



Financial Review 2022

Including Board of
Directors' Review and
Financial Statements

27 March 2023



YEAR 2022 IN BRIEF

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Terrafame reduces the carbon footprint of transport by delivering responsibly produced battery chemicals to the global battery industry. One of the world's largest production lines for chemicals used in electric car batteries is located on Terrafame's industrial site. The plant is capable of producing nickel sulphate for around 1 million electric cars per year. The carbon footprint of the nickel sulphate produced by Terrafame is among the smallest in the industry. Terrafame's integrated, unique and energy-efficient production process from the mine to battery chemicals is located on a single industrial site. It provides customers with a transparent, traceable and truly European battery chemical supply chain.

Net sales	EBITDA	EBITDA, %
584.4 MEUR	152.1 MEUR	26.0%
Operating result	Own personnel at the end of the year	All personnel on the industrial site, avg.
93.9 MEUR	763	1,500
Equity ratio, %	LTIFR, own personnel (1)	LTIFR, all (1)
38.9%	4.3	6.4

(1) Lost-time injury frequency rate per million hours worked (12 months rolling).



The ramp-up of production at the battery chemicals plant continued and the plant's share of Terrafame's total net sales increased to 35%.

Net sales increased by 54% to EUR 584.4 million and EBITDA excluding non-recurring items rose markedly to EUR 152.1 (24.2) million. For the first time in its history, the company reported a positive result for the financial year.

Terrafame signed multiyear supply agreements for nickel sulphate with Renault Group in late 2022 and with Stellantis and Umicore in early 2023.

Started in late 2020, the project to improve operational efficiency and safety at work was completed. This was clearly reflected in the company's safety performance, and Terrafame's injury frequency rate decreased markedly.

Terrafame set a target to reach carbon neutrality in its own operations by 2039.



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2022 was a pivotal year for Terrafame. In terms of financial performance, it was also a record-breaking year. The ramp-up of the battery chemicals plant progressed, and Terrafame has established its position as part of the sustainable European battery industry supply chain. Terrafame's operating result has been positive for four consecutive quarters.

Despite the uncertain geopolitical situation, the demand for electric cars grew strongly during the year. A total of 10.1 (6.6) million electric cars were sold worldwide during 2022, representing an increase of around 53% year-on-year.

The nickel market has stabilised, and prices have settled at a new higher level since speculation arising from the war in Ukraine caused the price of nickel to increase to an unusually high level temporarily in March 2022. The average market price of nickel was 38% higher in 2022 than in 2021. The price of nickel sulphate for batteries was also higher in 2022 than in the previous year, although the spot prices of nickel sulphate (SPOT China) were not linked to the LME price.

Terrafame's net sales increased markedly in 2022, although price hedging reduced the direct impact of higher product prices on net sales. Net sales from the battery chemicals business operations increased to EUR 207.1 (27.1) million, or around 35% of Terrafame's total net sales. Net sales from the metal intermediates business operations totalled EUR 377.3 (351.3) million. In 2022, Terrafame achieved a new annual production record of 31,550 tonnes for nickel, as well as the highest monthly production of 3,270 tonnes in its history in December, thanks to the company's long-term technology development work. Terrafame's net sales increased by 54% to EUR 584.4 (378.4) million, driven by solid basic production, strong growth in the battery chemicals business operations and an increase in metal prices from the comparison period. This growth is significant.

Thanks to the strong increase in net sales, Terrafame's EBITDA excluding non-recurring items increased to EUR 152.1 (24.2) million, or 26.0% (6.4) of net sales. The use of alternative sources of supply since the Russian attack on Ukraine and the general increase in prices had an adverse impact on the increase in EBITDA. In the comparison period, EBITDA was reduced by operating costs related to the ramp-up of the battery chemicals plant. The operating profit was EUR 93.9 million, which can be seen as a significant milestone for Terrafame.



Terrafame's strategic decision to invest in the needs of electric mobility has been the right choice. Sustainable European battery chemicals production is playing an increasingly important role as the automotive industry is striving towards carbon neutrality. A good example of this is the multiyear nickel sulphate supply agreement signed with the Renault Group in late 2022, as well as the agreement signed with Stellantis at the beginning of this year. In addition, we announced a nickel sulphate supply agreement with Umicore in February 2023. Commercial deliveries have already started after a successful qualification process, and delivery volumes will increase during 2023.

Towards the end of the year, Terrafame decided to invest EUR 20 million in starting the extraction of uranium by the summer of 2024. The company's production process enables the use of uranium found in small concentrations in ore as a by-product.

During the year, the company completed its two-year project to improve operational efficiency and safety at work. The project had a markedly positive impact, and the combined 12-month accident frequency rate on the industrial site was 6.4 (8.9) at the end of the year. Safety is one of the core values at Terrafame, and the continuous development of a safety culture has been one of the main priorities since the company was established. This systematic work continues.

I would like to extend my heartfelt thanks to the employees of Terrafame and our partner companies for their good work and to our customers for their trust. In 2023, Terrafame's top priority is to complete the ramp-up of the battery chemicals plant and continue our systematic long-term work to improve occupational safety and reduce our carbon footprint.



Joni Lukkaroinen

CEO

[Terrafame Ltd](#)



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The year 2022 was significant for Terrafame in many ways. With the ramp-up of production at the battery chemicals plant, Terrafame has developed from an intermediate products company into an enabler of electric mobility. Thanks to our long-term efforts, we also achieved our first positive annual result. This shows that our strategic decision to invest in the needs of electric transport has been the right choice.

The operating environment was very exceptional. The year began under restrictions related to the coronavirus pandemic, followed by the Russian attack on Ukraine. Terrafame ended its raw material deliveries from Russia, which significantly increased the company's costs. The nickel market fluctuated greatly, and following the war and the related speculation, prices rose to abnormal levels in the spring, and the London Metal Exchange (LME) had to discontinue trading for more than a week. The market and prices stabilised towards the end of the year, but the challenging situation in the market continues, as the price premium (SPOT China) for nickel sulphate is not linked to the LME price.

Despite significant uncertainty, the sales of electric cars continued to grow globally in 2022. Sustainable European battery chemicals production is playing an increasingly important role as the automotive industry is striving towards carbon neutrality. Good examples of this include the multiyear contract between Terrafame and Renault on the delivery of nickel sulphate and the agreement signed with Stellantis in early 2023. I also firmly believe that Terrafame and its role in the battery value chain have a significant positive impact on attracting battery industry investments to Finland.

The ramp-up of the battery chemicals plant was at the core of operating activities in 2022. Considering the complexity of the process, the ramp-up has progressed well, although we have not quite been able to meet the initial, exceptionally ambitious schedule. However, the battery chemicals plant's share of Terrafame's net sales increased to a significant level during the year, and we can be very satisfied with the strong development of our battery chemicals operations.

Commitment to sustainable development is at the core of our strategy. Thanks to its unique bioleaching technology, Terrafame has one of the lowest carbon footprints in its industry. The nickel produced by the company and the battery chemicals manufactured using the nickel come from the same industrial site, which is also unique and means that the battery chemicals are fully traceable without any doubt.



In 2022, we made a commitment to achieve carbon neutrality in our own operations by 2039. We had previously made a commitment to the UN Global Compact initiative, and the themes of our sustainability programme are linked to the UN Sustainable Development Goals.

Towards the end of the year, Terrafame decided to start the extraction of uranium by the summer of 2024. This investment of around EUR 20 million enables us to contribute to European energy self-sufficiency. The uranium produced annually at Terrafame will be sufficient for around six months of energy production at Olkiluoto 3.

In 2022, Terrafame continued its long-term work to ensure occupational safety, and good results were achieved in this respect. The combined accident frequency rate of the industrial site decreased for the third year in a row. Safety is one of Terrafame's values, and we are continuing the systematic development of our safety culture.

The positive impact of the company's operations on the regional economy of Kainuu is strong and will continue to be so long into the future. In my opinion, we have contributed to creating a more forward-looking atmosphere in Kainuu.

Finally, I would like to extend my heartfelt thanks to Terrafame's personnel and the battery chemicals plant's employees for their solid performance in 2022, and to our customers and partners for their good cooperation and trust in Terrafame. We expect the strong growth in electric mobility to continue in 2023, meaning that the outlook for Terrafame is very promising.



Lauri Ratia

Chairman of the Board

[Terrafame Ltd](#)



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Electric vehicle and battery markets

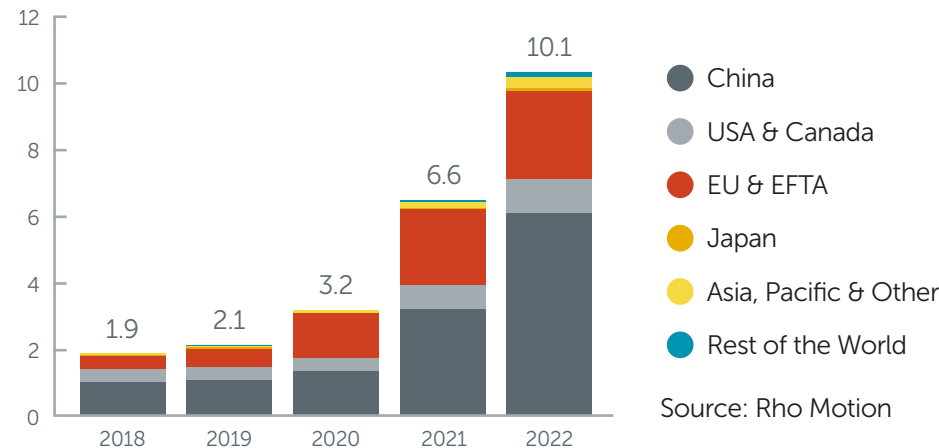
The global sales of electric vehicles continued to be strong. In 2022, around 10.1 (6.6) million electric cars were sold worldwide, which represents an increase of around 53% from 2021.

Around 6.0 (3.3) million electric passenger cars and light commercial vehicles were sold in China in 2022. This represents nearly 60% of their global sales. The sales almost doubled year-on-year. The sales of electric cars were also strong in the United States and Canada, where the total sales of electric passenger cars and light commercial vehicles increased by 30%. In Europe, the sales of these vehicle categories grew by 8.5% year-on-year.

In December 2022, including all vehicle categories, the sales-weighted average size of EV batteries was 51.9 (48.2) kWh. The market share of NCM 811 batteries, which have a high nickel content, increased from 15% in December 2021 to 20% in December 2022. The market share of NCM 622 batteries was 21% in December 2022 (27% in December 2021), and the market share of NCM 712 batteries was 5% and 7%, respectively.

Global EV sales (million units)

Includes battery electric vehicles (BEV) and plug-in hybrids (PHEV)



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Nickel

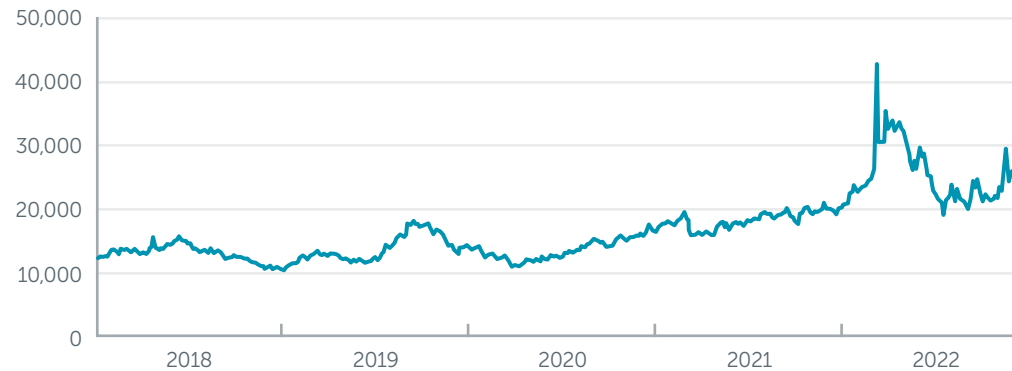
The price of nickel on the London Metal Exchange (LME) was markedly higher throughout 2022 than in the previous year. Speculation arising from the war in Ukraine caused the price of nickel to increase to an unusually high level temporarily at the beginning of March, but the price development of nickel began to normalise after the London Metal Exchange used exceptional means (disruption event) to restrict trading. The price of nickel sulphate for batteries in 2022 was slightly higher, although the spot price of nickel sulphate (SPOT China) has not been linked to the LME price since March 2022.

The average market price of nickel in 2022 was 25,585 (18,469) USD/t, which is 39% higher than in 2021. The average market price of nickel in the fourth quarter of 2022 was 25,289 (19,821) USD/t, which is 28% higher than in the comparison period and 15% higher than in the third quarter of 2022 (22,063).

Nickel price development

1 Jan 2018 – 31 Dec 2022

Day price for nickel on the London Metal Exchange (USD/t)



The total combined nickel stocks on the London Metal Exchange (LME) and the Shanghai Futures Exchange (SHFE) at the end of December 2022 were 57,878 tonnes, which is significantly lower than at the end of December 2021 (106,313). Nickel stocks have decreased sharply since the second quarter of 2021. The stock levels began to stabilise during the second quarter of 2022, and stocks at the end of December had increased slightly from the end of the third quarter of 2022 (55,080). The stock level at the end of 2022 corresponded to demand for one (1) week.

Exchange rate

The average EUR/USD exchange rate

1.05
2022

1.18
2021

The strengthening of the US dollar against the euro stabilised towards the end of 2022.



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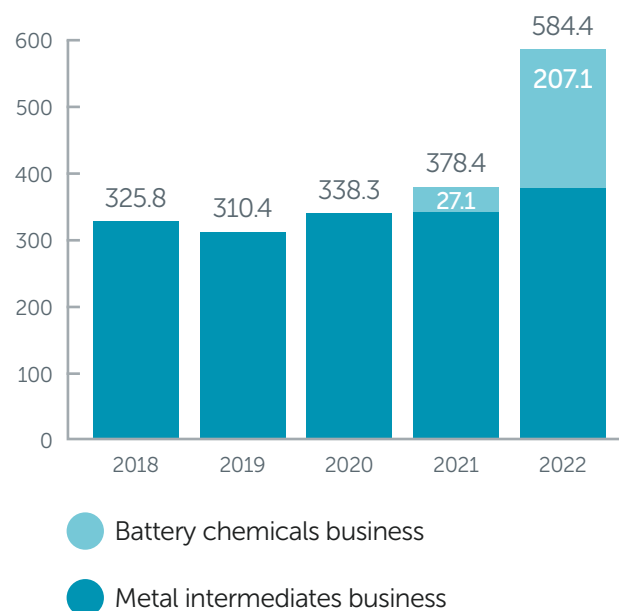
Net sales and financial performance

Net sales were EUR 584.4 (378.4) million in 2022, with an increase of 54% year-on-year.

The ramp-up of the battery chemicals business operations and the increase in metal prices had a positive impact on net sales, although price hedging reduced the direct impact of the higher price of nickel in particular.

Net sales from the battery chemicals business operations totalled EUR 207.1 (27.1) million, or around 35% of the company's total net sales. Net sales from the metal intermediates business operations totalled EUR 377.3 (351.3) million.

Net sales (EUR million)



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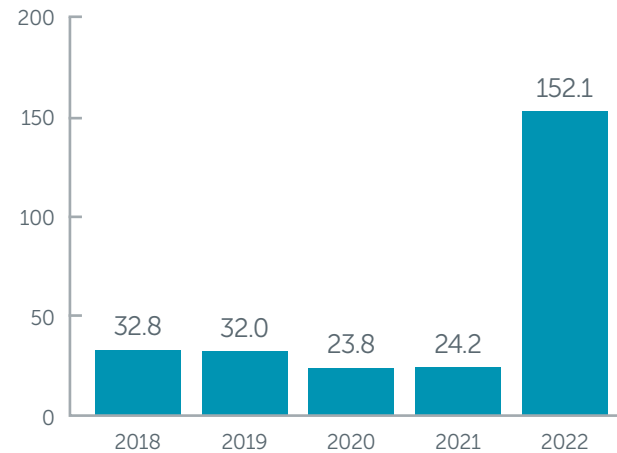
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EBITDA excluding non-recurring items increased to EUR 152.1 (24.2) million, or 26.0% of net sales. The strong increase in net sales offset the impact of higher material prices on EBITDA.

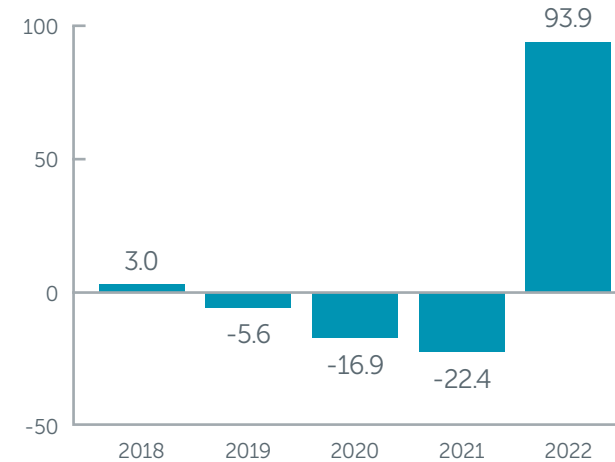
EBITDA (EUR million)

Excluding non-recurring items



Operating result (EUR million)

Excluding non-recurring items



The company's depreciation totalled EUR 58.2 (46.6) million.

The operating result excluding non-recurring items in 2022 was EUR 93.9 (-22.4) million.

An increase in an environmental provision recognised in the fourth quarter of 2021 had a negative impact of EUR 72.9 million on EBITDA and the operating result in the previous year.

The company's net financial items were EUR -31.0 (-20.5) million, and profit for the period was EUR 63.0 (-115.8) million.



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Terrafame and the Renault Group signed a long-term agreement on the supply of sustainable nickel sulphate

In December 2022, Terrafame and the Renault Group signed a multiyear agreement, according to which Terrafame will supply fully traceable low-carbon nickel sulphate for the batteries of the Renault Group's electric vehicles. Terrafame and Renault have been developing their cooperation since October 2021, when the companies signed a letter of intent on nickel sulphate deliveries.

Based on the agreement, Terrafame will supply sustainably produced nickel sulphate to Renault for the needs of around 200,000 electric vehicles every year. The agreement is an important milestone for Terrafame as a recognised partner in low-carbon and fully traceable electric vehicle manufacturing. The partnership also marks a concrete step towards a robust, transparent and sustainable European battery cluster.

Terrafame will start the extraction of uranium by the summer of 2024

In December 2022, Terrafame decided to start the extraction of uranium by the summer of 2024. Based on the results of a feasibility study, the company has decided to start preparations for the extraction of uranium.

Terrafame's production process enables the use of uranium found in small concentrations in ore as a by-product. A ready-built uranium recovery plant is located on Terrafame's industrial site, and the company is preparing the plant for operational use. The preparations require a total investment of around EUR 20 million. After the ramp-up phase, the recovery plant is expected to operate at full capacity by 2026.



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Cash flow and financial position

In 2022, cash flow from operating activities was EUR 51.8 (35.2) million, of which change in net working capital comprised EUR -82.0 (15.4) million. Cash flow from investment activities was EUR -75.5 (-136.9) million. Cash flow from investments increased from year 2021 when construction efforts in the battery chemicals plant project decreased the cash flow from investments.

At the end of 2022, the company's cash and cash equivalents totalled EUR 45.5 (63.5) million.

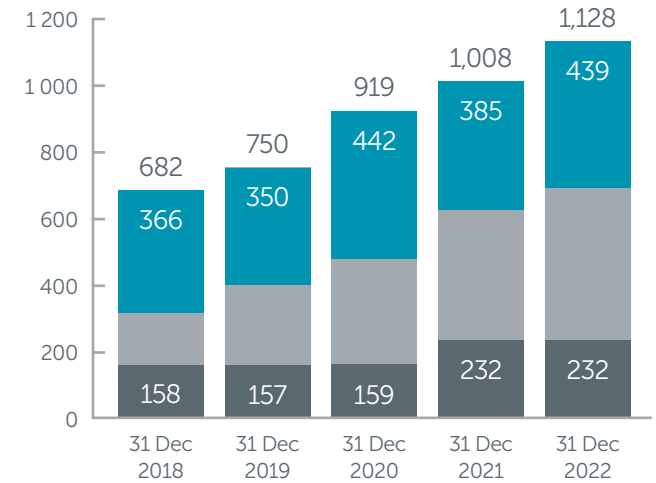
Terrafame's balance sheet total on 31 December 2022 was EUR 1,128.1 (1,006.7) million. Year-end inventories totalled EUR 288.9 (233.9) million. The company classifies its inventories into three groups: raw materials and consumables, work in progress, and finished products. The value of raw material and spare part inventories at the end of the financial period was EUR 31.2 (25.6) million. The value of work in progress was EUR 241.8 (204.0) million, and the value of the finished goods inventory was EUR 15.9 (4.3) million. The valuation principles for inventory items are presented in more detail in the Accounting principles, in section Inventories on [page 59](#).

Trade receivables totalled approximately EUR 66.7 (24.2) million at the end of the financial period. Other receivables totalled approximately EUR 0.9 (0.2) million. Prepaid expenses and accrued income totalled approximately EUR 14.4 (1.1) million.

Shareholders' equity on 31 December 2022 was EUR 439.1 (384.8) million. The total amount of debt was EUR 457.0 (389.8) million. In addition to this the balance sheet includes a rehabilitation provision for mine closure and environmental clean-up costs amounting to EUR 232.0 (232.0) million. More detailed information on the rehabilitation provision is provided in Accounting principles, in section Derivatives and hedge accounting/Rehabilitation provision for mine closure and environmental clean-up costs on [page 62](#).

Terrafame's equity ratio at the end of the financial period was 38.9 (38.2) per cent, and net gearing was 44.7 (42.6) per cent.

Equity and liabilities (EUR million)



- Equity
- Liabilities
- Environmental provision

The formulas for calculating the figures and the key figures are presented on [page 48](#).



Capital expenditure

Terrafame examines capital expenditure in two categories: investments in productivity improvement and capacity growth and investments in sustaining production.

Capital expenditure, EUR million	2022	2021	Change, %
Sustaining capital expenditure	69.9	60.3	+16%
Investments in productivity improvement and capacity growth	13.1	57.6	-77%
Total capital expenditure	83.0	117.9	-30%

The division of investments between categories has been adjusted retrospectively in 1-9/2021.

Capital expenditure totalled EUR 83.0 (117.9) million in 2022. Of this total, EUR 13.1 (57.6) million was used to improve productivity and increase capacity, and EUR 69.9 (60.3) million was used to sustain operations.

The most important investments in productivity improvement and capacity growth were related to the completion of the battery chemicals plant, the elimination of production bottlenecks and preparatory work to enable the exploitation of the Kolmisoppi deposit.

Investments in sustaining production mainly consisted of preparatory work related to the exploitation of the next sections of the Kuusilampi mine. Other significant investments included the start-up of the construction of a new section of the waste rock area, changes to the conveyors in the secondary leaching area and preparatory work for the new secondary sections (5–6).

Currency and commodity hedge transactions

In the 2022 financial period, the company continued to hedge its cash flow against a decrease in the US dollar exchange rate and metal prices in line with its hedging policy.

The company used hedge accounting. Additional information on hedging is given in note 2.8 to the financial statements on [page 72](#).



Financing arrangements

During 2022, Terrafame reduced debt financing raised from its shareholders by approximately EUR 66 million. The repayments for December 2022 and April 2023 totalled approximately EUR 68 million and were postponed to the end of 2023.

The amounts presented in the following table cover all the financial items received by Terrafame from its shareholders during its time of operation, as well as debt financing items converted into equity.

	Equity financing	Debt financing	Converted equity	Repayments	Debt financing	Total financing
Finnish Minerals Group	537.3					537.3
Galena Asset Management	248.3					248.3
Trafigura		192.2	-20.2	-50.6	121.4	121.4
Sampo Group	19.0	48.4	-6.8	-15.2	26.4	45.4
Total	804.6	240.6	-27.0	-65.8	147.8	952.4

Currency-denominated items have been translated into euros using the rate prevailing on the closing date of the review period.

Of the four-year USD 90 million unsecured financing arrangement signed with an international bank in September 2021, the remaining USD 70 million was drawn out during 2022. After the end of the instalment-free period, the first instalment was paid at the end of December. The arrangement includes the possibility to use so-called cargo-financing, which enables faster repatriation of receivables.

The company's other financing arrangements to cover its need for working capital include, for example, around EUR 50 million in account facilities and a receivables factoring agreement of USD 50 million signed with an international bank in late 2022.

In June 2022, the Regional State Administrative Agency for Northern Finland issued its decision on the environmental and water permit covering all Terrafame's operations. The permit also defines an environmental provision for discontinued operations. According to the new permit, the new environmental provision is EUR 324.1 million. A process of covering the guarantee is ongoing.

The company has a valid contract of EUR 161 million to cover the need for provision in accordance with the previous environmental permit.



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Terrafame has one series of shares. At the end of 2022, the company had 4,993,830 shares. Its share capital was EUR 2.0 million, and its shareholders' equity was EUR 439.1 (384.8) million.

On 31 December 2022, Finnish Minerals Group (FMG), a special-assignment company of the state of Finland, owned 67.0%, Trafigura Galena Funds owned 31.0% and Sampo plc owned 2.0% of Terrafame.

	Galena 2	Galena 3	Galena 4	Sampo	FMG	Trafigura	Total
Holding 31 December 2021	12.1%	14.7%	4.3%	1.8%	67.1%	0.0%	100.0%
31 December 2021	602,952	733,233	215,181	87,432	3,349,242	0	4,988,040
Changes in the number of shares during the financial year:							
Equity funding	0	0	0	0	0	0	0
Payment of interest and arrangement fees in shares	0	0	0	10,790	0	0	10,790
31 December 2022	602,952	733,233	215,181	98,222	3,349,242	0	4,998,830
Holding 31 December 2022	12.1%	14.7%	4.3%	2.0%	67.0%	0.0%	100.0%

Finnish Minerals Group's holding may decrease to no lower than 50.1% in the future, if Trafigura and Sampo exercise their option rights and the interest on the loans is paid in shares. In such a case, the holding of Trafigura would be around 45.0%, and that of Sampo would be around 5.0%.



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Legal and other administrative services were bought for a total of EUR 0.5 (0.5) million and administrative services for R&D projects for a total of around EUR 0.2 (0.3) million from Finnish Minerals Group.

The sales of nickel-cobalt sulphide and zinc sulphide to Trafigura Group amounted to EUR 376.8 (347.9) million and nickel sulphate to EUR 182.2 (27.1) million during the financial period.

The financing arrangements realised with the related-party companies Finnish Minerals Group, Trafigura Group and Galena funds are presented in the 'Financing arrangements' section of the annual review.

All business transactions between Terrafame and its related parties conformed to accepted market practices.

A more detailed description of related party transactions is given in [note 5](#) to the financial statements.



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Governance

As a non-listed company, Terrafame follows the Securities Market Association's current Corporate Governance Code to the extent applicable. The 2022 Corporate Governance Statement is published simultaneously with, but separately from, the Board of Directors' review at www.terrafame.com.

Annual General Meeting

Terrafame's Annual General Meeting (AGM) was held on 17 March 2022. The AGM adopted the financial statements for 2021, decided on profit distribution in accordance with the Board of Directors' proposal and discharged the members of the Board and the CEO from liability.

The AGM confirmed the number of Board members as seven and re-elected Lauri Ratia, Matti Hietanen, Tuomo Mäkelä, Jesus Fernandez, Emmanuel Henry, Riitta Mynttinen and Jyrki Vainionpää as members of the Board. Lauri Ratia was elected as Chair of the Board and Matti Hietanen as its Vice Chair.

The AGM decided to keep the Board members' fees unchanged. The annual fee for the Chair of the Board is EUR 72,000. The annual fee for each member of the Board is EUR 36,000. In addition, the Chair and members of the Board are paid a meeting fee of EUR 600 based on their attendance.

KPMG Oy Ab, Authorised Public Accountants, was elected as the auditor, with Antti Kääriäinen as the principal auditor.

On 1 July 2022, Terrafame Ltd's Extraordinary General Meeting elected Julian Sanchez, 49, Bachelor of Science in Mining Engineering, Head of Trafigura Mining, Trafigura Group Pte, as a new member of the Board. Sanchez is a Spanish citizen. He is independent of the company, but not independent of a major shareholder (Trafigura). Emmanuel Henry, Head of Mining Group, Trafigura Group Pte, had left Trafigura and thereby also his position as a member of Terrafame's Board of Directors.

At the end of 2022, the members of Terrafame's Board of Directors were Lauri Ratia (Chair), Matti Hietanen (Vice Chair), Jesus Fernandez, Riitta Mynttinen, Tuomo Mäkelä, Julian Sanchez and Jyrki Vainionpää.



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Leadership Team

At the end of 2022, Terrafame's Leadership Team consisted of the following members:

Joni Lukkaroinen

CEO

Antti Arpalhti

Chief Technology Officer

Veli-Matti Hilla

Chief Sustainability Officer

Heini Hämäläinen

Chief People Officer

Janne Palosaari

Chief Commercial Officer

Ville Sirviö

Chief Financial Officer

Seppo Voutilainen

Chief Production Officer



Statement of non-financial information

This statement has been prepared in accordance with chapter 3a of the Finnish Accounting Act (1336/1997), which is based on Directive 2014/95/EU of the European Parliament and of the Council. The disclosure of non-financial information is optional for Terrafame.

In addition to the information required by the Accounting Act, the statement on non-financial information includes a description of safety management at Terrafame and the company's tax footprint in accordance with the guidance issued by the Government Ownership Steering Department on 1 October 2014.

At the time of preparing this report, the taxonomy alignment of the production of Terrafame's battery chemicals (nickel and cobalt sulphate) cannot be assessed in accordance with the currently available screening criteria under the EU taxonomy (Delegated Act supplementing Article 8 of the Taxonomy Regulation). However, the battery chemicals produced by Terrafame play an important role in batteries manufactured for the use of transport. The screening criteria concerning the manufacturing processes of such batteries have already been published, including active materials. Terrafame closely monitors the development of the taxonomy. In the company's view, Terrafame is well positioned to meet the criteria for the climate targets of the taxonomy. More information about Terrafame's role in the battery value chain is provided in the "Business Model" section on [page 23](#) of the Board of Directors' review.

Responsibility management

Sustainability is an integral part of Terrafame's business operations. Terrafame's Board of Directors is responsible for the organisation of corporate responsibility management and the integration of corporate responsibility into Terrafame's business operations. The Board approves Terrafame's Code of Conduct, policies, strategy and sustainability programme, which also cover climate issues. The Board also approves this statement of non-financial information as part of the Board of Directors' review.

The CEO of Terrafame Ltd is responsible for implementing the policies and guidelines approved by the Board of Directors. The other members of the Management Team are responsible for monitoring the application and interpretation of these policies and guidelines in their respective areas of responsibility. Terrafame's sustainability policy determines operating principles for the company's sustainability work in terms of environmental aspects and good governance. Social responsibility aspects are included in the company's personnel policy.



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The Chief Sustainability Officer, who is a member of Terrafame's Leadership Team, is responsible for the monitoring and interpretation of sustainability policy application. The Chief People Officer, who is a member of the Leadership Team, is responsible for the monitoring and interpretation of personnel policy application.

Terrafame's operations are guided by the company's strategy and Code of Conduct and an operating culture based on its values: safety, commitment and efficiency. The company's operations are primarily guided by the following international initiatives and principles:

- UN Guiding Principles on Business and Human Rights
- ILO Declaration on Fundamental Principles and Rights at Work
- OECD Guidelines for Multinational Enterprises
- OECD Due Diligence Guidance for Responsible Business Conduct
- UN Global Compact initiative
- UN Sustainable Development Goals

Terrafame's employees, as well as the employees of its partners and suppliers, must comply with Terrafame's Code of Conduct, company sustainability policy and human rights policy. The implementation of the Code of Conduct, sustainability policy and human rights policy is supported by Terrafame's certified management systems (ISO 9001, ISO 45001 and ISO 14001) and more detailed operating guidelines. Terrafame's industrial site has a whistle-blowing channel for reporting any violations of the Code of Conduct. Reports can also be submitted anonymously through the channel.

Terrafame engages in active dialogue with various stakeholders in the spirit of mutual appreciation. Its operations are transparent and comply with ethical principles in a sustainable manner.



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Sustainability programme

Terrafame's strategic goal is to enhance low-carbon mobility with sustainable battery chemicals.

Terrafame's sustainability work is guided by its sustainability programme, which sets ambitious numerical and qualitative targets for operational development. The sustainability programme was supplemented during 2022, and Terrafame decided to aim for carbon neutrality in its own operations by 2039. For this purpose, Terrafame has created a carbon roadmap, which determines a cost-effective path towards carbon neutrality.

The themes and targets of the sustainability programme are linked to the UN Sustainable Development Goals as far as applicable. The implementation of the sustainability programme is monitored annually on the company's [website](#). The company publishes an annual Sustainability Review, which also presents key figures related to its sustainability themes, including climate-related emission indicators (Scope 1, Scope 2 and Scope 3 calculated in accordance with the GHG Protocol). The next Sustainability Review will be published in the summer of 2023.

Terrafame is committed to compliance with the operating principles of the Finnish Network for Sustainable Mining. Terrafame has carried out self-assessments in accordance with the Finnish TSM Standard since 2017. In late 2021, the company conducted a third-party verification of its TSM self-assessment, which is carried out every three years. The verified results were in line with the company's self-assessment. The system applies a five-step scale (C-B-A-AA-AAA, where C = complies with the regulations, and AAA = shows excellence). On that scale, the most important aspects of the company's environmental safety (dam safety and water management) are at a good level (A).



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Risk management

Terrafame complies with the risk management policy adopted by its Board of Directors. The company identifies risks, assesses their impact on its operations and plans any necessary risk management measures.

The key safety, process, environmental and operational business risks are updated annually, and the results and measures are discussed by the company's Leadership Team and Board of Directors. The company's assessment of its environmental, safety and process risks is updated comprehensively every three years by examining thousands of individual risks. Significant risks identified during risk assessment are reduced by technical improvement and competence development, for example. The company has also identified climate-related risks and opportunities.

A summary of the assessment of the most significant risks and uncertainties is presented on [page 47](#) of the Board of Directors' review.

Climate-related risks and opportunities

Terrafame's business operations play an active role in managing climate emissions from transport. The carbon footprint of the nickel sulphate produced by the company is considerably smaller than the industry average. The manufacturers of electric vehicles can significantly reduce their carbon footprint by choosing Terrafame's product. In its business operations, the company has identified opportunities related to climate change in terms of demand for its current and potential new products and the recycling of batteries, for example.

The identified risks related to climate change management mainly concern the procurement and prices of raw materials, as well as logistics, among other factors. The alterations to legislation caused by climate change are seen as both opportunities and risks. The increasing unpredictability of the weather caused by climate change is linked to a more detailed assessment of environmental and safety risks.

Business model

The strategic goal of Terrafame's business operations is for the company to be one of the world's most cost-effective and responsible producers of battery chemicals.



BUSINESS ENVIRONMENT

The cost of carbon dioxide emissions steers towards the use of carbon-neutral energy

The share of nickel in batteries grows

Concerns about climate change are directing consumers to favor electric cars

Europe's strong car industry lays groundwork for own regional battery value chain



Economic value added

- Wages and salaries (incl. pensions expenses) 54.1 MEUR
- Taxes and tax-like charges, receivable 18.0 MEUR
- Purchases 540.8 MEUR
- Net financial items 18.9 MEUR

Committed personnel

- Development of personnel's knowledge, skills and well-being, and active cooperation
- Training 4.5 days per person

IMPACTS

Safe work environment

- The lost-time injury frequency of the entire industrial site decreased to 6.8 in 2022 (2021: 8.9)
- A development project related to working culture had a positive impact on occupational safety

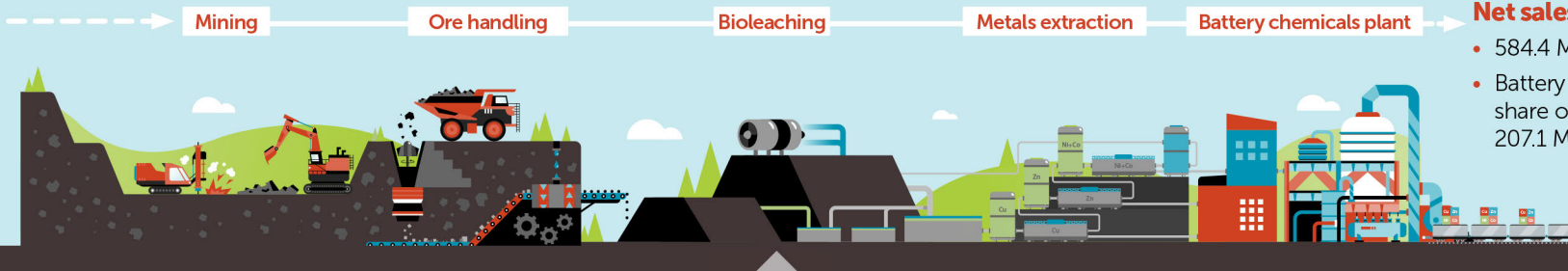
Fulfillment of customer promises

- Terrafame's nickel sulphate carbon footprint is over 60% smaller than average and the company is aiming for carbon neutral production by 2039
- Strong sales support and logistics services
- Quality is ensured by precise process control (Statistical Process Control)

TRACEABLE PRODUCTION CHAIN, SMALL CARBON FOOTPRINT

Financial capital

- Equity 439.1 MEUR
- Equity ratio 38.9%
- Capital expenditure 14.2% of net sales



Net sales

- 584.4 MEUR
- Battery chemicals business' share of full-year net sales 207.1 MEUR

RESOURCES

The largest nickel ore reserves in Europe

- 1,499 million tonnes, containing 3.9 Mt nickel and 0.3 Mt cobalt (JORC)
- Allows production to continue for decades

Skilled personnel

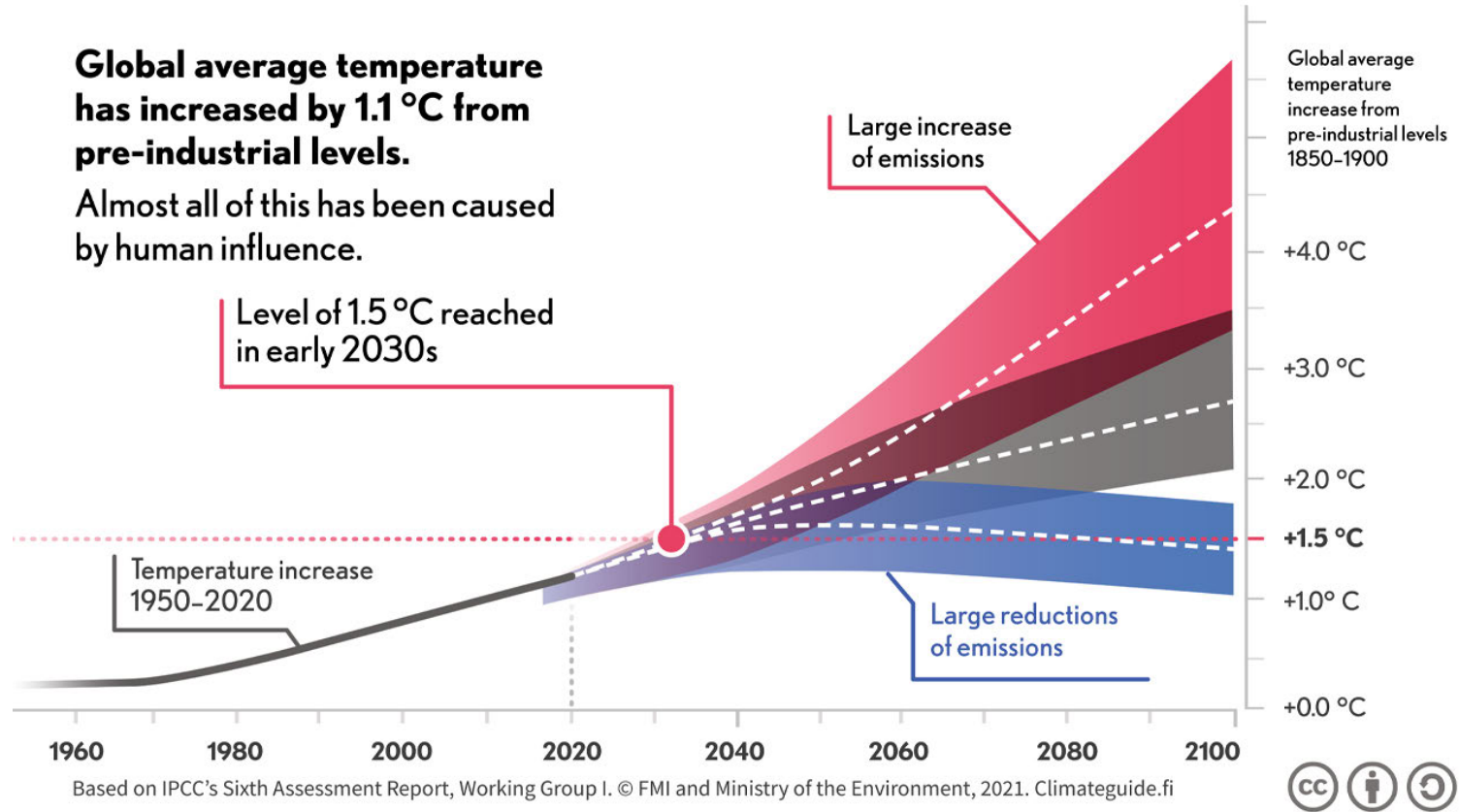
- Own personnel 763 in total
- Wide orientation and training programmes
- Certified quality and management systems

Wide partner network

- An average of 150 long-term partner companies on the industrial site
- A total of 783 employees of contractors and subcontractors
- Cooperation with academies and research institutes

Business environment

In Chapter 3 of its Sixth Assessment Report, published in April 2022, the Intergovernmental Panel on Climate Change (IPCC) states that current measures are not sufficient to limit global warming to 1.5 degrees, which means that effective emission reductions are necessary as early as the 2030s. With the climate measures already undertaken, global warming will temporarily exceed 1.5 degrees, and significant emission reductions will be needed after 2030 to limit global warming to 1.5–2 degrees.



Without rapid and effective emission reduction measures over the next two decades, the current emissions trend will lead to a rise of around 3 degrees by the end of the century. This scenario is marked in red in the diagram above. In other words, the extent of future changes depends on the future development of greenhouse gas emissions, especially carbon dioxide emissions.

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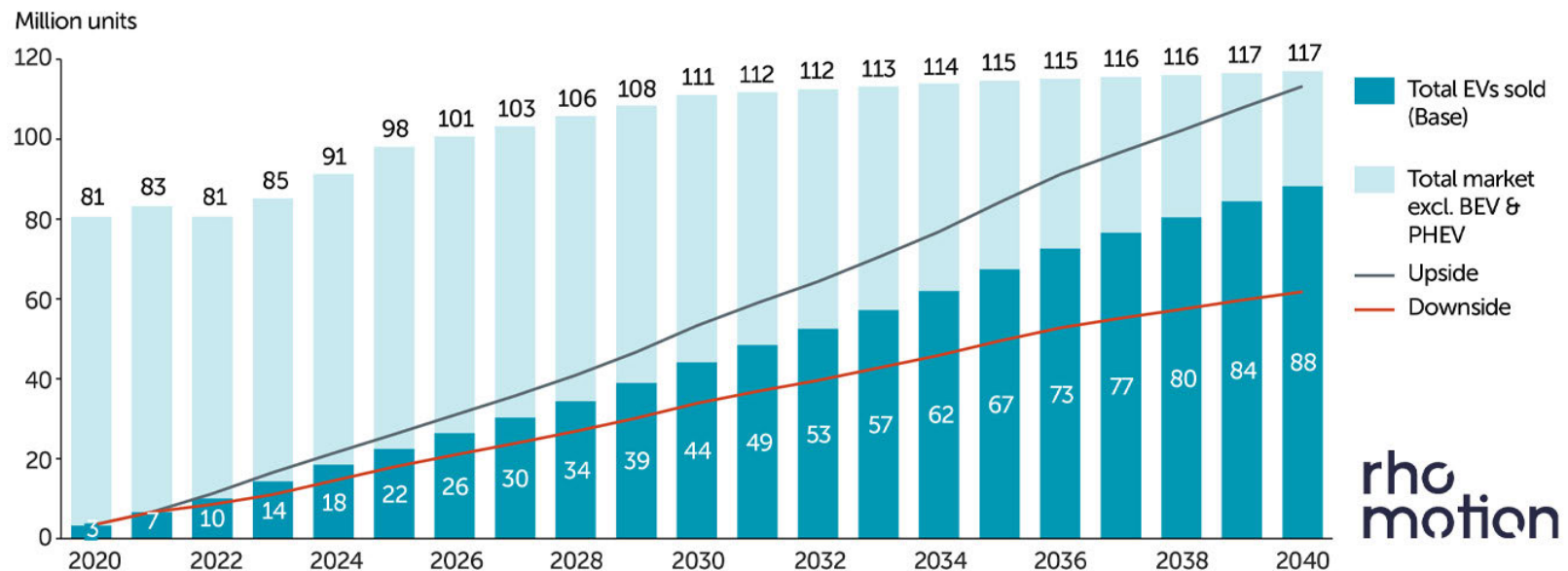
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International climate policy is guided by the UN climate agreement, the Kyoto Protocol and the Paris Agreement, as well as multilateral negotiations related to these. The Conference of the Parties (COP) is the highest decision-making body within the climate agreement. In November 2021, the conference issued a new statement on zero-emission vehicles. Its signatories are committed to promoting the goal of all new passenger cars and vans sold being emission-free by 2035 or earlier. The signatories include several car manufacturers.

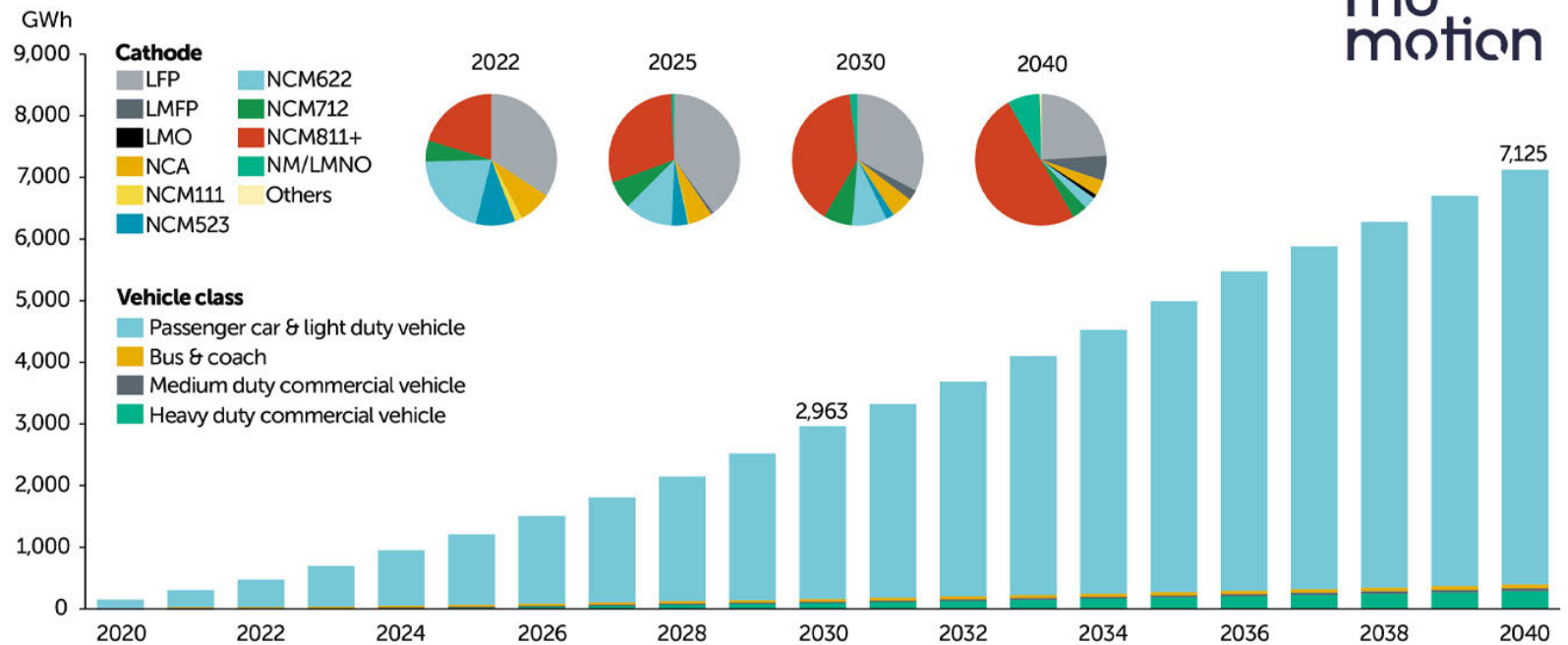
The transition to electric transport is seen as a significant means of combating climate change. Various incentives and increasing regulations are guiding the change towards electric transport, and technological development and changes in consumer behaviour are also being reflected in the growth of electric motoring. Around 10.1 million electric cars were sold globally in 2022, and the number is expected to increase to around 40 million by 2030.

Global EV sales forecast, 2020–2040



Electric cars are also required to have longer ranges, which increases the demand for batteries with a high nickel content. According to the latest estimate by Rho Motion, the demand for batteries for electric vehicles will grow by 42% in 2023 and almost quadruple in 2023 compared with 2021.

EV battery demand outlook by battery chemistry & vehicle class



rho motion



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Terrafame is combatting climate change in cooperation with its customers

Combatting climate change is a business opportunity for Terrafame. The ramp-up of the new battery chemicals plant continued in 2022, and its net sales increased to 35% of Terrafame's total net sales in 2022.

The full annual nickel sulphate capacity of the battery chemicals plant will be sufficient for around 1 million batteries for electric vehicles per year, and its full cobalt sulphate capacity will be sufficient for around 300,000 batteries, provided that the average battery size (source: RhoMotion) remains at its current level (50 kWh), and that the NCM811 battery technology is used. Most modern electric cars are powered by various types of lithium-ion batteries. The batteries consist of battery cells. The cells consist of cathodes and anodes, which store and release energy. Cathode active materials (CAM) play a significant role in the design of the battery cells, and the properties of the cathode active material determine the battery recharge speed and time. The nickel sulphate chemical produced by Terrafame is further processed, through a cathode active material precursor (pCAM), into a cathode active material and further into battery cells.

Climate sustainability is the foundation of the entire electric car industry. Analyses published in 2020 by Skarn Associates and CRU show that the nickel produced by Terrafame using a bioleaching process has the world's smallest carbon footprint among nickel producers. This makes the intermediate produced by Terrafame in its metal plant an ideal raw material for battery chemicals. An externally verified life cycle analysis by Sphera Solutions GmbH in 2020 shows that the carbon footprint of the nickel sulphate produced by Terrafame is more than 60% smaller than that of nickel sulphate production on average.

Electric car manufacturers can reduce their carbon footprint by up to 80% by choosing Terrafame's nickel sulphate instead of other nickel raw materials. Fewer chemicals and less energy are needed to produce Terrafame's nickel sulphate product, which reduces its climate impact.

Value creation

Terrafame's value creation is based on the efficient use of resources and an integrated and energy-efficient production chain with a low carbon footprint, as well as on active positioning in the battery value chain to support customers' value creation. Value creation is also described in the diagram in the "Business Model" section on [page 24](#) of the Board of Directors' review.



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Terrafame has Europe's largest nickel ore reserves, which will enable production to continue for decades to come. There are two verified ore deposits within Terrafame's mining concession: Kuusilampi, where the company's current open-pit mine is located, and Kolmisoppi, whose utilisation is expected to begin in the late 2020s. Together, these ore deposits will enable production operations to continue in their current form for up to 50–60 years from now.

A total of 763 Terrafame employees worked on its industrial site at the end of 2022. In addition to its own skilled personnel, the company has an extensive network of partner companies, particularly in production work, in accordance with its operating model. Through this network, around 800 people work regularly on Terrafame's industrial site. More information about our personnel and partner network is provided on [pages 34-38](#) of the Board of Directors' review.

In its production process, Terrafame seeks to use process-based side streams as effectively as possible, which reduces waste and the need for piling. Bioleaching is used in the management of metal-containing side streams and to prevent the generation of new industrial waste fractions.

The reuse of process-based side streams will increase with the introduction of the battery chemicals plant. Process planning and development are guided by efforts to use waste energy streams. The industrial site has a power plant that mainly uses forest industry side streams and recycled wood as fuel. Hose and pipe waste generated during bioleaching is one of the most significant waste fractions other than extractive and process waste fractions. Terrafame and its partner have used it as a raw material for new hoses and pipes for several years.

Production and supply chain

Integrated production, from the mine to battery chemicals, at a single industrial site is a unique traceable whole that enables consistently high product quality and reliable deliveries. Responsible ways of working are ensured by requiring the employees and suppliers of Terrafame and its partner companies to comply with Terrafame's Code of Conduct and sustainability policy. The company is working continuously and systematically to further improve its operational excellence.



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The start of commercial battery chemicals production has significant impacts on Terrafame's business model. Previously, most of Terrafame's production was delivered to customers through the distribution network of Trafigura, one of the company's two principal owners. In the new situation, Terrafame sells the battery chemicals that it produces directly to customers, with Trafigura serving as its sales agent.

The main market areas for Terrafame's battery chemicals business are in Asia and Europe. Up until now, the production of battery cells and cathode active materials has been centralised in Asia, but a regional battery value chain is also being built in Europe. Terrafame has actively positioned itself as part of this value chain from the very beginning.

In December 2022, Terrafame and the Renault Group signed a multiyear agreement, according to which Terrafame will supply fully traceable low-carbon nickel sulphate for the batteries of the Renault Group's electric vehicles. Terrafame and Renault have been developing their cooperation since October 2021, when the companies signed a letter of intent on nickel sulphate deliveries.

Based on the agreement, Terrafame will supply sustainably produced nickel sulphate to Renault for the needs of up to 200,000 electric vehicles every year. The agreement is an important milestone for Terrafame as a recognised partner in low-carbon and fully traceable electric vehicle manufacturing. The partnership also marks a concrete step towards a robust, transparent and sustainable European battery cluster.

In January 2023, Terrafame and Stellantis signed an agreement on the supply of nickel sulphate for electric vehicle batteries. Beginning in 2025, Terrafame will supply nickel sulphate to Stellantis over the five-year term of the agreement. The agreement is part of Stellantis' aggressive electrification strategy and will meet a significant portion of the company's need for sustainable locally sourced nickel.

In addition, Terrafame announced in February 2023 that it had started nickel sulphate deliveries to Umicore following a successful qualification process. The nickel sulphate supplied by Terrafame will meet a substantial portion of the nickel requirements of Umicore's cathode materials plant in Poland. High-quality nickel is a critical raw material for the production of cathode materials used in batteries for electric vehicles.

The purity and quality of the chemicals used in battery production, as well as reliable deliveries, are critical factors for customers and set new types of requirements for the logistics chain.



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Together with its partners, Terrafame has developed a comprehensive logistics solution that covers the entire supply chain from the production plant to the customer. Battery chemicals are packed in sealed sea containers and loaded into freight wagons on Terrafame's industrial site. The electrified railway network facilitates the climate sustainability of transport. Battery chemicals are delivered to a destination designated by the customer without any factory or other intermediate storage, and the containers are not opened during transport. Digital solutions and the comprehensive logistics solution, from the plant to the customer, enable high product quality and the full traceability required from the supply chain.

In 2022, as part of the development of the logistics chain, Terrafame and its partner VR Transpoint prepared for two-way transport, in which ammonium sulphate, a by-product of battery chemicals production, is transported by trucks to the harbour, and production chemicals for metals recovery are transported from the harbour to the production plant. Such transport is not carried out in Finland, and the transport volumes are high. The trucks run on natural gas and biogas, meaning that the carbon footprint of transport is low.

The selection of products manufactured by Terrafame will be expanded when the company starts uranium recovery by the summer of 2024. The company made the decision about uranium recovery in December 2022. Terrafame's production process enables the use of uranium found in small concentrations in ore as a by-product. A ready-built uranium recovery plant is located on Terrafame's industrial site, and the company is preparing the plant for operational use. The preparations require a total investment of around EUR 20 million. After the ramp-up phase, the recovery plant is expected to operate at full capacity by 2026.

Economic added value

Terrafame's operations generate both direct and indirect benefits for various stakeholders, particularly in the company's surrounding areas, but also more widely in Finland. Salaries and fees paid increase consumer demand, in addition to having positive multiplier effects on consumer products and services. The multiplier effects of Terrafame's operations also increase demand in other industrial sectors. In addition, tax-based revenues improve municipal economies and support the provision of municipal services. The most significant items of economic added value are presented in the figure on [page 24](#). Terrafame's tax footprint is discussed in more detail on [page 43](#) of the Board of Directors' review.



The environment and environmental permits

Terrafame seeks to continuously improve its environmental performance and reduce its environmental impact.

Environmental monitoring

Terrafame monitors the state of the environment on the industrial site in accordance with the permit decisions and the monitoring programme approved by the authorities.

Terrafame's annual environmental monitoring reports are available in Finnish on its [website](#).

The reports for 2022 are expected to become available in March 2023.

Sulphate loading of natural waterways is one of the most significant environmental impacts of Terrafame's production. The metal and sulphate concentrations of discharge waters, as well as sulphate loading, were in line with the environmental permit conditions in 2022.

The company has developed its operations in such a way that sulphate is recycled more effectively back into the process. The goal is to recycle 100% of the sulphate that ends up in the production process solution back into the production process solution circulation. The two-line run model that was introduced at the centralised water treatment plant in 2020 enables more efficient separation of runoff waters. Only low-sulphate runoff waters, to the extent that they are not used as raw water, are treated and directed out of the area.

Key indicators related to discharge waters	Actual 2022	Actual 2021
Purified discharge waters, Mm ³	9.42	8.86
Sulphate in discharge waters, tonnes (permit quota 16,300 tonnes)	12,763	14,492
Process-derived sulphate back into the leach cycle, % (target 100%)	100	100

Terrafame will report its key indicators related to environmental emissions in its Sustainability Review in the summer of 2023 on its [website](#).



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The most significant environmental risks in Terrafame's operations are related to leach cycle management and water management in bioleaching. Environmental safety related to process water management in bioleaching has a very high priority in the company's day-to-day operations. For example, the volumes and condition of the process solution ponds are continuously monitored as part of overall production monitoring.

In 2022, a significant portion of the leachate in the waste rock area was directed to bioleaching instead of water treatment. This reduced the amount of sulphate ending up in effluent.

To enhance water management efficiency, the discharge pipe's pumping capacity was increased during 2022. The increased capacity will increase the volume of purified water discharged from the industrial site, but the limit values for the harmful substance content of discharge waters will remain unchanged.

During 2022, the purification efficiency of water treatment was very good, in terms of metals in particular, similarly to the previous years.

Permits

On 20 June 2022, Terrafame announced that it had submitted its environmental permit application for the exploitation of Kolmisoppi and the expansion of the mining concession to the Regional State Administrative Agency for Northern Finland. Europe's largest nickel ore reserves are located in Terrafame's mining concession in Sotkamo. Zinc, cobalt and copper are also recovered from the ore. Since 2021, nickel and cobalt have been processed into battery chemicals at the company's battery chemicals plant for use in electric car batteries.

On 20 June 2022, the Regional State Administrative Agency for Northern Finland issued its decision on the environmental and water permit covering all Terrafame's operations – that is, the master permit. The master permit determines the scope of all operations (including new short-term plans), sets emission limits and defines an environmental provision for discontinued operations. The new permit also enables ongoing development projects to proceed as planned.

However, the permit decision will increase Terrafame's environmental provision from EUR 138 million to EUR 324 million, which is very high, even in international comparisons. In the third quarter, Terrafame filed an application with the Vaasa Administrative Court about accounting principles of the provision.



Personnel

Terrafame is a major employer

Terrafame is the largest industrial employer in the Kainuu region. The company continuously develops its operations to provide its own personnel and its partners' employees with a safe and healthy working environment. Around 1,500 people were regularly employed on Terrafame's industrial site during 2022. Terrafame had 763 (858) employees at the end of the year. The number of fixed-term employment relationships was 30 (56).

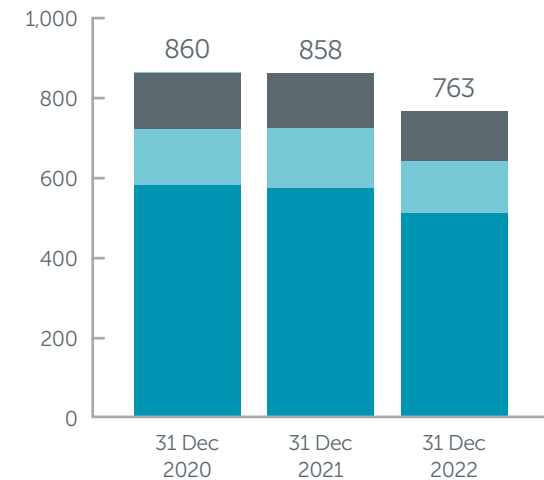
Terrafame is moving towards the battery chemicals business, but its traditional business operations must also be efficient and profitable as its business expands. Terrafame implemented a cost-saving programme at the beginning of the year. As part of the programme, change negotiations were carried out for reasons related to production and financial performance. The change negotiations led to a reduction of 65 person-years, including 42 redundancies.

The battery chemicals plant had a total of 133 employees at the end of the year. In addition, around 20 Terrafame employees worked in the battery chemical plant's support functions.

Between 2019 and 2022, Terrafame organised a two-year apprenticeship training programme leading to a vocational qualification in the process industry in cooperation with Kainuu Vocational College and Educational Consortium OSAO. There were three groups of students, and the third group, consisting of 23 students, graduated in April. A total of 67 people completed the apprenticeship training, and most of them secured a job with Terrafame after graduation. The company provided 90 people with a summer job. An average of 783 (883) people (calculated as FTEs) employed by contractors and subcontractors worked on the industrial site during the review period. The reduction in the number of external personnel was mainly due to a decrease in the number of people working for the battery chemicals plant construction project. In addition, reduction of purchased services in changed business circumstances was assessed during the change negotiations in the spring. More information about cooperation with partner companies is provided on [page 37](#) of the Board of Directors' review.

Terrafame employees

Active



- Senior salaried
- Salaried
- Hourly-paid



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Continuous development of leadership and management culture

In 2022, Terrafame continued its project to develop the company's safety and management culture and production reliability. The project strengthens a culture of continuous improvement through learning, inclusion and a systematic approach. The project was completed at the end of 2022, and the lessons learned will continue to be applied and further developed in the future.

Terrafame has more than 100 supervisors. Their supervisory skills and the management culture are developed continuously. For example, management principles created in cooperation between employees and managers were introduced in 2022. The members of the Leadership Team and middle management participated in training based on these principles. The management principles ensure consistent and high-quality management. During the year, the company started regular training to support supervisory work. A total of 17 training sessions were held. The trainings will continue in 2023. In addition, the performance management process was redesigned.

The development of corporate culture is reflected in safety at work in particular. In 2022, the accident frequency rate on the industrial site decreased from the previous year.

Highly competent employees are and will continue to be an important asset for Terrafame

The knowledge and skills of Terrafame's employees are developed systematically. Competence development needs and career path aspirations are identified during performance and development appraisals. Competence is developed through learning on the job, courses, degree programmes, internal job rotation and career development. Employees' commitment is strengthened by improving well-being at work.

In 2022, competence development focused on professional skills, sustainability, management and safety, among other aspects. During the year, 135 Terrafame employees pursued studies towards a partial or full qualification through apprenticeship training alongside their work. The most common qualifications pursued were basic, vocational or special vocational qualifications in the process industry, basic and vocational qualifications in the electrical and automation sector, and special vocational qualifications in production supervision. In addition, studies were undertaken towards vocational qualifications in vehicle mechanics, machine mechanics and maintenance. An average of 4.5 days of training per person was provided in the form of courses.



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In 2022, Terrafame started an extensive series of trainings on sustainability and the company's Code of Conduct and policies for all employees. A total of 2,333 hours of training on sustainability and policies were completed in 2022. In the autumn of 2022, the senior management and the middle management completed a three-day training programme on Terrafame's new management principles. Terrafame's supervisors will complete a similar training programme in 2023.

The safety training included statutory occupational safety and emergency first aid training, as well as Terrafame's new safety park for practising safe ways of working such as risk identification and early fire extinguishing.

Ensuring the availability of labour is important for the company. Terrafame cooperates closely with organisations and educational institutions to make its sector more attractive to prospective employees. Through internships, summer jobs and thesis opportunities, the company offers students opportunities to become future Terrafame employees.

Active cooperation and development of well-being

Employees are one of Terrafame's key stakeholder groups. They participate in operational development. Cooperation is very active at Terrafame. A total of 14 cooperation meetings between the management and employees were held in 2022.

Employee representatives were involved in all key management development projects in 2022. The most significant management development projects were the introduction of management principles, the redesign of the induction process, and the preparation of a diversity, equality and inclusion policy.

Terrafame requires each member of the workplace community to behave in a respectful and responsible manner and promote equality. Terrafame has zero tolerance for discrimination and inappropriate treatment. All suspected cases of inappropriate treatment or discrimination are investigated. A total of 12 investigations were conducted in 2022. Five cases of inappropriate behaviour and one case of discrimination were confirmed. These were addressed by means of guidance and sanctions.

Well-being consists of a variety of factors, including the opportunities for participation and development described above and good leadership. Terrafame also cooperates closely with its occupational healthcare provider.



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Terrafame regularly carries out workplace surveys involving occupational healthcare personnel. Health hazards, adverse health effects, stress factors and resources related to work, the working environment and the workplace community are assessed during the surveys. If necessary, targeted workplace surveys are conducted in a specific production department, for example.

A well-being programme is determined annually for Terrafame in cooperation between the management, employee representatives and the occupational healthcare provider. Within the framework of this well-being programme, Terrafame develops the management of well-being and structures and tools that support well-being, in addition to strengthening well-being skills in the workplace community.

In 2022, the well-being programme included body fitness index measurements and a group for the prevention of musculoskeletal disorders. Terrafame's employees have access to extensive occupational healthcare services. Digital services for mental well-being were added to the selection in 2022.

Partner companies

An average of around 150 long-term partner companies operated on Terrafame's industrial site during 2022. In addition to outsourced production work, production also involves significant purchases of materials, such as process chemicals and fuels. Terrafame's purchases of services and materials totalled around EUR 541 (426) million in 2022. Most of this consisted of purchases of materials and services related to the production process. Services and materials were purchased from more than 1,000 suppliers, most of which are located in Finland and elsewhere in the European Union.

Terrafame requires all its providers of services and suppliers of materials to operate on the basis of respect for human rights principles and values. Partners are expected to share the company's values, and to be committed to high-quality operations, safety and continuous improvement of efficiency. Terrafame's partners must also comply with its Code of Conduct, which determines the general responsibilities and obligations to be followed, as well as the sustainability policy and human rights policy. These are further specified by the company's more detailed operating guidelines. The Code of Conduct and the sustainability policy are available on the company's [website](#).

Terrafame assesses the operations of its partner companies through regular audits and evaluations conducted during the contract period, after the completion of work, and when selecting new partners through competitive bidding. A total of 5 (8) supplier audits were carried out in 2022. No significant shortcomings were detected during the audits.



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One partner meeting was held in 2022 to discuss the ramp-up of the battery chemicals plant, change negotiations, the project to develop safety and operational reliability, the safety bonus for Terrafame's employees (which takes into account partner companies' safety performance), the overall safety development of those working on the industrial site, and the assessment of suppliers. Representatives from around 40 partner companies were present at the partner meeting.

The company has a system in place to maintain a real-time register of the companies operating within the industrial site, as well as their subcontractors. The system monitors the companies in terms of the requirements of the Act on the Contractor's Obligations and Liability When Work Is Contracted Out. The companies are also monitored in terms of training requirements for employees. Significant omissions and violations are subject to sanctions, while good performance that promotes safety is rewarded. Partnerships are developed systematically over the long term, and partners who stand out with their responsible operations are invited to participate in tendering repeatedly.

In terms of partners, the most significant risks are related to any measures or omissions arising in the selection of partners and in the supply chain that violate Terrafame's policies and may result in financial losses, in addition to the risk of sanctions and reputation risk. The company's management and purchasing organisation play the most important role in terms of risk management. As far as possible, Terrafame seeks to identify any ethical risks related to business partners before establishing a partnership with them.

Human rights

In its human resources management, Terrafame complies with national rules and regulations, as well as international conventions on human rights and labour markets. The company respects freedom of association and abides by legally binding collective agreements. Employee participation and consultation have been organised in accordance with national rules and regulations. The company has adopted an equality plan, which is updated periodically. Terrafame promotes equal opportunities, equal employment and career development in the spirit of the Act on Equality between Women and Men and in compliance with Terrafame's Equality Plan. Terrafame has updated its processes, policies and guidelines on the processing of personal data to comply with the EU General Data Protection Regulation (GDPR).

Partners and all parties acting on their behalf are required to comply with current legislation on occupational health and safety. Suppliers and their subcontractors must agree to comply with all applicable national and international regulations concerning ethical and responsible business operations, such as the prevention of bribery, corruption and illegal work.

Terrafame's human rights policy is available on the company's [website](#).



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Whistleblowing channel

Everyone working on Terrafame's industrial site is responsible for the compliance of their own operations. Employees are encouraged to primarily contact their supervisor with any questions about compliance with or the interpretation of Terrafame's Code of Conduct or possible breaches of the Code of Conduct. The employees of partner companies can turn to their employer's contact person for Terrafame.

Terrafame has a whistleblowing channel in place. The channel is available for Terrafame's own employees and the employees of partner companies on the industrial site. Reports can also be submitted anonymously. Since the beginning of 2023, the whistleblowing channel has also been available for the company's external stakeholders on the [website](#).

The cases reported through the whistleblowing channel are transferred to the service provider's experts specialising in preventing and investigating misconduct. Terrafame has no access to the information provided through the separate online platform maintained by an external service provider.

Terrafame is responsible for ensuring that there will be no harmful consequences for employees reporting, in good faith, violations of the law or the company's Code of Conduct or other guidelines.

Four reports were submitted through the channel in 2022. Three of the reports were related to personnel matters, and one was related to safety. All cases have been investigated and processed appropriately. The reports had no financial or legal consequences. The company was not made aware of any cases related to human rights, financial misconduct, corruption or bribery during the year.



Occupational and process safety

Safety is one of the core values at Terrafame, and the continuous development of a safety culture has been one of the main priorities since the company started its operations. The company's management is committed to safety work, and safety is strongly promoted by the company's Management Team and Board of Directors. Terrafame has a safety bonus system, which applies to all employees and is used to reward good safety performance.

Safety at work

Operations within the industrial site must be safe for both the company's own employees and those of its partners in all circumstances and situations. We aim for zero accidents.

In Terrafame's operations, the most significant occupational safety risks are related to maintenance and construction work, large machinery and the use of chemicals. However, most injuries are sustained during normal installation work, or as a result of slipping and falling in yard areas, for example.

Occupational safety indicators, 12-month LTIFR1	2022	2021	Change, %
Accident frequency rate, Terrafame employees	4.3	5.5	-21.2%
Accident frequency rate, partner companies	8.5	11.8	-28.0%
Total accident frequency rate on the industrial site	6.4	8.9	-28.1%

The operating culture development project, which started in late 2020 and was completed at the end of 2022, had a positive impact on safety at work: lost-time accidents among Terrafame's employees decreased considerably during 2022. Special attention was paid to the development of partners' safety culture, and the accident frequency rate of our partner companies' employees fell below 10 for the first time in the history of Terrafame's operations.

An updated safety bonus was introduced at the beginning of 2022: its structure also takes into account accidents among partner companies' employees. This change encourages all our employees to address any unsafe ways of working in their area, including cases that concern an employee of a partner company. We closely monitor our partners' occupational safety performance, and we have also established separate incentive and sanction systems for them.



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For example, all employees are subject to regular occupational hygiene measurements in accordance with the department-specific plans, and inspection and counselling visits are made to various work areas. According to the biomonitoring results for 2022, the total concentration of nickel in the urine of Terrafame employees largely corresponds to the average concentrations in Finland. In terms of water-soluble nickel, there were some slight deviations during the ramp-up phase of the battery chemicals plant. The battery chemicals plant's employees have been provided with enhanced guidelines and training on occupational hygiene.

Terrafame also requires its partner companies operating within the industrial site to organise regular biomonitoring in the same manner as Terrafame conducts the biomonitoring of its own employees.

Process safety

In terms of process safety, the most significant risks are related to the use and manufacture of chemicals, as well as changes in processes. With regard to process safety, it is important that processes are run smoothly without any unexpected ramp-ups or shutdowns.

Systematic risk assessment work and development work in process safety continued during 2022. The network of chemical use supervisors and various process safety practices such as change management were developed on the industrial site. Terrafame's industrial fire brigade and mine employees, as well as the partner companies operating in the mine, organised a joint internal rescue exercise in the autumn. Terrafame's own rescue unit also operates in a specific area outside the industrial site as a contracting unit of the Kainuu rescue department.

Information security

Terrafame takes the various aspects of information security into account when developing its systems. The need for data processing is assessed, case by case, in preparing both technical and administrative measures. Solutions are selected and operations developed to ensure that high information security requirements are met. Information security risks are identified, assessed and addressed. Various technical methods for security risk management are applied, including firewalls, email scanning, antivirus protection and multi-factor authentication. Operating processes are developed and employees are kept informed and urged to be careful and maintain a healthy distrust with regard to opening links and attachments.



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This development is managed by an information security team of experts from different departments. Information security work is divided into themes in accordance with the annual calendar, and these themes are addressed regularly.

In 2022, information security was improved in terms of systems, technology and staff awareness. Preparations to meet the requirements of the ISO 27001 standard were started towards the end of the year. The goal is for Terrafame's information security management to meet the standard requirements in 2024. Opportunities to detect and respond to information security vulnerabilities were also improved during the year. In addition, two internal email scam exercises were organised to collect information about Terrafame employees' awareness of security risks.

Trafigura, Terrafame's second largest shareholder, has also been involved in increasing Terrafame's capacity to respond to information security risks. For example, Trafigura has assisted in carrying out technical scans of Terrafame's external services.

Tax footprint

Terrafame's commitment to accountability also extends to tax matters. Terrafame has an important social duty and a regional role to play, especially in the Kainuu region. The company only operates in Finland and does not, therefore, pay taxes in other countries.

Tax footprint reporting is based on the guidance on tax reporting issued on 1 October 2014 by the Government Ownership Steering Department of the Prime Minister's Office. The report excludes mandatory insurance premiums that are included in salary costs. These insurance premiums, which are directly related to salaries, are dealt with as direct salary costs, due to the nature of these kinds of insurance. The company does not report small amounts of value-added tax included in foreign travel and training costs.

Terrafame started the ramp-up of production in 2015, and the company does not yet have any taxable income. However, a considerable amount of tax expenses have accumulated due to the energy and fuel taxes related to the companies' operations. In addition, the company has paid taxes related to the acquisition and ownership of assets, as normal.



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Tax categories of Terrafame Ltd in 2022 and 2021 (EUR 1,000)

Taxes paid	2022	2021
Direct taxes paid	1,824	1,505
Income taxes, operating at a loss	0	0
Asset transfer taxes	12	22
Property tax	665	650
Employer's health insurance contributions	593	659
Parafiscal charges	553	174
Indirect taxes paid	5,794	3,287
Electricity taxes, net	341	-1,975
Electricity taxes	341	311
Electricity taxes, return	0	-2,286
Insurance premium tax	554	536
Fuel taxes, net	4,896	4,723
Fuel taxes	5,525	5,478
Fuel taxes, return	-629	-755
Waste tax	2	3
Taxes collected and accounted for	3,203	20,002
Tax withheld in advance	9,924	9,737
Value-added tax, net	-6,721	10,265
Value-added tax, sales	97,952	99,712
Value-added tax, purchases	-104,673	-89,447
Total	10,821	24,794
Ratio of tax payments to net sales	1.85%	6.55%

On 31 December 2022, the company had unrecognised deferred tax assets of approximately EUR 23.5 million. Deferred tax assets are made up of previous fiscal years' confirmed but unused tax losses that remain after the estimated taxable income for the fiscal year 2022.



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Terrafame's strategic goal is to enhance low-carbon mobility with responsible battery chemicals. The company's battery chemicals production is based on its own mining operations and metal processing, in which the key strategic goal is for the company to be among the world's top quartile of nickel producers in terms of cost-effectiveness.

Sustainability, traceability, a small carbon footprint and reliable deliveries in the supply chain are the core strengths of our strategy. Traceability is made possible by a unique combination of a mine and a battery chemicals plant. Located on the same industrial site, the integrated whole provides customers with a traceable production chain. This ensures sustainability, which is appreciated by global electric vehicle customers.

The bioleaching method is of primary importance in terms of strategy implementation. It enables us to reduce our customers' carbon footprints and improve our cost-effectiveness.

Our reliable deliveries are based on Europe's largest nickel reserves. The large reserves and one of the world's largest battery chemicals plants ensure reliable deliveries to global customers.

The competitive factors described above have made Terrafame a leader. Strengthening this leadership is an integral part of our strategy. That is why highly competent employees and partners are strategic competitive factors that drive the company forward. Our values – safety, commitment and efficiency – are therefore necessary for the realisation of the purpose of our operations.



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Research and development

Terrafame carries out process research and development mainly in connection with its normal business operations, and the development measures qualify as ordinary business expenses. During 2022, the focus areas for process development included ensuring the bioleaching process, supporting the ramp-up of the battery chemicals plant and enhancing metals recovery.

Research is also carried out in separate research projects, which are typically longer-term strategic projects. During 2022, the main research projects were:

1. Increasing the production volume and expanding the product portfolio,
2. Research on closure structure,
3. Investigation of the use of alternative alkali,
4. Adding recycled granules in Terrafame's process and
5. Uranium recovery process.

Research on enhancing the bioleaching process by means of microbiological and mineralogical techniques continued in 2022 with the aim of maximising the output. With regard to this, the ore fine-crushing study was continued to explore the possibility of enhancing the efficiency of bioleaching by producing microcracks in ore. The pilot project on further developing the secondary leaching phase that was started in 2020 was brought to completion during the year. In addition, bioleaching heaps were studied to develop agglomeration, aeration and irrigation processes.

In 2021, a study to increase microbiological activity was started in which the effect of fertiliser on bioleaching was investigated. In 2022, the study proceeded to production-scale experiments. The goal was to gain an understanding of the stimulating effect of added fertiliser on bacterial activity, as well as to identify critical limit levels. Based on the promising preliminary results, the experiments will be continued and a decision on deployment will be made on the basis of additional results.

Since 2017, Terrafame has been conducting surface structure experiments in secondary leaching and in the waste rock area to study various ways of covering these areas in the future. The monitoring of production-scale experimental fields that was started in 2021 was continued during 2022. In addition, chemical modelling of the long-term impact of closing measures was continued.



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Terrafame is closely involved in developing European and Finnish battery strategies. As part of the European IPCEI project, the company continued the development of process sample and end product analytics related to the ramp-up of the battery chemicals plant process and quality assurance in cooperation with the in-house laboratory and external laboratories. The project was completed in 2022. For Terrafame, the timing of the project was optimal as it coincided with the ramp-up of the battery chemicals plant. As a result, process sampling, analysis methods and the quality of the final products were verified. Terrafame is also involved in national research projects, such as the BATCircle 2.0 project coordinated by Aalto University. The project examines the possibility of using by-products and recycled materials in battery chemicals production in the future.

Significant events after the end of the financial period

Terrafame and Stellantis signed an agreement on the supply of nickel sulphate for electric vehicle batteries

In January 2023, Terrafame and Stellantis announced that they had signed an agreement on the supply of nickel sulphate for electric vehicle batteries. Beginning in 2025, Terrafame will supply nickel sulphate to Stellantis over the five-year term of the agreement. The agreement with Terrafame is part of Stellantis' decisive electrification strategy and will cover a significant portion of the company's need for sustainable locally sourced nickel.

Umicore and Terrafame signed a long-term agreement on the supply of nickel sulphate

In February 2023, Umicore and Terrafame announced that they had signed a long-term agreement on the supply of nickel sulphate. Commercial deliveries have already started after a successful qualification process, and delivery volumes will be increased during 2023.



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Estimate of major risks and uncertainties

The company's operations are affected by various general risks related to industrial operations, including the impact of environmental permits and other official permits, as well as taxes and fees, on the company's costs. The schedules and conditions related to various permits also bring uncertainty to operations. The most significant business risks include changes in exchange rates, nickel prices and zinc prices, as well as the counterparty risk related to customers and other business partners and the risks related to the prices of significant raw materials and electricity. The key risks related to Terrafame's production operations are associated with occupational safety and the environmental safety of processes.

Significant risks identified during risk assessments are reduced by technical improvements, investments and competence development, for example.

Outlook for 2023

- ▶ The ramp-up of production at the battery chemicals plant continues.
- ▶ The price development of base metals and battery chemicals involves considerable uncertainty.
- ▶ Terrafame continues to improve its occupational safety, operational efficiency and profitability.

Board of Directors' proposal for the disposal of result

Terrafame Ltd's result for the financial period for 2022 shows a profit of EUR 62,957,415.22. On 31 December 2022, Terrafame's distributable equity totalled EUR 437,069,280.37. The Board proposes that the profit be transferred to the retained earnings/loss account and that no dividend be paid.



Key figures and formulas for calculating the figures

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Scope of operations	2022	2021	2020	2019	2018
Net sales, MEUR	584.4	378.4	338.3	310.4	325.8
Balance sheet total, MEUR	1,128.1	1,006.7	918.5	749.5	681.6
Total capital expenditure, MEUR	83.0	117.9	201.8	130.6	81.5
as % of net sales	14.2	31.2	59.7	42.1	25.0
Average number of personnel	840	910	833	722	669
Profitability					
EBITDA, MEUR	152.1	-48.8	23.8	32.0	32.8
EBITDA-%	26.0	n.a.	7.0	10.3	10.1
EBIT	93.9	-95.3	-16.9	-5.6	3.0
EBIT-%	16.1	n.a.	n.a.	n.a.	0.9
Net profit	63.0	-115.8	-8.2	-15.2	-6.2
Profitability, excl. non recurring items					
EBITDA	152.1	24.2	23.8	32	32.8
EBITDA-%	26.0	6.4	7	10.3	10.1
EBIT	93.9	-22.4	-16.9	-5.6	3
EBIT-%	16.1	n.a.	n.a.	n.a.	0.9
Solvency					
Equity ratio, %	38.9	38.2	48.1	46.7	53.6
Net gearing, %	44.7	42.6	31.0	31.7	-0.9

Equity ratio:

$(\text{Equity} + \text{minority interest}) \times 100 /$
 $\text{Balance sheet total} - \text{short-term and}$
 $\text{long-term advance payments received}$

Net gearing:

$(\text{Interest bearing debt} - \text{cash funds}) \times 100 /$
 $\text{Equity} + \text{general provisions}$

Terrafame has adopted the IFRS 16 Leases standard as permitted by section 5:5b of the Finnish Accounting Act and by the IAS Regulation (EU) in its financial accounting effective 1 January 2019, using the simplified approach. The cumulative impact of the implementation of the standard has been recognized on the balance sheet and the comparative figures have not been restated. The comparative figures for 2017-2018 regarding lease liabilities are presented according to the Finnish Accounting Act.



Financial Statements

1 January – 31 December 2022

Balance sheet

Assets (EUR 1,000)

Non-current assets	Note	31 Dec 2022	31 Dec 2021
Intangible assets	2.1	305	440
Tangible assets	2.2	697,125	671,947
Non-current assets		697,431	672,387
Current assets			
Inventories	2.3	288,908	233,854
Long-term receivables			
Deferred tax assets	2.4	14,202	11,486
Short-term receivables			
Amounts owed by group companies	2.5	35	60
Trade receivables		66,701	24,150
Other receivables		897	174
Prepayments and accrued income	2.6	14,399	1,088
Cash and cash equivalents		45,501	63,466
Current assets		430,642	334,279
Assets total		1,128,072	1,006,666



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Equity and liabilities (EUR 1,000)

	Note	31 Dec 2022	31 Dec 2021
Equity	2.7		
Subscribed capital		2,000	2,000
Other reserves			
Invested unrestricted equity		802,610	800,469
Fair value reserve	2.8	-56,806	-45,945
Retained earnings (loss)		-371,692	-255,857
Loss of the financial year		62,957	-115,834
Equity		439,069	384,832
Provisions	2.9	232,024	232,024
Long-term liabilities			
Loans from credit institutions	2.10	102,163	115,917
Deferred tax liabilities	2.11	0	0
Long-term liabilities		102,163	115,917
Short-term liabilities			
Amounts owed to group companies	2.12	369	395
Loans from credit institutions	2.13	139,700	111,492
Trade payables		105,007	72,233
Other liabilities		1,239	10,802
Accruals and deferred income	2.14	108,502	78,973
Short-term liabilities		354,816	273,893
Liabilities total		456,979	389,811
Equity and liabilities total		1,128,072	1,006,666



Income statement (EUR 1,000)

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	Note	2022	2021
Net sales	3.1	584,414	378,448
Cost of goods sold	3.2	-453,603	-368,971
Gross profit		130,810	9,477
Sales and marketing expenses	3.3	-2,406	-3,030
Administrative expenses	3.4	-21,184	-20,098
Other operating revenues		5,599	1,937
Other operating expenses	3.5	-18,906	-83,632
Operating profit/loss		93,913	-95,345
Financial income and expenses	3.6		
Interest income and other financial income		3,926	1,396
Interest and other finance expenses		-34,882	-21,885
Financial income and expenses		-30,956	-20,490
Profit/Loss before tax		62,957	-115,834
Profit/Loss for the financial year		62,957	-115,834



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Cash flow statement (EUR 1,000)

Cash flow from operating activities	2022	2021
Result for the financial period	62,957	-115,834
Adjustments		
Depreciation and amortisation	58,192	46,585
Unrealised foreign exchange gains and losses	9,031	14,297
Other income and expenses, non-cash items	0	72,947
Financial income and expenses	21,571	6,192
Other adjustments	0	-76
Cash flow before change in net working capital	151,752	24,111
Change in net working capital		
Change in trade and other receivables; increase (-) / decrease (+)	-42,892	-2,215
Change in inventories; increase (-) / decrease (+)	-55,054	-13,368
Change in trade payables and other liabilities; increase (-) / decrease (+)	15,980	31,011
Cash flow before financial items and income tax	69,786	39,539
Interest paid and other financial expenses	-20,396	-4,317
Interest received, operational	2,409	66
Cash flow from operating activities (A)	51,798	35,288
Cash flow from investing activities		
Investments in tangible and intangible assets	-75,517	-136,981
Proceeds from sale of tangible and intangible assets	0	79
Cash flow from investing activities (B)	-75,517	-136,902



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Cash flow statement (EUR 1,000)

Cash flow from financing activities	2022	2021
Paid increase in equity	0	92,000
Proceeds from long-term borrowings	75,769	17,298
Repayment of long-term borrowings	-84,288	-111,124
Proceeds from short-term borrowings	84,288	111,124
Repayment of short-term borrowings	-67,077	-74
Repayment of short-term lease liabilities	-4,013	-4,119
Cash flow from financing activities (C)	4,678	105,106
Impact of exchange rate changes on the amount of foreign currency cash	1,076	1,329
Change in cash and cash equivalents; increase (+) / decrease (-)	-19,040	3,491
Cash and cash equivalents at the beginning of the period	63,466	58,646
Cash and cash equivalents at the end of the period	45,501	63,466



1. Accounting principles

Terrafame Ltd is domiciled in Sotkamo, Finland. Terrafame is a group company of Finnish Minerals Group, whose parent company is Suomen Malmijalostus Oy, Helsinki, Finland. Terrafame Ltd's financial statements are available on the company's website at www.terrafame.com. Copies of the Finnish Minerals Group's consolidated financial statements are available at the Group's office (Keskuskatu 5 B, 8th floor, 00100 Helsinki, Finland), and they can be viewed on the Group's website at www.mineralsgroup.fi.

Basis of preparation

The company has prepared its annual accounts in accordance with Finnish accounting legislation and Finnish Accounting Standards (FAS). The financial statement information is reported in tables and related texts in thousands of euros and in the report of the Board of Directors in millions of euros to one decimal place. The comparative figures reported in brackets are figures for the financial period 2021. All the presented figures have been rounded according to general rounding rules, so the sum of the individual figures may be different from the sum presented. Key figures have been calculated using exact values. Comparative information has been adjusted where necessary to correspond with the information of the year under review.

Translation of items denominated in foreign currencies

Transactions in foreign currencies are entered in euros at the rates prevailing at the transaction date or average rates provided by central banks. Foreign currency-denominated receivables and liabilities have been translated into euros using the rates prevailing at the balance sheet date. Foreign exchange gains and losses related to business operations are included in the corresponding items of net sales, operating expenses or financial income and expenses.

Revenue recognition

Terrafame Ltd sells battery chemicals, fertilizers and metal intermediates. Battery chemicals include nickel sulphate and cobalt sulphate, fertilizers include ammonium sulphate both in liquid form and as crystals. Metal intermediates include nickel-cobalt sulphide, zinc sulphide and copper sulphide.

Revenue is recognised from a sale when evidence of an arrangement exists, the title has been transferred to the customer, the price is determinable, and collection of the sales price is reasonably assured. Revenue is recognised net of sales-related foreign exchange gains and losses and any applicable sales taxes. Most sales are priced in US dollars. The time of revenue recognition is determined on the basis of the terms of delivery used.



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A large proportion of the company's production is sold under long-term contracts, but sales revenue is only recognised on individual sales when persuasive evidence exists that all of the following criteria have been met:

- › all material risks and rewards of ownership have been transferred to the buyer;
- › there is no continuing managerial involvement to the degree usually associated with ownership or effective control over goods sold;
- › the amount of revenue can be reliably determined;
- › the costs incurred or to be incurred in respect of the sale can be reliably determined; and
- › the flow of future economic benefits to the seller is probable.

In connection with metal intermediates delivery, a preliminary invoice is drawn up based on preliminary analysis and measurement results and the market prices of the month preceding the month of delivery. Preliminary invoices are entered as sales. The final analysis and measurement results are normally obtained within a few months. Any preliminary invoices are adjusted based on the final analysis and measurement results. Furthermore, the prices of delivered metals are adjusted to correspond to the market prices of the agreed pricing period.

In connection with battery chemicals delivery, a preliminary invoice is drawn up based on preliminary analysis and measurement results and the market prices of the month preceding the month of delivery. Preliminary invoices are entered as sales at the date of embarkation. Any preliminary invoices are adjusted to correspond to the market prices when the price for the period is available. In connection with the fertilizer delivery an invoice is drawn and entered as sales.

With regard to preliminary invoices for which final analysis and measurement results that are required in the sales contracts have not yet been obtained, the sales prices and euro-denominated valuations are adjusted so as to correspond to the average market prices of the month of the financial statements and the exchange rates at the date of closure of the accounts. With regard to these deliveries, the company also considers the need to make write-downs due to the changes in market prices or in analysis and measurement results. Such write-downs were not made in the financial statements of 31 December 2022. The metal hedges for metal tonnes sold have been taken into account in the valuation of sales.



Pension obligations

The company has pension schemes in accordance with local conditions and practices. These are arranged with an external insurance company. Pension costs are entered as expenses in the year in which they accrue.

Deferred tax assets and liabilities

Deferred tax assets and liabilities are calculated on temporary differences between the book value and taxable value, using the tax rates enacted by the balance sheet date. Deferred tax assets arising from taxable losses carried forward are recognised up to the amount for which there is likely to be taxable income in the future, and against which the temporary difference can be used. Deferred tax assets or tax liabilities with respect to the fair values of derivative contracts have been recognised in the company's balance sheet. Deferred tax assets and liabilities recognised according to adaptations of Section 5:5b of the Finnish Accounting Act are presented in the notes to the income statement.

Tangible assets

Tangible assets have been recognised in the balance sheet at cost, less planned depreciation. Interest and financing costs relating to significant investment projects are capitalised in accordance with the Section 4:5.2–3 of the Finnish Accounting Act. Non-current tangible assets include, among other things, buildings, infrastructure, machinery and equipment used in mining and metal recovery operations, laboratory equipment, vehicles, roads, power lines and structures for environmental protection. Acquisition cost includes expenditure that is directly attributable to the acquisition, construction or production of the item.

Non-current assets bought from the bankruptcy estate of Talvivaara Sotkamo Ltd on 15 August 2015 have been amortised in accordance with the original depreciation plan by applying the normal planned depreciation periods, with the exception that a write-down was made on the acquired tangible assets: the net expenditure of acquired tangible assets as at 15 August 2015 was approximately EUR 202.6 million, on which a write-down of EUR 76 million was made, and the acquired tangible assets were entered in the company's balance sheet in the amount of EUR 126.6 million.

Spare parts with a useful life of more than one year have been recognised in non-current assets as of the 2017 financial statements. On 31 December 2022, their value totalled EUR 15.0 (14.5) million.



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Where parts of an item of tangible assets have different useful lives, they are accounted for as separate items.

Utilising the ore reserves in the areas specified in the mining plan requires surface material to be moved and waste rock to be mined in the open pit. Resulting costs for moving the surface material and waste rock mining have been capitalized and will be depreciated by using units of production method as the mining of recognised ore reserves progresses according to mining plan.

Work in progress or land are not depreciated. Depreciation on other assets is calculated using the straight-line method to allocate their cost over their estimated useful lives, as follows:

Asset type	Depreciation period
Roads and power lines	25 years
Buildings and structures	10–40 years
Leaching heap base structures	10–30 years
Machinery and equipment	4–25 years
Furniture, fixtures and fittings	5–10 years
Vehicles	5–10 years
Fixed asset spare parts	3 years
Structures for environmental protection	25 years

Carrying amounts are reassessed in connection with each financial statement. The reassessment is based on the company's estimates of ore reserves, mineral resources, production capacity and other relevant factors.

Gains and losses on disposals are determined by comparing the proceeds with the book value and are recognised within other operating income or expenses, respectively, in the income statement.



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Implementation of the IFRS 16 Leases standard

Terrafame has applied the IFRS 16 Leases standard as permitted by section 5:5b of the Finnish Accounting Act and by the IAS Regulation (EU) in its financial accounting starting from 1 January 2019, using the simplified approach.

The standard requires that all leases be recognized on the lessee's balance sheet. As a lessee, the company is required to recognize a right-of-use asset representing its right to use the underlying leased asset and, correspondingly, a lease liability representing its obligation to make lease payments, in its balance sheet. The right-of-use asset is depreciated in accordance with a depreciation schedule determined on the basis of the lease term or useful life of the asset. Interest on a lease liability is presented in finance expenses.

The company applies the standard's exemption to the assets of short-term leases and leases of low-value and these are not recognized as right-of-use assets and lease liabilities on the balance sheet. As a result, the payments associated with such leases are recognized as an expense in the income statement on a straight-line basis over the lease term. From the lessor's point of view, lease agreements are still divided into two categories: finance leases and other leases. The company has not concluded any significant agreements as a lessor. These agreements are classified according to IFRS 16 as other leases.

As a result of the adoption of the standard, the company has recognized right-of-use assets on its balance sheet under machinery and equipment on the basis of lease liabilities concerning vehicles and mobile mining equipment.

Other intangible assets

Other intangible assets are recognised in the balance sheet at cost, less planned amortisation. Other intangible assets mainly comprise IT applications and geological data supporting the company's business operations, which are amortised over 3–5 years.



Research and development expenditure

Research expenditure is recognised as an expense as incurred. The company has not capitalised development expenditure during the financial period 2022 or earlier.

Inventories

The company classifies its inventories into three groups: raw materials and consumables, work in progress, and finished products.

Raw materials and consumables are valued at the average acquisition cost of the goods in stock. A so-called write-down on slow-moving items is made on the slow-moving goods in the raw materials and consumables inventory. If an item has been in stock for more than a year, a write-down of 25 per cent is made. The write-down increases 25 percentage points annually, so the value of an item that has been in storage more than four years is zero.

Work in progress and finished products (metal content for sale) are presented in the balance sheet as valued at actual production costs but up to the net realisable value of the products on the balance sheet date. Net realisable value refers to the estimated selling price in the ordinary course of business, less the production costs necessary to making work in progress and finished products ready for sale.

The acquisition cost of work in progress and finished products (production cost) includes the fixed and variable costs of production and maintenance that supports production, as well as depreciation on these functions, based on the realised production costs in the production process. The acquisition cost excludes borrowing costs.

Work in progress in metal intermediates business includes the metals in the ore in the primary and secondary heaps, as well as the metals in the leaching process or the metal precipitation and filtration process that can be processed for sale as a finished product. Work in progress at the battery chemicals business includes nickel-cobalt sulphide, which is used as a raw material in processing and is measured in accordance with the level of completion of the main phases of the production process (pressure leaching, solvent extraction and crystallisation).



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The amount of metal contained in work in progress is measured by calculating the metal tonnes added to and removed from the production process (inventory of work in progress). The recoverable quantities of nickel, zinc, copper and cobalt included in work in progress are determined based on the estimated ore concentrations based on geological studies, the estimated recovery percentages of metals in the bioheap leaching process and the recovery percentages of the metals recovery plant, and based on the battery chemicals plant.

Ore concentrations, the amount of metals in the production process and the metals recovery percentage are reviewed monthly.

The metal intermediates inventory on 31 December 2022 was measured at acquisition cost, on a cost basis, at EUR 3.7 million, because the net realisable value was higher than the cost-based value. Since the 2017 financial statements, work in progress for metal intermediates has been measured on a cost basis whenever the cost-based value is lower than the net realisable value. The value of work in progress in metal intermediates business measured on a cost basis on 31 December 2022 was EUR 236.8 million, and the value of work in progress in battery chemicals production measured at net realisable value was EUR 5.0 million. The inventory of finished sulphated products of the battery chemicals business on 31 December 2022 has been measured at net realisable value, EUR 12.2 million, because the unit costs in the ramp-up phase of production are higher than the net realisable value.

The value of inventories determined in accordance with the principle of net realisation value includes discretionary factors related to, for instance, the measurement of metal volume in work in progress, metals recovery percentages, production costs, the production time necessary to complete sales, and sales prices.



Derivatives and hedge accounting

Derivatives

The derivatives used by the company were acquired for hedging purposes, and hedge accounting has been applied to them. Any unrealised change in the value of derivatives that are considered effective hedges are recognised, in accordance with Section 5:2a of the Finnish Accounting Act, at fair value in the balance sheet's fair value reserve as per the valuation report for the last day of the reporting period. The fair values of derivatives are based on valuations of external counterparties.

The realised earnings-related impacts of changes in the value of effective hedging instruments that are covered by hedge accounting are presented uniformly with the hedged item. In the event of any ineffective hedging, changes in the fair value of hedging instruments are recognised in profit or loss.

Hedge accounting

The company applies hedge accounting in accordance with Section 5:2a of the Finnish Accounting Act to all hedging instruments it holds. At the beginning of the hedging arrangement, the relationship between each hedging instrument and the hedged asset, as well as the risk management objectives, are documented by hedging instrument type. The effectiveness of the hedging relationship is assessed at the beginning of hedging and in quarterly accounts at a minimum.

Cash flow hedging

The company's hedging activities are entirely focused on cash flow hedging. The effective portion of changes in the fair values of derivatives acquired for the purpose of hedging forecasted cash flows are recognised in the fair value reserve under equity. Changes in fair value are recognised in profit or loss for the same periods in which hedged cash flows affect the result.

Provisions

Provisions are recognised when the company has a present legal or constructive obligation as a result of past events, and when it is probable that an outflow of resources will be required to settle the obligation and a reliable estimate of the amount of the obligation can be made.

A provision is made for mine closure costs and legal claims on the following conditions: the obligation relates to a closed or prior financial period, its materialisation is deemed certain or likely upon preparation of financial statements, the corresponding income is neither certain nor likely, the obligation is based on law or commitment to third parties, and the obligation can be identified but its precise amount or time of realisation is not known.



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Rehabilitation provision for mine closure and environmental clean-up costs

Terrafame has prepared for the costs generated by the closure measures with an environmental provision, which is included in the balance sheet and updated annually.

Where applicable, the provision complies with the collateral stipulated in the environmental permit as well as the area-based cost estimate for the closure issued by the Regional State Administrative Agency for Northern Finland.

A rehabilitation provision for mine closure costs is made with respect to the estimated future costs of closure and restoration, and for environmental restoration and rehabilitation to the condition required by the environmental permits granted for mining operations.

Prevention of the threat of environmental pollution entails environmental and landscaping obligations. After mining operations have ceased, any machinery and equipment, chemicals, fuels and waste involving the risk of environmental pollution must be removed from the site. This will be carried out as part of normal mining operations. In addition, open pits must be restored to the condition required by public safety.

The majority of the estimated restoration costs arises from the closure of waste rock dumps and primary and secondary leaching areas, the treatment and clean-up of primary and secondary leaching solution channels, the construction, covering and landscaping of gypsum ponds, treatment of seepage waters, the fencing of open pits and the ex post supervision of the mining site.

The mine closure plan is based on the covering of areas with water- and oxygen-impermeable material, and long-term aftercare. It is assumed that environmental monitoring of the mine will continue for 30 years after closure of the mine.

Restoration costs have been estimated in accordance with the cost level at the date of closure of the accounts.

The bioleaching method used by Terrafame is of such a nature that the process cannot be stopped abruptly at the end of operations. In order to ensure environmental safety, bioleaching must be continued until most of the metals have been recovered at the metals production plant. Also, the safe management of solution circulation requires a phased ending. Mining and ore crushing will be terminated after the closure decision.



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The shutdown of bioleaching and metals recovery processes is expected to last approximately three to four years. During the first two years, primary phase leaching will be terminated, and primary leaching ore will be transferred to the secondary heap in accordance with permit requirements. In the first two years, the metals production plant will be operated normally on hydrogen sulphide precipitation, and the resulting metals will be sold. During this time, detailed closure plans will be drawn up, and regulatory processes required for closure will be initiated.

After the third year, bioleaching will still be operational in secondary leaching, and when the metal concentrations of the solution decrease, the metals production plant will transfer to sodium hydrogen sulphide precipitation, which will continue to produce small amounts of product for sale. This phase is estimated to last from one to two years, after which the bioleaching and the operations of the metals production plant will be discontinued, and the dilute solutions formed will be treated either at the central water treatment plant or by any other suitable purification method.

An environmental provision for the closure of the mine of EUR 232.0 million has been set to cover the closure costs for thirty years from the date the actual closure measures commence. The environmental provision covers, for example, closure of bioleaching areas, necessary soil rehabilitation measures, solution and water management, and environmental monitoring. It is estimated that the central water treatment plant will be used for around ten years, after which lighter purification methods will be adopted. The company assesses the amount of the environmental provision annually. The assumption is that a decision on the closure of mining operations would have been made at the balance sheet date.



2. Notes to the balance sheet

2.1. Intangible assets (EUR 1,000)

	Intangible rights	Other capitalised long-term expenditures	Investments in progress	Total
Carrying amount at 31 Dec 2021	307	133	0	440
Gross carrying amount at 1 Jan 2022	2,547	324	0	2,871
Increase	0	0	40	40
Capitalisation for the year	0	0	0	0
Gross carrying amount at 31 Dec 2022	2,547	324	40	2,911
Accumulated amortisation and impairment losses				
At 1 Jan 2022	2,240	191	0	2,431
Amortisation for the year	139	36	0	175
Accumulated amortisation and impairment losses				
At 31 Dec 2022	2,379	227	0	2,606
Carrying amount at 31 Dec 2022	168	97	40	305



2.2. Tangible assets (EUR 1,000)

	Land	Buildings	Machinery and equipment	Other tangible assets	Construction in progress	Total
Carrying amount at 31 Dec 2021	3,213	110,088	277,487	214,732	52,614	658,135
Gross carrying amount at 1 Jan 2022	3,213	134,720	385,486	262,503	52,614	838,537
Increase	227	104	10 536	0	73,320	83,187
Capitalisation for the year	0	70	16,599	28,431	-45,101	0
Transfers	0	0	0	0	0	0
Decrease	0	0	0	0	0	0
Gross carrying amount at 31 Dec 2022	3,440	134,895	412,621	290,934	79,834	921,724
Accumulated amortisation and impairment losses at 1 Jan 2022	0	24,632	107,999	47 771	0	180,402
Decrease	0	0	0	0	0	0
Amortisation for the year	0	6,498	35,125	13 078	0	54,701
Depreciation for reductions	0	0	0	0	0	0
Accumulated amortisation and impairment losses at 31 Dec 2022	0	31,130	143,124	60 849	0	235,103
Carrying amount at 31 Dec 2022	3,440	103,765	269,497	230,085	79,834	686,621



2.2. Tangible assets (EUR 1,000)

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	Machinery and equipment Right-of-use assets	Total
Carrying amount at 31 Dec 2021	13,812	13,812
Gross carrying amount at 1 Jan 2022	21,323	21,323
Increase	8	8
Decrease	0	0
Gross carrying amount at 31 Dec 2022	21,332	21,332
Accumulated amortisation and impairment losses at 1 Jan 2022	7,511	7,511
Decrease	0	0
Amortisation for the year	3,316	3,316
Depreciation for reductions	0	0
Accumulated amortisation and impairment losses at 31 Dec 2022	10,827	10,827
Carrying amount at 31 Dec 2022	10,505	10,505



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IFRS 16 Leases standard notes (EUR 1,000)

Maturity analyses	2022	2021
No later than 1 year	5,887	4,367
Later than 1 year and no later than 5 years	1,034	6,898
Over 5 years	0	0
Carrying amount at 31 December 2022	6,921	11,265

Items recognised in profit or loss

Expenses from low-value asset leases (which are not short-term leases);	63	42
Expenses from short-term leases;	5,794	4,228
Depreciation by item class (machinery and devices)	3,316	3,043
Interest losses from leasing liabilities	308	416

Above lease expenses costs are included in Other operating expenses

Items booked in Cash flow statement

Payments from lease agreements total	5,552	5,132
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2.3. Inventories (EUR 1,000)

	31 Dec 2022	31 Dec 2021
Raw materials and consumables	31,227	25,527
Work in progress	241,797	204,043
Finished goods	15,884	4,284
Total	288,908	233,854

The value of raw materials and consumables on 31 December 2022 includes a provision of EUR 8,935 thousand for slow-moving inventory, which reduces the value of inventory.

The corresponding provision on 31 December 2021 was EUR 7,605 thousand.

2.4. Deferred tax assets (EUR 1,000)

	31 Dec 2022	31 Dec 2021
Deferred tax assets	14,202	11,486

According to estimates, the company has approximately EUR 117.3 million of confirmed and to-be-confirmed losses, and approximately EUR 45.0 million of deferred depreciation. Deferred tax assets or tax liabilities for derivatives have been recognised in the company's balance sheet.



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2.5. Amounts owed by Group companies (EUR 1,000)

Trade receivables	31 Dec 2022	31 Dec 2021
Finnish Minerals Group	31	60
Sokli Oy	4	0
Total	35	60

2.6. Prepayments and accrued income (EUR 1,000)

	31 Dec 2022	31 Dec 2021
Other prepayments and accrued income	551	907
Derivative receivables	13,847	181
Total	14,399	1,088



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2.7. Equity (EUR 1,000)

	31 Dec 2022	31 Dec 2021
Subscribed capital at the beginning of the period	2,000	2,000
Subscribed capital at the end of the period	2,000	2,000
Fair value reserve at the beginning of the period	-45,945	-10,129
Increase	263,932	101,897
Decrease	274,792	137,713
Fair value reserve at the end of the period	-56,806	-45,945
Invested unrestricted equity at the beginning of the period	800,469	706,032
Investment in invested unrestricted equity	2,141	94,437
Invested unrestricted equity at the end of the period	802,610	800,469
Retained earnings at the beginning of the period	-371,692	-255,857
Retained earnings at the end of the period	-371,692	-255,857
Profit/Loss for the period	62,957	-115,834
Retained earnings	-308,734	-371,692
Total equity	439,069	384,832



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2.7. Equity (EUR 1,000)

Restricted equity at the end of the period	31 Dec 2022	31 Dec 2021
Subscribed capital	2,000	2,000
Fair value reserve	-56,806	-45,945
At the end of the period	-54,806	-43,945
Distributable equity at the end of the period		
Retained earnings	-371,692	-255,857
Loss for the period	62,957	-115,834
Fair value reserve	-56,806	-45,945
Invested unrestricted equity	802,610	800,469
At the end of the period	437,069	382,832

The fair value reserve comprises the market value of derivatives covered by hedge accounting.



2.8. Notes to hedging derivatives (EUR 1,000)

	31 Dec 2022			31 Dec 2021			2022	2021
		Fair value			Fair value		Notional amount	Notional amount
Currency and interest rate derivatives	Positive	Negative	Net	Positive	Negative	Net	USD	USD
Foreign exchange forwards	8,488	1,891	6,598	121	7,533	-7,412	318,000	234,000
Metal derivatives							Tonnes	Tonnes
Nickel forward contracts	0	65,797	-65,797	0	31,663	-31,663	14,262	12,800
Zinc forward contracts	2,590	196	2,393	41	6,911	-6,870	18,000	19,200
Derivatives total	11,078	67,884	-56,806	162	46,107	-45,945		
Long-term derivatives	239	14,035	-13,796	0	149	-149		
Short-term derivatives	10,839	53,849	-43,010	162	45,958	-45,796		
			31 Dec 2022			31 Dec 2021		
Balance assets, gross amount			13,847			181		
Balance liabilities, gross amount			84,855			57,613		

The fair value calculation of hedges is based on market rates and quotations on the balance sheet date in accordance with the hedging portfolio. Counterparties for derivative transactions have been approved in accordance with the company's hedging policy. Intercompany receivables and liabilities are connected on a transaction level with each counterparty and accounted for on a daily level by transaction.

The importance of hedging instruments to the company's financial position and projected profitability for the next 12 months was high on 31 December 2022. The company had set up a cash flow hedge against a weakening US dollar with a hedging rate of approximately 50 per cent of its projected estimated USD denominated net cash flow. Similarly, a hedging rate of approximately 50 per cent was also applied to set up a hedge against falling nickel prices for the company's projected nickel deliveries for the following year utilising derivatives and fixed-term sales agreements. For planned zinc deliveries company has set up a hedge with a hedging rate of approximately 23 per cent. In addition, in line with its hedging policy, the company had set up hedges for almost all of its nickel and zinc deliveries, which had been completed and reported under sales already earlier. As a result, the change in market prices after the closing of the accounts has hardly no effect on the deliveries reported as sales for the financial period 2022.

2.9. Obligatory provisions (EUR 1,000)

Rehabilitation provision	31 Dec 2022	31 Dec 2021
At the beginning of the period	232,024	159,077
Increase	0	72,947
Decrease	0	0
At the end of the period	232,024	232,024
Long-term total	232,024	232,024
Estimated cost of the rehabilitation provision		
Rehabilitation of bioleaching area	122,177	122,177
Other rehabilitation work	109,847	109,847
Estimated rehabilitation costs total	232,024	232,024

On 20 June 2022, the Regional State Administrative Agency for Northern Finland issued its decision on the environmental and water permit covering all Terrafame's operations – that is, the master permit. The master permit determines the scope of all operations (including new short-term plans), sets emission limits and defines an environmental provision for discontinued operations. The new permit also enables ongoing development projects to proceed as planned.

However, the permit decision increased Terrafame's environmental provision from EUR 138 million to EUR 324 million, which is very high, even in international comparisons. In the third quarter of 2022, Terrafame filed an application with the Vaasa Administrative Court about accounting principles of the provision.

Terrafame already increased the environmental provision in its Financial Statements for 2021 and the provision remained unchanged in the Financial Statements for 2022.

Terrafame has prepared for the costs generated by the closure measures with an environmental provision, which is included in the balance sheet and updated annually. Where applicable, the provision complies with the the environmental permit as well as the area-based cost estimate for the closure issued by the Regional State Administrative Agency for Northern Finland. Terrafame's estimate regarding the provision has remained unchanged.



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2.10. Long-term loans from credit institutions (EUR 1,000)

Installment credit	31 Dec 2022	31 Dec 2021
At the beginning of the period	125	239
Increase	0	0
Decrease	-125	-114
At the end of the period	0	125

Leasing liabilities	31 Dec 2022	31 Dec 2021
At the beginning of the period	6,898	9,021
Increase	21	1,918
Decrease	-5,886	-4,041
At the end of the period	1,034	6,898

Long-term loans I	31 Dec 2022	31 Dec 2021
At the beginning of the period	0	60,739
Increase	0	0
Decrease	0	-70,000
Valuation	0	-9,261
At the end of the period	0	0

Long-term loans II	31 Dec 2022	31 Dec 2021
At the beginning of the period	61,805	81,493
Increase	0	0
Decrease	-35,790	-26,802
Valuation	2,112	-7,114
At the end of the period	28,127	61,805

Long-term loans III	31 Dec 2022	31 Dec 2021
At the beginning of the period	30,902	40,746
Increase	0	0
Decrease	-16,965	-12,766
Valuation	126	2,922
At the end of the period	14,063	30,902

Long-term loans IV	31 Dec 2022	31 Dec 2021
At the beginning of the period	16,187	0
Increase	66,392	17,298
Decrease	-31,533	-1,442
Valuation	-1,824	330
At the end of the period	49,222	16,187

Other Long-term loans	31 Dec 2022	31 Dec 2021
At the beginning of the period	0	0
At the end of the period	9,717	0

Long-term loans total	102,163	115,917
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Option and other special rights

(pcs)	31 Dec 2022	31 Dec 2021
Batch 7		
Maximum number of shares to be issued	880,915	880,915
Batch 8		
Maximum number of shares to be issued	582,033	582,033
Batch 9		
Maximum number of shares to be issued	21,518	21,518
Batch 10		
Maximum number of shares to be issued	21,518	21,518
Batch 11		
Maximum number of shares to be issued	21,518	21,518
Batch 12		
Maximum number of shares to be issued	21,518	21,518
Batch 13		
Maximum number of shares to be issued	21,518	21,518
At the end of the period	1,570,538	1,570,538

The subscribed Option Rights may be transferred by each Warrant holder to a Permitted Transferee. No subscribed Option Rights may, directly or indirectly, be pledged. The subscription prices for the Option Rights are 10 per cent higher than the subscription price at the time of the closing of the financing arrangements and they are not required to be used in one lot and may also be used in parts. The Option holders are not entitled to dividend or other funds that are distributed from the Company's invested unrestricted equity.

The subscription period for batch seven has been split in two: 55% (7_1) 27 August 2020 – 31 December 2023 and 45% (7_2) 27 August 2020 – 24 April 2024. For batch eight subscription period has been split in two accordingly: 84% (8_1) 27 August 2020–31 December 2023 and 16% (8_2) 27 August 2020 – 31 December 2024. For batch nine subscription period is 27 October 2020 – 30 June 2024. For the batches 10–13 the subscription period started immediately and continues until 30 June 2024.



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2.11. Deferred tax liabilities (EUR 1,000)

	31 Dec 2022	31 Dec 2021
Deferred tax liabilities	0	0

2.12. Specifications of Group liabilities (EUR 1,000)

Short-term liabilities to group companies	31 Dec 2022	31 Dec 2021
Trade payables		
Finnish Minerals Group	369	395
Total	369	395



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2.13. Short-term loans from financial institutions (EUR 1,000)

Instalment credit	31 Dec 2022	31 Dec 2021
At the beginning of the period	115	76
Increase	125	114
Decrease	-114	-75
At the end of the period	126	115

Leasing liabilities	31 Dec 2022	31 Dec 2021
At the beginning of the period	4,367	3,512
Increase	5,873	4,974
Decrease	-4,353	-4,119
At the end of the period	5,887	4,367

Short-term loans I	31 Dec 2022	31 Dec 2021
At the beginning of the period	65,807	0
Increase	0	70,000
Decrease	-30,000	0
Valuation	4,124	-4,193
At the end of the period	39,931	65,807

Short-term loans II	31 Dec 2022	31 Dec 2021
At the beginning of the period	26,488	0
Increase	35,790	26,802
Decrease	-26,802	0
Valuation	2,027	-315
At the end of the period	37,502	26,488

Short-term loans III	31 Dec 2022	31 Dec 2021
At the beginning of the period	13,244	0
Increase	16,965	12,766
Decrease	-4,241	0
Valuation	2,159	477
At the end of the period	28,127	13,244

Short-term loans IV	31 Dec 2022	31 Dec 2021
At the beginning of the period	1,472	0
Increase	31,533	1,442
Decrease	-6,487	0
Valuation	1,609	30
At the end of the period	28,127	1,472

Short-term loans from financial institutions total	31 Dec 2022	31 Dec 2021
	139,700	111,492



2.14. Current liabilities/Accruals and deferred income (EUR 1,000)

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	31 Dec 2022	31 Dec 2021
Interests	1,791	1,299
Salaries, fees and other expenses	8,957	8,733
Other expenditure balances	7,945	4,081
Other accrued liabilities	4,954	7,247
Derivative liabilities	84,855	57,613
Total	108,502	78,973



3. Notes to the income statement

3.1. Net sales (EUR 1,000)

Industry distribution	2022	2021
Metal intermediates business	377,345	351,322
Battery chemicals business	207,069	27,126
Total	584,414	378,448

Geographical distribution	2022	2021
Europe	313,985	351,332
Asia	270,429	27,101
United States	0	15
Total	584,414	378,448



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3.2. Cost of goods sold (EUR 1,000)

Raw materials and consumables	2022	2021
Purchases during the financial year	-212,988	-129,183
Change in stocks	5,699	1,296
	-207,289	-127,887
External services	-102,144	-75,495
Total	-309,433	-203,382
Change in Inventory		
Change in Work in progress	37,754	13,893
Change in Finished goods	11,600	-1,821
Total	49,354	12,072
Personnel expenses		
Wages and salaries	-38,220	-38,755
Pensions expenses	-7,014	-6,596
Other personnel expenses	-1,123	-1,017
Total	-46,357	-46,368
Depreciation		
Depreciations	-57,755	-46,044
Total	-57,755	-46,044
Other expenses		
Other Cost of goods sold expenses	-89,562	-85,250
Total	-89,562	-85,250
Cost of goods sold total	-453,754	-368,971



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3.3. Sales and marketing expenses (EUR 1,000)

Personnel expenses	2022	2021
Wages and salaries	-849	-1,148
Pensions expenses	-153	-194
Other personnel expenses	-31	-33
Total	-1,033	-1,374
Depreciation		
Depreciation	-24	-116
Total	-24	-116
Other expenses		
Other Sales and Marketing expenses	-1 350	-1,540
Total	-1,350	-1,540
Sales and Marketing expenses total	-2,406	-3,030



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3.4. Administrative expenses (EUR 1,000)

Personnel expenses	2022	2021
Wages and salaries	-3,814	-3,552
Pensions expenses	-533	-605
Other personnel expenses	-262	-284
Total	-4,609	-4,441
Depreciation		
Depreciation	-305	-312
Total	-305	-312
Other expenses		
Other Administrative expenses	-16,060	-15,160
Total	-16,060	-15,160
Auditors' remunerations		
Audit	-123	-94
Certificates and reports	-2	-3
Tax consultancy	-14	-3
Other services	-71	-84
Total	-210	-185
Administrative expenses total	-21,184	-20,098



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3.5. Other operating expenses (EUR 1,000)

Personnel expenses	2022	2021
Wages and salaries	-1,473	-1,026
Pensions expenses	-267	-143
Other personnel expenses	-50	167
Total	-1,791	-1,002
Depreciation		
Depreciation	-108	-113
Total	-108	-113
Other operating expenses		
Other operating expenses	-17,007	-82,517
Total	-17,007	-82,517
Other operating expenses total	-18,906	-83,632

The other operating expenses for 2021 include a non-recurring item of EUR 72,947 thousand related to the increased environmental provision.



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Personnel expenses total (EUR 1,000)

	2022	2021
Wages and salaries	-44,251	-44,457
Pensions expenses	-7,994	-7,607
Other personnel expenses	-1,900	-1,894
Total	-54,144	-53,958

Wages and fees for Members of Board of Directors

-322 -297

Average number of company personnel

Salaried and senior salaried	282	297
Blue-collar	558	613
Total	840	910

Depreciation, amortisation and impairment charges total (EUR 1,000)

	2022	2021
Intangible assets	-139	-290
Other capitalised long-term expenditure	-36	-61
Total	-175	-351

Tangible assets

Buildings	-6,498	-4,887
Machinery and equipment depreciation	-25,184	-26,320
Machinery and equipment depreciation right-of-use assets	-13,257	-3,043
Other tangible assets depreciation	-13,078	-11,984
Total	-58,017	-46,234

Depreciation, amortisation and impairment charges total

-58,192 -46,585



3.6. Finance income and finance cost (EUR 1,000)

Finance income	2022	2021
Other interest and financial income	3,926	1,396
Total	3,926	1,396

Other interest and financial income include exchange rate profit	3,260	1,396
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Finance income for the financial period include interest income of approximately EUR 667 thousand and interest gains of EUR 3,260 thousand. Of the unrealised foreign exchange gains on finance income, EUR 215 thousand consists of the valuation of FX denominated loans and financial assets using the exchange rate at the balance sheet date. Correspondingly, of the comparative period's foreign exchange gains, EUR 1 329 thousand derives from the valuation of financial assets.

Finance expenses	2022	2021
Other interest and financial income	-21,885	-8,239
Finance expenses total	-21,885	-8,239

Financial expenses to others include exchange rate losses	-15,691	2,410
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Financial expenses include interest losses from leasing liabilities	-416	-438
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Financial income and expenses total	-20,490	8,706
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The finance expenses for the financial period include EUR 16,721 thousand of interest and finance expenses. Of the unrealised exchange rate losses included in the finance expenses, EUR 10,548 thousand consists on the valuation of FX denominated loans using the exchange rate at the balance sheet date. The finance expenses for the comparative period include EUR 6,194 thousand of interest and finance expenses and EUR 15,627 thousand of unrealised exchange rate losses on the valuation of FX denominated loans using the exchange rate at the balance sheet date.



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4. Notes to the commitments (EUR 1,000)

Amounts payable on rental and leasing agreements	31 Dec 2022	31 Dec 2021
No later than 1 year	418	332
Later than 1 year and no later than 5 years	119	410
Total	537	742
Other liabilities		
Fixed assets serving as collateral for installment credit	76	150
Installment credit		
No later than 1 year	126	115
Later than 1 year and no later than 5 years	0	125
Total	126	240
Other service agreement liabilities		
No later than 1 year	7,978	7,978
Later than 1 year and no later than 5 years	1,760	3,680
Total	9,738	11,658
Bank deposit	0	150



Securities complying with environmental and mining permits (EUR 1,000)

Beneficiary	Type of security	31 Dec 2022 Amount of security total	31 Dec 2021 Amount of security total
Kainuu Centre of Economic Development, Transport and the Environment; no. 196	Credit insurance	153,245	133,245
Security in accordance with permit decision no. 52/2013/1	Bank guarantee	1,500	1,500
Security in accordance with permit decision no. 43/2014/2	Bank guarantee	6	6
Security in accordance with permit decision no. 43/2015/1	Bank guarantee	100	100
Security in accordance with permit decision no. 3/2017/1	Bank guarantee	50	50
Security in accordance with permit decision no. 76/2017/1	Bank guarantee	100	100
Security in accordance with permit decision no. 133/2020	Bank guarantee	10	10
Security in accordance with permit decision no. 5/2021	Bank guarantee	200	200
Security in accordance with permit decision no. 5/2021	Bank guarantee	20	20
Security in accordance with permit decision no. 87/2022	Bank guarantee	17	0
Security in accordance with permit decision no. 87/2022	Bank guarantee	10	0
Decision of the Finnish Safety and Chemicals Agency Tukes, 30 June 2014, KaivNro: 2819	Bank guarantee	100	100
Decision of the Finnish Safety and Chemicals Agency Tukes, 30 June 2014, KaivNro: 2819	Bank guarantee	35	35
Decision of the Finnish Safety and Chemicals Agency Tukes, 30 June 2014, KaivNro: 2819	Bank guarantee	50	50
Total		155,443	135,416
Other securities	Bank guarantee	1,895	1,545
Real estate investments' VAT refund liability		13,797	15,894
Business mortgages		320,000	320,000
Real estate mortgage		1,200,079	1,200,079
Mining certificate, mine register number 2819, mining concession	Pledged	yes	yes

Business mortgages and Real estate mortgages are pledged for Company's long term financing agreements.

5. Related party transactions

Terrafame's key related parties include the following entities: Suomen Malmijalostus Oy – Finnish Minerals Group, the State of Finland, Galena Private Equity Resources Investment 2 L.P., Galena Private Equity Resources Investment 3 L.P. funds and Galena Private Equity Resources Investment 4 L.P. -funds, as well as Trafigura Group. In addition, Terrafame's related parties include the members of the Board, the CEO and the members of the Leadership Team, persons responsible for Terrafame Ltd's commercial agreements, and the immediate family members of the persons referred to here, as well as entities over which they or their immediate family members have control. Terrafame's related parties also include entities in which the State of Finland exercises control or considerable influence. Terrafame has applied an exemption pursuant to which it only reports significant transactions with Government-related companies.

Financing arrangements are in place between the company, Trafigura Group and Galena Private Equity Resources Investment 2 L.P., Galena Private Equity Resources Investment 3 L.P. and Galena Private Equity Resources Investment 4 L.P. – as well as between the company and Finnish Minerals Group. The value of the company's related-party borrowings connected with the financial arrangement is EUR 121.4 million. The commercial agreements between Terrafame and Trafigura NatGas Limited generated EUR 686.6 million in sales during the financial period. The company has acquired legal and other administrative services worth EUR 0.5 million and management services for product development projects worth EUR 0.2 million from Finnish Minerals Group.

All business transactions between Terrafame Ltd and its related parties were conducted on regular market terms.



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Business transactions with related parties (EUR 1,000)

Goods and services sold	31 Dec 2022	31 Dec 2021
Group companies		
Associate and joint ventures	16	10
Other related party ventures	686,595	437,603
Ventures total	686,611	437,613
Total	686,611	437,613
Goods and services purchased		
Associate and joint ventures	735	863
Other related party ventures	53,477	33,504
Ventures total	54,211	34,367
Total	54,211	34,367
Credits		
Other related party ventures	121,360	159,720
Ventures total	121,360	159,720
Total	121,360	159,720



Board of Directors' proposal for measures concerning the company's result

Terrafame Ltd's result for the financial period shows a profit of EUR 62,957,415.22. The Board of Directors proposes to the Annual General Meeting that no dividend be distributed, and that the profit be retained in shareholders' equity.

In Helsinki, 2 March, 2023

Lauri Ratia

Chair of the Board

Matti Hietanen

Jesus Fernandez

Riitta Mynttinen

Tuomo Mäkelä

Julian Sanchez

Jyrki Vainionpää

Joni Lukkaroinen

CEO



Auditor's confirmation

A report on the audit has been issued today.

In Sotkamo, 9 March 2023

KPMG Oy Ab

Authorised Public Accountants

Antti Kääriäinen

APA



Auditor's Report

To the Annual General Meeting of Terrafame Oy

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of Terrafame Oy (business identity code 2695013-5) for the year ended 31 December 2022. The financial statements comprise the balance sheet, income statement, cash flow statement and notes.

In our opinion, the financial statements give a true and fair view of the company's financial performance and financial position in accordance with the laws and regulations governing the preparation of financial statements in Finland and comply with statutory requirements.

Basis for Opinion

We conducted our audit in accordance with good auditing practice in Finland. Our responsibilities under good auditing practice are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the company in accordance with the ethical requirements that are applicable in Finland and are relevant to our audit, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of the Board of Directors and the Managing Director for the Financial Statements

The Board of Directors and the Managing Director are responsible for the preparation of financial statements that give a true and fair view in accordance with the laws and regulations governing the preparation of financial statements in Finland and comply with statutory requirements.

The Board of Directors and the Managing Director 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 Board of Directors and the Managing Director are responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting. The financial statements are prepared using the going concern basis of accounting unless there is an intention to liquidate the company or cease operations, or there is no realistic alternative but to do so.

Auditor's 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 auditor's 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 good auditing practice 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 the financial statements.

As part of an audit in accordance with good auditing practice, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.



- Conclude on the appropriateness of the Board of Directors' and the Managing Director's use of the going concern basis of accounting and based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events so that the financial statements give a true and fair view.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.



Other Reporting Requirements

Other Information

The Board of Directors and the Managing Director are responsible for the other information. The other information comprises the report of the Board of Directors. Our opinion on the financial statements does not cover the other information.

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. Our responsibility also includes considering whether the report of the Board of Directors has been prepared in accordance with the applicable laws and regulations.

In our opinion, the information in the report of the Board of Directors is consistent with the information in the financial statements and the report of the Board of Directors has been prepared in accordance with the applicable laws and regulations.

If, based on the work we have performed, we conclude that there is a material misstatement of the report of the Board of Directors, we are required to report that fact. We have nothing to report in this regard.

Sotkamo, 9 March 2023

KPMG Oy Ab

Antti Kääriäinen

Authorised Public Accountant, KHT





Terafame

Financial Review 2022

27 March 2023

