareview.co.uk/dealing

The shareholder reference number (at the top of your share certificate or on your dividend confirmation) is required to use the dealing service.

ShareGift

ShareGift, the charity share donation scheme, is a free service for shareholders wishing to give shares to a wide range of UK charitable causes. It is particularly useful for those shareholders who may wish to dispose of a small quantity of shares in a charitable way where the market value makes it uneconomic to sell on a commission basis. Further information can be obtained from ShareGift.

Telephone: +44 (0)20 7930 3737

Website: www.sharegift.org

Email: help@sharegift.org

Dividend Reinvestment Plan

Equiniti offers a dividend reinvestment plan through which shareholders can use their Vesuvius cash dividends to buy additional shares in Vesuvius. Further details, including how to sign up and the terms and conditions of the plan, are available from the Share Dividend Helpline.

Telephone*: 0371 384 2335
(or +44 371 384 2335 if calling from outside the UK)

Website: www.shareview.co.uk

Overseas Payment Service

Equiniti provides a dividend payment service in over 90 countries that automatically converts dividend payments into local currency and pays the funds into a shareholder's bank account. Further details, including an application form and the terms and conditions of the service, are available from Equiniti.

Telephone*: +44 371 384 2335

Website: www.shareview.co.uk

By post: Equiniti, Aspect House, Spencer Road, Lancing, West Sussex, BN99 6DA, United Kingdom

Please quote Overseas Payment Service, the Company's name and your shareholder reference number.

Financial Calendar

2023 Annual General Meeting	Thursday 18 May 2023

Analysis of Ordinary Shareholders

	Investor type			Shareholdings			
As at 31 December 2022	Private	Institutional and other	Total	1–1,000	1,001–50,000	50,001–500,000	500,001+
Number of holders	2,340	466	2,806	2,171	444	122	69
Percentage of holders	83.39%	16.61%	100%	77.37%	15.82%	4.35%	2.46%
Percentage of shares held	0.50%	99.50%	100%	0.11%	1.42%	7.01%	91.46%

Share Fraud – Spot the Warning Signs

Investment scams are designed to look like genuine investments.

Have you been…

- Contacted out of the blue
- Promised tempting returns and told the investment is safe
- Called repeatedly
- Told the offer is only available for a limited time?

If so, you might have been contacted by fraudsters.

How to Avoid Share Fraud

1. Reject cold calls

If you have been contacted by telephone, email or post, or via a third party or at a seminar or exhibition, with an offer to buy or sell shares, the chances are that it's a high-risk investment or a scam. You should treat any offer with extreme caution. The safest thing to do is to ignore the approach and if you were contacted by phone to hang up on the call.

2. Check if the firm is authorised by the Financial Conduct Authority (FCA) and recorded on the Financial Services register at https://register.fca.org.uk/

The Financial Services Register is a public record of all the firms and individuals in the financial services industry that are, or have been, regulated by the Prudential Regulation Authority and/or the FCA. If there are no contact details on the Register or if the firm claims the Register is out of date, call the FCA Consumer Helpline on 0800 111 6768.

If you're dealing with an overseas firm, you should check with the regulator in that country and also check the scam warnings from foreign regulators.

3. Get impartial advice

Think about getting impartial financial advice before you hand over any money. Seek advice from someone unconnected to the firm that has approached you.

Reporting a Scam

If you suspect that you have been approached by fraudsters, please tell the FCA Consumer Helpline by contacting them on 0800 111 6768 (or +44 20 7066 1000 from outside the UK) or by using the share fraud reporting form at www.fca.org.uk/scams, where you can find out more about investment scams. For calls using next generation text relay, please call the FCA Consumer Helpline on (18001) 0207 066 1000.

If you have lost money to investment fraud, you should report it to Action Fraud on 0300 123 2040 (or +44 300 123 2040 from outside the UK) or online at www.actionfraud.police.uk.

Find out more at www.fca.org.uk/scamsmart.

* Lines are open Monday to Friday 8.30 am to 5.30 pm (excluding public holidays in England and Wales).

Glossary

5S	Five Steps to improve housekeeping and therefore workplace safety and efficiency: separate, sort, shine, standardise and sustain
8D	Eight Disciplines: an eight-step methodology to resolve customer, supplier and internal quality issues
AGM	Annual General Meeting
BMC	Bayuquan Magnesium Co acquired in October 2022 and now trading through the legal entity Yingkou YingWei Magnesium Co., Ltd
CEO	Chief Executive
CFO	Chief Financial Officer
CG Statement	The Corporate Governance Statement
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
Code	The UK Corporate Governance Code
Company	Vesuvius plc
CORE Values or Values	The Group's key values of Courage, Ownership, Respect and Energy
COVID-19 or COVID-19 pandemic	Coronavirus disease (COVID-19), the infectious disease caused by the newly discovered coronavirus, and the pandemic that has arisen from this
DO	Dangerous occurrence
DOFR	Dangerous occurrence frequency rate
DRI	Direct reduced iron (DRI) is produced from the direct reduction of iron ore (in the form of lumps, pellets, or fines) into iron by a reducing gas or elemental carbon produced from natural gas or coal
DSBP	Deferred Share Bonus Plan
DTR	The Disclosure and Transparency Rules of the UK Financial Conduct Authority
EAF	Electric Arc Furnace
EBITDA	Trading profit before depreciation and amortisation of non-acquired intangible charges
ECL	Expected Credit Loss
EEMEA	Eastern Europe, Middle East and Africa
EMEA	Europe, Middle East and Africa
EPS	Earnings per share
ESOP	Employee Share Ownership Plan
EU	European Union
EU27	The 27 European Union countries
FRC	Financial Reporting Council
FRS	Financial Reporting Standards
FTSE 250	Equity index whose constituents are the 101st to 350th largest companies listed on the London Stock Exchange in terms of their market capitalisation
FX	Foreign exchange
GEC	Group Executive Committee
GHG	Greenhouse gas
Group	Vesuvius plc and its subsidiary companies
HeaTt	Vesuvius e-learning programme
HPDC	High Pressure Die Casting
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
KPI	Key Performance Indicator
LMS	Learning Management System
LPDC	Low Pressure Die Casting
LTI	Lost time injury
LTIFR	Lost time injury frequency rate, a KPI which calculates the number of LTIs per million hours worked
Median	The middle number in a sorted list of numbers
MTI	Medically treated injury
MTIFR	Medically treated injury frequency rate
PwC	PricewaterhouseCoopers LLP
NAFTA	Canada, Mexico and USA
Ordinary share	An ordinary share of 10 pence in the capital of the Company
R&D	Research and development
Scope 1 emissions	Direct CO_2 and CO_2e emissions from owned or controlled sources
Scope 2 emissions	Direct CO_2 and CO_2e from indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the Company
Scope 3 emissions	All other direct CO_2 and CO_2e emissions that occur in the Company's value chain
Senior Leadership Group	The Group Executive Committee plus the most senior Vesuvius managers worldwide, in terms of their contribution to the Group's overall results and to the execution of the Group's strategy. This group comprises between 150 to 170 members
Top Management	Key leadership roles reporting directly to members of the GEC
TSR	Total shareholder return
Turbo S	The Vesuvius safety training programme
UK GAAP	UK Generally Accepted Accounting Principles
UN	United Nations
UN SDGs	United Nations Sustainable Development Goals
Universal Refractories	The trade and assets of Universal Refractories, Inc. acquired in December 2021 and now trading through the legal entity Vesuvius Penn Corporation
VISO	Vesuvius Isostatic
VSP	Vesuvius Share Plan

The imagery included in this Annual Report aims to capture the many different aspects of Vesuvius and our team around the world. The photographer Samuel Dhote shot most of these images. www.samueldhote.com

Our front cover features:

Top
Name: Kuan Wu, Ph.D.
Role: Senior Research Associate
Location: Pittsburgh

Middle
Name: Tobias Weinert
Role: Quality Engineer
Location: Borken

Bottom
Name: Rajasree Das
Role: Manager CSR
Location: Kolkata

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