

Terrafame

Financial Review

2023

20 March 2024



2023 IN BRIEF

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Terrafame enhances low-carbon mobility by delivering responsibly produced battery chemicals to the global battery industry. One of the world's largest production lines for chemicals used in electric vehicle (EV) batteries is located on Terrafame's industrial site. The plant is capable of producing nickel sulphate for around 1 million EVs 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 truly transparent, traceable and European battery chemical supply chain.

Net sales	EBITDA (1)	EBITDA, % (1)
EUR 560.9 million	EUR 99.4 million	17.7%
Operating result (1)	Own personnel at the end of the year	All personnel on the industrial site, avg. ca.
EUR 38.4 million	842	1,900
Equity ratio, %	LTIFR1, own personnel (2)	LTIFR2, all (2)
57.8%	4.5	4.8

(1) Excluding non-recurring items. An increase in an environmental provision recognised in the fourth quarter had a negative impact of EUR 15.1 million on EBITDA and the operating result. Taking the change in the provision into account, EBITDA for 2023 is EUR 84.3 million, and the operating result is EUR 23.3 million.

(2) Occupational accidents leading to absence from work per million hours worked (LTIFR1, rolling 12 months).

Terrafame's net sales and operating profit decreased in 2023 due to lower market prices and limited production volumes at the battery chemicals plant.

Net sales decreased by 4% from 2022 and were EUR 560.9 million. EBITDA excluding non-recurring items decreased to EUR 99.4 (152.1) million.

The ramp-up of the battery chemicals plant progressed well in a challenging market situation. The downtime caused by the fall in nickel sulphate price was put to good use by removing bottlenecks in production and focusing on improving product quality.

At the beginning of 2023, Terrafame signed multiyear nickel sulphate supply agreements with Stellantis and Umicore.

Terrafame strengthened its financing position towards the end of the year. The financing arrangement consists of the repayment of EUR 142 million of shareholder loans with the exercise of option rights and an unsecured EUR 250 million loan agreement with a Nordic banking group.



CEO's review

Terrafame's financial performance weakened in 2023 due to a very challenging market environment. In terms of production, however, the year was successful, and we managed to develop our operations and improve the quality of our products.

The year 2023 was close to the previous year's record level both in terms of stacking ore to primary heap leaching and nickel production. Our unique bioleaching technology worked flawlessly throughout the year even though the weather was more rainy than usual.

The ramp-up of the battery chemicals plant progressed well in the challenging market situation. Following the fall in the price of nickel sulphate, we took advantage of the downtime in the summer by removing bottlenecks in production and focusing on improving product quality.

Terrafame's net sales and operating profit decreased in 2023 due to lower market prices and limited production volumes at the battery chemicals plant. This was also visible in the fourth quarter of the year.

The volume of basic production was at the previous year's record level, which balanced the financial result for the period. In the second half of the year, we were able to supply nickel sulphide intermediate under new contracts, which compensated for the decrease in the price of nickel sulphate in the Chinese market. This highlights the flexibility and capability of our production and supply chain.

The total accident frequency rate on the industrial site continued to decrease during the year. The safety performance of the partner companies operating on our industrial site developed quite favourably, and the occupational safety of our own personnel continued to be stable. The continuous development of the safety culture will remain an important focus area for us in 2024.



We strengthened our financing towards the end of the year. The financing arrangement consists of the repayment of EUR 142 million of shareholder loans with the exercise of option rights and an unsecured EUR 250 million loan agreement with a Nordic banking group. The maturity of the new loan package is four years. As part of the shareholders' financing arrangement, Finnish Minerals Group increased the working capital facility granted to Terrafame from EUR 40 million to EUR 65 million and extended its maturity until June 2025.

I became Terrafame's interim CEO in January 2024. My task is to implement the company's existing strategy with determination in cooperation with the Leadership Team and Terrafame's employees. Terrafame focuses on lowering the carbon footprint of transport as a responsible producer of battery materials. We will continue the operational development of the battery chemicals plant during the year, so that we are ready for significant direct nickel sulphate deliveries from 2025 onwards in accordance with the agreements we have previously signed. We believe that the battery and electric vehicle industry will grow significantly in the coming years in Europe, and that region will become Terrafame's main market.

I would like to take this opportunity to thank all Terrafame employees for their solid performance and our customers and other stakeholders for their good partnership in 2023.



Seppo Voutilainen

Interim CEO

Terrafame Ltd



Chair of the Board's review

The year 2023 was demanding and eventful for Terrafame. By taking decisive measures, the company managed to balance the impact of the difficult market situation while continuing to promote electronic mobility in line with its strategy.

The operating environment was very challenging, and the changes were dramatic at times. In Asia, new investments in the production of nickel sulphate, for example, were completed at the same time as the market for electric vehicles in China temporarily fell by more than 30%. As a result, the battery industry supply chain in China almost stalled when stocks were full of raw materials. These factors had a significant impact on the price level of nickel sulphate in particular, which overall was markedly lower in 2023 than in the previous year.

Due to the sudden halt in the Chinese battery industry market, Terrafame decided to suspend production at its battery chemicals plant in the summer and run the plant below full capacity during the year. The downtime also had a positive impact: we removed production bottlenecks so that the plant can operate at significantly higher capacity than before as market demand recovers.

Terrafame's financial performance weakened year-on-year due to lower nickel prices and limited supply volumes of battery chemicals. Unit costs also increased when the battery chemicals plant was running below full capacity. In the metal intermediates business, delivery volumes remained close to the previous year's record level, which had a balancing impact on Terrafame's financial performance. The company also won significant new customers in its intermediates business operations.

Strategy implementation progressed consistently despite the challenges posed by the market environment. Thanks to its unique bioleaching technology, Terrafame has one of the lowest carbon footprints in its industry. What is also unique is that the nickel produced by the company and the battery chemicals produced from the nickel are manufactured on the same industrial site in an integrated production process. Commitment to sustainable development is at the core of our strategy.



Terrafame is implementing a historically large investment in new secondary production areas required for bioleaching. Other investments include a uranium recovery plant which will start operation by the summer of 2024. After this investment, we can further investigate the recovery of rare earth elements found in ore. These investments support the positive impacts of Terrafame's operations on Kainuu's regional economy long into the future.

Terrafame is entering a new phase of development that will further strengthen our leadership as a partner for the global battery industry. Our previously signed agreements on direct nickel sulphate supply with Renault and Stellantis mean that our deliveries will increasingly focus on Europe.

I would like to take this opportunity to thank Joni Lukkaroinen for his important contribution as the CEO for almost eight years: the period included both the successful ramp-up of Terrafame's operations and the ambition to become a battery chemicals producer to enable the electrification of transport.

Finally, I would like to extend my heartfelt thanks to each and every Terrafame employee for their tenacious work in 2023, which was a challenging year, and to our customers and partners for their trust in Terrafame and good cooperation.



Lauri Ratia

Chair of the Board

Terrafame Ltd



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Electric vehicle and battery markets

According to Rho Motion's EV Battery Chemistry Assessment report, a total of around 13.6 (10.1) million electric passenger cars and light commercial vehicles were sold worldwide in 2023. This represents an increase of almost 35% from 2022.

Around 7.9 (6.0) million electric passenger cars and light commercial vehicles were sold in China in 2023. This represents around 58% of their global sales. In China, the sales started to grow again in the second half of the year after a fall in the first quarter.

The sales were particularly strong in the United States and Canada, where the total sales of electric passenger cars and light commercial vehicles increased by 59% in 2023. In Europe, the sales of these vehicle categories grew by 18% year-on-year. Manufacturers of battery cells and cathode materials have announced investments in giga factories that will strengthen the North American and European battery markets.

According to Rho Motion, the global sales of electric vehicles are expected to continue to increase in 2024. Sales are expected to increase by around 30% to 17.7 million cars.

In December 2023, the sales-weighted average EV battery size, including all vehicle categories, was 51.8 (51.9) kWh.

The EV battery market is clearly becoming divided between high-nickel-content NCM batteries and LFP batteries. The market share of NCM 811 batteries, which have a high nickel content, increased from 20% at the end of 2022 to 22% at the end of 2023. The market share of LFP batteries was 42% in December 2023 (39% in December 2022).

Increase of electric passenger cars and light commercial vehicles sold worldwide in 2023

+35%



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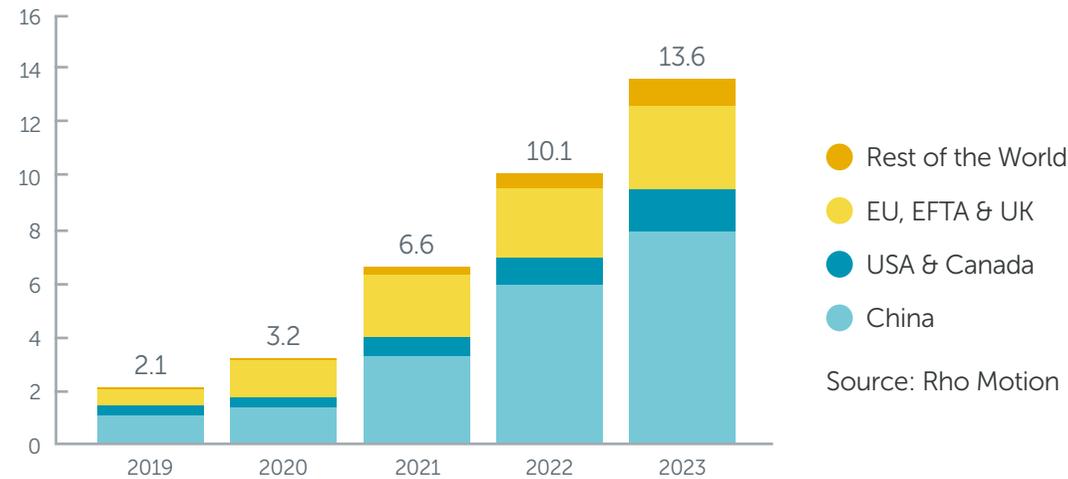
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7.2 (5.6) million electric vehicles utilising NCM battery technology were sold in 2023. The sales increased by 29% year-on-year.

In terms of gigawatt hours, the demand for NCM batteries increased by 22% to 36.5 (29.8) GWh compared to December 2022. The share of NCM 811 batteries increased by around 62% to 17.8 (11.0) GWh. The share of LFP batteries increased by around 27% to 33.4 (26.4) GWh.

Global EV sales

Includes electric passenger cars and light duty vehicles (million units)



Nickel market

The price of nickel on the London Metal Exchange (LME) in 2023 was markedly lower than in 2022. The average market price in 2023 was 21,477 (25,585) USD/t, which is around 16% lower than in 2022. The average market price of nickel in October–December 2023 was 17,247 (25,289) USD/t, which is around 32% lower than in the corresponding period in 2022. Compared with the third quarter of 2023, the average market price of nickel decreased by around 15% in October–December.



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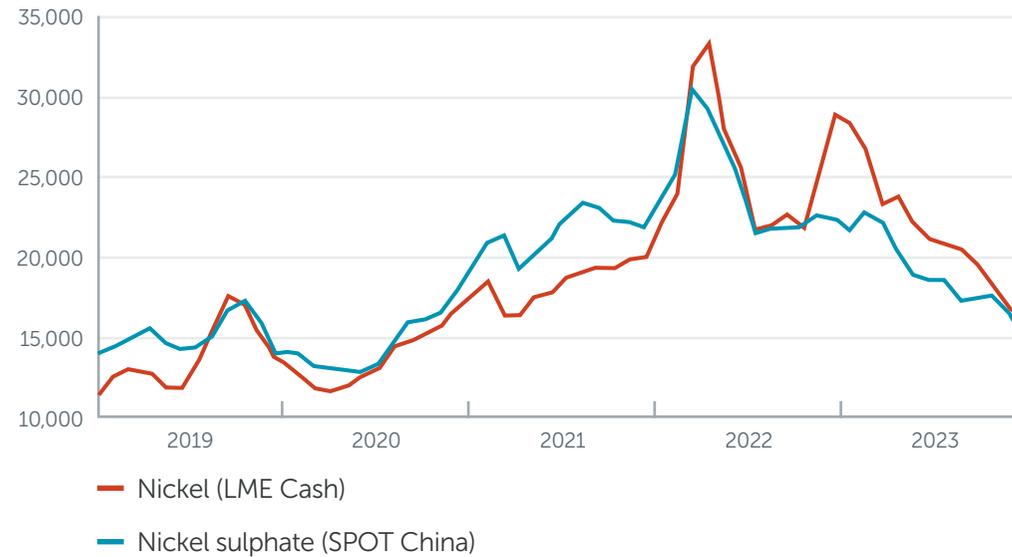
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The price of nickel sulphate (SPOT China) also fell markedly, and the average price in 2023 was 18,930 USD/t, which is around 16% lower than in 2022. The average price of nickel sulphate in October–December 2023 was 16,449 USD/t, which is around 26% lower than in the corresponding period in the previous year and 7% lower than in the third quarter of 2023. The spot price (SPOT China) of nickel sulphate has not been fully linked to the LME price since 2022.

Price development of nickel and nickel sulphate

1 Jan 2019–31 Dec 2023 (USD/t)



The total combined nickel stocks on the London Metal Exchange (LME) and the Shanghai Futures Exchange (SHFE) at the end of 2023 were 77,923 tonnes, which is around 35% higher than in the corresponding period in 2022 (57,878). The strong decrease in nickel stocks, which began in the second quarter of 2021, turned around in the third quarter of 2023, and the stocks at the end of 2023 were around 56% higher than at the end of the third quarter of 2023 (49,674). The stock level at the end of December 2023 corresponded to demand for 1.3 weeks (1.0).

Currency exchange rate

Average EUR/USD exchange rate

2023
1.08

2022
1.05



Net sales and financial performance

Net sales were EUR 560.9 (584.4) million, representing a decrease of 4.0% year-on-year.

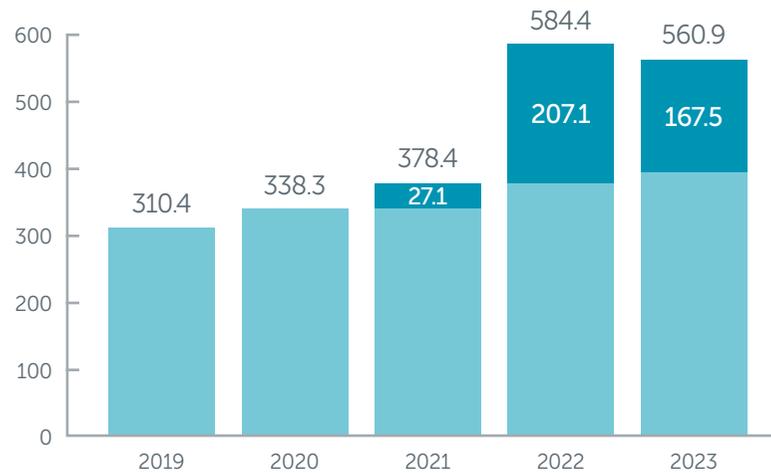
Net sales from the battery chemicals business developed favourably during the first quarter of the year, but a decrease in the market price of nickel sulphate and limited production volumes had a negative impact on full-year net sales compared with the previous year.

The metal intermediates business was close to the previous year's record level. This had a positive impact on net sales, balancing the lower market prices of nickel and zinc.

Price hedging softened the impact of lower sales prices on net sales.

Net sales from the battery chemicals business totalled EUR 167.5 (207.1) million, or 29.9% (35.4) of the company's total net sales. Net sales from the metal intermediates business totalled EUR 393.4 (377.3) million.

Net sales (EUR million)



- Battery chemicals business
- Metal intermediates business



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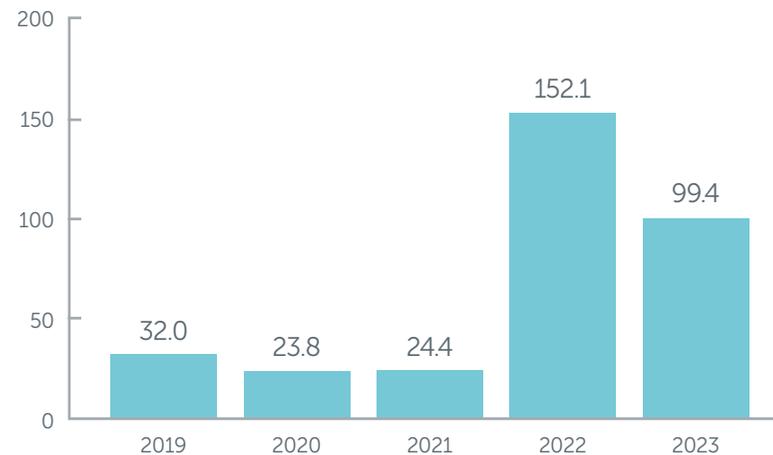
EBITDA excluding non-recurring items was EUR 99.4 (152.1) million, or 17.7% (26.0) of net sales. Depreciation totalled EUR 61.0 (58.2) million in 2023.

The operating result excluding non-recurring items was EUR 38.4 (93.9) million. An increase in an environmental provision recognised in the fourth quarter had a negative impact of EUR 15.1 million on EBITDA and the operating result. Taking the change in the provision into account, EBITDA for 2023 is EUR 84.3 million and the operating result is EUR 23.3 million. The decrease in EBITDA and the operating result was caused by lower market prices and limited production volumes at the battery chemicals plant. In addition, the increase in work-in-progress inventory was clearly lower than the previous year. Stable production volumes in the metal intermediates business and the lower prices of materials had a positive impact on the result.

The company's net financial items were EUR -30.3 (-31.0) million, and the profit for the period was EUR -7.1 (63.0) million.

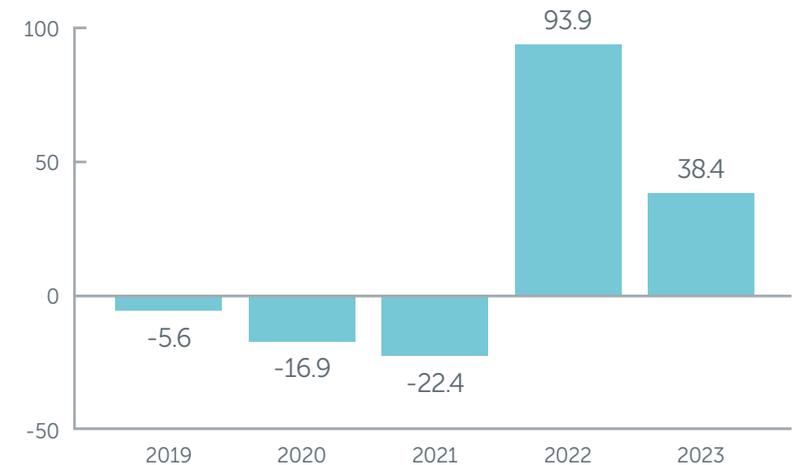
EBITDA (EUR million)

Excluding non-recurring items



Operating result (EUR million)

Excluding non-recurring items



Key events during the review period

Terrafame and Stellantis entered into an agreement on the supply of low-carbon 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' aggressive 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 sustainable low-carbon nickel

In February 2023, Umicore and Terrafame announced that they had signed a long-term agreement on the supply of nickel sulphate. Commercial deliveries had already started after a successful product approval process.

Guarantee arrangement for an environmental and water management permit for operations

A guarantee arrangement related to the environmental and water management permit concerning all Terrafame's operations was negotiated in the first half of 2023. The value of the guarantee arrangement was EUR 365 million.

Fortum and Terrafame to cooperate on recycling battery materials

In June 2023, Fortum and Terrafame signed an agreement on a pilot operation to use metals recycled by Fortum from the black mass from EV batteries in Terrafame's battery chemicals production. The cooperation between Fortum and Terrafame enables an even more sustainable value chain for the European battery industry.

According to the agreement, Fortum will supply Terrafame with nickel and cobalt recovered from used EV batteries at the Harjavalta recycling plant. Terrafame will use the recycled raw material to produce battery chemicals for new EV batteries. At the end of their useful lives, the batteries will be recycled again, which closes the cycle of the recovered raw materials.



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Cash flow and financial position

In 2023, cash flow from operating activities was EUR 35.8 (51.8) million, of which the change in net working capital accounted for EUR -39.5 (-82.0) million. Cash flow from investing activities was EUR -134.9 (-75.5) million. Cash flow after investment activities was EUR -99.1 (-23.7) million.

At the end of 2023, the company's cash and cash equivalents totalled EUR 15.2 (45.5) million.

Terrafame's balance sheet total on 31 December 2023 was EUR 1,242.6 (1,128.1) million. Inventories totalled EUR 313.3 (288.9) million at the end of the financial year. The company's inventories are divided into three categories: materials and supplies, work in progress and finished products. The value of the inventory of materials and spare parts at the end of the financial year was EUR 30.0 (31.2) million. The value of work in progress was EUR 258.6 (241.8) million, and the value of the inventory of finished products was EUR 24.7 (15.9) million. The valuation principles for inventories are presented in more detail under "Intangible assets/Inventories" in the accounting principles on [page 67](#) of the financial statements.

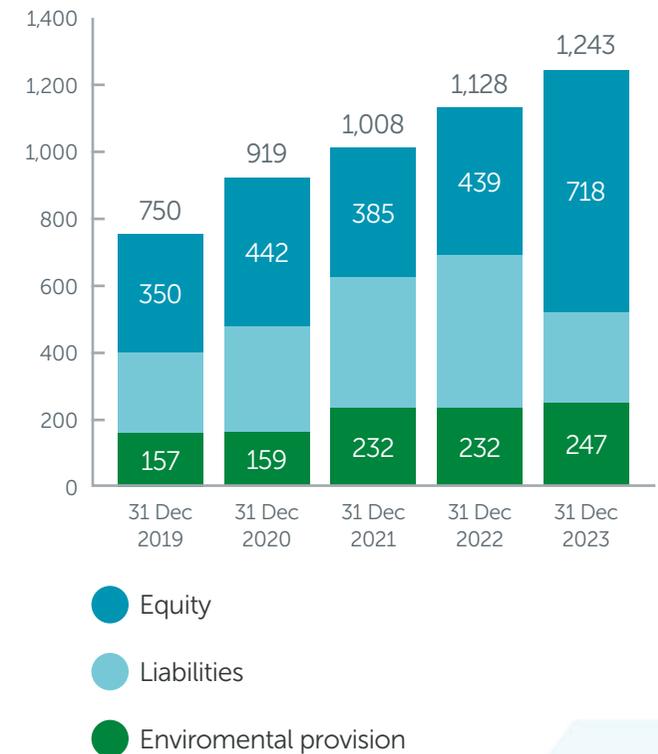
At the end of the financial year, trade receivables totalled around EUR 48.8 (66.7) million. Other receivables totalled around EUR 13.4 (0.9) million. Accruals totalled around EUR 77.4 (14.4) million.

Equity stood at EUR 718.4 (439.1) million at the end of 2023. Debt totalled EUR 277.1 (457.0) million. In addition, the balance sheet includes a remediation provision of EUR 247.1 (232.0) million for the costs arising from closing a mine and cleaning the environment. The remediation provision is explained in more detail under "Remediation provision for costs arising from closing a mine and cleaning the environment" in the accounting principles on [page 70](#) of the financial statements.

Terrafame's equity ratio was 57.8% (38.9) at the end of the financial year, and its gearing was 17.6% (44.7).

Key figures and their calculation formulas are presented on [page 55](#).

Equity and liabilities (EUR million)



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Capital expenditure

Capital expenditure totalled EUR 138.2 (83.0) million in 2023. Of this total, EUR 25.7 (13.1) million was used to improve productivity and increase capacity, and EUR 112.4 (69.9) million was used to sustain production.

Capital expenditure, EUR million	2023	2022	Change
Sustaining capital expenditure	112.4	69.9	60.8%
Investments in productivity improvement and capacity growth	25.7	13.1	96.2%
Total capital expenditure	138.2	83.0	66.5%

The most significant investments in productivity improvement and capacity growth were related to the elimination of production bottlenecks at the battery chemicals plant 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 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).

In August 2023, Terrafame decided to invest more than EUR 200 million in a new secondary leaching area, which is planned to be introduced in 2026. New secondary leaching areas are needed on the industrial site when old ones become full.

Currency and commodity hedges

In the 2023 financial year, 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 applied hedge accounting. More information about hedges is provided in Note 2.8 to the financial statements on [page 79](#).



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Financing arrangements

Terrafame restructured its funding during 2023. In June, the company agreed with Finnish Minerals Group on a new working capital facility of EUR 40 million. The company also repaid and restructured its shareholder loans by, for example, transferring the June 2023 and October 2023 repayments to the spring of 2024.

On 30 June 2023, the Galena funds managed by Trafigura and Sampo plc exercised their option rights and subscribed for a total of EUR 33 million in shares in Terrafame.

Sampo sold its shareholding to Mandatum Holding Ltd on 29 September 2023.

Terrafame significantly strengthened its financing position towards the end of 2023. The financing arrangement consists of the repayment of EUR 142 million of shareholder loans to Trafigura and Mandatum with the exercise of option rights and an unsecured EUR 250 million loan agreement with a Nordic banking group. The maturity of the new loan package is four years. Finnish Minerals Group increased the working capital facility granted to Terrafame in June from EUR 40 million to EUR 65 million and extended its maturity until June 2025.

The amounts presented in the following table cover all the financing 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	Transfer	Converted	Repayment	Debt financing	Total financing
Finnish Minerals Group	537.3	65.0			-7.0	58.0	595.3
Galena Asset Management	389.6		120.0	-113.3	-6.7		389.6
Trafigura	0	120.0	-120.0		0	0	0.0
Mandatum Holding	47.7	26.1		-26.1	0	0	47.7
Total	974.6	211.1		-139.4	-13.7	58.0	1,032.6

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

Shares and shareholders

Terrafame has one series of shares. At the end of 2023, the company had 5,197,154 (4,998,830) shares. Its share capital was EUR 2.0 (2.0) million, and its shareholders' equity was EUR 718.4 (439.1) million.

At the end of 2023, Finnish Minerals Group (FMG), a special-assignment company of the state of Finland, owned 64.4% (67.0), Galena funds managed by Trafigura owned 32.9% (31.0) and Mandatum owned 2.7% (2.0) of Terrafame.

Share arrangements carried out during 2023 are presented in the following table:

	Galena 2	Galena 3	Galena 4	Mandatum	FMG	Trafigura	Total
31 Dec 2022	602,952	733,233	215,181	98,222	3,349,242	0	4,998,830
Holding 31 Dec 2022	12.1%	14.7%	4.3%	2.0%	67.0%	0.0%	100.0%
Changes in the number of shares during the financial year							
Equity funding	158,676	0	0	26,109	0	0	
Share transfer							
Payment of interest and arrangement fees in shares	0	0	0	13,539	0	0	
Registered holding 31 Dec 2023	761,628	733,233	215,181	137,870	3,349,242	0	5,197,154
Registered holding 31 Dec 2023	14.7%	14.1%	4.1%	2.7%	64.4%	0.0%	100.0%
Changes in the number of shares during the financial year							
Equity funding	151,538	490,587	0	122,701	0	0	
Share transfer							
Payment of interest and arrangement fees in shares	0	0	0	6,675	0	0	
Holding after option arrangements 31 Dec 2023	913,166	1,223,820	215,181	267,246	3,349,242	0	5,968,655
Non-registered holding 31 Dec 2023	15.3%	20.5%	3.6%	4.5%	56.1%	0.0%	100.0%

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

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The legal and other administrative services purchased from Finnish Minerals Group totalled EUR 0.6 (0.5) million, and the product development project management services purchased from Finnish Minerals Group totalled around EUR 0.2 (0.2) million.

Net sales of nickel-cobalt sulphide and zinc sulphide to Trafigura Group during the financial year amounted to EUR 229.7 (376.8) million, and net sales of nickel sulphate to Trafigura Group amounted to EUR 54.1 (182.2) million.

Information about the financing arrangements carried out with related-party companies Finnish Minerals Group, Trafigura Group and Galena funds is provided under "Financing arrangements" in the Board of Directors' review.

All transactions between Terrafame and its related parties have taken place on market terms.

A more detailed description of related party transactions is provided in Note 5 to the financial statements on [page 96](#).



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As a non-listed company, Terrafame follows the Securities Market Association's current Corporate Governance Code to the extent that it is applicable. The 2023 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 2023. The AGM adopted the financial statements for 2022, 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, Jesus Fernandez, Riitta Mynttinen, Tuomo Mäkelä, Julian Sanchez and Jyrki Vainionpää as members of the Board. Lauri Ratia was elected as Chair of the Board and Matti Hietanen as its Vice Chair. There were no changes in the Board during the financial year.

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 APA Antti Kääriäinen as the principal auditor.



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Leadership Team

At the end of 2023, Terrafame's Leadership Team consisted of the following members:

Joni Lukkaroinen

CEO

Antti Arpalahi

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

More information about the change of Terrafame's CEO is provided under "Key events after the review period" on [page 51](#).



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 review, 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 25](#) of the Board of Directors' review.



Sustainability management

Sustainability is an integral part of Terrafame's business operations. Terrafame Ltd'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 Leadership 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. 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
- › Responsible Care programme of the global chemical industry



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Terrafame's employees, as well as the employees of its partners and suppliers, must comply with Terrafame's Code of Conduct and the company's 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 made progress in its management systems for energy efficiency (ISO 50001) and information security (ISO 27001) during 2023, and the related certifications are expected to take place during 2024.

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. Seven reports were submitted through the channel in 2023.

Terrafame engages in active dialogue with various stakeholders in the spirit of mutual appreciation. Its stakeholder cooperation includes cooperation with personnel, meetings with partners working on the industrial site, a local cooperation group, and events for local residents and summer cottage owners.



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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. Terrafame aims to achieve carbon neutrality in its own operations by 2039. For this purpose, the company has created a carbon roadmap which determines a cost-effective path towards carbon neutrality.

The themes 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 in the company's Sustainability Review, which is published on Terrafame's [website](#). The report also presents key figures related to the company's 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 June 2024.

Terrafame is committed to compliance with the operating principles of the Finnish Sustainable Mining Network. Terrafame has carried out annual self-assessments in accordance with the Finnish Towards Sustainable Mining (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). In the 2023 self-assessment, occupational safety also reached level A. The company still has room for improvement in the areas of energy efficiency and biodiversity, where measures are currently being taken. The energy efficiency management system is scheduled to be certified in 2024. Additionally, guidelines have been established to ensure the consideration of endangered species and habitats, particularly in large-scale infrastructure projects.



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Risk management

Terrafame complies with the risk management principles 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 improvements and competence development, for example. The company has also identified climate-related risks and opportunities. The environmental risk assessment prepared by an independent expert was updated during 2023. The assessment is a requirement for the environmental permit.

A summary of the assessment of the most significant risks and uncertainties is presented on [page 53](#) 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 vehicles

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



IMPACTS

Economic value added

- Wages and salaries (incl. pensions expenses) EUR 56.1 million
- Taxes and tax-like charges, debt EUR 3.9 million
- Purchases EUR 613.9 million
- Net financial items EUR 30.3 million

Committed personnel

- Development of personnel's knowledge, skills and well-being, and active cooperation

Safe work environment

- In 2023, the lost-time injury frequency (LTIFR₁) decreased to 4.8 (2022: 6.4)

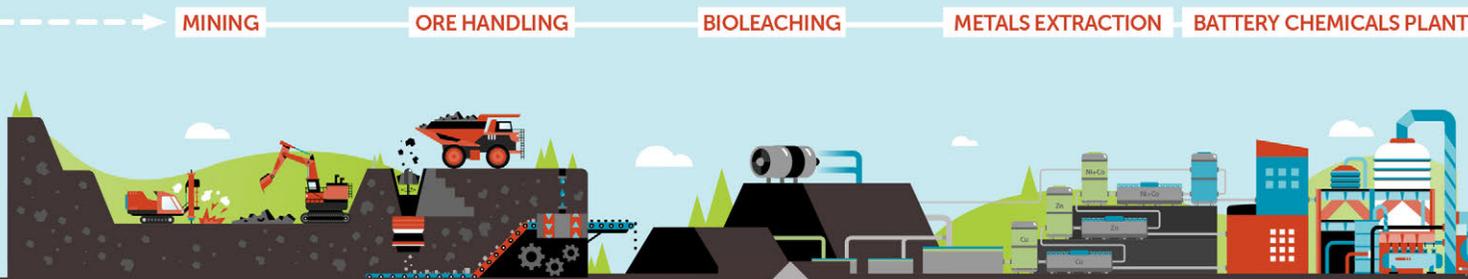
Fulfillment of customer promises

- 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 EUR 718.4 million
- Equity ratio 57.8%
- Capital expenditure 24.6% of net sales



Net sales

- EUR 560.9 million
- Battery chemicals business share of full-year net sales EUR 167.5 million

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 842 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 site
- A total of appr. 1,000 employees of contractors and subcontractors

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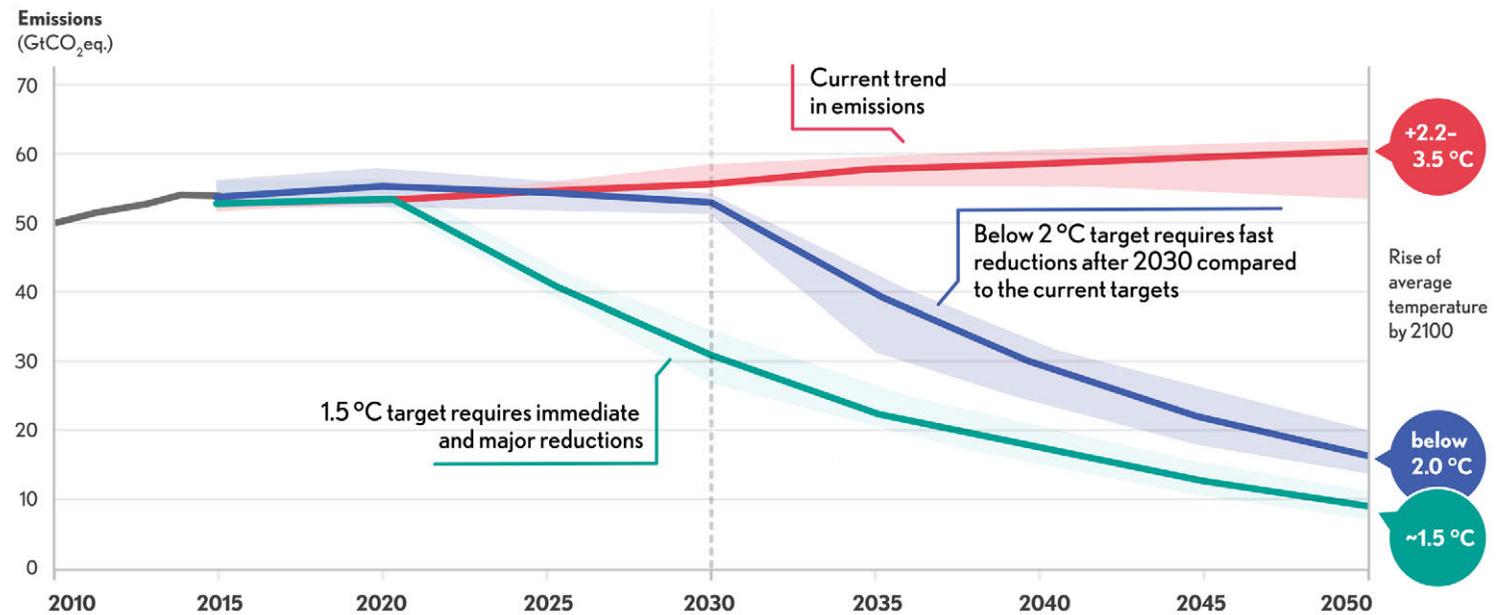
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Business environment

In the summary section of its Sixth Assessment Report, published in March 2023, the Intergovernmental Panel on Climate Change (IPCC) states that current measures are not sufficient to limit global warming to 1.5 degrees. This means that effective emission reductions are necessary after 2023 to make it possible to limit global warming to 2 degrees. With the climate measures already undertaken, global warming will exceed 1.5 degrees, and significant emission reductions will be required after 2030 to limit global warming to 1.5–2 degrees.

Current emission reduction measures will not be enough to reach the 1.5 degree target.

The climate targets of the states that extend until 2030 will not lead to adequate emission reductions. Faster emission reductions will be needed after 2030 to limit warming to below 2 degrees.



Based on IPCC Assessment Report 6, Working Group III. © Ministry of the Environment and VTT Technical Research Centre of Finland, 2022 Ilmasto-opas.fi



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.

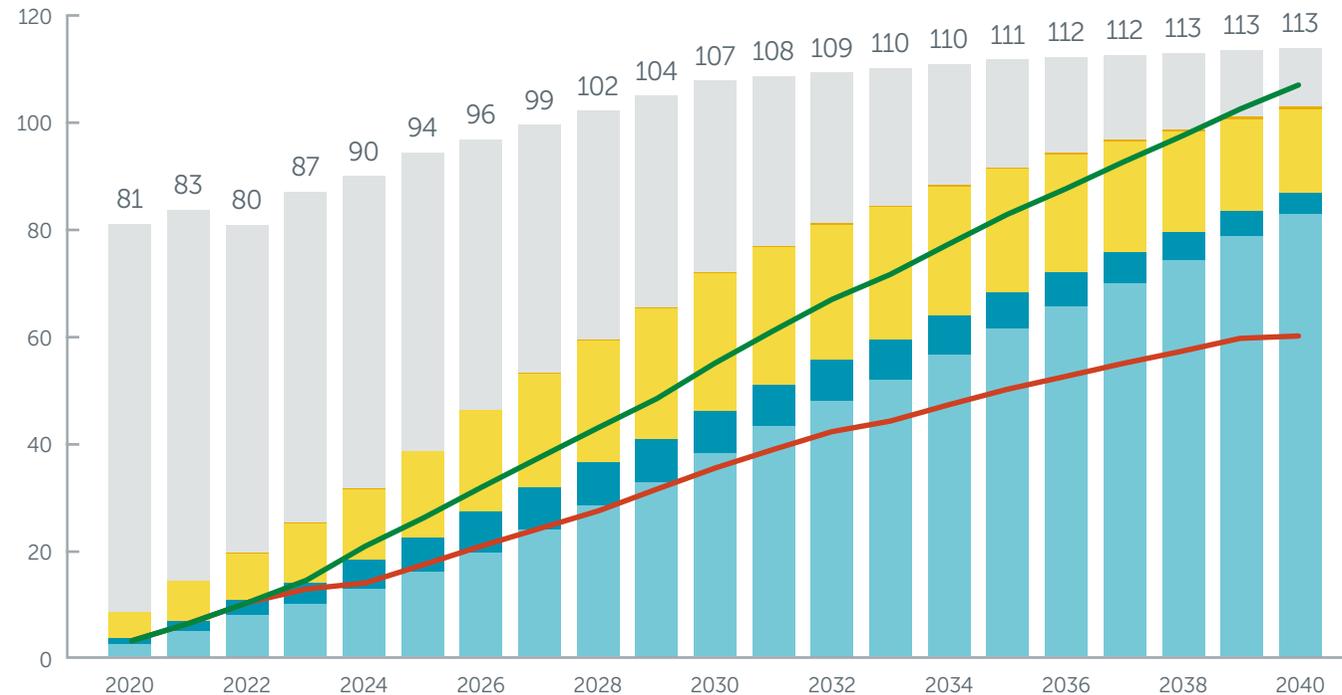
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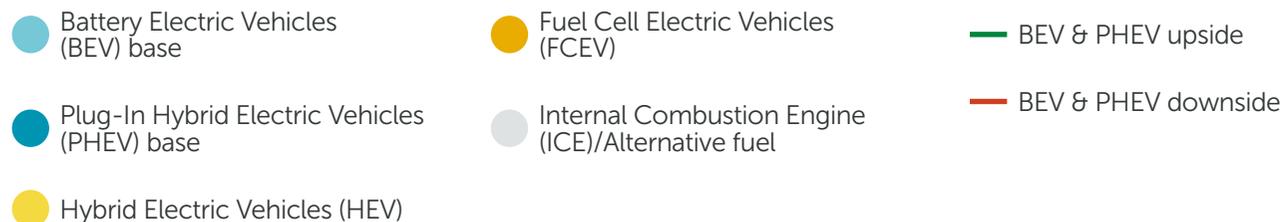
International climate policy is guided by the UN climate agreement, the Kyoto Protocol and the Paris Agreement, as well as multilateral negotiations related to these. The Conference of the Parties (COP) is the highest decision-making body within the climate agreement.

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 reflected in the growth of electric motoring. Around 13.6 million electric vehicles were sold globally in 2023, and this number is expected to increase to up to 45 million by 2030 (source: Rho Motion).

Global EV sales forecast, 2020–2040 (million units)

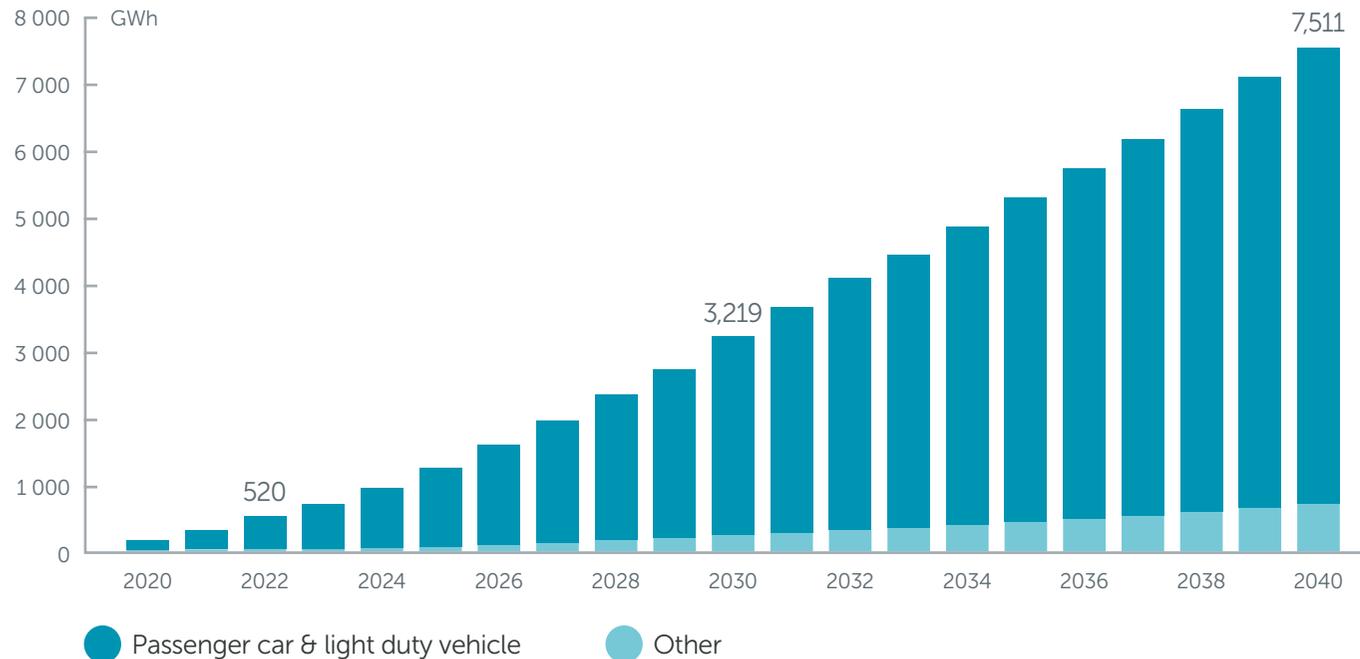
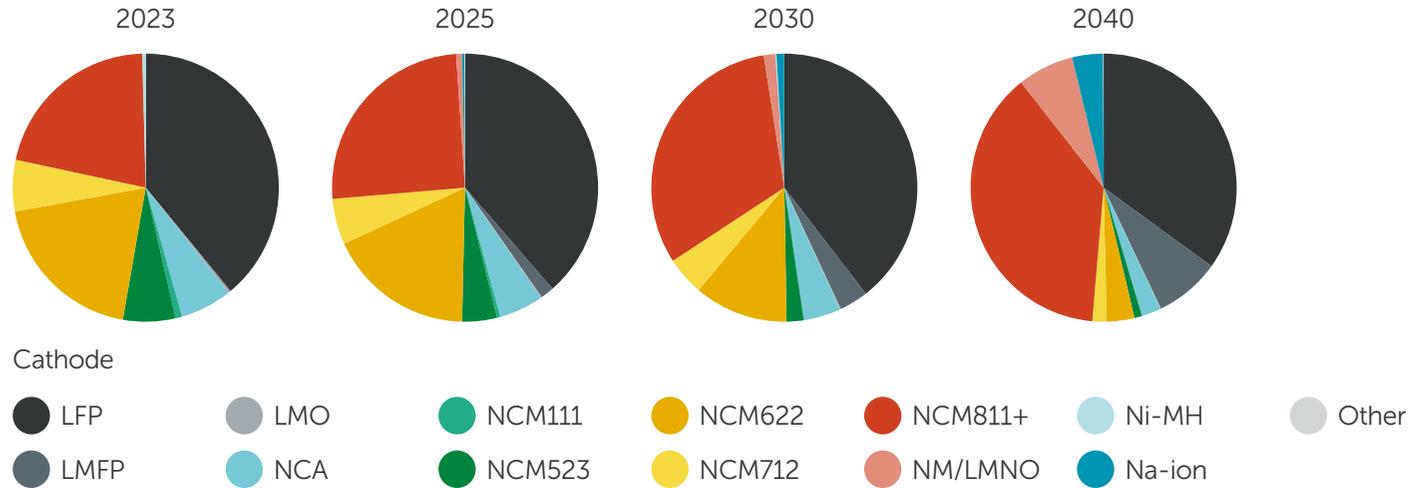


Source: Rho Motion



Electric vehicles are also expected to have longer ranges, which increases the demand for batteries with a high nickel content. According to the latest estimate by research firm Rho Motion, the demand for batteries for electric vehicles will grow by 35% in 2024 and almost quadruple in 2024 compared with 2021.

EV battery demand outlook by battery chemistry & vehicle class, 2020–2040



Source: 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 2023, and its net sales accounted for around 30% of Terrafame's total net sales in a challenging market situation during the financial year.

The full nickel sulphate production capacity of the battery chemicals plant is sufficient for approximately 1 million EV batteries per year and the cobalt sulphate production capacity will meet the needs of around 300,000 EV batteries annually, provided that the average size of EV batteries (source: Rho Motion) remains the same (50 kWh) and utilises NCM811 battery technology.

Most modern electric vehicles 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 EV 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 metals 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 vehicle 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 required to produce Terrafame's nickel sulphate product, which reduces its climate impact.

Although the carbon footprint of Terrafame's nickel products is already very low, the goal is to further reduce carbon dioxide emissions to achieve carbon neutrality in production by 2039 (Scope 1 and Scope 2).



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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 26](#) of the Board of Directors' review.

Resources

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 842 Terrafame employees worked on its industrial site at the end of the financial year 2023. 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 1,000 people worked regularly on Terrafame's industrial site in 2023. More information about our personnel and partner network is provided on [pages 37–43](#) 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 has further increased 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 use it as raw material for new hoses and pipes.



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In 2023, Fortum Corporation and Terrafame signed an agreement on a pilot operation to use metals recycled by Fortum from the black mass from EV batteries in Terrafame's battery chemicals production. The cooperation between Fortum and Terrafame enables an even more sustainable value chain for the European battery industry.

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 Terrafame's and its partner companies' employees and suppliers to comply with Terrafame's Code of Conduct, human rights policy and sustainability policy. The company is working continuously and systematically to further improve its operational excellence.

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. The global production of electric vehicles is currently strongly focused in China. However, manufacturers of battery cells and cathode materials (pCAM/CAM) have announced investments in giga factories that will strengthen the North American and European battery markets.

During 2022 and 2023, Terrafame signed multiyear supply agreements with Renault, Stellantis and Umicore for low-carbon and fully traceable nickel sulphate used in EV batteries. The partnerships mark concrete steps towards a robust, transparent and sustainable European battery cluster.

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



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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, ensure high product quality and the full traceability required from the supply chain.

As part the development of the logistics chain, Terrafame and its partner VR Transpoint continued to develop 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 metal 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. 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 local 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 26](#). Terrafame's tax footprint is described in more detail on [page 47](#) of the Board of Directors' review.

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 report for 2023 is expected to become available in March 2024.

Terrafame received a new environmental and water management permit for its operations in June 2022. As part of this process, the company updated its environmental monitoring plan. In September 2023, the Kainuu Centre for Economic Development, Transport and the Environment (ELY Centre), and the Lapland and North Savo ELY Centres, which serve as the fishery authorities, approved Terrafame's updated environmental monitoring plan.

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 2023.

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. In 2023, 99% of the sulphate derived from the process solution was recycled back into the circulation, so the 100% recycling target was not quite achieved.

Key indicators related to discharge waters	Actual 2023	Actual 2022
Purified discharge waters, Mm ³	10.1	9.4
Sulphate in discharge waters, tonnes (permit quota 16,300 tonnes)	11,056	12,763
Recycling rate for sulphate from processes, % (target 100%)	99	100

Terrafame will report its key indicators related to environmental emissions in its Sustainability Review in the summer of 2024 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 2023, 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 discharge waters.

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. The year 2023 was rainy, which was also reflected in the amount of purified discharge waters.

During 2023, 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. Kolmisoppi, which remains unexploited, is the second ore deposit located in Terrafame's mining concession. Including Kolmisoppi, Europe's largest nickel ore reserves are located in Terrafame's mining concession in Sotkamo. In addition to nickel, 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 EV batteries.

On 17 February 2023, the Regional State Administrative Agency for Northern Finland decided not to process the Kolmisoppi project permit application. A key obstacle to processing the permit application in accordance with the scope of the application submitted in June 2022 was the fact that the procedure to deviate from the objectives of the water management plan requires a legislative amendment, which is still under preparation.



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Terrafame has decided to change the Kolmisoppi project plans so that the project will proceed in two phases. In the first phase, the company will apply for a permit to exploit the ore deposit in the Kolmisoppi land area, with mining scheduled for 2028–2033. The first-phase permit application was submitted to the Regional State Administrative Agency for Northern Finland in the summer of 2023. In the second phase, Terrafame will apply for a permit to expand the mine into the water area, with mining scheduled for 2040–2050. Between 2033 and 2040, mining will take place in the current Kuusilampi mine.

On 26 April 2023, the Vaasa Administrative Court issued its ruling on the environmental permit decisions concerning Terrafame's battery chemicals plant and its energy production units. The administrative court amended the battery chemicals plant's permit by removing the authorisation to recycle the iron sediment generated at the plant into bioleaching. The court deemed the related reports to be insufficient. In other respects, the appeals against the decision were rejected. Terrafame applied for a new permit for recycling from the Regional State Administrative Agency in July 2023 following the completion of the necessary studies. The administrative court also further specified the energy production units' environmental permit in terms of environmental monitoring, based on an appeal filed by Terrafame. The decision of the administrative court has not been appealed to the Supreme Administrative Court, and the decisions have therefore gained legal force.

On 29 June 2023, the Regional State Administrative Agency for Northern Finland granted an environmental permit for the new KL1 waste rock area and the Rajasuo landfill for soil, and a water management permit for construction projects related to these operations.

In January 2024, Terrafame received two interim decisions from the Vaasa Administrative Court. One decision pertained to the company's main permit, and the other related to the KL1 waste rock area. Additional information about the interim decisions can be found in the section Key events after the financial period on [page 51](#).



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Personnel

Sustainability is at the core of Terrafame's business operations. Terrafame supports and respects human rights and labour rights and requires the same from its business partners. The company is continuously developing its operations together with its personnel to provide a safe and healthy working environment for its employees and those of its partner companies, as well as learning and career development opportunities for its personnel.

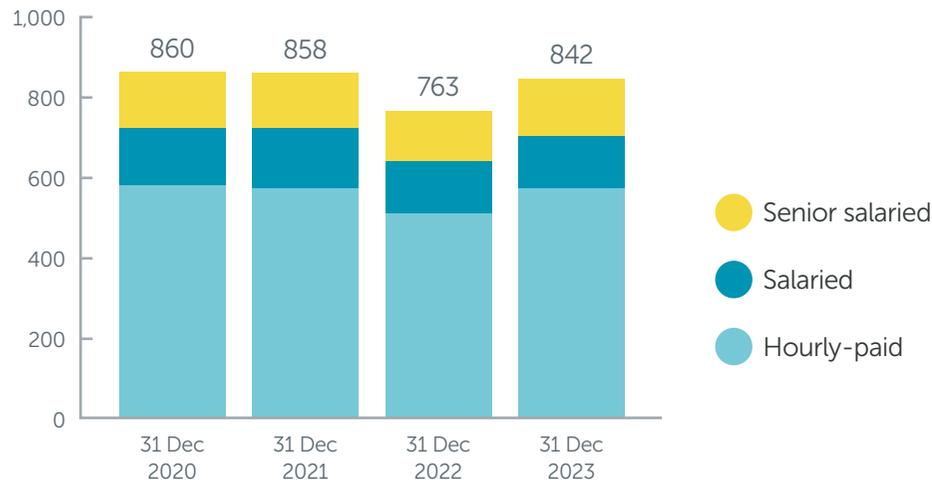
Terrafame's industrial site regularly employs around 1,900 people in various production, maintenance and expert tasks. Terrafame had 842 (763) employees at the end of the year. The number of fixed-term employment relationships was 55 (30). The increase in the number of fixed-term employment relationships is mainly explained by a new two-year apprenticeship training programme that began in the autumn. The company provided around 100 people with a summer job.

In addition, an average of 1,038 people employed by partner companies worked on the industrial site during the year. More information about partner companies is available on [page 41](#).

In late 2022, Terrafame announced that it is preparing to start uranium recovery by the summer of 2024. In 2023, the company recruited around 40 people for various employee, management and expert positions at the plant. The vacancies attracted great interest among Terrafame's personnel and external jobseekers.

Terrafame personnel

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The highest level of employee satisfaction in Terrafame's history

Terrafame carried out its fourth extensive personnel survey in the autumn of 2023. The response rate was 78.9%, the highest in Terrafame's history. The level of employee satisfaction was also higher than ever before.

Terrafame monitors the development of employee satisfaction with the PeoplePower® index, which was 68.1 (A+) in the 2023 survey (65.5 in the previous survey in 2019). The index has increased in every survey, indicating that the personnel are even more committed to the company than before. The development work continues.

Corporate culture is developed in line with the principles of continuous improvement

The two-year Operational Excellence project for the development of safety and management culture and operational reliability in production was completed at the end of 2022. A new Operational Excellence function was launched at the beginning of 2023 to apply the lessons learned during the project. The goal is to further develop a culture of learning, inclusion and continuous improvement with a safe, analytical and systematic approach.

In 2023, the main focus was on ensuring that previously launched practices are rooted in the organisation's operations and on continuing to develop management structures such as meeting practices, key performance indicators and reports. At the same time, efforts were made to strengthen supervisors' ability to apply and further develop these structures. At the end of 2023, Terrafame began to strengthen process thinking and the related operating models to ensure the implementation of its strategy.

The development of culture was also studied as part of the personnel survey, which showed that change is currently underway, and that the personnel are satisfied with the development. The average score for all statements related to the development of culture was 3.1 on a scale of 1–4. The adoption of the new culture is also reflected in occupational safety and in production, where the nickel production continued close to the record level of the previous year.

Cooperation is very active at Terrafame. A total of five cooperation meetings between the management and employees were held in 2023. In addition, monitoring and development meetings were held on a monthly basis. The most significant cooperation development projects included the creation of an operating model for co-worker responsibility and the implementation of a personnel survey.



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Continuous competence development

With its current known reserves, Terrafame can continue its production operations for several decades, so the commitment and availability of skilled personnel is important.

At the beginning of 2023, Terrafame introduced a new recruitment system that further improves the management and monitoring of the recruitment process. In the system, attention has also been paid to making it as easy as possible for jobseekers to submit an application.

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 also strengthened by improving well-being at work.

In 2023, the focus areas of competence development included leadership and sustainability.

Terrafame's three-day management training programme based on the management principles created in 2022 continued during 2023. The target groups consisted of site managers, team leaders and other new supervisors. During the year, around 80 people in total participated in the training. The management principles ensure consistent management of a high quality.

During the year, supervisors were also provided with training on the integration and induction process and the management of success, for example.

In 2022, Terrafame started an extensive series of courses on sustainability and the company's operating principles and policies for all employees. In 2023, the series continued with anti-bribery and anti-corruption training, as well as information security training and exams, among other topics.

During the year, around 80 Terrafame employees developed their expertise in various training programmes leading to qualifications. The most common qualifications were vocational qualifications in the electrical and automation sector, vocational qualifications and special vocational qualifications in the process industry, vocational qualifications in machine mechanics and maintenance, and vocational qualifications in the automotive industry. In addition, the uranium recovery plant's employees and supervisors started an operator-driven reliability training, which will continue in 2024.



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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.

In the autumn, the company recruited people for a two-year apprenticeship training programme in the process industry. The programme is carried out in cooperation with Educational Consortium OSAO and Kainuu Vocational College (KAO). Those selected for the training mainly work in Terrafame's chemical plants (metals extraction, the battery chemicals plant or uranium recovery) alongside their studies. A total of 24 people started the apprenticeship training.

Safety training is part of the induction training for Terrafame's employees, and certain training programmes are repeated regularly. Safety training includes statutory occupational safety and emergency first aid training, as well as Terrafame's own Safety Park for practising safe ways of working. The implementation of an extensive induction and training plan for the personnel of the uranium recovery plant started in 2023.

Promoting well-being in many ways

Terrafame takes care of its employees' well-being, and the company annually determines a well-being programme in cooperation with the management, employee representatives and the occupational healthcare provider. The programme includes creating practices that support well-being and strengthening employees' competence in well-being at work, among other aspects.

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 in the surveys. If necessary, targeted workplace surveys are conducted in a specific department, for example.

In 2023, the focus was on supporting mental well-being and preventing musculoskeletal disorders.



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Terrafame requires each member of the workplace community to behave in a respectful and responsible manner and promote equality. Terrafame has zero tolerance for harassment and discrimination. In 2023, the principles of co-worker responsibility were compiled into guidelines in cooperation with employee representatives. The goal is to emphasise the importance of respectful behaviour to the well-being of the workplace community and to provide practical guidelines in case an employee experiences inappropriate treatment and on how the supervisor should act in such a situation.

The company also organises events, exercise opportunities and other leisure activities for its personnel. In September 2023, a Family Day event was organised for employees' family members and other close persons to offer them a chance to learn about Terrafame's operations and industrial site. Around 400 people participated in the event.

Partners

In addition to its highly skilled personnel, Terrafame relies on a network of partner companies for production and maintenance and cooperates with various suppliers of materials, services and chemicals.

With its partners, Terrafame strives for long-term cooperation, in which the development of the safety and quality of operations is continuous and an absolute prerequisite for the continuity of cooperation. Long-term procurement contracts can guarantee partners the opportunity to invest in safe, high-quality and cost-effective operations.

Purchases are made only from approved suppliers. New suppliers' background information is checked during the supplier approval process. Terrafame expects its partners to:

- › Respect human rights principles and values and operate in accordance with them.
- › Comply with Terrafame's Code of Conduct, sustainability policy and human rights policy. The Code of Conduct and the policies are available on the company's website.
- › Commit to Terrafame's values, high-quality operations, safety and the continuous improvement of efficiency.



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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. 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 and cost-effectiveness is rewarded.

An average of around 150 long-term partner companies operated on Terrafame's industrial site during 2023, with an average of 1,038 (783) employees. In addition to outsourced production and maintenance work, production also involves significant purchases of materials such as process chemicals and fuels.

Terrafame's purchases of services and materials totalled around EUR 614 (541) million in 2023. 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 does not cooperate or enter into agreements with suppliers and countries that are subject to sanctions.

In 2023, Terrafame began to develop its partner company management – that is, the monitoring of its partner companies' operations and cost-effectiveness. The aim is to work more closely together so that both Terrafame and the partner company will benefit financially, and both companies will be able to operate more sustainably. For instance, an induction programme for contractors was created during the year and will be introduced in 2024.

The development of cooperation is also related to an ongoing project to allocate purchases to the best partners. Terrafame wants to cooperate with companies that are committed to its operating methods and values, and that operate cost-effectively and participate in the continuous improvement of operations. The project will continue in 2024.

In 2023, three partner meetings were held to discuss the company's situation, safety and the development of cooperation.

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. Terrafame regularly monitors the ways of working and safety practices of its partner companies that operate in their locations on the industrial site.



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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. Terrafame promotes equal opportunities, equal employment and career development in the spirit of the Act on Equality between Women and Men. Terrafame has updated its processes, policies and guidelines on the processing of personal data to comply with the EU General Data Protection Regulation (GDPR). The themes of equality and non-discrimination are described extensively in the company's various policies and guidelines, such as human rights policy and guide for co-worker responsibility.

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](#).

In 2023, Terrafame began defining due diligence principles related to human rights. Based on this, the company is creating a process to monitor the implementation of human rights in supply chains. The process is intended to be implemented during 2024.



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Whistle-blowing 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 whistle-blowing 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 [whistle-blowing channel](#) has also been available for the company's external stakeholders.

The cases reported through the whistle-blowing 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.

In 2023, seven reports were submitted through the channel, four of which were related to occupational or environmental safety, two to HR and one to common practices. 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 Leadership 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. The goal is 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	2023	2022	Change, %
Accident frequency rate, Terrafame employees	4.5	4.3	4.7%
Accident frequency rate, partner companies	5.0	8.5	-41.2%
Total accident frequency rate on the industrial site	4.8	6.4	-25.0%

The operating culture development project launched in late 2020 and completed at the end of 2022 had a positive impact on occupational safety. During 2023, particular attention was paid to the development of partners' safety culture. This was clearly reflected in a decrease in lost-time accidents among partner companies' employees. The accident frequency rate of our partner companies' employees decreased to almost the same level as that of Terrafame's own personnel.

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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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. In terms of water-soluble nickel, there were some slight deviations at the battery chemicals plant in 2023. 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 2023. 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

In 2023, preparations for the level required by the ISO 27001 certification continued. The goal is to have the system certified in the spring of 2024. As part of the preparations, an information security policy and an information security management system (ISMS) were devised and introduced in 2023. The development of the system continues as part of other operations. An information security training programme and exam were published. These are part of the mandatory induction training for employees.

Terrafame takes information security into account from different perspectives. Critical information and information systems have been identified, and these choices guide the targeting of information security work.



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Information security risks are identified, assessed and addressed. Technical, administrative and physical controls are used to protect against risks, and personnel are also trained to take care of information security. Operating processes are developed, and employees are informed and guided to operate in a secure manner. Project management and the requirements for our suppliers are also taken into account in the development of information security.

This development is managed by an internal 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 throughout the year.

Information security is also developed in cooperation with external experts. For example, technical scans of Terrafame's external services were carried out in 2023 with the help of experts from Trafigura.

Tax footprint

Terrafame is committed to sustainability in all areas, including taxation. Terrafame has a significant role in society and an important regional role, especially in the Kainuu region. The company operates only in Finland and thus does not pay taxes in other countries.

Tax footprint reporting is based on the guidance on tax reporting issued by the Ownership Steering Department of the Prime Minister's Office on 1 October 2014. Mandatory insurance contributions included in salary costs are excluded from reporting. These insurance contributions are directly related to salaries and are treated as direct salary costs because of the nature of the insurance policies. In addition, the company does not report minor VAT amounts included in foreign travel and training expenses.

Terrafame has yet to generate any taxable income. However, the company has incurred significant tax expenses because of the energy and fuel taxes related to its operations. In addition, the company has paid normal taxes related to the acquisition and ownership of property.



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Terrafame Ltd's tax items in 2023 and 2022 (EUR thousand)

Taxes payable	2023	2022
Direct taxes paid	3,563	3,917
Income tax	0	0
Transfer tax	0	12
Property tax	691	665
Employer's health insurance contributions	685	593
Customs fees	1,844	2,093
Statutory fees	342	553
Indirect taxes paid	11,081	5,794
Excise tax, net	10,482	5,237
Insurance premium tax	585	554
Waste tax	14	2
Taxes collected and accounted for	-18,545	3,203
Withholding tax	10,234	9,924
Value added tax, net	-28,778	-6,721
Total	-3,901	12,914
Ratio of tax payments to net sales	-0.70%	2.21%

The company had around EUR 18.8 million in unrecognised deferred tax assets on 31 December 2023. Deferred tax assets consist of confirmed losses for previous financial periods that have not been taken into account in taxation for the taxpayer's benefit. The amount is the amount remaining after the estimated amount of taxable income in the financial year 2023.



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Strategy

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 plant 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 studies and develops its production process mainly in connection with normal business operations. Development activities are included in normal business expenses. Last year, the development of the production process focused on the ramp-up of the battery chemicals plant, product quality assurance in the metals production plant and the battery chemicals plant, and the chemical efficiency of metals extraction.

Research is also carried out in separate research projects, which are typically longer-term strategic projects. In 2023, research continued to be carried out to increase production volumes and expand the product portfolio. The company is constantly exploring bioleaching and opportunities to increase its efficiency through agglomeration, aeration and irrigation.

Terrafame has previously studied uranium recovery. In late 2022, the company decided to start uranium recovery by the summer of 2024. Terrafame's production process enables the use of natural uranium found in small concentrations in ore as a by-product. A ready-built uranium recovery plant is located on Terrafame's industrial site. In 2023, the company started preparing the plant for operational use.

In the summer, the addition of recycling fractions to Terrafame's production process entered the trial phase, where metals recycled from the black mass of EV batteries by Fortum Battery Recycling began to be fed to Terrafame's battery chemicals plant.

For several years, Terrafame has been conducting surface structure trials in secondary leaching and the waste rock area to study the best ways to close the areas at the end of their service life. In addition, chemical modelling of the long-term impact of closing measures was continued.

Terrafame participates in the development of the European and Finnish battery industry through various cooperation projects. The company has joined the Finnish Battery Industries, which was established in January 2023 and is the world's first organisation representing battery industry operators. Terrafame was also involved in the BATCircle 2.0 project coordinated by Aalto University. The project examined the possibility of using by-products and recycled materials in battery chemicals production. The project was completed in the summer of 2023.



Key events after the financial period

CEO Joni Lukkaroinen resigned his position

Terrafame announced on 17 January 2024 that the company's CEO Joni Lukkaroinen will resign his position. Lukkaroinen served as the CEO of Terrafame since 2016.

The company's Board of Directors appointed Seppo Voutilainen as the interim CEO of Terrafame. Voutilainen has served as Terrafame's Chief Production Officer and a member of its Leadership Team since September 2020. He will continue to serve in these roles during his term of office as the interim CEO.

Terrafame received two interim decisions from the Vaasa Administrative Court

On 24 January 2024, Terrafame announced that the company had received two interim decisions from the Vaasa Administrative Court, one relating to the company's main permit and the other to the KL1 waste rock area.

The Northern Finland Regional State Administrative Agency issued an environmental permit decision in the permit case concerning all Terrafame's operations in the summer of 2022 and in the case concerning the KL1 waste rock area in the summer of 2023. Both permit decisions included a permission to start the operations specified in the permit decision despite any appeals. Both permit decisions have been appealed and are being processed by the Vaasa Administrative Court.

The permission granted by the Northern Finland Regional State Administrative Agency to increase the extraction of ore and waste rock annually was excluded from the interim decisions issued by the Vaasa Administrative Court. In its permit decision, the Northern Finland Regional State Administrative Agency approved an increase in the ore extraction volume from 15 million tonnes per year to 18 million tonnes per year, and an increase in the waste rock extraction volume from 30 million tonnes per year to 45 million tonnes per year. In addition, the interim decisions issued by the Vaasa Administrative Court included restrictions concerning the construction and use of the new secondary leaching area (SEK5-8) and the new waste rock area (KL1).



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The interim decisions do not have an immediate impact on Terrafame's production, but they affect waste rock dumping plans and ongoing construction projects. If the final decisions by the Vaasa Administrative Court are delayed, the interim decisions may also have an impact on extraction volumes and, consequently, on production and net sales.

Terrafame expects final decisions by the Vaasa Administrative Court on both issues during 2024.

Terrafame strengthened its financing

On 25 January 2024, Terrafame announced that the company had strengthened its financing. In connection with this, the funds managed by Galena Asset Management and Mandatum Holding Ltd exercised the option rights previously granted to them. The funds raised by means of the option rights have been used to repay long-term loans of EUR 142 million granted by Trafigura and Mandatum, meaning that Terrafame no longer has shareholder loans from Trafigura or Mandatum. As part of the shareholders' financing arrangement, Finnish Minerals Group increased the working capital facility granted to Terrafame from EUR 40 million to EUR 65 million and extended its maturity until June 2025.

In addition, Terrafame agreed on a new loan arrangement of EUR 250 million. The loan package is unsecured, with a maturity of four years. It includes a bullet loan of EUR 100 million and a revolving credit facility of EUR 150 million. The bullet loan is for refinancing Terrafame's existing liabilities. The revolving credit facility is for working capital needs and the company's general financing needs.

The above transactions were completed in December 2023 and have been recognised on the company's balance sheet on 31 December 2023.

After exercising the options, Finnish Minerals Group owns 56.1% of all shares in Terrafame, Trafigura's Galena funds own 39.4% and Mandatum 4.5%.



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Terrafame pursues annual savings of EUR 10 million and initiated change negotiations

On 21 February 2024, Terrafame announced that the company has decided to initiate a profitability programme, aiming for EUR 10 million in annual savings. The goal is to improve the company's international competitiveness and profitability. The company is currently implementing significant investment programmes, which are necessary for the continuation of its operations and particularly related to the construction of the new secondary leaching area. These investment programmes increase the need for ensuring cash flow. Terrafame estimates that if realised, the measures of the profitability programme would start to impact the company's profitability as of the second half of 2024.

As part of the profitability programme, Terrafame has on 21 February 2024 issued an invitation to change negotiations concerning all personnel groups on production-related and financial grounds in accordance with the Finnish Co-operation Act. Terrafame has over 800 permanent employees, and the negotiations affect all employees. According to the initial estimate of the company, the maximum personnel reduction need would be in total 75 person-years. The possibility of layoffs is also considered in the negotiations.

Terrafame will announce the outcome of the negotiations after they end.

Assessment of the most significant 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 improvement, investments and competence development, for example.



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- › The battery chemicals market will continue to be challenging in 2024, but Terrafame's production process will also enable flexible operations in the intermediates market.
- › The price development of base metals and battery chemicals involves considerable uncertainty.
- › The development of operational efficiency, profitability and safety at work will continue.
- › Terrafame is preparing to start uranium recovery by the summer of 2024.

The Board of Directors' proposal on the distribution of profit

Terrafame Ltd's loss for the financial year is EUR 7,056,490.30. Terrafame's distributable equity on 31 December 2023 was EUR 656,879,228.16.

The Board of Directors proposes to the Annual General Meeting that no dividend be distributed and that the result for the financial year be left in equity.



Key figures and formulas for calculating the figures

Scope of operations	2023	2022	2021	2020	2019
Net sales, MEUR	560.9	584.4	378.4	338.3	310.4
Balance sheet total, MEUR	1,242.6	1,128.1	1,006.7	918.5	749.5
Total capital expenditure, MEUR	138.2	83.0	117.9	201.8	130.6
as % of net sales	24.6	14.2	31.2	59.7	42.1
Average number of personnel	830	840	910	833	722
Profitability					
EBITDA, MEUR	84.3	152.1	-48.8	23.8	32.0
EBITDA-%	15.0	26.0	n.a.	7.0	10.3
EBIT	23.3	93.9	-95.3	-16.9	-5.6
EBIT-%	4.1	16.1	n.a.	n.a.	n.a.
Net profit	-7.1	63.0	-115.8	-8.2	-15.2
Profitability, excl. non-recurring items					
EBITDA	99.4	152.1	24.2	23.8	32.0
EBITDA-%	17.7	26.0	6.4	7.0	10.3
EBIT	38.4	93.9	-22.4	-16.9	-5.6
EBIT-%	6.8	16.1	n.a.	n.a.	n.a.
Solvency					
Equity ratio, %	57.8	38.9	38.2	48.1	46.7
Net gearing, %	17.6	44.7	42.6	31.0	31.7

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 recognised on the balance sheet and the comparative figures have not been restated.

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

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



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Assets (EUR thousand)

Non-current assets	Note	31 Dec 2023	31 Dec 2022
Intangible assets	2.1	282	305
Tangible assets	2.2	774,284	697,125
Investments		1	0
Non-current assets total		774,567	697,431
Current assets			
Inventories	2.3	313,250	288,908
Long-term receivables			
Deferred tax assets	2.4	0	14,202
Short-term receivables			
Amounts owed by group companies	2.5	0	35
Trade receivables		48,754	66,701
Other receivables		13,384	897
Prepayments and accrued income	2.6	77,419	14,399
Cash and cash equivalents		15,230	45,501
Current assets total		468,039	430,642
Assets total		1,242,606	1,128,072



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Equity and liabilities (EUR thousand)

	Note	31 Dec 2023	31 Dec 2022
Equity	2.7		
Subscribed capital		2,000	2,000
Other reserves			
Invested unrestricted equity		972,670	802,610
Fair value reserve	2.8	59,522	-56,806
Retained earnings (loss)		-308,734	-371,692
Loss (profit) of the financial year		-7,056	62,957
Equity total		718,401	439,069
Provisions	2.9	247,123	232,024
Long-term liabilities			
Loans from credit institutions	2.10	41,362	102,163
Deferred tax liabilities	2.11	14,881	0
Long-term liabilities total		56,243	102,163
Short-term liabilities			
Amounts owed to group companies	2.12	58,993	369
Loans from credit institutions	2.13	42,324	139,700
Trade payables		93,738	105,007
Other liabilities		1,289	1,239
Accruals and deferred income	2.14	24,495	108,502
Short-term liabilities total		220,839	354,816
Liabilities total		277,082	456,979
Equity and liabilities total		1,242,606	1,128,072



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Income statement (EUR thousand)

	Note	2023	2022
Net sales	3.1	560,930	584,414
Cost of goods sold	3.2	-477,935	-453,603
Gross profit		82,994	130,810
Sales and marketing expenses	3.3	-5,630	-2,406
Administrative expenses	3.4	-27,897	-21,184
Other operating revenues		4,564	5,599
Other operating expenses	3.5	-30,778	-18,906
Operating profit/loss		23,253	93,913
Financial income and expenses	3.6		
Interest income and other financial income		5,962	3,926
Interest and other finance expenses		-36,271	-34,882
Financial income and expenses		-30,309	-30,956
Profit/Loss before year-end allocations and taxes		-7,056	62,957
Income tax		0	0
Profit/Loss for the financial year		-7,056	62,957



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Cash flow statement (EUR thousand)

Cash flow from operating activities	2023	2022
Result for the financial period	-7,056	62,957
Adjustments		
Depreciation and amortisation	61,040	58,192
Unrealised foreign exchange gains and losses	-2,259	9,031
Other income and expenses, non-cash items	15,099	0
Financial income and expenses	32,226	21,571
Other adjustments	0	0
Cash flow before change in net working capital	99,050	151,752
Change in net working capital		
Change in trade and other receivables; increase (-) /decrease (+)	3,167	-42,892
Change in inventories; increase (-) / decrease (+)	-24,343	-55,054
Change in trade payables and other liabilities; increase (-) / decrease (+)	-18,282	15,980
Cash flow before financial items and income tax	59,592	69,786
Interest paid and other financial expenses	-26,420	-20,396
Interest received, operational	2,647	2,409
Cash flow from operating activities (A)	35,819	51,798
Cash flow from investing activities		
Investments in tangible and intangible assets	-134,927	-75,517
Proceeds from sale of tangible and intangible assets	0	0
Purchased Subsidiary Shares	-1	0
Cash flow from investing activities (B)	-134,927	-75,517



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Cash flow statement (EUR thousand)

Cash flow from financing activities	2023	2022
Paid increase in equity	28,000	0
Proceeds from long-term borrowings	27,767	75,769
Proceeds from short-term borrowings	65,000	0
Repayment of short-term borrowings	-49,699	-67,077
Repayment of short-term lease liabilities	-1,174	-4,013
Cash flow from financing activities (C)	69,894	4,678
Impact of exchange rate changes on the amount of foreign currency cash	-1,056	1,076
Change in cash and cash equivalents (A+B+C); increase (+) / decrease (-)	-29,214	-19,040
Cash and cash equivalents at the beginning of the period	45,501	63,466
Cash and cash equivalents at the end of the period	15,230	45,501



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.

Terrafame Alueverkko Oy, a wholly-owned (100%) subsidiary of Terrafame Ltd, was established during the 2023 financial year. The subsidiary is domiciled in Sotkamo. The subsidiary was established for electricity network operations, and its actual business operations will start during the financial year 2024 once its electricity network operator's permit process has been completed.

Terrafame Ltd will not prepare consolidated financial statements for the 2023 financial year under chapter 6, section 1 of the Accounting Act, because the subsidiary Terrafame Alueverkko Oy did not have any significant transactions by the end of the 2023 financial year, and the consolidation of the subsidiary would not have an impact in terms of a true and fair view of the Group's or parent company Terrafame Ltd's performance during the financial year or financial position at the end of the 2023 financial year.

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 2022. 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 adjusted for 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.

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.



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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 2023. 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 2023, their value totalled EUR 15.3 (15.0) million.

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 capitalised 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.



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 recognised on the lessee's balance sheet. As a lessee, the company is required to recognise 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 recognised as right-of-use assets and lease liabilities on the balance sheet. As a result, the payments associated with such leases are recognised 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 recognised 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 2023 or earlier.



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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 percent 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. As of the 2023 Financial Statements, the valuation of the metals in the ore in the primary and secondary heaps that are included in the work-in-progress inventory of the metal intermediates business follows a method in which the metals' purchase cost activated during the closed financial period has been determined for each function based on the average cost of each supply chain function during the closed and prior financial period. Previously, the valuation presented in the financial statements considered the function-specific costs of each function during the closed financial period. The aim of this change is to diminish the effect of exceptional short-term cost fluctuations on the value of the work-in-progress inventory of the metal intermediates business presented on the balance sheet. 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 end product inventory of metal intermediates on 31 December 2023 was measured at acquisition cost, on a cost basis, at EUR 8.6 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 operations measured on a cost basis on 31 December 2023 was EUR 254.0 million, and the value of work in progress in battery chemicals production measured on a cost basis was EUR 4.6 million. The inventory of finished products in battery chemicals business operations on 31 December 2023 has been measured at net realisable value, EUR 16.1 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.



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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.

Rehabilitation provision for mine closure and environmental clean-up costs

In case of closure, Terrafame's balance sheet includes an environmental provision, which is updated annually. As far as applicable, the provision complies with the guarantee determined in the environmental permit and the Northern Finland Regional State Administrative Agency's estimate of area-based closure costs. The general costs in the guarantee requirement and the value added tax added to the unit cost are not included in the environmental provision, as these costs will not be borne by Terrafame when the company carries out its closing obligation.

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.



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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.

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 247.1 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 thousand)

	Intangible rights	Other capitalised long-term expenditures	Investments in progress	Total
Carrying amount at 31 Dec 2022	168	97	40	305
Gross carrying amount at 1 Jan 2023	2,547	324	40	2,911
Increase	0	0	140	140
Capitalisation for the year	0	180	-180	0
Gross carrying amount at 31 Dec 2023	2,547	504	0	3,051
Accumulated amortisation and impairment losses				
At 1 Jan 2023	2,379	227	0	2,606
Amortisation for the year	115	48	0	163
Accumulated amortisation and impairment losses				
At 31 Dec 2023	2,494	275	0	2,769
Carrying amount at 31 Dec 2023	53	229	0	282



2.2. Tangible assets (EUR thousand)

	Land	Buildings	Machinery and equipment	Other tangible assets	Construction in progress	Total
Carrying amount at 31 Dec 2022	3,440	103,765	269,497	230,085	79,834	686,621
Gross carrying amount at 1 Jan 2023	3,440	134,895	412,621	290,934	79,834	921,724
Increase	2	0	11,253	0	125,607	136,862
Capitalisation for the year	0	1,137	11,777	39,495	-52,409	0
Gross carrying amount at 31 Dec 2023	3,442	136,031	435,652	330,429	153,032	1,058,585
Accumulated amortisation and impairment losses at 1 Jan 2023	0	31,130	143,124	60,849	0	235,103
Amortisation for the year	0	6,530	36,630	14,311	0	57,471
Accumulated amortisation and impairment losses at 31 Dec 2023	0	37,660	179,754	75,160	0	292,574
Carrying amount at 31 Dec 2023	3,442	98,371	255,898	255,269	153,032	766,011
				Machinery and equipment Right-of-use assets		Total
Carrying amount at 31 Dec 2022					10,505	10,505
Gross carrying amount at 1 Jan 2023					21,332	21,332
Increase					1,174	1,174
Gross carrying amount at 31 Dec 2023					22,506	22,506
Accumulated amortisation and impairment losses at 1 Jan 2023					10,827	10,827
Amortisation for the year					3,406	3,406
Accumulated amortisation and impairment losses at 31 Dec 2023					14,232	14,232
Carrying amount at 31 Dec 2023					8,273	8,273

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IFRS 16 Leases standard notes (EUR thousand)

Maturity analyses	2023	2022
No later than 1 year	1,600	5,887
Later than 1 year and no later than 5 years	3,878	1,034
Over 5 years	0	0
Carrying amount at 31 December 2022	5,478	6,921
Items recognised in profit or loss		
Expenses from low-value asset leases (which are not short-term leases);	86	63
Expenses from short-term leases;	6,884	5,794
Depreciation by item class (machinery and devices)	3,406	3,316
Interest losses from leasing liabilities	342	308
Above Leasing costs are included in Other operating expenses		
Items booked in Cash flow statement		
Payments from lease agreements total	8,058	5,552



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2.3. Inventories (EUR thousand)

	31 Dec 2023	31 Dec 2022
Raw materials and consumables	29,966	31,227
Work in progress	258,579	241,797
Finished goods	24,705	15,884
Total	313,250	288,908

The value of materials and supplies on 31 December 2023 includes a provision of EUR 9.8 million that reduces the value of inventory in terms of slow-moving inventory. The corresponding provision on 31 December 2022 was EUR 8.9 million.

2.4. Deferred tax assets (EUR thousand)

	31 Dec 2023	31 Dec 2022
Deferred tax assets	0	14,202

It is estimated that the company has around EUR 93.9 million in confirmed losses and losses to be confirmed, and around EUR 45.0 million in unused tax depreciation. The company has recognised deferred tax assets or liabilities on the balance sheet in terms of derivatives. Deferred tax assets have not been recognised on losses confirmed in income taxation or on unused tax depreciation.



2.5. Amounts owed by Group companies (EUR thousand)

Trade receivables	31 Dec 2023	31 Dec 2022
Finnish Minerals Group	0	31
Sokli Oy	0	4
Total	0	35

2.6. Prepayments and accrued income (EUR thousand)

	31 Dec 2023	31 Dec 2022
Other prepayments and accrued income	2,879	551
Derivative receivables	74,541	13,847
Total	77,419	14,399



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2.7. Equity (EUR thousand)

	31 Dec 2023	31 Dec 2022
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	-56,806	-45,945
Increase	188,457	263,932
Decrease	72,129	274,792
Fair value reserve at the end of the period	59,522	-56,806
Invested unrestricted equity at the beginning of the period	802,610	800,469
Investment in invested unrestricted equity	170,060	2,141
Invested unrestricted equity at the end of the period	972,670	802,610
Retained earnings at the beginning of the period	-308,734	-371,692
Retained earnings at the end of the period	-308,734	-371,692
Profit/Loss for the period	-7,056	62,957
Retained earnings	-315,791	-308,734
Total equity	718,401	439,069



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2.7. Equity (EUR thousand)

Restricted equity at the end of the period	31 Dec 2023	31 Dec 2022
Subscribed capital	2,000	2,000
Fair value reserve	59,522	-56,806
At the end of the period	61,522	-54,806
Distributable equity at the end of the period		
Retained earnings	-308,734	-371,692
Loss for the period	-7,056	62,957
Fair value reserve	0	-56,806
Invested unrestricted equity	972,670	802,610
At the end of the period	656,879	437,069

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



2.8. Notes to hedging derivatives (EUR thousand)

	31 Dec 2023			31 Dec 2022			2023	2022
		Fair value Positive	Fair value Negative	Net	Fair value Positive	Fair value Negative	Notional amount USD	Notional amount USD
Currency and interest rate derivatives								
Foreign exchange forwards	2,179	0	2,179	8,488	1,891	6,598	133,000	318,000
Metal derivatives							Tonnes	Tonnes
Nickel forward contracts	56,974	0	56,974	0	65,797	-65,797	10,465	14,262
Zinc forward contracts	480	111	369	2,590	196	2,393	3,300	18,000
Derivatives total	59,633	111	59,522	11,078	67,884	-56,806		
Long-term derivatives	686	0	686	239	14,035	-13,796		
Short-term derivatives	58,947	111	58,836	10,839	53,849	-43,010		
			31 Dec 2023			31 Dec 2022		
Balance assets, gross amount			74,541			13,847		
Balance liabilities, gross amount			138			84,855		

The fair value calculation of hedges is based on the market rates and prices on the balance sheet date in accordance with the hedging portfolio. The counterparties in derivative transactions have been approved in accordance with the company's hedging policy. Mutual receivables and liabilities are combined at the transaction level with each counterparty and accounted for at the daily level specific to each transaction.

Hedging instruments had a significant impact on the company's financial position and the predictability of its profitability for the next 12 months on 31 December 2023. The company had hedged against the weakening of the dollar at a hedging rate of around 25% of its projected dollar net cash flow. The company had hedged at a rate of around 35% against the weakening of the price of nickel for the deliveries agreed for the coming year by means of derivatives. In addition, in accordance with its hedging policy, the company had hedged almost all of its completed nickel and zinc deliveries that had been reported as sales. For this reason, changes in market prices after the balance sheet date have little impact on the sales revenue recognised on nickel and zinc batches delivered during 2023.

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2.9. Obligatory provisions (EUR thousand)

Long-term rehabilitation provision	31 Dec 2023	31 Dec 2022
At the beginning of the period	232,024	232,024
Increase	15,099	0
Decrease	0	0
At the end of the period	247,123	232,024
Long-term total	247,123	232,024
Estimated cost of the rehabilitation provision		
Rehabilitation of bioleaching area	122,177	122,177
Other rehabilitation work	124,946	109,847
Estimated rehabilitation costs total	247,123	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 guarantee for discontinued operations. The new permit also enables the progress of ongoing development projects, taking account of the interim decisions issued by the Vaasa Administrative Court in January 2024. More information about the interim decisions is provided under "Key events after the review period" in the Board of Directors' review.

However, the permit decision increased Terrafame's environmental guarantee 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 concerning the calculation principles of the guarantee.

Terrafame increased the environmental provision in its 2021 financial statements, and the provision remained unchanged in its 2022 financial statements. In the 2023 financial year, the provision was increased by EUR 15.1 million, mainly because of the introduction of new waste rock fields.

In case of closure, Terrafame's balance sheet includes an environmental provision, which is updated annually. As far as applicable, the provision complies with the guarantee determined in the environmental permit and the Northern Finland Regional State Administrative Agency's estimate of area-based closure costs. The general costs in the guarantee requirement and the value added tax added to the unit cost are not included in the environmental provision, as these costs will not be borne by Terrafame when the company carries out its closing obligation.

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2.10. Long-term loans from credit institutions (EUR thousand)

Installment credit	31 Dec 2023	31 Dec 2022
At the beginning of the period	0	125
Increase	0	0
Decrease	0	-125
At the end of the period	0	0
Lease liabilities		
At the beginning of the period	1,034	6,898
Increase	4,111	21
Decrease	-1,267	-5,886
At the end of the period	3,878	1,034
Long-term loans II		
At the beginning of the period	28,127	61,805
Increase	0	0
Decrease	-27,013	-35,790
Valuation	-1,114	2,112
At the end of the period	0	28,127
Long-term loans III		
At the beginning of the period	14,063	30,902
Increase	0	0
Decrease	-12,788	-16,965
Valuation	-1,276	126
At the end of the period	0	14,063

Long-term loans IV	31 Dec 2023	31 Dec 2022
At the beginning of the period	49,222	16,187
Increase	0	66,392
Decrease	-50,716	-31,533
Valuation	1,494	-1,824
At the end of the period	0	49,222
Other Long-term loans		
At the beginning of the period	9,717	0
Increase	27,767	0
At the end of the period	37,484	9,717
Long-term loans total	41,362	102,163

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Option and other special rights (pcs)

	31 Dec 2023	31 Dec 2022
Batch 7		
Maximum number of shares to be issued	71,419	880,915
Batch 8		
Maximum number of shares to be issued	441,918	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	620,927	1,570,538

Option rights can be transferred to approved transferees. The direct or indirect pledging of options is prohibited. The subscription price agreed for the option rights is EUR 176.46, and subscriptions can be made in several instalments, in part or in full. The holder of an option is not entitled to dividends or funds distributed from the company's invested unrestricted equity fund.

In 2023, the funds managed by Galena Asset Management and Mandatum Holding Ltd exercised the option rights previously granted to them. Most of the remaining option rights will mature on 31 December 2025.



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2.11. Deferred tax liabilities (EUR thousand)

	31 Dec 2023	31 Dec 2022
Deferred tax liabilities	14,881	0

2.12. Specifications of Group liabilities (EUR thousand)

Short-term liabilities to group companies	31 Dec 2023	31 Dec 2022
Finnish Minerals Group		
Loans	58,000	0
Trade payables	790	369
Accrued liabilities	203	0
Total	58,993	369



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2.13. Short-term loans from financial institutions (EUR thousand)

Instalment credit	31 Dec 2023	31 Dec 2022
At the beginning of the period	126	115
Increase	0	125
Decrease	-126	-114
At the end of the period	0	126
Lease liabilities		
At the beginning of the period	5,887	4,367
Increase	1,406	5,873
Decrease	-5,692	-4,353
At the end of the period	1,600	5,887
Short-term loans I		
At the beginning of the period	39,931	65,807
Increase	0	0
Decrease	-40,000	-30,000
Valuation	69	4,124
At the end of the period	0	39,931
Short-term loans II		
At the beginning of the period	37,502	26,488
Increase	27,013	35,790
Decrease	-62,802	-26,802
Valuation	-1,713	2,027
At the end of the period	0	37,502

Short-term loans III	31 Dec 2023	31 Dec 2022
At the beginning of the period	28,127	13,244
Increase	12,788	16,965
Decrease	-38,278	-4,241
Valuation	-2,637	2,159
At the end of the period	0	28,127
Short-term loans IV		
At the beginning of the period	28,127	1,472
Increase	50,716	31,533
Decrease	-33,310	-6,487
Valuation	-4,809	1,609
At the end of the period	40,724	28,127
Short-term loans from financial institutions total	42,324	139,700

2.13. Short-term loans from financial institutions

On 25 January 2024, Terrafame announced that the company had strengthened its financing. In connection with this, the funds managed by Galena Asset Management and Mandatum Holding Ltd exercised the option rights previously granted to them. The funds raised by means of the option rights have been used to repay long-term loans of EUR 142 million granted by Trafigura and Mandatum, meaning that Terrafame no longer has shareholder loans from Trafigura or Mandatum. As part of the shareholders' financing arrangement, Finnish Minerals Group increased the working capital facility granted to Terrafame from EUR 40 million to EUR 65 million and extended its maturity until June 2025.

In addition, Terrafame agreed on a new loan arrangement of EUR 250 million. The loan package is unsecured, with a maturity of four years. It includes a bullet loan of EUR 100 million and a revolving credit facility of EUR 150 million. The bullet loan is for refinancing Terrafame's existing liabilities. The revolving credit facility is for working capital needs and the company's general financing needs.

2.14. Current liabilities/Accruals and deferred income (EUR thousand)

	31 Dec 2023	31 Dec 2022
Interests	7,778	1,791
Salaries, fees and other expenses	8,871	8,957
Other expenditure balances	7,474	7,945
Other accrued liabilities	233	4,954
Derivative liabilities	138	84,855
Total	24,495	108,502



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3. Notes to the income statement

3.1. Net sales (EUR thousand)

Industry distribution	2023	2022
Metal intermediates business	393,433	377,345
Battery chemicals business	167,497	207,069
Total	560,930	584,414
Geographical distribution		
Europe	403,531	313,985
Asia	109,398	270,429
America	24,342	0
Australia	23,658	0
Total	560,930	584,414



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3.2. Cost of goods sold (EUR thousand)

Raw materials and consumables	2023	2022
Purchases during the financial year	-205,596	-212,988
Change in stocks	-1,260	5,699
	-206,856	-207,289
External services	-97,897	-102,144
Total	-304,753	-309,433
Change in Inventory		
Change in Work in progress	16,782	37,754
Change in Finished goods	8,820	11,600
Total	25,603	49,354
Personnel expenses		
Wages and salaries	-39,748	-38,220
Pensions expenses	-7,581	-7,014
Other personnel expenses	-1,384	-1,123
Total	-48,714	-46,357
Depreciation		
Depreciations	-60,567	-57,755
Total	-60,567	-57,755
Other expenses		
Other Cost of goods sold expenses	-89,504	-89,562
Total	-89,504	-89,562
Cost of goods sold total	-477,935	-453,754



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3.3. Sales and marketing expenses (EUR thousand)

Personnel expenses	2023	2022
Wages and salaries	-721	-849
Pensions expenses	-138	-153
Other personnel expenses	-30	-31
Total	-889	-1,033
Depreciation		
Depreciation	-71	-24
Total	-71	-24
Other expenses		
Other Sales and Marketing expenses	-4,671	-1,350
Total	-4,671	-1,350
Sales and Marketing expenses total	-5,630	-2,406



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3.4. Administrative expenses (EUR thousand)

Personnel expenses	2023	2022
Wages and salaries	-3,318	-3,814
Pensions expenses	-663	-533
Other personnel expenses	-194	-262
Total	-4,176	-4,609
Depreciation		
Depreciation	-295	-305
Total	-295	-305
Other expenses		
Other Administrative expenses	-23,088	-16,060
Total	-23,088	-16,060
Auditors' remunerations		
Audit	-129	-123
Certificates and reports	-7	-2
Tax consultancy	-0	-14
Other services	-200	-71
Total	-337	-210
Administrative expenses total	-27,897	-21,184



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3.5. Other operating expenses (EUR thousand)

Personnel expenses	2023	2022
Wages and salaries	-1,659	-1,473
Pensions expenses	-244	-267
Other personnel expenses	-51	-50
Total	-1,955	-1,791
Depreciation		
Depreciation	-107	-108
Total	-107	-108
Other operating expenses		
Other operating expenses	-28,717	-17,007
Total	-28,717	-17,007
Other operating expenses total	-30,778	-18,906

In the 2023 financial year, other operating expenses include a non-recurring item of EUR 15.1 million related to an increase in an environmental provision.



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Personnel expenses total (EUR thousand)

	2023	2022
Wages and salaries	-45,455	-44,251
Pensions expenses	-8,680	-7,994
Other personnel expenses	-1,934	-1,900
Total	-56,069	-54,144
Wages and fees for Members of Board of Directors	-371	-322
Average number of company personnel		
Salaries and senior salaried	274	282
Blue-collar	556	558
Total	830	840

In the 2023 financial year, the personnel expenditure presented as an expense in the income statement totalled EUR 55.7 million, and the personnel expenditure transferred to own investments totalled EUR 0.3 million. In the comparison period, the personnel expenditure presented as an expense in the income statement totalled EUR 54.0 million, and the personnel expenditure transferred to own investments totalled EUR 0.2 million.



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Depreciation, amortisation and impairment charges total (EUR thousand)

	2023	2022
Intangible assets	-115	-139
Other intangible assets	-48	-36
Total	-163	-175
Tangible assets		
Buildings	-6,530	-6,498
Machinery and equipment depreciation	-36,630	-35,125
Machinery and equipment depreciation right-of-use assets	-3,406	-3,316
Other tangible assets depreciation	-14,311	-13,078
Total	-60,877	-58,017
Depreciation, amortisation and impairment charges total	-61,040	-58,192



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3.6. Finance income and finance cost (EUR thousand)

Finance income	2023	2022
Other interest and financial income	5,962	3,926
Total	5,962	3,926
Other interest and financial income include exchange rate profit	5,083	3,260

Financial income for the financial year includes around EUR 0.9 (0.7) million in interest income and EUR 5.1 (3.3) million in exchange rate gains. Of the unrealised exchange rate gain in financial income, EUR 3.3 (0.4) million consists of the valuation of foreign currency loans at the prevailing rate on the balance sheet date. Of the exchange rate gain in the comparison period, EUR 1.1 million arises from the valuation of bank accounts at the prevailing rate on the balance sheet date.

Finance expenses	2023	2022
Associate and joint ventures	-1,848	0
Other interest and financial income	-34,068	-34,882
Finance expenses total	-35,917	-34,882
Financial expenses to others include exchange rate losses	-2,584	-14,990
Financial expenses include interest losses from leasing liabilities	-342	-308
Financial income and expenses total	-29,599	-30,956

The financial expenses for the financial year include EUR 25.4 million in interest and financial expenses. Of the unrealised exchange rate loss in financial expenses, EUR 1.1 million consists of the valuation of bank accounts at the prevailing rate on the balance sheet date. Financial expenses for the comparison period include EUR 16.7 million in interest and financial expenses and EUR 10.5 million in unrealised exchange rate losses related to the valuation of financial assets at the prevailing rate on the balance sheet date.



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4. Notes to the commitments (EUR thousand)

Amounts payable on rental and leasing agreements	31 Dec 2023	31 Dec 2022
No later than 1 year	1,500	418
Later than 1 year and no later than 5 years	474	119
Total	1,975	537
Other liabilities		
Fixed assets serving as collateral for installment credit	0	76
Installment credit		
No later than 1 year	0	126
Later than 1 year and no later than 5 years	0	0
Total	0	126
Other service agreement liabilities		
No later than 1 year	7,695	7,978
Later than 1 year and no later than 5 years	0	1,760
Total	7,695	9,738



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Securities complying with environmental and mining permits (EUR thousand)

Beneficiary	Type of security	31 Dec 2023 Amount of security total	31 Dec 2022 Amount of security total
Kainuu Centre of Economic Development, Transport and the Environment; no. 196	Credit insurance	362,325	153,245
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	0	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	0	20
Security in accordance with permit decision no. 87/2022	Bank guarantee	17	17
Security in accordance with permit decision no. 87/2022	Bank guarantee	10	10
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		364,493	155,443
Other securities	Bank guarantee	1,895	1,895
Real estate investments' VAT refund liability		12,181	13,797
Business mortgages		0	320,000
Real estate mortgage		0	1,200,079
Mining certificate, mine register number 2819, mining concession	Pledged	free	yes

Business and real estate mortgages and the pledging of the mining concession certificate served as collateral for the company's long-term financing agreements. During the 2023 financial year, the company's business and real estate mortgages were released (see Note 2.13: Short-term loans from financial institutions).

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.

In the 2023 financial year, the funds managed by Galena Asset Management exercised the option rights previously granted to them. The funds raised by means of the option rights have been used to repay long-term loans of EUR 121.4 million from Trafigura, meaning that Terrafame no longer has shareholder loans from Trafigura. As part of the shareholders' financing arrangement, Finnish Minerals Group increased the working capital facility granted to Terrafame, of which EUR 58.0 million had been drawn by the end of the financial year.

The commercial agreements between Terrafame and Trafigura NatGas Limited generated EUR 252.7 million in sales during the financial period. The company has acquired legal and other administrative services worth EUR 0.6 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 made on market terms.



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Business transactions with related parties (EUR thousand)

Goods and services sold	31 Dec 2023	31 Dec 2022
Associate and joint ventures		
Group companies	0	16
Other related party ventures	252,714	686,595
Ventures total	252,714	686,611
Total	252,714	686,611
Goods and services purchased		
Group companies	790	735
Other related party ventures	64,956	53,477
Ventures total	65,746	54,211
Total	65,746	54,211
Credits		
Group companies	58,000	0
Other related party ventures	0	121,360
Ventures total	58,000	121,360
Total	58,000	121,360



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

Terrafame Ltd's result for the financial period shows a loss of EUR 7,056,490.30.

The Board of Directors proposes to the Annual General Meeting that no dividend be distributed, and that the result be retained in shareholders' equity.

Helsinki, 29 February 2024

Lauri Ratia

Chair of the Board

Matti Hietanen

Jesus Fernandez

Riitta Mynttinen

Tuomo Mäkelä

Julian Sanchez

Jyrki Vainionpää

Seppo Voutilainen

Interim CEO



Auditor's confirmation

A report on the audit has been issued today.

Kajaani, 1 March 2024

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 2023. 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.

Kajaani, 1 March 2024

KPMG Oy Ab

Antti kääriäinen

Authorised Public Accountant, KHT





Terrafame

Financial Review

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