

2023



Annual Report

Pyrum Innovations AG



Annual report for the 2023 financial year

The Pyrum Group's KPIs at a glance

Results of operations and financial position

(EUR thousand)	2023	2022
Sales	1,147	982
Total output	12,799	19,069
Other operating income ¹	715	1,318
EBITDA ²	-7,087	-5,061
EBITDA (adjusted) ³	-7,087	-4,776
EBIT ⁴	-9,173	-7,615
EBIT (adjusted) ³	-9,173	-7,330
Net income/loss	-9,511	-7,808

Net assets

(EUR thousand)	31 December 2023	31 December 2022
Total assets	50,926	49,857
Equity	22,380	31,891
Equity ratio ⁵	43.9%	64.0%
Available liquidity	4,275	12,519
Employees ⁶	73	63

¹ Research grants, subsidies and R&D services

² Consolidated net income for the period before depreciation, amortisation and write-downs, before financial result, before income taxes

³ 2022 reporting period: adjusted for costs of the secondary listing (EUR 285 thousand)

⁴ Consolidated net income for the period before financial result, before income taxes

⁵ Equity/total assets

⁶ Annual average

TABLE OF CONTENT

Letter from the Executive Board	7
Report of the Supervisory Board	10
The company	
Pyrum share	16
Introduction to Pyrum Innovations AG	17
Combined management report	
Profile of the Group and of Pyrum Innovations AG	30
Economic report	46
Opportunities and risks of future development	59
Supplementary report	72
Annual and consolidated financial statements for 2023	
Consolidated balance sheet	74
Consolidated income statement	76
Consolidated cash flow statement	77
Consolidated statement of changes in equity	79
Balance sheet of Pyrum Innovations AG	80
Income statement of Pyrum Innovations AG	82
Combined notes to the financial statements	
I. General disclosures on Pyrum Innovations AG and the Group	85
II. Consolidated Group	86
III. Principles of consolidation	86
IV. Accounting policies	87
V. Balance sheet disclosures	90
Consolidated gross statement of changes in non-current assets	92
Gross statement of changes in fixed assets Pyrum Innovations AG	93
VI. Income statement disclosures	100
VII. Related Parties	103
VIII. Cash flow statement disclosures	104
IX. Significant events after the reporting date	104
X. Other disclosures	105
Independent Auditor's report	107
Financial calendar and legal notice	112



Dear Shareholders, Partners and Supporters of Pyrum,

We have had another eventful year in which we achieved many of our goals and partially realised others, though some things proved impossible to achieve as planned. We have also had to grapple with new challenges and unforeseen events almost every day, forcing us to think outside the box and improvise on more than one occasion. But that is precisely what a company at our stage needs to do: It is impossible to plan everything 100% and we have to be creative every day to solve problems very few people have ever faced. After all, we are developing a new technology in a market still in its infancy. Even the partners who often cannot yet foresee what exactly will be needed in the future. But being involved in this very development process and helping to shape it will secure us, Pyrum, a position on the market which no one will be able to take from us that quickly.

The main highlight of the year was completing the construction, at long last, of our two new lines (TAD 2 and 3) and that TAD 2 operated with rubber from for the first time. It all took longer than planned, and we often had to make the impossible possible in order to source some components. But we ultimately resolved all issues together and fed the first rubber into Reactor 2 at the start of November. It was truly an exhilarating feeling and the whole company was thrilled when the first rubber went into the reactor. We even arranged a live camera feed into the control room so that every employee could be there at 11 p.m. Then, in one fell swoop we forgot all the hardships and disputes with our suppliers, including those we had to beg to get parts delivered. We even chartered an aeroplane to assemble some parts at the factory on time and not lose any more weeks. There have been some tough years behind us, Corona and the war in Ukraine did not really help us with the construction of the two new lines and we had to find solutions to problems we would never have thought possible before. Yet one thing has always kept me motivated and spurred me on: that was building our new Pyrum plant (costing just shy of EUR 30 million) just as quickly as it took my father-in-law to install his heat pump at home. So our delivery times were not all that bad.

A second highlight was finally finding the right location for our new Pyrum-owned plant in Perl/Besch. After almost two years of searching, we finally identified a property in Saarland that met our requirements. Just to be clear: We were welcomed with open arms everywhere! The challenge was to find an industrial area at least 20,000 m² in size, situated outside of a water protection area and preferably on a river. If you type in these criteria and search for property in the Saarland, at first you get no hits. So we had to talk to owners who had no intention of selling their land: a rather tedious task, even with the state government's help. We initially thought we had found such a site in Homburg. But the requirements of the water protection area would have made the plant incredibly expensive and, in some instances, forced a shutdown if the oil had not been transported out several times a day. Despite getting a great deal of support from the city of Homburg, we unfortunately had to pull the plug and find a different solution. As they say: "better a terrible end than terror without end".

As fate would have it, the solution took shape shortly afterwards in the form of a site on the Moselle in Perl/Besch. It is logistically perfectly located and more than big enough, but (and sadly there always has to be a "but") while it is located in the middle of an industrial zone, it was designated as woodland and used as a protective forest between the former ammonia plant and the district of Besch. As the ammonia plant was closed in 1995 and this part of the forest was artificially planted with poplars in the 1960s, the forestry authorities told us that it is not a protected woodland and is not inhabited by

animals due to its location in the middle of the industrial area. In addition, poplars only have a limited lifespan and most of them were already rotten. To secure the adjacent railway line, approximately a third of the area would have to have been cleared without creating compensatory areas. With our presence, a new, high-quality forest is being planted in the municipality of Perl, just where nature needs it and wildlife can benefit. In addition, the municipality of Perl is setting aside part of the existing woodlands for forestry activities so that no more trees are felled there. So in summary, there will be more woodland and more green than before, and between November 2023 and May 2024 we turned an area of forest into an industrial zone in spite of all the official requirements in place. It was a mammoth effort by our entire team and was only possible with the support of the municipality of Perl, the municipal and local councils and the state government. This means that almost nothing else now stands in the way of the construction of our new three-line plant in Perl/Besch and initial work can begin.

In parallel with Pyrum's next plant of its own in Perl/Besch, the pipeline of partner plants has grown massively and great progress has been made on existing projects. Applications for approval have already been submitted in Greece and Czechia. Working with Remondis in Bremen, Unitank in Emleben and SUEZ in the UK, we have taken huge strides in the planning of the plants: Sites have been identified, preliminary talks have been held with the authorities that grant approval and the financial planning has been largely finalised. We now expect the project to start in 2024, at least in Bremen with Remondis and in Emleben with Unitank. With our latest joint venture project in Sweden, we are now working on eight projects in various stages and have more than enough to do to get all these plants over the finishing line in the next three years. Let us not forget that we are dealing with a construction volume well in excess of EUR 300 million! So it is safe to say that we are completely sold out, not just in terms of the works, but also our end products.

Moving on to other highlights of 2023: Sales of our end products rCB and oil and the deepening of our partnerships with BASF and Continental. The joint research project with Continental (JDA) helped to produce rCB (carbon black) to a standard Continental has been using to produce all its solid tyres with our rCB at the Korbach plant since calendar week 23 2023. This is an incredible milestone and has resulted in us also being approved as suppliers by Pirelli and Hankook. We completely underestimated what was needed to win approval as an automotive supplier in accordance with VDA 6.3 and were faced with a huge task to qualify for them in 2023. We only had to restructure the entire company, create new departments, build a laboratory, set up quality assurance, recruit several specialists, write reams and reams of working instructions to turn a start-up into a certified automotive supplier permitted to supply safety-relevant parts for the automotive industry. This was really an effort that we had not initially planned, but we were still able to successfully complete it in 2023. We have been regularly supplying Continental and Schwalbe with rCB since August 2023. Unfortunately, we are not yet in a position to produce enough rCB to even come close to meeting Continental's needs, let alone supply Pirelli and Hankook.

For this, we will need another grinding and pelletising plant five times the size of our existing one. The facilities have been ordered and the grinder has been delivered. The pelletising plant is still experiencing some delivery problems, as some components are being sourced from the US. However, we are currently doing everything in our power to get the pelletising plant up and running as quickly as possible. We were in negotiations with BASF for nearly nine months to finalise a new cooperation agreement, which was signed on 15 November 2023. The highlights of this new agreement are truly remarkable but have unfortunately not yet been fully understood by our shareholders. By that we mean BASF is providing us with a financing line of EUR 50 million to fund the expansion of the new plants on conditions that we would not get from any bank. In addition, the price of oil was raised from

EUR 150 per tonne to a guaranteed EUR 400 per tonne and the purchase volume from 100,000 tonnes per year to 300,000 tonnes per year. We are talking about quantities of oil that we will never be able to produce over the next ten years. This means we can build one plant after another, with our oil volumes already sold, so to speak.

This was just a brief overview of the biggest milestones in 2023. There were also a number of other ones, such as increasing headcount to over 90 (as of today), a string of successes in research projects and countless improvements to our old and the two new plants.

And there are already huge new milestones on the horizon. 2024 will be a very exciting year in our company's history.

Warm regards,



Pascal Klein
CEO of Pyrum Innovations AG

REPORT OF THE SUPERVISORY BOARD

Dear Shareholders,

Pyrum Innovations AG's 2023 financial year was defined in particular by the assembly and start-up of the new TAD 2 and TAD 3 reactors at the main facility in Dillingen/Saar. The expansion of the plant in Dillingen is on track with processing capacity due to triple to 20,000 tonnes of end-of-life tyres per year. The first steps were taken for a new subsidiary called Pyrum GreenFactory II GmbH, which will run the second Pyrum plant in the Saarland currently in planning. As before, business progress was driven by the strategic acquisition of customers for the construction of new recycling plants. Among other things, a letter of intent was signed with REMONDIS to build a joint recycling plant in Bremen. The international expansion continued with plans to build recycling plants in Czechia, Greece and the UK. The signing of a new cooperation agreement between BASF and Pyrum with seed financing for at least three new plants by 2026 was also highly important to our growth plans. There was also a breakthrough in the recycling of carbon-fibre reinforced plastics (CFRP) with the development of the first automated semi-industrial recycling plant. This makes Pyrum the first company in the world to fully recycle CFRP. Cultivating this new market entails enormous growth potential.

I would especially like to thank you, our shareholders, for the trust you have shown in Pyrum Innovations AG, its Executive Board and its staff in the past financial year.

ONGOING DIALOGUE WITH THE EXECUTIVE BOARD

In the 2023 financial year, the Supervisory Board duly performed its supervisory and consulting duties in accordance with the law, the Articles of Association and its Rules of Procedure. We received regular written and verbal reports from the Executive Board on the situation of the company and we assisted the Executive Board in its governance, ongoing strategic development and significant business events.

In addition, the Executive Board and the Supervisory Board together discussed business performance, corporate policy and planning. All measures requiring the approval of the Supervisory Board and decisions of fundamental importance to the company were discussed in detail by the Supervisory Board with the Executive Board. Their working relationship was defined by a trusting dialogue at all times.

Besides the four regular meetings of the Supervisory Board on 20 March 2023, 17 May 2023, 27 September 2023 and 11 December 2023, there were also five extraordinary meetings of the Supervisory Board in the reporting year. The meetings were typically held in person and in some cases as video conferences.

At the meetings of the Supervisory Board, the Executive Board reported to the Supervisory Board comprehensively on the situation and development of the company. It coordinated all steps for the ongoing strategic development of the company and material individual measures with us. The Supervisory Board had ample opportunity to examine the reports and proposals by the Executive

Board. The Supervisory Board ascertained the compliance of the Executive Board's corporate governance.

Outside its meetings, the members of the Supervisory Board received regular and prompt written and verbal reports on matters such as business performance, the accounting and earnings situation, corporate planning issues, risks and opportunities and material individual matters.

KEY TOPICS AT SUPERVISORY BOARD MEETINGS

At all its meetings, the Supervisory Board reviewed the comprehensive, detailed reports by the Executive Board and, together with the Executive Board, discussed the company's development, strategic issues and the general economic environment.

In view of the expansion of operating activities, meetings in the 2023 financial year dealt with recurring issues such as financing, e.g. for the expansion of the plant in Dillingen, the construction of a new plant in the Saarland and other promising projects. Various options, such as a capital increase, bonds or loans, were considered and discussed at length. KFM Deutsche Mittelstand AG reported on the current situation on the (German) market for SME bonds. The new cooperation agreement with BASF and the resulting loans for the establishment of new plants were also discussed in detail. The expansion of BASF's commitment is a boost to the confidence of Pyrum customers and other potential financing partners who intend to invest in Pyrum's growth, and is therefore seen by the Supervisory Board as a key component of the financing concept. Naturally, the Supervisory Board also discussed the operation and development of the existing plants, the progress in the expansion of the Dillingen plant, in particular the start-up of the TAD 2 and TAD 3 reactors, and the new pelletiser. It approved the application by the Executive Board to establish a new company for the construction of the plant in the Saarland and to buy the land for the project. The items presented here provide just a small insight into the matters addressed. Further details and essential issues are provided in the company's annual report.

Given its small size and for efficiency reasons, the Supervisory Board has opted not to form any committees to date.

INDIVIDUAL DISCLOSURE OF MEETING ATTENDANCE

The members of the Supervisory Board have an attendance rate of almost 100% for its meetings. The meetings were typically held in person and in some cases as video conferences. The meeting attendance of the members of the Supervisory Board is broken down by individual member as follows:

	Number of meetings	Attendance in %
Alf Schmidt (Chairman)	8/9	89
Renata Bandov	9/9	100
Manfred Oswald Alt	3/3	100
Jürgen Opitz	8/9	89
Matthias Lindner	9/9	100
Hans-Jürgen Maas	6/6	100

AUDIT OF THE 2023 ANNUAL AND CONSOLIDATED FINANCIAL STATEMENTS

The annual financial statements and the consolidated financial statements as at 31 December 2023 were prepared by the Executive Board of Pyrum Innovations AG in accordance with the provisions of the *Handelsgesetzbuch* (HGB – German Commercial Code). The notes to these two sets of financial statements were combined. BRBD Reger Hecht GmbH Wirtschaftsprüfungsgesellschaft und Steuerberatungsgesellschaft, Eschborn, audited the annual financial statements, the consolidated financial statements and the combined management report and issued an unqualified audit opinion. The auditor conducted the audit in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the *Institut der Wirtschaftsprüfer* (IDW – Institute of Public Auditors in Germany).

The documents for the financial statements and the auditor's report were distributed to all members of the Supervisory Board in good time to allow an intensive review and discussion of the documents.

The auditor took part in the meetings of the Supervisory Board on 13 May 2024 and 15 May 2024 to discuss the annual financial statements and reported on the key audit findings. The questions from the members of the Supervisory Board were discussed in detail. The review of the annual and consolidated financial statement documents by the Supervisory Board did not give rise to any objections, hence we concur with the auditor's findings.

The annual financial statements and the consolidated financial statements as at 31 December 2023 prepared by the Executive Board of Pyrum Innovations AG were approved at the meeting of the Supervisory Board on 15 May 2024. The annual financial statements are thereby adopted.

CHANGES IN THE SUPERVISORY BOARD AND THE EXECUTIVE BOARD

Personnel changes took place within the Supervisory Board of Pyrum Innovations AG in the 2023 reporting year. Mr Manfred Alt left the Supervisory Board as at 13 July 2023.

Mr Hans-Jürgen Maas was elected to the Supervisory Board by the Annual General Meeting on 13 July 2023.

Mr Alf Schmidt was confirmed as the Chairman of the Supervisory Board at the meeting of the Supervisory Board on 13 July 2023 and Ms Renata Bandov was elected as the Deputy Chairwoman.

OUTLOOK

The 2024 financial year will be affected by the weak state of the world economy. In addition, there is geopolitical uncertainty stemming from Russia's ongoing war with Ukraine, the possibility of a Chinese blockade of Taiwan and the escalation of the conflict in the Middle East, the implications of which cannot be foreseen at this time.

Also, in times such as these, environmental protection and the necessity of reducing carbon emissions is becoming more and more important. The EU and Germany have set strict standards on reducing emissions. It is our responsibility to find and implement sustainable solutions, to protect our planet and to leave behind an environment that future generations can live in. One example of an EU initiative for reducing carbon emissions is the emissions trading system (ETS) that aims to reduce greenhouse gas emissions in industrial and energy sectors by issuing and trading offset certificates. Another example is the setting of strict emissions standards for vehicles that force carmakers to change their fleets by using low-emissions technologies. Moreover, the EU is promoting renewable energies with various programmes and investments to accelerate the transition to a low-carbon economy.

And this is where Pyrum plays a key role that will become even more vital moving ahead. Tyres contain a large number of materials, such as rubber and synthetic polymers, that can release carbon when they decompose or burn. Under anaerobic conditions (without oxygen), tyres in landfills can also produce methane, a greenhouse gas even more harmful to the environment than carbon dioxide – and Pyrum has the solution. Focusing on growth without losing sight of the economic challenges, the aim of Pyrum Innovations AG's development strategy is to safeguard a sustainable future. This should help the company to achieve its ambitious goals even in the difficult economic environment of 2024.

The Supervisory Board wishes to thank the Executive Board and all the employees and express its appreciation for their hard work in the 2023 financial year.

Dillingen, 15 May 2024

The Supervisory Board

Alf Schmidt
Chairman



PYRUM
innovations ®

Content

The company

Pyrum shares	16
Introduction to Pyrum Innovations AG	17

Pyrum shares

Performance Pyrum's shares in the 2023 financial year

The closing price of Pyrum shares was EUR 61.00 on 30 December 2022. The shares reached their high for the year of EUR 64.80 on 4 January 2023 and their low at EUR 25.80 on 7 November 2023. The closing price on 29 December 2023 was EUR 31.80.

Basic info

ISIN	DE000A2G8ZX8
Ticker symbol	FRA: PYRUM OSLO: PY FRA: SCALE;
Trading segment	OSLO: Euronext Growth Market
1st trading day	30 September 2021

Key figures

Price on 2 Jan. 2023	EUR 59.20
Highest price (4 Jan. 2023)	EUR 64.80
Lowest price (7 Nov. 2023)	EUR 25.80
Closing price on 29 Dec. 2023	EUR 31.80
Number of shares	3.25 million

Pyrum's shares in 2023



The first investor newsletter was published in February 2024 and subsequent issues will come out each quarter.

All relevant information on our investor relations activities can be viewed in the Investor Relations section at <https://www.pyrum.net/en/investors/>.

Introduction to Pyrum Innovations AG

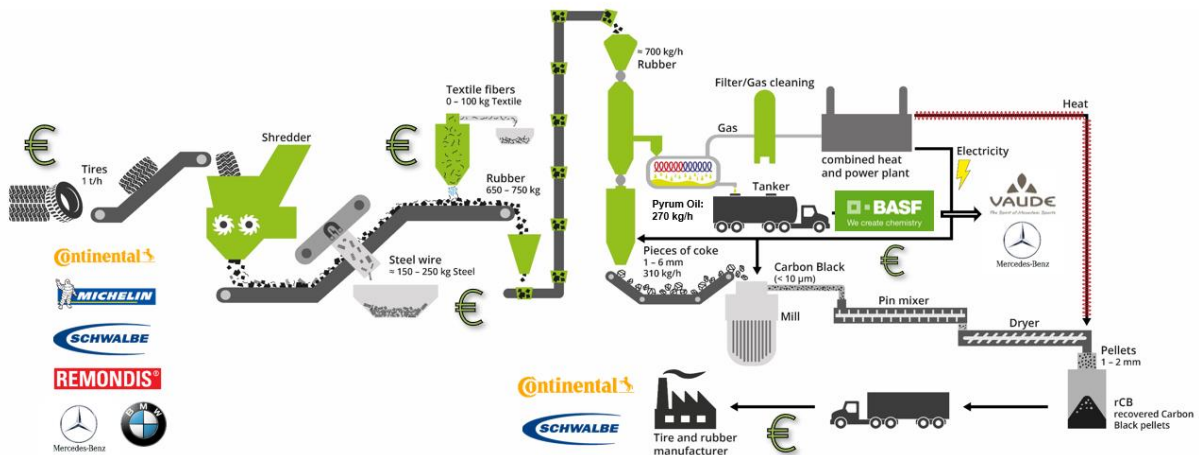
Operating activities

Pyrum Innovations AG operates with its patented thermolysis technology in the attractive recycling market for end-of-life tyres. Pyrum's thermolysis process is largely energy self-sufficient, saves significantly more carbon emissions than the recycling processes normally used for end-of-life tyres today according to the Fraunhofer Institute – especially compared to incineration at cement plants – and uses waste as input materials to produce new raw materials such as thermolysis oil, gas and recovered carbon black (rCB). Pyrum thus closes the recyclable material loop and has a sustainable business model.

As a pioneer, Pyrum Innovations AG was the first company in the end-of-life tyre recycling sector to receive, back in 2018, REACH registration from the European Chemicals Agency (ECHA) for the thermolysis oil it produces. The oil is thus recognised as an official raw material that can be used in production processes. In addition, Pyrum has received ISCC+ certification for its thermolysis oil and rCB. Both products are thus classed as sustainable and renewable raw materials. Based on the ISCC+ certification (since 2021), we can confirm to our customers that the secondary raw materials originate from sustainable production.

These successes have also been recognised by international experts and major companies in the tyre industry. For example, the tyre manufacturer Continental has held an equity interest in Pyrum since the company was first listed in Oslo in 2021 and uses recovered carbon black (rCB) from Pyrum in its Super Elastic solid tyres. BASF, which has held an equity interest in Pyrum Innovations AG since 2020 as part of its ChemCycling project, also uses thermolysis oil from Pyrum within its production network. Furthermore, Pyrum won in the *Best Tyre Recycling Innovation* category at the inaugural Recircle Awards in 2021 and has been nominated for the 'Grand Prix Mittelstand' by the German state of Saarland on more than one occasion.

Value chain



This diagram presents an example of how one tonne of end-of-life tyres is processed. In order to guarantee the product safety and quality of its end products, Pyrum operates its own tyre shredder. The volume flow and the quality of the input materials can thus be actively managed and monitored.

The disposal fee that Pyrum receives for accepting the tyres is used to cover the running costs of the shredder.

The proportions of steel, textiles and rubber that are recovered vary depending on whether truck, car or bicycle tyres are being processed. The tyre wire that is recovered can be directly reprocessed into new products at steel plants.

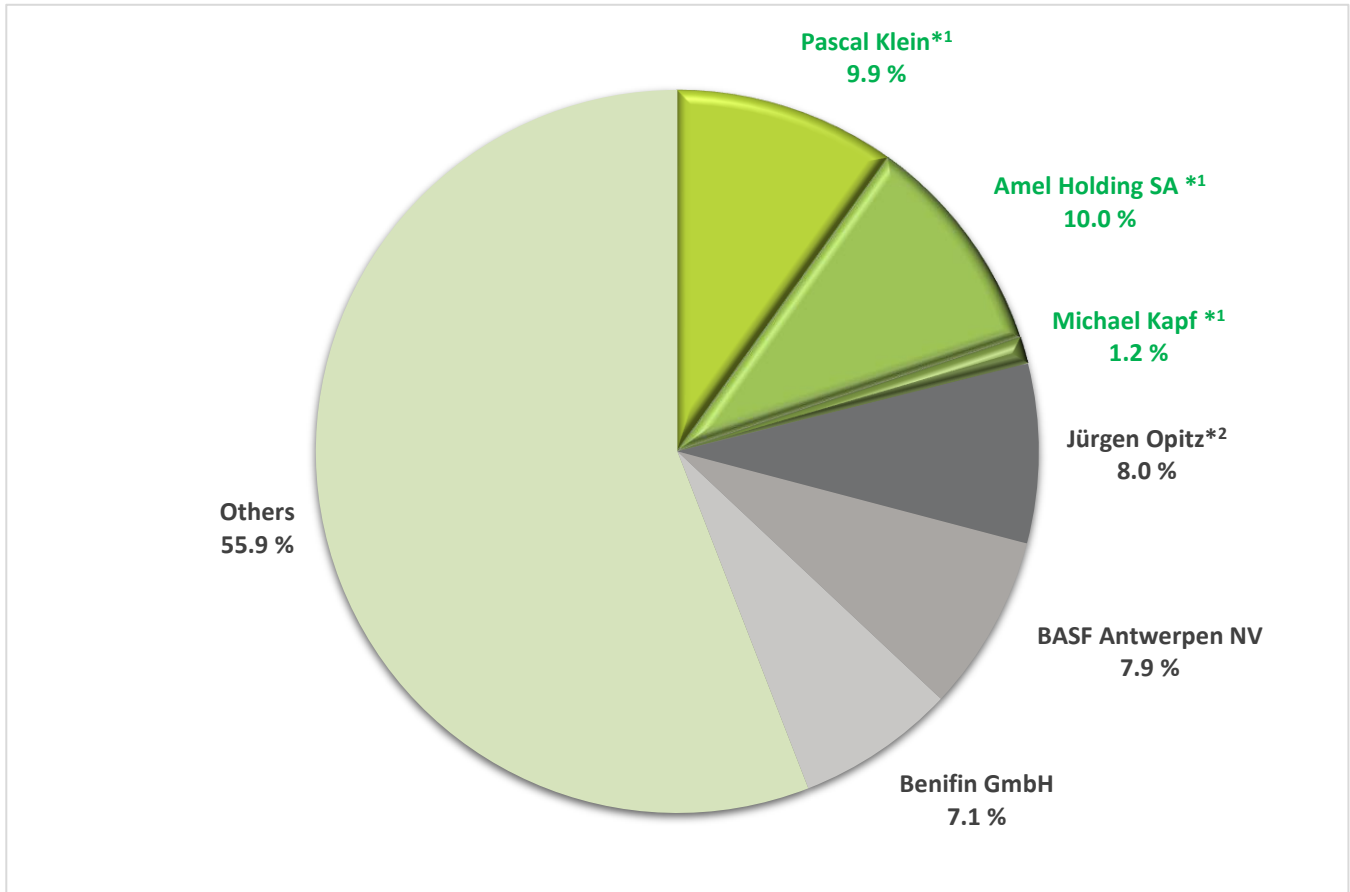
The thermolysis reactor is energy self-sufficient and operated using electricity generated from the conversion of the thermolysis gas recovered during the process. More than 150 heat sources thus ensure optimal and controllable distribution of the temperature in the reactor. This is the basis for producing high-quality thermolysis oil and recovered carbon black (rCB) repeatedly over the long term.

As there are no moving parts in the reactor, unwanted inflows of oxygen, which can arise in conventional processes such as batch ovens or rotary kilns, are consistently excluded. An optimal thermolysis process is thus guaranteed.

The waste heat created by the in-house electricity generation can be used for the process to dry the rCB pellets, resulting in an additional carbon saving compared to the current recovery mix for end-of-life tyres.

With the delivery of the thermolysis oil to BASF, which manufactures high-quality products from it, and the use of the rCB in tyre production, optimal recycling is achieved.

Shareholder structure of Pyrum Innovations AG as at 31 December 2023

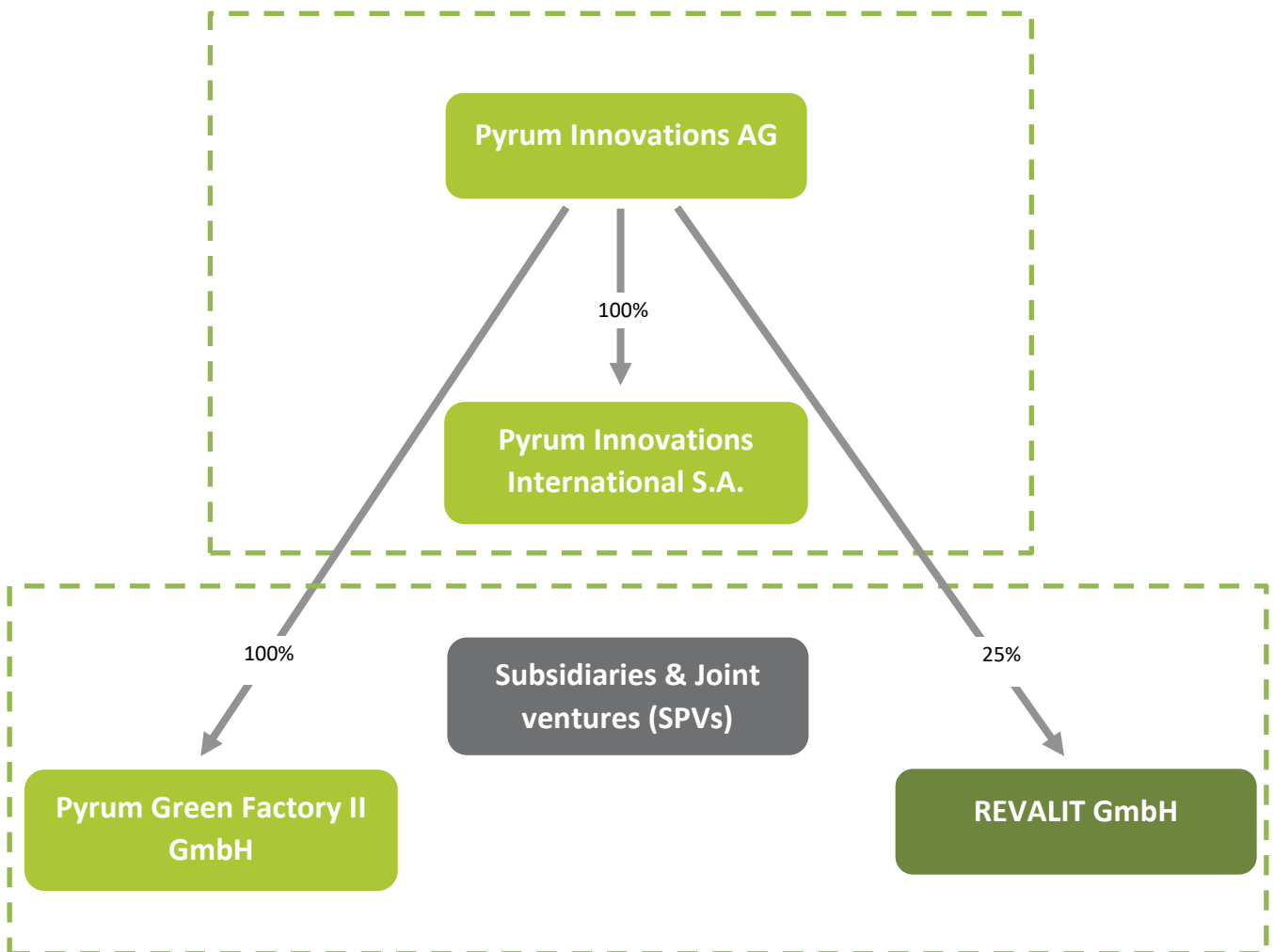


*1 Major founding shareholders

*2 Including attributable shares

→ Approximately 5,200 shareholders were recorded in the share register as at 31 December 2023.

Group structure



- ▶ **Pyrum Innovations AG**, based in Dillingen/Saar, Germany, runs the operating business, while Pyrum Innovations International S.A., based in Schengen, Luxembourg, owns the intellectual property and all patents.
- ▶ **Pyrum Innovations AG** has licensed the intellectual property of Pyrum Innovations International S.A.
- ▶ **Pyrum GreenFactory II GmbH** is the project and operating company founded in January 2024 for the future plant in Perl-Besch

Our certificates

(First-time) certificates over time



ISCC+ certification

Pyrum was established in 2008 with the idea of closing the loop. After more than ten years of development, Pyrum took a vital first step towards commercialisation in 2021 through the partnership with BASF and the ISCC+ certification of ThermoTireOil. Thanks to our **ISCC+ certification** based on the mass balance system, Pyrum guarantees transparent traceability of the oil and rCB production right down to the source of the end-of-life tyre.

Quality Management: ISO 9001

We began to restructure our company from top to bottom in 2022. We initially started with the quality management system (**ISO 9001**). We were thus able to prove to our customers that our processes can guarantee quality.

Environmental Management: ISO 14001

Environmental protection and sustainability are two of the most important challenges of our century. That is why we added the factor **“Environment”** to our existing quality management systems and underwent **ISO 14001** certification in 2023.

In the course of **introducing the environmental management system**, we tackled the subject of supply chains and sustainable procurement. We developed our own **supplier code of conduct** and defined **ESG criteria for selecting suppliers**.

We help our customers become more sustainable by also addressing climate protection and supply chains. For example, we again won a **silver medal** in the **EcoVadis sustainability ratings** in 2023.

imug Rating

In March 2023, the company was awarded “very good” status by imug Rating. imug Rating is one of the leading German providers of sustainability ratings. We will continue to work on making our company even more sustainable.

RCS certification

We gained Recycled Claim Standard (RCS) certification for thermolysis oil in March 2024, setting another milestone for the use of our oil in the textile industry. We were one of the first companies to have our oil certified to this standard. This means the oil can be used as a secondary raw material in the production of new textiles. The certification also ensures transparent traceability in the supply chain.

Recertification

Every year, we have the ‘specialised waste management company’ and ‘ISCC+’ recertifications carried out, each of which is valid for a further year. At the time of reporting, we had already **passed the annual recertification as a specialised waste management company** in April 2024 without any deviations and received positive feedback.

Waste management cycles:

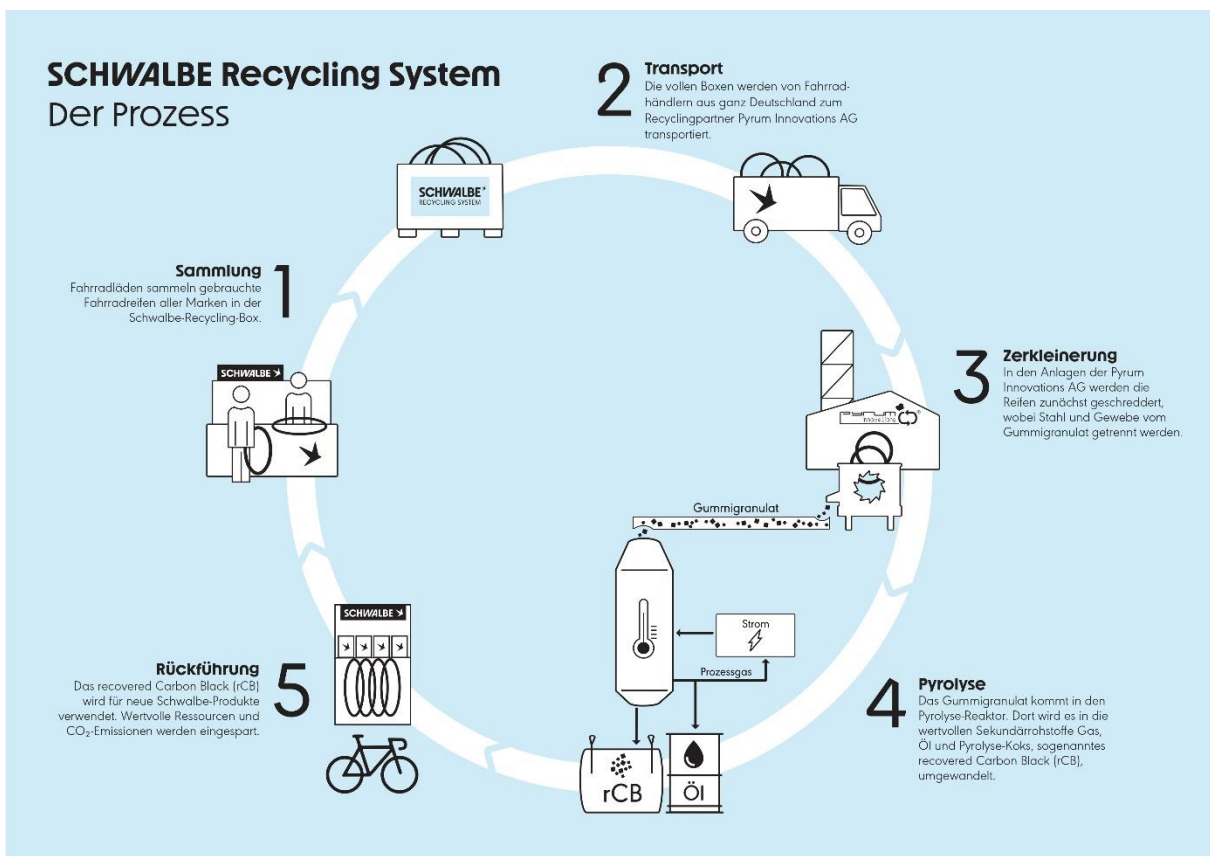
We have also been able to guarantee this traceability for rCB since March 2022.

Thanks to the **disposal company audit** that we passed in February 2023, we can create a recycling loop with Mercedes. In future, Pyrum will manufacture thermolysis oil from the end-of-life tyres at Mercedes used car centres, which will then be used to produce BASF plastics, and these will in turn be installed in Mercedes vehicles.

Schwalbe tyre recycling

We created a textbook example of a real circular economy after working with Schwalbe – Ralf Bohle GmbH in particular.

Their bicycle tyres are collected through a return system at the point of sale (POS) and brought to us for recycling. The rCB produced from them is used by Schwalbe to manufacture new tyres. Within a year, more than 2,100 bike shops had already been connected up to the system by the end of the 2023 financial year.



Source: Schwalbe – Ralf Bohle GmbH



Pyrum Innovations AG's digital twin



From the digital model to the physical plant

The digital twin reproduces a physical processing system using mathematical models. In modern plant engineering, process engineering plants are designed and validated using calculations and simulations. This simulation data can already be used during the engineering phase for other valuable processes.

Virtual commissioning

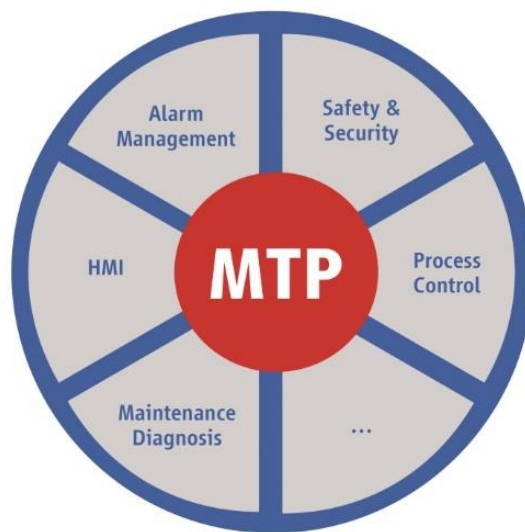
The commissioning phase of a plant is generally tightly synchronised. Initial tests are often conducted in this phase and corrections are made to minor planning errors in the plant and software engineering. This work can already be carried out in advance using a digital plant model. Plant workflows can already be fundamentally coordinated with each other and optimised here.

Operator training

In 2023, the digital process twin was used intensively for operator training. Start-up and shut-down sequences were practised safely in regular training sessions so that the operators were familiar with the new technology from the very first production run, from system start to system stop. In the future, recurring training sessions are planned to familiarize the operators with fault sequences. This trains the behavior in the event of a fault so that errors can be routinely responded to in critical situations. In 2024, this process twin will be expanded to include customer requirements. This will allow the customer's operators to be trained and educated during the planning and construction phase. The training can also be carried out remotely during the subsequent operating phase and supervised by Pyrum's own staff in Dillingen.

MTP

Innovation is not only being driven forward in recycling technology, but also in process automation. As part of the plant expansion, Pyrum has accelerated module development with the module standard MTP (Module Type Package). The software modules were developed by the company's own staff and then subjected to a preliminary test. The modules can now be integrated into the existing process automation. The preliminary testing allows a flexible response to customer requirements, while at the same time reducing delivery and development times. An expansion of the module standard to include pelletising technology is planned for 2024. Like the core technology of thermolysis, the necessary modules will be tested and optimised on a digital process twin.



The future development of digital twins

In order to be able to offer both its own production and its customers optimal support, Pyrum is planning to create a digital data twin in addition to the digital process twin. This will contain asset data across all planning phases so that complex documentation steps can be simplified and documents can be made available digitally at any time.

Ethernet APL field test

In order to generate additional process data and further optimise the technology, a pilot test setup with Ethernet APL (Advanced Physical Layer) will be carried out in Pyrum's own automation laboratory in 2024 together with our long-standing cooperation partner VEGA Grieshaber KG. Ethernet APL enables a transmission rate of 10 Mbit/s to the field devices. This means that additional data from the process measurement technology can be utilised profitably. Ethernet APL is also suitable for hazardous areas and safety applications

Our guiding principles

At Pyrum, we started addressing the social issues surrounding the problem of waste disposal and the shortage of raw materials at a very early stage.

To this end, we have developed an innovative thermolysis process and the necessary technology to establish a circular economy for the production of tyres. The low-impact thermolysis process for end-of-life tyres recovers carbon black (rCB) in particular, which is then reused in the production process for new tyres. In addition to rCB, other raw materials such as thermolysis oil are also recovered during the process, which can be used as a sustainable alternative to crude oil in the chemical industry.

By closing the energy loop – as a result of converting the thermolysis gas into electricity – we offer our partners a sensible solution in both ecological and economic terms.

To build on our success story so far, we have set ourselves a number of business targets, which we intend to achieve as a team.

Customer satisfaction

We want to permanently change the market by making it “circular”. Our customers are therefore required by contract to use our products exclusively to manufacture new, sustainable products and not to use them as energy sources themselves or sell them on to third parties. In order to enable these partnerships based on trust, we work closely together with our customers and define a common direction in joint research projects.

Satisfied employees

A motivated and satisfied team is the foundation of our economic success and our growth. We provide our employees with opportunities and challenges and allow them to participate in our shared success. We see the health and safety of our employees as a valuable commodity. Reasonable investments – including in occupational health and safety – therefore obtain prompt and straightforward approval.

Innovation and continuous improvement

Research and development are of paramount importance for us. In the most varied of projects around the world, we conduct research into new opportunities for establishing further circular economies. Innovations and continuous improvement provide a basis for us to tap into new markets, to shape them and to improve our own performance. We actively encourage ideas and initiatives from our employees.

In order to guarantee the continual development/improvement of our product quality and our environmental performance, we have implemented an integrated management system and had it certified in accordance with ISO 9001 and ISO 14001. The management is committed to maintaining and further developing this system.

Environmental awareness and sustainability

With regard to our customers and in research and development, we make sure that the recycling of resources and the production of environmentally friendly products are in the foreground of our economic activity. In order to continue meeting all binding obligations, we cooperate closely with the authorities and are already taking further measures to protect the environment and consumers of the future.

Content

Combined management report

Profile of the Group and of Pyrum Innovations AG	30
Economic report	46
Opportunities and risks of future development	59
Supplementary report	72

Profile of the Group and of Pyrum Innovations AG

Market, competition and customer relationships

Pyrum Innovations AG operates the recycling market. Using its patented thermolysis technology, the company recycles end-of-life tyres and obtains new raw materials such as recovered carbon black, thermolysis oil and gas. In the upstream shredding process, high-quality tyre wire is recovered and fed back into steel production.

This market is still characterised by a high degree of fragmentation. There is still no leading company on the European market at the moment. Pyrum already has a strong presence in the sub-market in Germany for rCB – the most significant output factor in terms of revenue-share – and the market is in the early stages of development. The high demand from industry for sustainable raw materials and production processes as well as tightening regulation, especially in the EU, are also creating attractive conditions.

Pyrum obtains the input factor, end-of-life tyres, from workshops, tyre manufacturers, waste disposal firms or local governments and receives a disposal fee in return. According to the World Business Council for Sustainable Development (WBCSD), around 3.4 million of the 30.9 million tonnes of end-of-life tyres arising globally every year can be attributed to Europe alone.⁷ Around 600,000- 700,000 tonnes arise in Germany. These volumes of end-of-life tyres are additionally expected to continue growing over the next few years as a result of increasing electromobility. In Europe alone, this offers Pyrum the potential to use thermolysis to sustainably recycle nearly 1.5 million tonnes of end-of-life tyres per year and thus introduce them to the circular economy.

According to the life cycle assessment of Pyrum technology produced by the Fraunhofer Institute, the current recycling mix for end-of-life tyres in Germany is made up of the recycling of materials, accounting for a market share of 52%, the incineration of end-of-life tyres in cement plants (42%) and substitute fuel (SF) power plants (6%). Major carbon savings are already achieved through the material recycling of end-of-life tyres to produce playground surfaces and sports grounds from rubber granules (infill), for example. However, the thermolysis process developed by Pyrum, including the use of waste heat, exceeds these savings by 187 kg of CO₂ equivalent per tonne of end-of-life tyres. Furthermore, the Fraunhofer Institute confirms there is a significantly limited market potential for this material recycling – at 52%, it has already reached its maximum market share right now, which will be very difficult to expand.

There are different technologies for thermolysis-based tyre recycling. The process patented by Pyrum is characterised by its continuous production and the absence of mechanical conveying in the reactor. Pyrum Innovations AG is not currently aware of any competitors in tyre thermolysis that do not still operate on the basis of existing batch oven/rotary kiln processes or that likewise maintain operations 24/7. Previous findings indicate that competitors are still operating test and semi-industrial facilities that are currently being scaled up.

⁷ World Business Council for Sustainable Development: Global ELT Management (2019)

Stricter regulations at the EU level and in the individual member states will additionally result in more restrictive handling of end-of-life tyres. For example, the rising price of carbon triggered by European emissions trading means is making the incineration of end-of-life tyres much more expensive as time goes on. In addition, disposing of end-of-life and shredded tyres in landfill is now prohibited in the EU. Countries such as Belgium, Finland, Norway and Sweden have also forbidden the incineration of rubber products and in future the use of shredded tyre granulate in the open – on playgrounds or sports grounds for example – will be prohibited throughout the EU. Finally, approaches such as extended producer responsibility (EPR) require producers and distributors of products to consider the post-consumer phase of a product and thus enable a functioning circular economy. The EU is thus responding to the increasing scarcity of resources and incorrect handling of waste that have mostly negative consequences for people and the environment. In addition, the cement industry has poured substantial investment into new, more energy-efficient furnaces in recent years. The new furnaces have shorter combustion paths, so there will be technological limitations in future in the usability of tyres in cement production.

Accordingly, Pyrum Innovations AG observed steadily increasing demand for its sustainably produced raw materials such as thermolysis oil and rCB in 2023. Over the next few years, the planned expansion in production will fall far short of meeting demand. The ongoing war in Ukraine is now also driving up prices for virgin carbon black produced conventionally by burning heavy oil. Carbon black is used as a raw material in numerous sectors, for example in the tyre industry for the production of new tyres, but also in the plastics and electronics industries. The growing demand for recovered carbon black is being encouraged by the fact that many international tyre manufacturers have set themselves ambitious sustainability targets. The Continental Group, with which Pyrum Innovations AG entered into a contract for the delivery of carbon black in March 2023, aims for example to use 100% sustainably produced materials in its tyre production by 2050.⁸ The current use of Pyrum rCB in forklift tyres is a start.

Overall, Pyrum Innovations AG thus operates on a highly attractive market. At the same time, Pyrum is in demand both as a sustainable disposal purchaser of the input material end-of-life tyres and as a supplier of sustainably produced raw materials. Pyrum Innovations AG intends to play a significant role on this rapidly growing recycling market for end-of-life tyres.

⁸ Continental AG: Vision 2030



STATUS OF EXPANSION OF DILLINGEN TAD 2&3



In 2023, Pyrum continued to drive and prioritise the work planned since 2020 and started in 2021 to expand the thermolysis plant at the location in Dillingen as planned.

The reactors for lines 2 and 3 were successfully installed in the thermolysis tower in February 2023. In June, the planned heating elements were installed in the reactors and the insulation of the reactors, sensors and cabling were completed and connected to the control centre.

In the first quarter of the 2023 financial year, staff training was initiated with the help of the “digital twin”. By the end of August, all employees working in production at the time had been trained to use the new plant and it had been ensured that enough specialists had command of the new control technology before the plant went into operation.

Commissioning of the tyre shredding plant (shredder) began in May 2023 after a delivery delay of six months. This was largely completed at the end of June before entering trial operation. In the meantime, the system is running sufficiently for the current supply of the site in Dillingen, but has not yet reached the target output for all parameters.

In the second quarter, as part of the commissioning work the first tests on steel purity from the end-of-life tyres shredded in the new plant were carried out. The intended steel purity within the range of 95% to 98% steel content of the recovered tyre wire has been verified, thus achieving a significant improvement in purity compared to the previous plant.

Following the successful completion of the cold commissioning works, the first warm-up of Reactor 2 (TAD 2) took place at the start of November, when it was heated to a production temperature of around 650°C for the first time. The main goal of this run was to test whether a controlled shutdown of the plant is ensured.

Hot commissioning is carried out in cycles ideally lasting up to four weeks each, during which the respective reactor is kept at full operating temperature and various production tests carried out in continuous operation before the plant is shut down again in order to implement findings directly in a cold state.

In the current 2024 financial year, throughput was gradually increased to 75% of the level anticipated for future series production within a week on the third run. TAD 2 is now on its sixth warm-up run. The reactor was briefly operated with a throughput rate of 80%. To date, more than 100,000 litres of marketable Thermo Tire Oil (TTO) have already been produced in the new plant, sampled in an external laboratory and delivered to BASF with 100% compliance with BASF's specifications. The start-up of TAD 2 is continuing as planned.

The start-up of power generation unit will soon be completed. The power generation unit has been running on thermolysis gas since the end of April 2024. The final adjustments and fine-tuning are taking place now.

Based on the latest findings, it was decided to make further, minor optimisations before launching the first warm-up of TAD 3. These optimisations will take around six weeks. As a result, TAD 3 is expected to go on-stream by the end of May 2024, with the aim of then quickly ramping up this reactor to up to 75% of its rated output as well.

The grinding and pelletising of the recovered carbon black (rCB) produced in the new reactors still needs to be ensured in order to achieve substantial increases in sales. A jet mill will be used for the plant extension in Dillingen in future. Assembly is expected to commence in the third quarter of 2024. The required pelletising plant was only ordered after extensive material testing had been completed by the manufacturer. This was done in order to ensure that the facility can be launched more quickly than the existing facility (for TAD 1) and that the manufacturer can ensure the required throughput quantity after it has been delivered and assembled. This also ensured that the capex costs for the plant were also based on verified technical facts. In addition, the findings from the joint research project with Continental were to be directly implemented. Owing to the very long delivery times for key components, delivery and installation of the pelletising plant should begin by the end of 2024, with the result that Pyrum Innovations AG's sales will then substantially increase.

The first parts for the grinding mill will be delivered at the end of June. However, assembly is not planned until the end of 2024 owing to the dependencies between the grinding and pelleting systems.

Current (customer) projects in plant construction

Pyrum's team is currently working on the implementation of several new plant construction projects in parallel to the commissioning at the company headquarters in Dillingen/Saar to advance the roll-out of its patented technology and to create additional recycling capacities at other locations in the short and medium term. As the pipeline is very well filled with projects, the acquisition of new projects is being postponed for the time being. Activities in 2024 will focus on the respective approval procedures and the considerations specific to the sites.

Own plant in the Saarland

In November 2023, the Executive Board of Pyrum Innovations AG decided that it was not economically viable to continue with the construction of a plant on the originally intended site in Homburg/Saar.

Parallel to this location, Pyrum was already actively looking for suitable sites for its own and its customers' next plants. The criteria for the search were that the site should be located in an industrial area, close to the river (for logistics) and not in a water conservation area. The company found such a site in Perl-Besch on the Moselle, allowing it to move forward with the next project for a second site without major delays.

Most of the preparatory and planning work in conjunction with the original project was still used. Thanks to its access to waterways, rail and motorways, the alternative site is in a very good logistical location. A reservation agreement was entered into with the owner that also sets the terms for a future purchase.

The goals for the new site in Perl-Besch were already implemented in February of this year. After the competent municipal council approved the application to amend the development plan by a large majority, preparatory measures to develop and upgrade the first construction phase at the new Pyrum site were carried out over an area of 8,800m² at the end of February. Pyrum will reforest the entire construction site with higher quality woodland elsewhere.

The disclosure process for development planning caused minor delays in submitting the application for approval. Pyrum currently expects construction to begin in Q3 2024.

Czechia

On 25 September 2023, Pyrum Innovations AG signed a consulting agreement with a subsidiary of a Czech energy group to construct a Pyrum thermolysis plant in Czechia to prepare for the approval of the tyre recycling plant and submit the building application. The final investment decision will be made by the end of 2024. Scheduled to start operations in 2026, the new plant will have a capacity of 20,000 tonnes of end-of-life tyres per year and is being built near the Czech border with Germany. The Czech partner, which operates in energy and recycling management, already has a power plant on the site and therefore has a gas turbine which will co-generate electricity from the thermolysis gas, allowing the company to benefit from synergies and existing structures in the planning and realisation of the new plant.

A joint venture (special purpose vehicle (SPV)) will be set up to build and operate the new plant, in which Pyrum is expected to hold 30%.

Greece (“Thermo Lysi SA”)

In the third quarter of 2023, Pyrum Innovations AG signed a contract for the planning of a new plant in Greece. Pyrum has been commissioned to perform all the necessary planning that will be used for the submission of the documents required under Greek law for a construction and operating licence for the new plant. The plant of the Greek project company Thermo Lysi SA is to be built about 140 km north of Athens. It will have a capacity of 20,000 tonnes of end-of-life tyres per year and will thus be able to cover almost half of the total amount of end-of-life tyres in Greece. The country produces about 45,000 tonnes of end-of-life tyres per year. The new plant will help to sustainably recycle these end-of-life tyres and recover valuable resources. Pyrum is expected to hold an equity interest of 15% in the project company.

The location of the prospective plant is already the site of an existing tyre recycling plant. The site on which the new plant will be built offers ample space for future capacity expansion.

A positive decision on the subsidy application for the project in Greece is expected in the first half of 2024. ThermoLysi also expects a positive decision from Ecoelastika, the non-profit distribution system for end-of-life tyres in Greece, to ensure the quantities of end-of-life tyres by the end of the first half of the year. Work to amend the application to build and operate an end-of-life tyre thermolysis plant will be completed soon.

Bremen – REMONDIS

In mid-November 2023, Pyrum and the recycling company REMONDIS initiated the planning phase for a joint Pyrum plant for recycling end-of-life tyres by signing a letter of intent. The plant will be located on a site owned by Weserport GmbH in the port area of Bremen, a subsidiary of REMONDIS’ sister company, Rhenus. It will have a recycling capacity of 20,000 tonnes of end-of-life tyres per year. The site should be available for the planned development from the second quarter of 2025. Assuming that the investment is approved by all involved, which should happen by the end of 2024, it is intended that Pyrum will hold an equity interest of 33% in the SPV.

Emleben - UNITANK

The memorandum of understanding (MoU) entered into with UNITANK Betriebs- und Verwaltungs GmbH in September 2022 envisages implementing up to ten joint plants by 2030. The suitability of the site for potentially the first joint project in Emleben (Thuringia) is currently being carefully examined, and discussions have already been held with local government representatives and utility companies in order to co-ordinate which special site-specific features will need to be taken into account and to ensure the supply to the public grid in the required extent at an early stage. In collaboration with the partner UNITANK, extensive preliminary work is already in progress at the project level for the pre-engineering, the drafting of a business plan and preparations for the ownership structure planned in future for a potential joint venture for building and operating a plant. In parallel with this, UNITANK is

already holding discussions with future suppliers for the tyre input and with potential customers for the end products. The target regions for the next joint plants are also being coordinated with UNITANK.

The final work on the consulting contract is expected to be completed by the end of the first half of 2024, when it will be ready to be signed. At the same time, detailed layout planning is continuing, which means that external service providers can be commissioned to prepare the approval documents as soon as the agreement has been signed.

Other projects

In addition to the projects described above, Pyrum Innovations AG has a well-filled pipeline of attractive projects in their early stages, such as the potential construction of a plant in the United Kingdom with SUEZ and other projects in Germany and Europe.





Research and development

In Pyrum's own interest, research and development is one of its core competencies. The activities serve to improve know-how and products, ensure Pyrum's technological advantage and guarantee the quality of the products it delivers.

To explore additional application areas for Pyrum technology, the company operates an experimental laboratory of its own, which, alongside the advancement of the application areas for our own technology, is also used for customer research projects and thus generates additional sales. The public funding that is committed usually covers up to 70% of the respective project costs, sometimes more in individual cases.

Regular cooperation with external parties and universities takes place in order to exploit the greatest possible level of expertise for these developments and to stand consistently at the cutting edge of research. In addition, there is a regular dialogue with suppliers of key components and customers so that innovative issues, trends and individual requirements can be taken into consideration early on in development.

The research focuses on homogeneous input materials, for which there are currently few to no solutions for circular material cycles. This produces major opportunities in markets that, from a technology perspective, has not so far been possible to tap commercially.

After a development period of almost four years, in the second quarter of 2023, Pyrum Innovations AG opened the first automated, semi-industrial recycling plant for carbon-fibre reinforced plastics (CFRP) and thus fully recycled CFRP for the first time in the world. The plant is located at the main facility in Dillingen/Saar and will be used as the cornerstone for the construction of an industrial plant. Discussions with interested parties are already under way.

Pyrum is still maximising the potential of its patented recycling technology and identifying new potential applications. Several projects are currently in the application process.

Completed projects:

ZIM-Schwalbe

“Recycling of end-of-life bicycle tyres for reuse as raw materials in new and sustainable bicycle tyres”

Unlike car and truck tyres, worn-out bicycle tyres are currently almost exclusively disposed of in residual waste, and most of them are sent for thermal recycling, which leads to a steadily increasing and irreversible loss of raw materials. Together with Ralf Bohle GmbH (“Schwalbe” tyre brand) and Cologne University of Applied Sciences, Pyrum Innovations AG is researching a sustainable solution to this problem. The aim of the cooperation project is to develop a raw material recycling concept for old bicycle tyres with a view to creating a closed-loop economy. In addition to production waste, a collection system designed by Schwalbe is to be used to feed used tyres directly from the end user to the thermolysis process after shredding. The resulting gas can be used to generate electricity, thereby allowing the entire process to be energy self-sufficient. The thermolysis oil is intended to serve as a substitute for crude oil in the chemical industry. The recovered carbon black (rCB) is to be fed back into the manufacturing process for bicycle tyres. Cologne University of Applied Sciences is investigating the incorporation of rCB into rubber compounds for inner tubes for bicycles. The product properties of the prototypes produced in this way will then be examined by Schwalbe.

The Pyrum Innovations AG team focused on the development of the optimal process parameters for the thermolytic recycling of bicycle tyres. The goal was to provide high quality products for the best possible use in bicycle tyre production.

The project partners were:

1. Ralf Bohle GmbH
2. Cologne University of Applied Sciences

→ After the project partners analysed the rCB, the optimum process conditions for the thermolysis of bicycle tyres was determined in 2023. The rCB therefore meets all the requirements Schwalbe needs to use the rCB in the production of new bicycle tyres.

On 20 June 2023, Ralf Bohle GmbH (‘Schwalbe’) presented the ‘Green Marathon’, the first bicycle tyre that closes the product cycle and is made from used tyres, among other things, which are recycled at Pyrum. The successful implementation of the project has proven that it is possible to produce a new tyre from the Pyrum rCB from tyres that does not differ in quality from conventionally manufactured tyre types. In future, Pyrum will recycle bicycle tyres for Schwalbe and then supply the required rCB to Schwalbe. The project was therefore successfully and fully completed.

Infinity

“Technology Transfer Programme Lightweight Construction”

Since as early as 2019, Pyrum Innovations AG has been looking into the question whether the increasing problem of disposal, for example of wind turbines and car bodies, could be solved using the thermolysis process. After initial basic research in-house, a funding project was submitted. The project was launched after years of preparatory work on 1 January 2021. The project ran for two and a half years. The aim of the “Infinity” project was to develop, establish and demonstrate a sustainable process cycle for carbon fibre composite materials using novel recycling technologies, materials and processing methods, as well as the substitution of the carbon fibre primary material with high-quality recycled and bio-based materials for significant carbon reductions in lightweight construction.

Pyrum was responsible for the recovery of high-quality carbon fibres (CF). These were processed into rCF tapes in the project consortium, generating a raw materials loop.

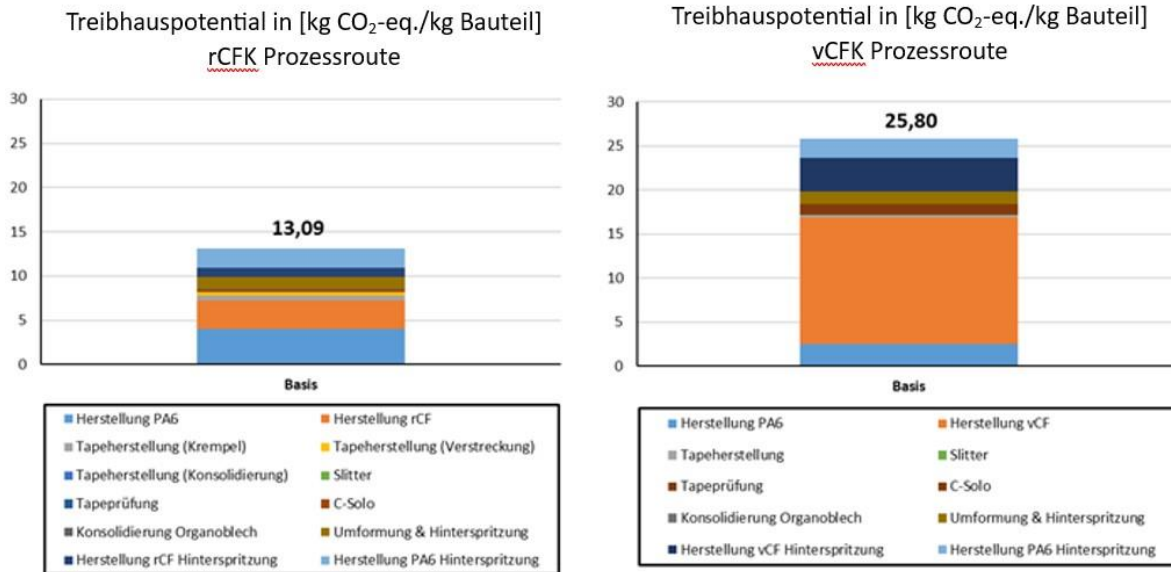
The project partners were:

1. Altex Textil-Recycling GmbH & Co. KG,
2. Textechno Herbert Stein GmbH & Co. KG,
3. Kraus Maffei Technologies GmbH,
4. German Institutes of Textile and Fiber Research Denkendorf,
5. Fraunhofer IGCV,
6. Coriolis Composites GmbH,
7. CTC GmbH,
8. V-Carbon GmbH

→ *The Infinity project was successfully completed on 30 June 2023. A holistic concept was developed for this, in which the entire value chain is mapped and a more sustainable closure of valuable material cycles is to be achieved. The project objectives were met and Pyrum was able to make an important contribution to the project with a specially developed and subsequently commissioned demonstration plant for the fibre-friendly and low-CO₂ recycling of carbon fibre-reinforced plastics. In subsequent test phases, recycled carbon fibres were obtained and the other thermolysis products oil and gas were characterised.*

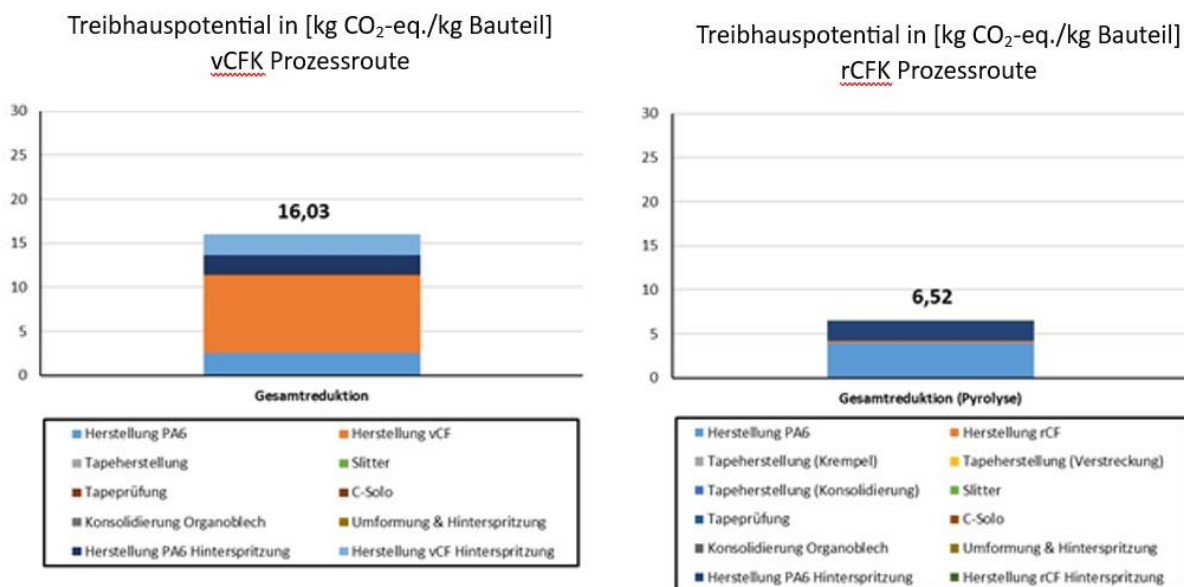
In addition to the use of high-quality recycled carbon fibres (rCF), the innovative thermolysis process also allows the thermolysis oil produced to be used as a material for the first time and thus represents the most holistic recycling approach possible.

Overall, the following figure shows that for a mass-based comparison (functional unit: 1 kg of component), the use of rCF tapes can achieve a 49.3% reduction in global warming potential compared to the use of vCF tapes (virgin carbon fibre).



Treibhauspotential in kg CO₂-eq./kg Bauteil - Basisszenario

As shown in the following figure, the global warming potential of the rCFC process chain can be reduced by 50.2% by exploiting further reduction potential, in particular through the use of green electricity and ecological optimisation of the thermolysis process. Compared to the vCFRP process chain, this in turn has a 59.3% lower global warming potential (thermolysis fibres) for the ‘overall reduction’ scenario.



Treibhauspotential in kg CO₂-eq./kg Bauteil – Szenario „Gesamtreduktion“

The final report of the project can be found on the Fraunhofer IGCV homepage:

<https://publica.fraunhofer.de/entities/publication/8ddc6bf8-f568-4934-b037-d182ad7a5a87/details>

→ A patent was filed after the project was completed.

Pyrum is currently conducting the following significant R&D projects:

BlackCycle

“Recycling of end-of-life tyres for reuse as raw materials in new and sustainable car tyres”

The goal of the European BlackCycle project, which was launched in 2020, is to create a closed-loop economy for the efficient recycling of end-of-life tyres. The consortium, represented in five countries, is to develop a sustainable process to recycle recovered materials from scrap tyres back into new tyre production. This includes the collection and selection of raw materials from used tyres as well as the optimisation of thermolysis, oil refining and utilisation.

The Pyrum team focused on the further development and adaptation of the thermolysis process on a laboratory and industrial scale. The aim was to obtain products with customised properties for ideal further utilisation with the highest possible quality from end-of-life tyres.

The project partners are:

1. Manufacture Française des Pneumatiques Michelin
2. Aliapur
3. Axelera
4. Ethniko Kentro Erevnas Kai Technologikis Anaptyxis
5. Agencia Estatal Consejo Superior de Investigaciones Cientificas (CSIC)
6. Estado Umweltservice GmbH
7. HERA HOLDING HABITAT, ECOLOGIA Y RESTAURACION AMBIENTAL S.L.
8. International Center for Advanced Materials and raw materials of Castilla y León (ICAMCyL)
9. Institut National de l’environnement et des Risques (INERIS)
10. Orion Engineered Carbons GmbH
11. Quantis Sàrl
12. Sisener Ingenieros SL

→ *Pyrum’s work in the project has thus been successfully and fully completed with the delivery of the thermolysis oil to the project partners customised to the system parameters. During the project, there was a continuous dialogue with the project partners on the production of high-quality carbon black from the provided oils. The product will be used as a raw material substitute in new Michelin tyres. These new tyres are intended to consist largely of raw materials that have been obtained from end-of-life tyres, thus closing the raw materials loop. The project findings will be presented at the BlackCycle Final Workshop at the end of May 2024. The project will therefore be wrapped up in the current financial year.*

ÖkoCap

The two-year ÖkoCap project involves researching the economic, technical and ecological potential of recycled carbon fibres (rCF) and rCF non-wovens in comparison to glass fibres, steel or, for example, aluminium. The aim is also to determine the effective relationship between the economic, ecological and technical levels for individual processes and routes in order to be able to identify the effects of various levers (e.g. various process parameters).

Pyrum Innovations AG participates in the ÖkoCap project in working group 1 on the shredding and recycling of carbon-fibre reinforced plastics. Complementing the Infinity project, a detailed life cycle assessment (LCA) analysis is also being conducted in the ÖkoCap project.

- Investigation of further process parameters for the identification of control levers
- Contribution of new findings to the LCA analysis after completion of the Infinity project
- LCA analysis (as well as profitability analysis) of the scale-up process → Target is in-house facilities that are observed, i.e. a scale-up level from the laboratory scale

The project is being implemented with in-house facilities that are much larger than the usual laboratory facilities. This project enables Pyrum Innovations AG to expand the network in the composite area along the process chain to potential customers and future project partners.

→ The 'MAI ÖkoCap' project aims to provide decision-making aids for a variety of applications in the field of fibre-reinforced plastics and thereby increase the market penetration of recycled materials. To this end, Pyrum has provided real operating data from the demonstration plant developed in the Infinity project, which has been included in the study for the fibre-matrix separation step.

Further information can be found on the Fraunhofer IGCV website:

https://www.igcv.fraunhofer.de/en/research/reference_projects/oekocap_evaluation_recycled_carb_on_fibers.html

Extracting hydrogen from the thermolysis process

Pyrum Innovations AG can also contribute to the mobility revolution moving ahead. Among other things, the company is a partner in the "Future Campus Hydrogen" initiated by the district of Saarlouis. The plan is for Pyrum to supply Kreisverkehrsbetriebe Saarlouis GmbH (KVS GmbH) with hydrogen for buses. After initial tests to extract hydrogen from the gas Pyrum obtains by recycling end-of-life tyres using its thermolysis technology, Pyrum is optimistic that it will be able to offer solutions here. Various studies predict high demand for hydrogen in future, particularly in the transport sector⁹. This offers Pyrum Innovations AG another new market with great potential. Pyrum forecasts that it will be possible to deliver relevant hydrogen buses on the necessary scale from 2026, so Pyrum can reasonably expect to invest in corresponding large-scale industrial separation technology (separation of hydrogen from thermolysis gas) from 2025/2026.

⁹ Fraunhofer Institute for Systems and Innovation Research ISI: Metastudie Wasserstoff – Auswertung von Energiesystemstudien (2021)



Economic report

Overview of economic conditions

Despite some significant global challenges, including geopolitical conflicts, elevated inflation and accompanying central bank interest rate hikes, the global economy stayed largely stable in the 2023 financial year. According to the International Monetary Fund (IMF, April 2024), provisional global economic growth was 3.2% in the past year.¹⁰ The trend was therefore much more positive than expected. In particular the banking system proved resilient in 2023 and global inflation was contained in many regions. Economic growth of 1.6% was achieved in the industrialised nations in 2023 (previous year: 2.6%). However, growth in gross domestic product in the euro area countries was significantly lower at 0.4% (previous year: 3.4%). The German economy even slightly contracted by 0.3% (previous year: +1.8%). Europe in particular was still buffeted by the energy crisis caused by the war in Ukraine, so negative factors continued to dominate in 2023. In Germany, the annual average inflation rate was 5.9% compared to the previous year.¹¹

Around the world, more than 1.6 billion new tyres are sold on the tyre market each year.¹² In Germany, just under 44.5 million car, van and truck tyres were sold in 2023, according to the German Tyre Retail and Vulcanisation Trade Association.¹³ Accordingly, there will be roughly the same amount of used tyres later on. According to research by SWR, this amounts to around 700,000 tonnes per year in Germany alone.¹⁴ By comparison, a standard Pyrum thermolysis plant with three reactors has a recycling capacity of around 20,000 tonnes of end-of-life tyres per year. At the same time, according to a feasibility study by Chemnitz University of Technology on behalf of the German Tyre Retail and Vulcanisation Trade Association, a deficit is emerging in the recycling capacity available for end-of-life tyres in Germany.¹⁵

This deficit could lead to increased illegal dumping, rising disposal costs and higher exports of end-of-life tyres. Half of end-of-life and used tyres in the EU are already transported abroad.¹⁶ Accordingly, demand for the acceptance of end-of-life tyres remains high. At a macroeconomic level, the circular economy is garnering increasing public attention. In conjunction with the energy transition, there is a growing focus on sustainable products, which is also affecting regulatory conditions. For example, the incineration of end-of-life tyres entails ever-higher costs for carbon emissions.

Based on the EU Commission's strategy, the European Parliament has also taken initial action aimed at reducing the microplastics released into the environment by 30% by 2030. As a result of the amendment of the REACH Regulation, trading in bulk polymers with an average diameter of < 5 mm will be banned by 2031 at the latest.¹⁷ These materials also include polymers and the rubber granulate found in end-of-life tyres. For context, around 1.2 million tonnes of end-of-life tyres are shredded every year in the EU. 42% of the rubber granulate obtained from this is used as filler for artificial turf pitches,

¹⁰ IMF: World Economic Outlook Update April 2024

¹¹ Destatis: Press release 020 of 16 January 2024

¹² BlackCycle Project: Press release of 3 September 2020

¹³ Bundesverband Reifenhandel und Vulkaniseur-Handwerk (German Tyre Retail and Vulcanisation Trade Association): Press release of 25 August 2024

¹⁴ SWR "Vollbild": Press release of 9 August 2022

¹⁵ Chemnitz University of Technology: Neue Nutzungsperspektiven und Anwendungsfelder für Altreifenzyklal of 24 January 2022

¹⁶ World Business Council for Sustainable Development (WBCSD): Global ELT Management (2019)

¹⁷ Ecoelastika: Annual Report 2022

making this the most widespread recycling application for end-of-life tyres for decades. The ban on bulk polymers resulting from the amendment will inevitably have a major impact on the market.

Pyrum Innovations AG can make a decisive contribution to the desired transformation of the economy with the recycling of end-of-life tyres in materials recycling.

Economic development of Pyrum AG and the Group

The most important developments in the reporting period regarding cooperations/partnerships, the main facility in Dillingen/Saar, certifications/analyses and financing are presented below.

Cooperations/partnerships

A letter of intent was signed with Polyfuels in January 2023, envisaging the joint construction and operation of thermolysis plants in Scandinavia. These were to be built in Norway, Sweden, Finland and Estonia. However, the letter of intent expired at the start of the new financial year and will not be followed up. Instead, the company signed a consulting agreement with GreenTech Tires AB at the start of February 2024, providing for the joint construction of a Pyrum plant with a capacity of around 20,000 tonnes of end-of-life tyres in Sweden.

Approval from Continental for the series supply from TAD 1 was granted in March 2023 and corresponding purchasing agreements were finally signed, with the result that it was now possible to make the first deliveries of rCB to Continental in addition to Ralf Bohle GmbH (Schwalbe tyres). The contract also allows for an increase in delivery volumes in parallel with the ongoing expansion of production capacity. As a result, long-term supply contracts were signed for all Pyrum's core products in addition to thermolysis oil.

The next step in the collaboration with Mercedes-Benz was also taken: Pyrum will potentially recycle several hundred tonnes of end-of-life tyres from the Mercedes-Benz Used Parts Centre every year. Pyrum will utilise them to produce thermolysis oil, which will be supplied to its co-operation partner BASF. The company will use the oil as a raw material in combination with biomethane to produce new plastics used in the manufacture of Mercedes-Benz vehicle parts.

In June, Pyrum and SUEZ signed an exclusivity agreement to construct Pyrum's first thermolysis plant in the UK. The one-year contract will be used to find a suitable location for the planned plant and kick-start the authorisation process with Pyrum's assistance. The planned plant will be equipped with three thermolysis reactors and have a recycling capacity of 20,000 tonnes of end-of-life tyres per year.

In September 2023, a contract was signed between Thermo Lysi SA and Pyrum Innovations AG, providing for the construction of a joint recycling plant in Greece. In this context, Pyrum has agreed to perform all the necessary planning that will be used for building permits, as required by the Greek law, for the new plant. The plant is expected to be built around 140 km north of Athens and have a capacity of 20,000 tonnes of end-of-life tyres per year. This means the company would cover almost half of the total volume of end-of-life tyres in Greece (45,000 tonnes of end-of-life tyres per year).

There were further additions to the project pipeline at the end of September 2023. The company signed an engineering and consulting contract with a subsidiary of a Czech energy group providing for the construction of a new Pyrum plant that will be integrated into the partner's existing plant. The

Czech partner, which is active in energy and recycling management, already operates a power plant on the site and therefore has a gas turbine which will co-generate electricity from the thermolysis gas, The plant will be built in the region bordering Germany and commence start operations in 2026.

In November 2023 REMONDIS and Pyrum Innovations AG have also signed a letter of intent and already begun planning a joint recycling plant in Bremen. With a capacity of 20,000 tonnes of end-of-life tyres per year, the new plant will be located on a Weserport site in Bremen, a subsidiary of REMONDIS' sister company, Rhenus.

Development at the main facility in Dillingen/Saar

The pelletising plant for the existing plant (TAD 1) was put into series production in the first quarter of 2023. After obtaining the necessary certifications for supplying well-known tyre manufacturers such as Continental, the company could begin series supply to Continental in May 2023 in addition to supplying Ralf Bohle GmbH ("Schwalbe").

After completing the assembly work on TAD 2 & 3 in the first half of the year, cold commissioning of the thermolysis recycling plant with loop checks began in July 2023. All parts of the entire plant were put into operation in stages.

Following cold commissioning, the company commenced the hot commissioning phase of the reactors 2 and 3 at the end of October 2023. This was followed by the first warm-up run in Reactor 2 at the start of November. Within the process, the reactor was started up and heated to the production temperature of around 650 °C for the first time, fed with granulate and the dosing system successfully tested with the result that the first thermolysis oil was produced in small quantities.

The plant construction measures in 2023 as well as the developments in the project business are described in detail in the section "Project status report".

Certifications/analyses

In April 2023, Pyrum obtained ISO 14001 certification for end-of-life tyre recycling, production and sales of the resulting products, research and development of new input materials and products, and plant design and construction. Therefore, the existing quality management system was expanded to include the "environment" factor. The implementation of and compliance with the environmental management system according to DIN EN ISO 14001:2015 was confirmed by successfully passing the audit. The certificate is valid until 2026 (three years).

In March 2023, the company was awarded "very good" status by imug Rating. imug Rating is recognised as the best provider of sustainability ratings in Germany. The assessment is based on three criteria – ESG management, products/services and governance – and is based on the Principles of the UN Global Compact. The company was awarded full marks for products/services and governance in particular.

Financing

Pyrum Innovations AG was paid an investment grant of EUR 1.5 million in February 2023, with positive liquidity effect, in order to create new jobs in Dillingen/Saar. A further payment of EUR 0.9 million was made in November 2023. A total of EUR 3.8 million in federal and state funding has been approved for the plant expansion, of which EUR 3.4 million has already been paid out.

Pyrum Innovations AG signed a loan agreement for EUR 4 million with BASF Antwerp in May 2023. The loan was disbursed in four tranches between May and August 2023.

In July 2023, the third tranche of the **convertible loan** from Pyrum, which was available according to the milestone plan with BASF, was drawn and EUR 2 million was disbursed to Pyrum. This means that the convertible loan totalling EUR 7 million has been fully disbursed.

On 15 November 2023, Pyrum Innovations AG and BASF Antwerp NV signed a new cooperation agreement providing for a loan of initially EUR 25 million, which can be utilised in tranches, is subject to various conditions (e.g. orders for long leads, i.e. plant components with the longest delivery times) and is to be used as seed funding for the implementation of Pyrum Innovations AG's current project pipeline until 2026. BASF will also provide an additional EUR 25 million as a loan to Pyrum, provided that Pyrum has secured additional funding of EUR 50 million, including investments by project partners. This may include corporate bonds, equity increases, loans or the financing share of partners in jointly planned plants.

The purpose of the agreement is to plan, design and construct at least three new plants, with an annual capacity of 20,000 tonnes of end-of-life tyres each, using the funds made available. Pyrum plans to use most of the funds to build another plant in the Saarland and to contribute equity and co-finance up to five of the projects announced in recent months with financially strong partners. The goal of Pyrum and BASF is to significantly expand the production capacity of Pyrum technology.

In conjunction with the seed financing from BASF, a tranche of EUR 3 million were already paid to Pyrum in the 2023 financial year and tranches totalling EUR 8.3 million in 2024, hence key orders, for reactors, for instance, were already received for Pyrum's new plant in Perl-Besch in the first quarter of 2024.

Pyrum is also in talks with other potential investors and financial advisors to secure additional financing for all projects in the pipeline and currently negative cash flows.

NET ASSETS, FINANCIAL POSITION AND RESULTS OF OPERATIONS

This section jointly addresses the consolidated and annual financial statements of Pyrum Innovations AG. If individual items differ materially in the two sets of financial statements, they are presented differently.

The figures for the reporting period are followed by the respective figures for the same period of the previous year in brackets.

The annual result and the net assets of the Pyrum Innovations AG Group were primarily influenced by the high investments at the company's headquarters in Dillingen/Saar, investments in personnel, the further development of organisational structures and the throughput in the rCB milling and pelletising plant, which is not yet satisfactory in terms of volume.

Results of operations

Pyrum Innovations AG generated **sales** of EUR 1,147 thousand in 2023, an increase of 17% compared to 2022 (EUR 982 thousand). In particular, proceeds for the rCB obtained fell well short of expectations, despite prices of more than EUR 900 per tonne. Following extensive certification work, the first official delivery was made to Continental in April 2023. From July 2023, material that satisfies tyre manufacturers' high standards was produced exclusively, albeit still with high recirculation rates from the pelletising plant into the production process and thus repeat processing. Pelletisation operations have been stable since August 2023. However, despite steady increases in production volumes, the maximum rate is still limited to 350 kg per hour rather than the intended 650 kg per hour (for the plant that processes the material from the existing thermolysis plant in Dillingen).

The **change in inventories of finished goods and work in progress** decreased significantly year-on-year to EUR -60 thousand (2022: EUR 277 thousand). Older rCB inventories were cleared owing to the growing shortage of space. Alternative marketing options for the current surplus of unprocessed raw coke are being examined on an ongoing basis in order to reduce inventories significantly.

With the plant expansion in Dillingen progressing as planned, **own work capitalised** amounted to EUR 11,712 thousand (EUR 17,810 thousand). The decline corresponds to the reduction in the cost of materials required for the generation of own work as the plant expansion draws closer to completion.

Total output decreased by EUR 6,271 thousand or 33% year-on-year to EUR 12,799 thousand (EUR 19,069 thousand) due to a decline in own work and lower than expected rCB production quantities.

In the same period of the previous year, **other operating income** was dominated by research grants for the BlackCycle project. Income of EUR 715 thousand (EUR 1,318 thousand) in total was generated in the 2023 financial year. This essentially resulted from investment grants of EUR 150 thousand (EUR 0 thousand) and research grants of EUR 253 thousand (EUR 993 thousand).

In addition to raw materials, consumables and supplies for ongoing production operations (EUR 602 thousand), the **cost of materials** includes the materials used in own work capitalised

(EUR 9,062 thousand). **Expenses for purchased services** of EUR 1,755 thousand relate almost exclusively to the plant expansion. The reported cost of materials fell to EUR 11,420 thousand in total in 2023 (EUR 17,653 thousand).

Personnel expenses increased by 29% to EUR 5,405 thousand (EUR 4,184 thousand) due to the personnel requirements for capacity expansion and inflation-related wage adjustments.

Depreciation and amortisation fell to EUR 2,086 thousand (EUR 2,554 thousand) due to the end of depreciation for the first construction phase of the existing plant at Pyrum Innovations AG. At Group level, EUR 869 thousand (EUR 870 thousand) resulted from the amortisation of Pyrum Innovations International S.A.'s patents.

Interest expenses doubled year-on-year to EUR 423 thousand (EUR 212 thousand). In particular, this was as a result of the convertible loan, which has now been paid out in full, and the additional borrowing in the financial year.

The **consolidated net result for the year** was EUR -9,511 thousand (EUR -7,808 thousand).

Net assets

Intangible assets were amortised by EUR 905 thousand in the period under review. The value on the reporting date thus declined to EUR 5,638 thousand (31 December 2022: EUR 6,492 thousand).

Tangible assets increased by EUR 10,699 thousand year-on-year to EUR 39,458 thousand (EUR 28,759 thousand). The key driver here was a further EUR 10,387 thousand for payments on account and assets under construction that accompanied the plant expansion in Dillingen.

Financial assets related to the investment in REVALIT GmbH. In the consolidated financial statements, the investment was further reduced by the pro rata net loss for the 2023 financial year.

Total fixed assets amounted to EUR 45,126 thousand (31 December 2022: EUR 35,288 thousand).

Inventories climbed to EUR 446 thousand (EUR 389 thousand) largely as a result of increases in the manufacturing costs of work in progress in the 2023 financial year.

Trade receivables decreased to EUR 101 thousand (EUR 147 thousand).

Other assets decreased from EUR 1,259 thousand to EUR 702 thousand. This includes research subsidies (EUR 116 thousand) and receivables from research grants totalling EUR 309 thousand for the Black Cycle project. The reduction was the result of optimised internal processes that enable faster registration of claims to VAT reimbursement and thus quicker reimbursement than in the previous year.

At EUR 50,926 thousand, **total assets** were slightly higher than in the 2022 annual financial statements (EUR 49,857 thousand).

FINANCIAL POSITION

Capital structure

The **equity base** of the Pyrum Group amounted to EUR 22,380 thousand as at 31 December 2023 (31 December 2022: EUR 31,891 thousand).

The **equity ratio** declined as a result of the consolidated net result for the reporting period to 43.9% (64.0%).

Liabilities to banks decreased by EUR 462 thousand to EUR 3,599 thousand as at 31 December 2023 (31 December 2022: EUR 4,061 thousand) as a result of scheduled repayments.

By contrast, liabilities to BASF, which include convertible loans and long-term loans, increased to EUR 13,706 thousand. These are recognised in **other liabilities**, which amounted to EUR 18,895 thousand as at the end of the reporting year (previous year: EUR 8,010 thousand). This increase also included a grant of EUR 2,400 thousand disbursed in 2023 for the creation of new jobs at the Dillingen/Saar site. This grant has not yet been posted to profit or loss.

Liabilities from advance payments increased to EUR 651 thousand (EUR 100 thousand). These included the advance payments made by customers under consulting contracts for the preparation of approval documents.

Trade payables decreased by EUR 468 thousand to EUR 2,213 thousand (EUR 2,681 thousand).

To mark the company's 15th anniversary, Pascal Klein, the founder and CEO of Pyrum Innovations AG, donated his own shares for all permanent employees to hold an interest in the company. The transaction is shown in the consolidated statement of changes in equity as "acquisition" and "sale" of treasury shares.

Liquidity situation

The company continuously monitors the available liquidity and potential investment effects. To preserve liquidity, land purchases are usually refinanced in the long term in order to secure the roll-out planning.

Cash in hand and bank balances amounted to EUR 4,483 thousand as at 31 December 2023 (31 December 2022: EUR 12,726 thousand).

The decrease was essentially due to investment in the expansion of the plant in Dillingen/Saar (EUR 10,387 thousand).

Cash flow statement

The cash flow statement has been prepared in accordance with the requirements of German Accounting Standard GAS 21. In accordance with the amendment to this standard in June 2023, the payments received from research grants are now shown in the cash flow from operating activities and no longer in the cash flow from financing activities. The figures for the previous year have been restated accordingly to improve comparability.

The **cash flow from operating activities** was virtually unchanged year-on-year at EUR -6,217 thousand in the 2023 financial year (EUR -6,203 thousand). The payment effect of the higher loss was offset by the reduction in receivables.

Cash flow from investing activities decreased significantly from EUR -20,823 thousand to EUR -11,680 thousand. Investments focused on the expansion of the plant at the Dillingen site in the previous year.

Cash flow from financing activities amounted to EUR 9,654 thousand (EUR 5,306 thousand). This resulted from the payment of EUR 2,000 thousand from the convertible loan and EUR 4,000 thousand from the loan agreement signed with BASF in the first half of 2023 and a further payment of EUR 3,000 thousand from the cooperation agreement with BASF from November 2023. The payment of the investment grant of EUR 2,400 thousand, less loan repayments, also contributed to the cash flow from financing activities.

The Group companies were able to meet their payment obligations at all times.

Report on key performance indicators

Key financial performance indicators

Pyrum Innovations AG's financial management is based on the key performance indicators or sales, total output and earnings before interest and taxes (EBIT). Adjusted values are determined if necessary.

Available liquidity is also a key performance indicator. Closely monitored liquidity planning and management plays a central role in this.

(EUR thousand)	2023	2022
Sales	1,147	982
Total output	12,799	19,069
EBIT	-9,173	-7,615
EBIT (adjusted)*	-9,173	-7,330
Available liquidity	4,275	12,519

* 2022 reporting period: adjusted for costs of the secondary listing (EUR 285 thousand)

Sales

Pyrum Innovations AG expected sales from the operation of the plant to increase to between EUR 1.8 million and EUR 2.5 million in 2023. The forecast was reduced to between EUR 1.1 million and EUR 1.5 million in the fourth quarter of 2023. The sales actually realised amounted to EUR 1,147 thousand in the 2023 financial year.

Sales in the 2023 financial year fell considerably short of expectations, especially in terms of rCB production and sales, on account of the unsatisfactory throughput of the pelletising plant. Pyrum therefore looked at alternative applications and sales opportunities for the unpelletised material, sent samples to potential customers and worked with the manufacturer of the plant to come up with solutions to permanently increase throughput. This had not yet been realised by the end of the reporting period. The material produced meets the strict requirements of tyre manufacturers, can be sold at fair market prices (more than EUR 900 per tonne) and is supplied on an ongoing basis.

Total output

Total output, which includes the costs of materials and own work in connection with the construction of the new thermolysis plant, was forecast at between EUR 14 million and EUR 16 million for the financial year 2023. At EUR 12.8 million, it fell short of expectations owing to the problems in rCB production described above.

Liquidity

The signing of consulting agreements for the construction of customer plants and project start-ups was forecast for two to three projects in total. This goal was clearly achieved with agreements with the Greek and Czech partners, work on the new plant in Perl and preliminary work on further projects. In project business with customer plants, Pyrum focused more heavily on customers expected to have strong financing in 2023. This has already resulted in new consulting agreements that are recognised in advance payments received. The inflows from this are recognised as earnings when the respective approval documents are submitted, hence there was no effect on earnings in the reporting period.

The company still assumes that the caution of the cash-rich parties interested in the plant and of the banks regarding the more cash-strapped customers will be dispelled when the expansion facility in Dillingen/Saar is completed and begins production. It had also been planned to raise funding to implement the roll-out plan. The cooperation agreement concluded with BASF in November, which includes a credit facility of up to EUR 50 million, is expected to enable the start of all customer projects planned for 2024/2025 and for them to begin their approval processes. Additional funding of up to EUR 25 million is required for Pyrum's project in Perl by the middle of 2025. Management assumes that it will be possible to generate these funds in the 2024 financial year. A capital increase by Pyrum Innovations AG is no longer ruled out.

In view of the high level of investing activities and the planned expansion of the workforce, the EBIT was expected to be negative again in 2023. This amounted to EUR -9.2 million and therefore turned out worse than expected due to the low production turnover.



Non-financial targets and key performance indicators

This section discusses the non-financial targets and related activities. Definitive key performance indicators for these targets have not been yet established. Pyrum Innovations AG's current mission is shown on page 27

Employees

Our motivated and satisfied employees are the foundation of our economic success and our growth. We therefore encourage and challenge our employees and allow them to participate in our shared success. We provide contributions to occupational pensions, healthcare cards, bicycle leasing, a gym (since 2023) and a wide range of further education and training.

In the 2023 financial year, our managers attended a management seminar aimed at highlighting and consolidating their strengths and skills in their role.

The Company Mode platform was also integrated into the company. This gives employees the opportunity to anonymously express their wishes and criticism to the management in order to contribute to positive change in the interests of the company. On average, employees rated their mood as "satisfied".

We also see the health and safety of our employees as a valuable commodity. Reasonable investments - including in occupational health and safety - are therefore implemented promptly and straightforwardly. There were five minor reportable accidents over the 2023 financial year as a whole (e.g. cuts and bruises).

We also encourage team cohesion through a number of joint activities such as team-building measures, company runs, Christmas parties and other personal and professional activities.

Quality

The tyre is a critical safety component in a vehicle. As a supplier (rCB) to tyre manufacturers, Pyrum is aware of its responsibility to motorists. Pyrum's quality management system helps it to maintain its high standards and steadily improve its products. The company's technical departments are constantly working on optimising the thermolysis process.

Pyrum has also continued to expand its laboratory, which now has the necessary equipment to measure all relevant customer parameters.

Sustainable and corporate responsibility

A key pillar of the company's development, which is geared towards the long term, involves taking on our ecological and social responsibility. In 2023, Pyrum supported the selected social project "Deutscher Kinderschutzbund Ortsverband Saarbrücken e.V.". The organisation is committed to promoting the rights of children and young people and helps children and families create a safe environment and enjoy better living conditions.

Supplier selection and partnerships

Pyrum is a regional company that aims to maintain long partnerships with its customers and suppliers in the region. Most of the tyre suppliers are based in the Saarland or an area within a radius of 70 km. Where possible, Pyrum hires regional companies for services and trades work. The company harnesses the synergies of the industrial area to find flexible, quick solutions with local logistics and waste disposal providers and steel and machine manufacturers. Many regional firms also had a hand in expanding the plant in Dillingen (public utilities, architects, concrete construction, appraisers, steel construction, etc.). This ideal is also embedded in Pyrum's procurement criteria. Sustainability is particularly important here too.

Opportunities and risks of future development

OUTLOOK

Future economic conditions

In its current outlook from April 2024, the International Monetary Fund (IMF) is predicting growth at the previous year's level of 3.2%.¹⁸ Economic output is therefore anticipated to remain solid, but below the historical average (2000-2019) of 3.8%. This is due to high borrowing costs and the withdrawal of fiscal policy support, as well as an increasingly obvious geopolitical fragmentation. For 2024 as a whole, the IMF is forecasting a slight increase in GDP of 0.8% year-on-year in the euro area. The IMF is again forecasting a slight improvement in the German economy's economic output of 0.2%.

Outlook for oil/steel/rCB

According to Precedence Research, the market volume for thermolysis oil was around USD 340 million in 2023, corresponding to a market share of roughly 0.02% of the global crude oil market (with a market volume of about USD 1.4 trillion).¹⁹ The global thermolysis oil market is expected to grow to approximately USD 568 million by 2033, which would equate to an annual growth rate (CAGR) of 5.3%.

According to the World Steel Association, global demand for steel will increase by more than 2% to around 1.8 billion tonnes in 2024.²⁰ After reaching a low in October 2023 and rising since then, the price of steel should remain within the price range of between the highs and lows of the last 12 months (EUR 650 - 1,000 per tonne).²¹

There are still only a few publicly available outlooks for the future main product rCB. According to Business Wire, the rCB market is predicted to top USD 8.8 billion by 2028, up from USD 4.0 billion in 2021, and will probably grow at a compound annual growth rate (CAGR) of 11.7% until 2028.²² The price is expected to vary based on the quality. There may at first be price cuts compared to conventional virgin carbon black (vCB) produced from oil combustion. However, industry leaders believe that the sustainability and positive environmental footprint of rCB compared to vCB could lower the barrier to entry and potentially yield an additional sustainability premium. At a minimum, the company expects the price of rCB to come close to the price of virgin carbon black, which is traditionally produced from burning oil, and so prices well in excess of EUR 1,000 per tonne seem realistic for rCB.

¹⁸ IMF: World Economic Outlook Update April 2024

¹⁹ Precedence Research: Tire Pyrolysis Oil Market (April 2024)

²⁰ World Steel Association: Short Range Outlook April 2024

²¹ Jactio: Steel price development 2024, from 11 March 2024

²² Business Wire: Insights on the Recovered Carbon Black Global Market to 2028 from 10 January 2022

Outlook for Pyrum Innovations AG and the Group in 2024

Following the successful launch of TAD 2, the start-up of TAD 3 is planned for May 2024 so that all lines in Dillingen will be operating around the clock. TAD 3 should ideally be ramped up directly to a rated output of 75% to 80%. When both new lines are operated at the same time, output will be gradually increased to 100% and downtime for maintenance will be progressively reduced. At the same time, the attempt will be made to accelerate the construction of the second grinding and pelleting system and to shorten supply chains.

While Pyrum's sales will rise slightly in 2024 as a result of higher oil production and tyre intake, sales will not increase significantly until rCB can be delivered in far greater quantities than today.

rCB is already being produced in series on line 1, but larger quantities will not be possible until the second grinding and pelleting system has been built. All components of the second grinding and pelleting system have been ordered with the first ones to be delivered in May 2024. However, it will take until the end of 2024 for this new system to become operational. The "old" grinding and pelleting system was originally designed for an output of 650 kg rCB per hour, but is currently only achieving a maximum of 250 kg per hour in the right quality. Attempts will be made to further optimise the plant. Management assumes that it will be possible to improve output, but not to achieve the originally planned maximum output of 650 kg per hour. By contrast, the new grinding and pelleting system will produce around 1,350 kg of rCB per hour, five times more than the first system. The output values for the new grinding and pelleting system were checked repeatedly, tested and verified on industrial systems with our rCB and are guaranteed by the Group.

The company is constantly in close dialogue with Continental, the current main customer of the rCB, in order to obtain the customer's approval for delivery from the new plant as soon as the plant components have been completed.

For 2024, Pyrum Innovations AG, has plans for extensive investment in the new Pyrum GreenFactory II GmbH plant in the Saarland.

Pyrum has already ordered and made payments on the three new Pyrum reactors for Perl-Besch. The price conditions have been negotiated for the shredder and just a few small details still have to be worked out before the negotiations are concluded. The detailed planning is in full swing and the necessary structural calculations have been commissioned as well. Pyrum assumes that groundworks and foundation work can begin in summer 2024. According to current planning, the plant will commence operations in early 2026. Once completed and operating successfully, it will have a processing capacity of 20,000 tonnes of end-of-life tyres per year. Based on the current prices possible for oil and rCB, this translates into a future sales volume of EUR 12 million from the new plant.

The other projects in the pipeline are making progress as well. In addition to the expansion in Dillingen already referred to and the construction work in Perl-Besch, Pyrum currently has detailed plans for seven further plants. Planning is furthest along for the plants in Greece with Thermo Lysi SA, in Czechia with a Czech energy group and in Bremen with Remondis.

Forecasts of the business performance in 2024 are based on certain assumptions concerning the successful acquisition of financing, an easing of the situation in supply chains and prices for plant components and energy as well as the costs of steel construction stabilising at a high level. Further increases in the cost of materials, energy and financing in 2024 would have a negative impact on sales and earnings performance.

Pyrum Innovations AG expects an increase in consolidated sales and sales of the AG from the operation of the plant to between EUR 2.5 million and EUR 3.5 million in 2024 as well as sales from consulting

agreements with customers of around EUR 0.5 million. Overall, sales of between EUR 3.0 million and EUR 4.0 million are therefore expected.

With the expected successful conclusion of plant purchase agreements, the scheduled realisation of the construction of the new plant in Perl and the delivery of the new pelleting plant, the company expects total output for the AG and the Group to be in the range of EUR 25 million to EUR 30 million in the 2024 financial year.

The Group's earnings before interest and taxes are expected to be in the range of EUR -11.0 million to EUR -13.0 million in 2024 in view of the high level of investing activity and the planned further expansion of the workforce. The EBIT of Pyrum Innovations AG is expected to be in the range of EUR -10.0 million to EUR -12.0 million.

For the planned growth, further financing is essential to build additional plants and achieve the currently still negative cash flows. The core focus of the management is therefore currently directed at obtaining relevant financing commitments. Capital increases are also planned in the future in order to maintain a healthy balance sheet structure.

The company continues to pursue the goal of achieving the planned growth through a mix of organic growth based on its own plants and by participating in joint customer projects (SPVs).

New Projects

Sweden (“GreenTech Recycling Tires AB”)

At the end of February 2024, a consulting agreement was signed between GreenTech Recycling Tires AB and Pyrum Innovations AG to build a joint thermolysis plant in Sweden. It is intended that Pyrum will hold an interest of up to EUR 3 million in the SPV, provided that the financing from GreenTech is assured in full. The company is currently holding talks concerning this. Meanwhile, GreenTech Recycling Tires AB has already reserved a suitable plot of land in Billingsfors, Sweden, held talks with tire suppliers and begun putting together the documents necessary for approval.

The suitability assessment of the site in Sweden has already begun. The kick-off in Billingsfors, together with the customer and an engineering office based in Sweden, also took place as planned. The Swedish engineering office is currently examining the synergies that can be harnessed at the site in close cooperation with Pyrum. The two partners are aiming to build a facility with a recycling capacity of 20,000 tonnes of end-of-life tyres per year. It is due to start production in 2027.

RISK REPORT

General business risks

The economy in Germany and the euro area is important for Pyrum Innovations AG, but it and the global economy are subject to volatility that might have an adverse impact on the operating activities and results of operations of Pyrum Innovations AG. Pyrum Innovations AG is now about to start the roll-out phase and is reliant on functioning supply chains especially involving the components required for the plants that are planned for the future. The outbreak of the COVID pandemic in 2020 and the ongoing war in Ukraine posed major challenges for Pyrum Innovations AG, which were countered by expanding the supplier network and giving preference to integrating partners in the euro area in 2023 as well.

Political instability as a consequence of the ongoing war in Ukraine or any destabilisation of the financial system could seriously affect operating activities of Pyrum Innovations AG.

In the medium and long term, the speed of the roll-out of Pyrum's technology and thus the future business performance of Pyrum Innovations AG is dependent on whether it can successfully maintain and strengthen its technological leadership in the area of tyre thermolysis.

In order to ensure that it achieves its goals, Pyrum Innovations AG maintains very close and reliable contacts with its customers with regard to the end products, which are constantly being improved based on customer requirements, and with the customers in the area of plant construction. In the case of the end products, the aim is, as far as possible, not to become reliant on individual customers or, alternatively, to enter into long-term, binding supply contracts. There is a clear focus on mature CIP, innovation and cost management processes. Pyrum Innovations AG constantly monitors market trends as well as the business policy of other competitors that use thermolysis processes to recondition end-of-life tyres. According to management, however, these are not yet in continuous industrial operation. This results in the opportunity to play a dominant role in the medium term in the area of tyre thermolysis and other homogeneous waste flows.

With regard to the selection of the location of individual plants, Pyrum Innovations AG is dependent on political decisions, which are key for general approvals and the long-term assurance of 24/7 production, as well as potential awards of funds in connection with these investments.

Technology risks

When selecting suppliers, the company focuses on opportunities and consistently opts for the delivery of new technologies in the production process. This gives rise to the risk that delivered technologies do not possess the expected level of maturity, which can lead to delays until plants commence operations.

Legal, regulatory and political risks

The company's business activities are dependent on the prevailing legal conditions for recycling and waste processing. In particular, but not exclusively, these include the provisions of the German Federal Immission Control Act, the Saarland Soil Protection Act and the German Circular Economy and Waste Act. Future changes can influence market and competitive conditions.

The recycling market on which the company operates is also subject to recurrent economic and political changes. Stricter environmental regulations could result in increased expenses. Legal amendments and new standards in future could impede or delay the company's operations, increase the company's operating costs and reduce demand for its services and products.

The company is dependent on the reputation of renewable energy and the recycling market in general. Widely publicised failings of competitors, lawbreaking, bankruptcies or fraudulent undertakings can give the public the impression that the technology is inadequate or flawed, causes pollution, etc. In turn, this can damage the reputation of the market on which the company operates, damage the market reputation of the company, reduce its market share, and lead to a decline in the number of projects.

General operational risks

Pyrum Innovations AG is exposed to general operational risks. These also include risks associated with business expansions as well as risks from disruptions to industrial operations and other interruptions to business such as strikes or other industrial action or restrictions as a result of orders issued by national authorities. These could entail adverse repercussions for the earnings and the financial position of Pyrum Innovations AG.

Presentation of individual risks

The key risks from the management's perspective that could negatively affect Pyrum Innovations AG's net assets, financial position and results of operations are described below.

Financing risks

The realisation of the medium-term strategic plan requires the sale of customer plants (including SPVs) in addition to the construction and operation of the company's own plants. On the one hand, there is a risk at project level that the potential buyers of the plants will not be able to provide sufficient equity and will not be able to obtain financing for these plants due to the new technology and rising interest rates, and that planned projects will be postponed or not materialise. To take this risk into account, Pyrum supports customers in financing discussions with banks, authorities and potential other (project) investors.

There is also a risk for Pyrum Innovations AG itself that the company will only be able to generate financing under more difficult conditions.

As expected, Pyrum's financing requirements remain high during the roll-out phase, as the company is not yet generating any surpluses and will continue to invest in staff expansion and additional facilities for pursuing its growth path.

In order to cover its financing requirements, the Pyrum Group also needs to raise funds independently of projects. With the loan volume of € 50 million provided by BASF N.V., Pyrum has covered a significant part of its multi-year financing requirements; half of this volume is subject to the condition that Pyrum or the respective project partners succeed in raising additional funds in the same amount. Some of these funds must also be raised through new equity in order to ensure an acceptable capital structure.

The success of these measures depends on whether and to what extent and on what terms these funds can be raised. A lack of funds, delays or the availability of funds only on unfavourable terms could have a negative impact on the net assets, financial position and results of operations of Pyrum Innovations AG and severely restrict the pace of growth.

Based on ongoing discussions with financing partners, the company assumes that it will be able to raise the necessary funds in a timely manner and at market conditions.

Risks arising from financial commitments

Pyrum Innovations AG has entered into credit, lease and rental obligations and must meet repayment obligations from financing for land, buildings and plant components that may adversely impact the liquidity situation in future. These obligations have to be settled from the cash flow from operating activities. The commitments arising from rental and lease agreements for technical equipment and machinery, installations and vehicles are significant and represent high fixed costs. These costs cannot be adjusted in the event there is a sharp slowdown in sales and earnings. This could adversely affect Pyrum Innovations AG's net assets, financial position and results of operations.

General operating risks

The company's activities entail general operating risks that can lead, for example, to higher-than-expected costs during the construction phase, lower returns on sales and higher costs or lower returns than expected in connection with technical management. As the company's plants are new designs, there is an inherent risk that the plants require improvements or adjustments that could slow down or restrict their operation. Additional design considerations could also be necessary in order to guarantee safe and reliable operation. There is always the risk that unforeseen events or circumstances that are unknown to the company, its partners and counterparties occur in a way that jeopardises the essential conditions for development and production. Moreover, it cannot be ruled out that unforeseen technical difficulties arise at the recycling plants operated or sold by the company.

Such general operational risks could therefore considerably impair the future economic performance of the company and thus the company's net assets, financial position and results of operations. Pyrum has acquired experience over its four years of continuous operation and is now able to estimate and optimise cost development and the technical control parameters of the plants.

Dependence on country and industry-specific approvals and certificates

Pyrum Innovations AG's business success also depends, among other things, on obtaining the industry and country-specific approvals and certificates as well as complying with stipulated standards and technical directives that apply to the introduction of new products and technologies. Should Pyrum Innovations AG not be able to develop products and processes that meet these requirements or receive the approvals necessary in the relevant country, this might have an adverse impact on Pyrum Innovations AG and its operating activities. By qualifying as an automotive supplier, Pyrum has demonstrated that the company is capable of satisfying high standards.

Approval risks

The construction and operation of recycling plants requires various approvals (e.g. building permits, environmental regulations, etc.) depending on the locations in Germany and abroad. There is a risk that such permissions cannot be obtained or can be obtained only with unforeseen, adverse side conditions, were granted ineffectively, are successfully contested, or are subsequently withdrawn or limited for other reasons. When transferring approvals, there is a risk that authorities or other third parties do not approve these transfers and approvals/licences therefore are or become void. Approvals for the operation of a recycling plant often entail environmental requirements, non-compliance with which results in sanctions or withdrawal of the approval. A necessary transfer of a licence or permit can be ineffective despite approval from the authority responsible, or the approval can apply only to a part of the transferred licence or approval. The occurrence of one or more of these risks can have substantial negative effects on the company's net assets, financial position and results of operations. Pyrum therefore enters into dialogue with all stakeholders as soon as possible after a potential location has been identified, regardless of whether it is for a plant of the company's own or a potential plant for a customer.

Dependencies on raw material and energy prices

Pyrum Innovations AG's thermolysis process is energy self-sufficient. An increase in the prices for raw materials and energy can nevertheless lead to higher production costs, especially in the operation of the shredder and in grinding/pelletising and thus to decline in Pyrum Innovations AG's income. Pyrum Innovations AG endeavours to counteract these influences by adjusting the sales prices to changes in the prices for procuring materials and by agreeing indexation clauses tied to material and energy prices. If this is not possible in future as a result of a change in the competitive situation, this could negatively affect Pyrum Innovations AG's net assets, financial position and results of operations.

Foreign currency risks

Pyrum Innovations AG has so far generated sales exclusively in euros. Purchases of construction parts, components and raw materials are also made in foreign currency in exceptional cases. Individual suppliers connected with the listing in Oslo are invoiced in Norwegian kroner. The foreign currency risk, which may have an adverse impact on the net assets, financial position and results of operations of Pyrum Innovations AG, is therefore not significant.

With regard to the listing of the Pyrum Innovations AG shares, Euronext in Oslo (Norway) is the primary market, which means there is a considerable foreign currency risk between the Norwegian kroner and the euro concerning the valuation of the share.

Information technology risks

The Pyrum Innovations AG plant is managed using complex IT systems. 24/7 production relies on the permanent availability of the relevant systems and data. Serious disruptions such as system failures, outside attacks on the networks or the loss or manipulation of data can put production at risk and bring with them high down time and restart costs. This is why the company works constantly, also with the support of external specialists, to optimise the IT environment and IT security. The expenses and resources for the IT security management increased considerably once again in the period under review.

Staff recruitment and selection risks

Pyrum Innovations AG is particularly dependent on qualified personnel for realising further growth and for implementing the roll-out plan. If it is no longer possible in future to attract sufficient numbers of qualified personnel on salaries in line with the market and to retain them in the long term at Pyrum Innovations AG and its affiliated companies, this could result in a failure to achieve Pyrum Innovations AG's growth plans or to achieve them only later than planned.

A shortage of qualified personnel could become a critical factor restricting growth in future. Pyrum Innovations AG meets this challenge, which is also demographic, by considerably intensifying its activities in personnel marketing and in personnel development. Significant increases in personnel costs and wage and salary levels will also have an impact in this connection.

Warranty risks

The underlying assumptions and calculations for guarantees and assurances to buyers of a Pyrum thermolysis system might prove to be incorrect or plant components might contain defects and Pyrum Innovations AG will be exposed to warranty claims or claims for damages as a result in future. This could adversely affect Pyrum Innovations AG's net assets, financial position and results of operations.

Risks relating to receivables

Full or partial default on receivables from customers or other business partners or considerable delays in payment to a greater extent could result in liquidity constraints and consequently in a limitation of the operating activities of Pyrum Innovations AG or a significant impact on its net assets, financial position and results of operations. Pyrum Innovations AG counters these risks by agreeing liquidity-covering payment plans, asking for advance payments, using progress invoicing in the project business and asking customers to furnish guarantees.

Subsidy repayment risks

Pyrum Innovations AG has been and will be granted or promised state investment grants for individual development projects and business measures. The use of funds of this kind is generally assigned for a specific project and tied to appropriate requirements and conditions. Should Pyrum Innovations AG not be able to guarantee or furnish proof of this, this may result in the company having to pay back the relevant investment grants. Pyrum Innovations AG counters this risk by implementing professional project controlling.

Risks from insufficient insurance coverage

Despite having extensive insurance cover, Pyrum Innovations AG cannot guarantee that all damage that may possibly arise can be compensated in full. Should losses be incurred, especially in the area of product liability or as a result of disruptions to production, but also from other material damage, that are not covered or not sufficiently covered by the insurance, this could negatively affect Pyrum Innovations AG's net assets, financial position and results of operations.

Risks from general economic disruptions resulting from external influences (conflicts, pandemics)

The company does not manufacture the components for the construction of the plants itself. All components required for the construction of the recycling plants developed by the company are produced and assembled by third-party manufacturers.

The war in Ukraine is still having a serious impact on the entire global economy and supply chains. New, totally unforeseeable situations such as additional conflicts or a global viral pandemic represent a risk that will have a significant influence on all areas of Pyrum Innovations AG and against which there is no protection. In our globalised economy, it cannot be ruled out that Pyrum Innovations AG's business activities will be significantly impaired in the medium term as a result of the outbreak or escalation of political conflicts. The same applies to the outbreak of new pandemics.

Risks from breaches of environmental protection obligations

Pyrum Innovations AG might breach existing environmental legislation or unintentionally pollute the environment during its production processes. This could adversely influence the net assets, financial position and results of operations of Pyrum Innovations AG. These risks are prevented and the statutory regulations are fulfilled by implementing appropriate management systems. In addition, a variety of environmental audits were conducted and successfully passed – with the company scoring good marks – in the period under review.

Risks from breaches of intellectual property rights

Competitors and development partners might copy Pyrum Innovations AG's products and processes or unknowingly infringe patents belonging to Pyrum Innovations AG. Moreover, it cannot be ruled out that Pyrum Innovations AG will unknowingly infringe patents of its competitors or development partners, something that can also result in particular from a different understanding of the contents of the intellectual property protected by the patent. Both of these factors could negatively affect Pyrum Innovations AG's net assets, financial position and results of operations.

REPORT ON OPPORTUNITIES

Looking back at the 2023 financial year as well, Pyrum Innovations AG faced a variety of challenges.

In parallel with Pyrum's next plant of its own in Perl/Besch, the pipeline of partner plants has massively grown and huge progress made with existing projects. In addition to the applications for approval already filed in Greece and Czechia, working with Remondis in Bremen, Unitank in Emleben and SUEZ in the UK, we have taken huge strides in the planning of the plants. Suitable sites for further plants has been identified, preliminary talks have been held with the authorities and the financial planning has been largely completed. Pyrum expects the project to officially start with Remondis in Bremen and Unitank in Emleben in 2024. These were defined when the consulting agreements for the approval processes were signed. Pyrum now has eight projects at various stages of development that will be carried over the finish line in the next three years to achieve the full capacity utilisation planned. The total construction volume is well in excess of EUR 300 million.

The demand for Pyrum's consistently reproducible and high-quality products is still significantly higher than the company can serve in the next few years with the construction of plants.

The material opportunities for Pyrum's positive business and economic performance are outlined below. The list is not exhaustive and the opportunities outlined are not necessarily the only ones available to Pyrum. Conversely, it is also possible that identified opportunities will not materialise.

Raw material prices and security of supply

What constitutes a risk for purchasing, is a major opportunity for Pyrum on the product side, as higher construction costs ought to be more than compensated for by higher selling prices. Scarcity encourages creativity. A shortage of carbon black is already resulting in enquiries from industries that Pyrum had not yet identified as markets for its products. The pigment industry, ink manufacturers, cast iron makers, manufacturers of rubber products, seal manufacturers and packaging manufacturers are all seeking new solutions, as the traditional channels and supply chains have been lastingly disrupted by the ongoing war in Ukraine. Therefore, the biggest challenge for Pyrum is now to grow sufficiently to meet the demand and occupy new niches. Thanks to the company's own laboratory, new customer requirements and enquiries can usually be answered without recourse to external experts.

Political environment

In recent years, government regulation has been working towards inducing the necessary ecological realignment and prohibiting the export of waste to distant countries, as this is not a sustainable solution for our waste disposal problems. The unchecked consumption of raw materials without recycling is jeopardising our supply of raw materials in the medium term. Companies have set themselves ambitious climate targets and are now seeking solutions for implementing them in order to survive on the market in the long term. Pyrum sees itself as a solution provider. At present, this is focused on tyres but in future it will extend this to other waste on the basis of its research and development activities.

Competition and current state of the art

With the large-scale industrial deployment of its own technology in 24/7 operation since May 2020, Pyrum has proved that its technology is ready for the market. So far, it seems to be the only provider on the market that can both reliably deliver high-quality thermolysis oil and rCB in consistent quality every day and convert the thermolysis gas into electricity in such a reliable and efficient manner that the thermolysis process, seen over the entire year, can be energy self-sufficient. Pyrum believes that, technologically, it is 4-5 years ahead of the competition. The end-of-life tyres disposed of with Pyrum can already be reused in new products in an almost entirely circular manner without thermal recycling of the oil.

A very positive view is taken of technological competition, as it raises public awareness, and the market for end-of-life tyres contains enough potential for multiple providers to find a sustainable solution to the end-of-life tyre disposal problem in the long term.

Technological opportunities

Pyrum sees itself as a technological market leader and, together with strong partners, is already researching additional applications of the thermolysis process, with the aim of adapting it to other waste flows for which there are still no answers (such as the recycling of wind turbines). At the same time, Pyrum is meeting the social and political pressure on manufacturers to provide recycling opportunities along with the production of products.

Bans on the use of tyre rubber

The tyre market holds major opportunities for Pyrum Innovations AG. Worldwide, around 30.9 million tonnes of end-of-life tyres are produced every year; in Europe alone, 3.4 million tonnes have to be disposed of annually. The best-known disposal methods include the incineration of end-of-life tyres or their processing into rubber granulate, which is then used as infill material for artificial turf and playgrounds. The methods are subject to constantly tightening regulatory requirements, meaning that disposal options are gradually disappearing.

- **Landfill ban**

The EU has been cracking down on the dumping of end-of-life tyres for years. This means that it is forbidden to illegally dispose of end-of-life tyres in the environment.

- **Ban of incineration**

Around 50% of the tyres produced each year are incinerated. The resulting emissions are not only harmful to the environment, but are also becoming increasingly expensive. In the long term, this will lead to an unattractive solution for the disposal of end-of-life tyres. Belgium, Norway, Sweden and Finland have already taken the first step. In these countries, the incineration of end-of-life tyres has been completely banned, meaning that new ways of disposing of them will inevitably have to be found.

- **Ban on rubber granulate as filling material**

The European Parliament has also taken initial measures based on the EU Commission's strategy, which aims to reduce the amount of microplastics released into the environment by 30% until 2030. The amendment to the REACH Regulation of 26 April 2023 will ban the trade of bulk polymers with an average diameter < 5mm by 2031 at the latest. These materials include polymers and rubber granulate obtained from end-of-life tyres. To put this into context: In the EU, around 1.2 million tonnes of end-of-life tyres are processed into shredded material every year. 42% of the rubber granulate obtained from this is used as infill material for artificial turf pitches, making this the most widespread recycling application for end-of-life tyres for decades. The ban on bulk polymers resulting from the amendment will inevitably have a major impact on the market.

- **OEM audits**

In addition, there are the OEM audits, which require degrees of circularity and push the market towards new raw materials. The aim is to return products to the manufacture of new products as recycled raw materials at the end of their service life, thereby avoiding the use of raw materials.

In summary, it can be said that the tyre market is in a state of upheaval with regard to the disposal of end-of-life tyres. In terms of both the size of the tyre market and the shrinking disposal options, there is great potential for Pyrum's thermolysis technology. The demand for new disposal options will continue to grow in the coming years. As the consultations on this issue have already been in progress for more than 10 years and the proposed ban aimed at minimising the amount of microplastics in the environment will now be submitted to the EU Commission for a decision, the management of Pyrum Innovations AG assumes that this trend is irreversible and will thus have a positive impact on the future market prospects of Pyrum Innovations AG.

Overall assessment of the future development of Pyrum Innovations AG

Pyrum Innovations AG has proved in continuous operations since May 2020 that the technology in use can set new benchmarks in the recycling of tyres. During the ongoing commissioning of the plant expansion in Dillingen, 80% of the nominal output has already been achieved and end products that meet the quality standards of the market have been produced. The series production status of the future industrial plants has thus been achieved. The interest of the customers in the products, whether directly as in the case of rCB or indirectly in terms of the products manufactured by BASF from our oil, is several times higher than the volumes it has previously been able to satisfy with one plant. The (minimum) target volumes for the purchase of thermolysis oil of 300,000 tonnes of oil per year agreed with BASF in the new 2023 cooperation agreement alone, as well as the targets already published by the tyre industry regarding its separate objectives for a circular economy, show that demand is already sufficiently high today and that the future prospects of Pyrum Innovations AG are very good given the successful implementation of the rollout.

There are currently no risks that pose a threat to the company as a going concern. The business opportunities outweigh the potential risks.

Supplementary report

In January 2024, a new subsidiary – Pyrum Green Factory II GmbH – was founded, which will operate the second Pyrum-owned plant in Perl-Besch (Saarland).

At the start of February, the municipal council of Perl-Besch approved the development plan for the site of Pyrum's new plant with a large majority. Around three weeks later, on 26 February, permission was granted for the clear-cutting, which was carried out on the same day, paving the way for the planned construction works this year. Pyrum will reforest the entire construction site with higher quality woodland elsewhere.

The new Reactor 2 in Dillingen was gradually ramped up to 75% of its rated output within a week at the start of February 2024. Already by the second test run, the new plant produced 30,000 litres of oil, which was then successfully sampled. The oil therefore meets all required specifications, with the result that more than 100,000 litres had already been delivered to BASF in this new plant facility at the time of this report.

A consulting agreement was signed with GreenTech Recycling Tires AB at the end of February 2024. This provides for the construction of a joint recycling plant with a recycling capacity of 20,000 tonnes of end-of-life tyres per year in Sweden.

In March 2024, Pyrum received the Recycled Claim Standard (RCS) certification for its thermolysis oil, making it one of the first companies to have its oil certified to this standard. The certified thermolysis oil can now be used as a recycled raw material in the production of new textiles. This means that the oil now also has all the sustainability qualities required by Pyrum's customer BASF in order to manufacture its product "Ultramid® Cycled®", a polyamide for textile applications. The certificate also guarantees complete traceability of the oil in the supply chain. The certificate is valid for one year.

Pyrum Innovations AG

Dillingen/Saar, 15 May 2024



Pascal Klein
CEO



Michael Kapf
Member of the Executive Board



Kai Winkelmann
Member of the Executive Board

Content

Annual and consolidated financial statements for 2023

Consolidated balance sheet.....	74
Consolidated income statement.....	76
Consolidated cash flow statement.....	77
Consolidated statement of changes in equity	79
Balance sheet of Pyrum Innovations AG	80
Income statement of Pyrum Innovations AG	82

Consolidated balance sheet as at 31 December 2023

ASSETS (In EUR)

	31 December 2023	31 December 2022
A. Non-current assets		
I. Non-current intangible assets		
1. Self-created rights and licences in such rights	58,261.00	78,236.00
2. Acquired rights and licences in such rights	5,518,847.79	6,394,276.79
3. Intangible assets under development	60,535.33	19,734.13
	5,637,644.12	6,492,246.92
II. Property, plant, and equipment		
1. Land and buildings	3,956,416.84	4,009,216.84
2. Technical equipment and machinery	4,042,909.32	3,449,205.32
3. Other equipment, operating and office equipment	1,076,448.00	1,272,559.00
4. Advances paid and assets under construction	30,382,206.43	20,027,994.92
	39,457,980.59	28,758,976.08
III. Non-current financial assets		
Shares in associates	29,921.62	36,921.62
Total non-current assets	45,125,546.33	35,288,144.62
B. Current assets		
I. Inventories		
1. Raw materials and supplies	194,900.00	23,000.00
2. Work in progress	164,692.43	69,700.00
3. Finished and unfinished goods	86,601.81	241,640.38
4. Advance payments made	0.00	54,270.00
	446,194.24	388,610.38
II. Receivables and other current assets		
1. Trade receivables	101,067.04	146,728.46
2. Other current assets	702,080.57	1,258,986.39
	803,147.61	1,405,714.85
III. Cash at hand and in bank	4,482,957.30	12,725,508.05
Total current assets	5,732,299.15	14,519,833.28
C. Deferred expenses	68,295.57	49,389.85
Total assets	50,926,141.05	49,857,367.75

Consolidated balance sheet as at 31 December 2023

EQUITY AND LIABILITIES (In EUR)

	31 December 2023	31 December 2022
A. Equity		
I. Subscribed Capital	3,253,735.00	3,253,735.00
II. Capital Reserves	52,058,141.06	52,058,141.06
III. Accumulated Losses	-32,932,016.31	-23,420,539.29
Total Equity	22,379,859.75	31,891,336.77
B. Provisions and Accrued Liabilities		
Other provisions and accrued liabilities	3,188,022.43	3,113,897.55
C. Liabilities		
1. Liabilities to banks	3,599,173.73	4,060,778.08
2. Advance payments received	651,115.00	100,000.00
3. Trade payables	2,212,942.15	2,681,088.24
4. Other liabilities	18,895,027.99	8,010,267.11
Total liabilities	25,358,258.87	14,852,133.43
Total equity and liabilities	50,926,141.05	49,857,367.75

Consolidated income statement for the 2023 financial year

(In EUR)	2023	2022
1. Revenues	1,146,664.13	981,952.80
2. Increase/decrease of finished and unfinished goods	-60,046.14	276,897.53
3. Other own work capitalised	11,712,123.66	17,810,233.72
4. Total output	12,798,741.65	19,069,084.05
5. Other operating income	714,704.88	1,318,003.19
6. Expenses for materials		
a) Expenses for raw materials and supplies	9,664,385.91	16,218,052.50
b) Expenses for purchased services	1,755,226.65	1,434,516.34
	11,419,612.56	17,652,568.84
7. Personnel expenses		
a) Wages and salaries	4,606,438.99	3,537,503.01
b) Social security contributions and expenses for pension provision	798,980.17	646,315.48
	5,405,419.16	4,183,818.49
8. Depreciation, amortisation and write-downs of intangible non-current assets and property, plant, and equipment	2,085,573.86	2,554,345.91
9. Other operating expenses	3,733,476.61	3,581,309.30
10. Other interest and similar income	92,265.78	32,389.06
11. Interest and similar expenses	423,080.60	211,550.72
12. Cost of equity valuation of associates	7,000.00	13,078.38
13. Result after taxes	-9,468,450.48	-7,777,195.34
14. Other taxes	43,026.54	30,915.33
15. Net loss for the year	-9,511,477.02	-7,808,110.67
16. Loss carried forward from the previous year	-23,420,539.29	-15,612,428.62
17. Balance sheet loss	-32,932,016.31	-23,420,539.29

Consolidated cash flow statement for the 2023 financial year

(In EUR)	2023	2022
Net income/loss for the period	-9,511,477	-7,808,111
Depreciation, amortisation of non-current assets / reversals of write-downs of non-current assets	2,085,574	2,554,345
Increase/decrease in provisions	161,236	-200,137
Other non-cash expenses/income	7,000	13,078
Increase/decrease in inventories, trade receivables and other assets not related to investing or financing activities	525,427	-1,411,070
Increase/decrease in trade payables and other liabilities not attributable to investing or financing activities	333,661	203,993
Profit/loss from the disposal of non-current assets	15,100	-9,999
Interest expenses/income	330,815	179,162
Miscellaneous other income not attributable to cash flow from operating activities	-164,184	275,330
Cash flow from operating activities	-6,216,848	-6,203,409
Payments for investments in non-current assets	-50,823	-19,734
Proceeds from disposals of property, plant and equipment	5,000	10,000
Payments for investments in property, plant and equipment	-11,639,768	-20,763,358
Payments for investments in financial assets	0	-50,000
Interests received	5,155	230
Cash flow from investing activities	-11,680,436	-20,822,862
Proceeds from short- or long-term (financial) loans	9,000,000	5,800,000
Payments from the redemption of (financial) loans	-1,336,336	-872,153
Proceeds from grants/subsidies received	2,413,500	1,010,000
Payments in connection with expenses for the private placement and the capital increase, as for the second listing	0	-420,530
Interests paid	-423,081	-211,551
Cash flow from financing activities	9,654,083	5,305,766
Net change in cash funds	-8,243,201	-21,720,505
Cash funds at beginning of period	12,518,505	34,239,010
Cash funds at end of period	4,275,304	12,518,505

Consolidated statement of changes in equity for the 2023 financial year

	Subscribed capital	Capital reserve			Total reserves	Consolidated loss carried forward	Consolidated net loss	Consolidated balance sheet loss	Total group equity
		according to §272 Para. 2 No. 1 - 3 HGB	according to § 272 Para. 2 No. 4 HGB	Total					
(In EUR)									
As of 1 January 2022	3,253,735.00	43,815,165.06	8,242,976.00	52,058,141.06	52,058,141.06	-7,261,100.97	-8,351,327.65	-15,612,428.62	39,699,447.44
Allocation to/withdrawal from reserves						-8,351,327.65	8,351,327.65		0.00
Net loss for the year							-7,808,110.67	-7,808,110.67	-7,808,110.67
As of 1 December 2022	3,253,735.00	43,815,165.06	8,242,976.00	52,058,141.06	52,058,141.06	-15,612,428.62	-7,808,110.67	-23,420,539.29	31,891,336.77
As of 1 January 2023	3,253,735.00	43,815,165.06	8,242,976.00	52,058,141.06	52,058,141.06	-15,612,428.62	-7,808,110.67	-23,420,539.29	31,891,336.77
Acquisition of own shares	-1,500.00		-69,000.00	-69,000.00	-69,000.00				-70,500.00
Disposal of own shares	1,500.00		69,000.00	69,000.00	69,000.00				70,500.00
Allocation to/withdrawal from reserves						-7,808,110.67	7,808,110.67		0.00
Net loss for the year							-9,511,477.02	-9,511,477.02	-9,511,477.02
As of 31 December 2023	3,253,735.00	43,815,165.06	8,242,976.00	52,058,141.06	52,058,141.06	-23,420,539.29	-9,511,477.02	-32,932,016.31	22,379,859.75

Balance sheet of Pyrum Innovations AG as at 31 December 2023

ASSETS (In EUR)

	31 December 2023	31 December 2022
A. Non-current assets		
I. Non-current intangible assets		
1. Self-created rights and licences in such rights	58,261.00	78,236.00
2. Acquired rights and licences in such rights	16,780.00	23,465.00
3. Intangible assets under development	60,535.33	19,734.13
	135,576.33	121,435.13
II. Property, plant, and equipment		
1. Land and buildings	3,956,416.84	4,009,216.84
2. Technical equipment and machinery	4,017,566.00	3,400,538.00
3. Other equipment, operating and office equipment	1,076,448.00	1,272,559.00
4. Advances paid and assets under construction	30,382,206.43	20,027,994.92
	39,432,637.27	28,710,308.76
III. Non-current financial assets		
1. Shares in affiliated companies	6,544,700.00	6,544,700.00
2. Loans to affiliated companies	323,775.76	314,345.40
3. Shares in associates	50,000.00	50,000.00
	6,918,475.76	6,909,045.40
Total non-current assets	46,486,689.36	35,740,789.29
B. Current assets		
I. Inventories		
1. Raw materials, and supplies	194,900.00	23,000.00
2. Work in progress	164,692.43	69,700.00
3. Finished and unfinished goods	86,601.81	241,640.38
4. Advance payments made	0.00	54,270.00
	446,194.24	388,610.38
II. Receivables and other current assets		
1. Trade receivables	101,067.04	146,728.46
2. Other current assets	690,168.57	1,261,819.21
	791,235.61	1,408,547.67
III. Cash at hand and in bank	3,981,530.42	12,220,032.78
Total current assets	5,218,960.27	14,017,190.83
C. Deferred expenses	68,295.57	49,389.85
Total assets	51,773,945.20	49,807,369.97

Balance sheet of Pyrum Innovations AG as at 31 December 2023

EQUITY AND LIABILITIES (In EUR)

	31 December 2023	31 December 2022
A. Equity		
I. Subscribed Capital	3,253,735.00	3,253,735.00
II. Capital Reserves	52,058,141.06	52,058,141.06
III. Accumulated Losses	-30,750,874.09	-22,156,675.63
Total Equity	24,561,001.97	33,155,200.43
B. Provisions and Accrued Liabilities		
Other provisions and accrued liabilities	2,269,683.49	2,117,235.08
C. Liabilities		
1. Liabilities to banks	3,599,173.73	4,060,778.08
2. Advance payments received	651,115.00	100,000.00
3. Trade payables	2,208,752.94	2,672,085.90
4. Other liabilities	18,484,218.07	7,702,070.48
Total liabilities	24,943,259.74	14,534,934.46
Total equity and liabilities	51,773,945.20	49,807,369.97

Income statement of Pyrum Innovations AG for the 2023 financial year

(In EUR)	2023	2022
1. Revenues	1,146,664.13	981,802.80
2. Increase/decrease of finished and unfinished goods	-60,046.14	276,897.53
3. Other own work capitalised	11,712,123.66	17,810,233.72
4. Total output	12,798,741.65	19,068,934.05
5. Other operating income	714,704.88	1,318,003.19
6. Expenses for materials		
a) Expenses for raw materials and supplies	9,664,385.91	16,218,052.50
b) Expenses for purchased services	1,755,226.65	1,434,516.34
	11,419,612.56	17,652,568.84
7. Personnel expenses		
a) Wages and salaries	4,606,438.99	3,537,503.01
b) Social security contributions and expenses for pension provision	798,980.17	646,315.48
	5,405,419.16	4,183,818.49
8. Depreciation, amortisation and write-downs of intangible non-current assets and property, plant, and equipment	1,193,505.86	1,660,909.43
9. Other operating expenses	3,678,910.49	3,521,755.01
10. Income from non-current loans	9,430.36	9,155.68
11. Other interest and similar income	13,514.91	32,389.06
12. Interest and similar expenses	410,505.65	204,260.19
13. Result after taxes	-8,571,561.92	-6,794,829.98
14. Other taxes	22,636.54	7,095.33
15. Net loss for the year	-8,594,198.46	-6,801,925.31
16. Loss carried forward from the previous year	-22,156,675.63	-15,354,750.32
17. Balance sheet loss	-30,750,874.09	-22,156,675.63

Content

Combined notes to the financial statements

I. General disclosures on Pyrum Innovations AG and the Group	85
II. Consolidated Group	86
III. Principles of consolidation	86
IV. Accounting policies	87
V. Balance sheet disclosures	90
Consolidated gross statement of changes in non-current assets ..	92
Gross statement of changes in non-current assets	93
VI. Income statement disclosures	100
VII. Related parties	103
VIII. Cash flow statement disclosures	104
IX. Significant events after the reporting date	104
X. Other disclosures	105

I. General disclosures on Pyrum Innovations AG and the Group

The parent company, Pyrum Innovations AG, Dillingen/Saar, was founded as a limited liability company under German law (*Gesellschaft mit beschränkter Haftung*) on 10 September 2008. It was transformed into a stock corporation (*Aktiengesellschaft*) by way of resolution of 18 August 2017.

It is entered in the commercial register of the Saarbrücken Local Court under HR B 104458.

Since 30 September 2021, Pyrum Innovations AG has been listed in the Euronext Growth market segment of the Oslo stock exchange in Norway. Since 30 March 2022, it has had a secondary listing in the Scale market segment of Deutsche Börse AG at the Frankfurt stock exchange. Neither segment is an organised market as referred to by section 11(2) of the *Wertpapierhandelsgesetz* (WpHG – German Securities Trading Act). Pyrum Innovations AG is therefore not a listed company as referred to by section 264d of the *Handelsgesetzbuch* (HGB – German Commercial Code).

The **annual financial statements** were prepared in accordance with the accounting regulations of section 242 et seq. HGB for corporations in compliance with the special regulations for stock corporations. The balance sheet and the income statement were prepared in accordance with the regulations for large corporations. The income statement was prepared in line with the total cost (nature of expense) method. Some practical expedients for mid-sized corporations were used in preparing the combined notes to the financial statements.

The **consolidated financial statements** of Pyrum Innovations AG and its subsidiary were prepared in accordance with the regulations of sections 290 et seq. HGB in compliance with the standards of the German Accounting Standards Committee.

The consolidated balance sheet and the consolidated income statement were prepared in accordance with the regulations for large corporations. The consolidated income statement was prepared in line with the total cost (nature of expense) method. The consolidated statement of cash flows has been prepared in accordance with German Accounting Standard GAS 21 as amended by Amendment Standard No. 13 dated 16 June 2023. The consolidated statement of changes in equity has been prepared in accordance with German Accounting Standard DRS 22. German Accounting Standard 18 on deferred taxes was applied including Amending German Accounting Standard 11.

The annual financial statements and the consolidated financial statements have been presented in euro. The financial year of Pyrum Innovations AG and of the Group is the calendar year. The reporting date of the consolidated financial statements is 31 December 2023, which is also the reporting date of all companies included in the consolidated financial statements.

The disclosures in these notes relate to the consolidated financial statements. It is indicated separately if these disclosures are not the same for the annual financial statements of the parent company.

II. Consolidated Group

As the parent company, Pyrum Innovations AG prepares the consolidated financial statements for the largest and, at the same time, the smallest group of entities included in the statements.

Fully consolidated companies

The subsidiary Pyrum Innovations International S.A., Schengen, Luxembourg, is included in the consolidated financial statements.

Associates

REVALIT GmbH, in which Pyrum Innovations AG holds a share of 25% of the capital and voting rights, was founded on 10 June 2022. The company's purpose is to build and operate a thermolysis plant.

III. Principles of consolidation

The assets, liabilities, prepaid expenses, deferred income, income and expenses of the individual companies included in the consolidated financial statements are combined in the consolidated financial statements.

First-time consolidation is performed in accordance with the purchase method. The assets and liabilities are recognised at fair value as at the date when the company became a subsidiary; however, provisions and deferred taxes are measured in accordance with the applicable German accounting policies. Any excess of assets from first-time consolidation is recognised as goodwill, while a negative difference is reported as a difference from capital consolidation after equity. This procedure also applies to asset deals and contributions.

Intercompany balances are consolidated by the elimination of receivables against the corresponding liabilities between the companies included in the consolidated financial statements.

The consolidation of income and expenses is achieved by offsetting intragroup income against the corresponding expenses. Intercompany profits and losses from transactions between consolidated companies are eliminated.

In line with section 306 HGB, deferred taxes from differences between the carrying amounts of assets and liabilities in the consolidated balance sheet and their tax carrying amounts that are expected to reverse in future are recognised accordingly as deferred tax assets and liabilities in the consolidated balance sheet.

Equity investments not controlled but significantly influenced by Pyrum Innovations AG or another Group company are included in the consolidated financial statements as shares in associates accounted for using the equity method in accordance with sections 311 et seq. HGB. The equity investment is initially carried at acquisition cost under financial assets. Any difference between the acquisition cost and Pyrum Innovations AG's share in the balance sheet equity of the associate is allocated to hidden reserves and liabilities and carried forward; any remaining difference is carried forward according to the principles of goodwill. Pyrum Innovations AG's share in the profit or loss of the associate is recognised in the consolidated income statement together with the expenses and income from the subsequent measurement of the difference.

IV. Accounting policies

The accounting policies are applied uniformly and consistently in the annual and consolidated financial statements.

Purchased intangible assets are carried at acquisition cost less amortisation if applicable.

Internally generated intangible assets are recognised using the option provided in section 248(2) HGB and measured at production cost. They are amortised over their useful life from the time of their completion. The capitalisation phase commences as soon as the development phase for an asset that will be individually usable after completion has begun, there is a high probability of completion and the development costs can be reliably allocated.

Goodwill from the acquisition of companies and first-time consolidation is capitalised and depreciated over the expected useful life.

Tangible fixed assets are reported at acquisition or production cost less depreciation if applicable.

Subsequent acquisition or production costs are capitalised if the scope, function or performance of technical equipment in operation is significantly expanded. Depreciation and amortisation are recognised on a straight-line basis over the remaining useful life.

The production cost of tangible and intangible assets includes direct costs of materials, direct labour costs and overheads, depreciation/amortisation of the fixed assets used and appropriate amounts of administrative overheads. Interest on borrowings is not capitalised.

Depreciation and amortisation are recognised on a straight-line basis over the expected useful lives of the assets. The following useful lives are assumed:

	Years
Buildings and other structures	14 to 35
Patents, licences, expertise	10.6
Technical equipment and machinery	5 to 10
Equipment and facilities	4 to 11
Internally generated intangible assets	5
Computer software	5
Computer hardware	3 to 5

Low-value assets of up to EUR 800.00 are written down in full in the year of their acquisition.

Financial assets are capitalised at acquisition cost including incidental purchase costs. They are written down to the lower fair value in the event of permanent impairment. Associates are accounted for at equity in the consolidated financial statements in deviation from this.

Raw materials, consumables and supplies are carried at acquisition cost. Work in progress and finished goods are recognised at their production cost in accordance with the upper limit value under commercial law. Inventories are written down to their fair value at the balance sheet date.

Receivables and other assets are recognised at their nominal value and measured taking all

discernible risks into account.

Other provisions are recognised for all uncertain liabilities and, if necessary, expected losses from onerous contracts. All discernible risks are taken into account. Provisions are measured at the amount required to settle the underlying obligation in line with prudent business judgement. The costs at the expected settlement date of the obligation are taken into account.

Provisions expected to be settled more than one year after the balance sheet date are discounted. The remaining terms estimated for this are based on management forecasts of expected future utilisation, including in particular the medium-term budget planning for plant engineering. The maturity-based average market rates of the past seven years calculated by the Deutsche Bundesbank in accordance with the *Rückstellungsabzinsungsverordnung* (German Regulation on the Discounting of Provisions) are used for discounting. The income from discounting and interest effects from changes in interest rate and amended estimates or terms are recognised net as interest income or interest expenses.

Deferred taxes are recognised and measured in accordance with section 274 HGB. Deferred tax assets and liabilities relating to the same tax jurisdiction are offset – including deferred taxes from consolidation adjustments within the Group; exercising the option provided by section 274(1) sentence 2 HGB, any excess assets from first-time consolidation are not recognised. Deferred tax assets and liabilities are reported net. Deferred tax assets from tax loss carryforwards are recognised if they are expected to be utilised. Future taxable income expected to arise in the same tax jurisdiction is included in measurement if it is expected that there will be loss carryforwards against which they can be utilised in the next five years. They are recognised at least in the amount of any net deferred tax liabilities relating to the same tax jurisdiction.

Liabilities are carried at their settlement amount.

Transactions in foreign currency are translated into euro using the exchange rate on the day of the transaction. In the balance sheet, foreign currency receivables and liabilities with a remaining term of up to one year are translated into euro at the average spot exchange rate on the reporting date. Foreign currency receivables and liabilities with a remaining term of more than one year are translated using the closing rate or the lower/higher rate on the transaction date.

The functional currency of both Group companies is the euro; the currency translation of the single-entity financial statements of the Group companies is not necessary.

Sales are recognised on delivery or completion of the service.

Income from government grants is recognised when commitments are made or grant agreements signed and to the extent that the activities funded are performed. Income from grants for assets for which capitalisation is required is recognised in full as income as at the date that the asset is completed or commences operations; it is not recognised pro rata temporis in line with the useful life of the asset.

The income is reported as other operating income; claims to realised subsidies are reported as other assets; funds already received but not yet realised are recognised as other liabilities.

Accounting and classification policies that deviate from the previous year

The application of DRS 21 in the version dated 16 June 2023 leads to a different allocation of research and development grants; these are now allocated to cash flow from operating activities and no longer to cash flow from financing activities. The previous year's figures in the consolidated cash flow statement have been adjusted to improve comparability. In all other respects, the accounting and classification policies have not changed and are applied in the same way as in the previous year.

V. Balance sheet disclosures

1. Fixed assets

The development of the individual items of fixed assets is shown in the statement of changes in fixed assets in the consolidated and annual financial statements with disclosures on depreciation and amortisation for the financial year.

The purchased industrial and similar rights and assets capitalised in conjunction with first-time consolidation in the 2021 consolidated financial statements comprise the two patents owned by Pyrum Innovations International S.A. for the recycling of end-of-life tyres and the expertise acquired in applying this process by the end of 2017 under a research services agreement between Pyrum Innovations International S.A. and Pyrum Innovations AG. These are written down on a straight-line basis over the remaining period of patent protection for the two patents.

The internally generated intangible assets capitalised during the financial year under intangible assets under development relate to the development of a “digital twin”. This is a virtual environment for the thermolysis plant that has been developed using simulation software. This will allow employees to be trained, unexpected incidents to be simulated and the plant to be tested as the thermolysis technology continues to be developed without having physically to conduct changes beforehand.

Payments on account and assets under construction of EUR 30,382 thousand (previous year: EUR 20,028 thousand) essentially break down as follows:

(EUR thousand)		Financial year	Previous year
Thermolysis line 2 and 3	Start of project 2020	29,074	18,688
Pelletiser	Start of project 2020	0	1,289

The start-up of the pelletising plant took considerably more time than expected when it was delivered by the manufacturer in February 2022. Series production was commenced at the end of the first quarter of 2023. Series supply for the automotive industry began in May 2023. The plant will continue to be optimised with the primary goal of further increasing the material throughput.

The project to extend the plant at the company’s headquarters in Dillingen with the construction of thermolysis lines 2 and 3 was launched in 2020 after continuous operation of the first industrial thermolysis tower was commenced. Construction on the plant began in September 2021. As per 31 December 2023 the balance also includes the costs already incurred for the second shredder plant and for other peripheral facilities.

The 100% interest in Pyrum Innovations International S.A. is capitalised in the annual financial statements of Pyrum Innovations AG. Equity amounts to EUR 3,387 thousand as at 31 December 2023. The net loss of the subsidiary for 2023 amounts to EUR 688 thousand. This essentially resulted from amortisation on patents and expertise (EUR 568 thousand).

Pyrum Innovations International S.A. holds an interest of 10% in Pyrum Innovations SAS, Flévy, France. The company has neither assets nor business activities. The interest is not shown in the consolidated balance sheet.

Consolidated gross statement of changes in non-current assets

(In EUR)	Acquisition and production costs					Cumulative depreciation and amortisation				Book value	
	1 January 2023	Additions	Disposals	Reclassifications	31 December 2023	1 January	Additions	Disposals	31 December 2023	31 December 2023	31 December 2022
I. Non-current intangible assets											
1. Self-created rights and licences in such rights	99,875.19	0.00	0.00	0.00	99,875.19	21,639.19	19,975.00	0.00	41,614.19	58,261.00	78,236.00
2. Acquired rights and licences in such rights	7,522,152.76	10,022.00	0.00	0.00	7,532,174.76	1,127,875.97	885,451.00	0.00	2,013,326.97	5,518,847.79	6,394,276.79
3. Intangible assets under development	19,734.13	40,801.20	0.00	0.00	60,535.33	0.00	0.00	0.00	0.00	60,535.33	19,734.13
	7,641,762.08	50,823.20	0.00	0.00	7,692,585.28	1,149,515.16	905,426.00	0.00	2,054,941.16	5,637,644.12	6,492,246.92
II. Property, plant, and equipment											
1. Land and buildings	4,112,288.69	44,049.64	0.00	0.00	4,156,338.33	103,071.85	96,849.64	0.00	199,921.49	3,956,416.84	4,009,216.84
2. Technical equipment and machinery	9,771,991.80	19,980.12	0.00	1,302,110.95	11,094,082.87	6,322,786.48	728,387.07	0.00	7,051,173.55	4,042,909.32	3,449,205.32
3. Other equipment, operating and office equipment	2,067,782.75	179,352.40	53,606.79	0.00	2,193,528.36	795,223.75	354,911.15	33,054.54	1,117,080.36	1,076,448.00	1,272,559.00
4. Advances paid and assets under construction	20,027,994.92	11,671,322.46	15,000.00	-1,302,110.95	30,382,206.43	0.00	0.00	0.00	0.00	30,382,206.43	20,027,994.92
	35,980,058.16	11,914,704.62	68,606.79	0.00	47,826,155.99	7,221,082.08	1,180,147.86	33,054.54	8,368,175.40	39,457,980.59	28,758,976.08
III. Non-current financial assets											
Shares in associates	50,000.00	0.00	0.00	0.00	50,000.00	13,078.38	7,000.00	0.00	20,078.38	29,921.62	36,921.62
	43,671,820.24	11,965,527.82	68,606.79	0.00	55,568,741.27	8,383,675.62	2,092,573.86	33,054.54	10,443,194.94	45,125,546.33	35,288,144.62

Gross statement of changes in non-current assets

(In EUR)	Acquisition and production costs					Cumulative depreciation and amortisation				Book value	
	1 January	Additions	Disposals	Reclassifications	31. December	1 January 2023	Additions	Disposals	31. December 2023	31. December 2023	31. December 2022
I. Non-current intangible assets											
1. Self-created rights and licences in such rights	99,875.19	0.00	0.00	0.00	99,875.19	21,639.19	19,975.00	0.00	41,614.19	58,261.00	78,236.00
2. Acquired rights and licences in such rights	63,441.40	10,022.00	0.00	0.00	73,463.40	39,976.40	16,707.00	0.00	56,683.40	16,780.00	23,465.00
3. Intangible assets under development	19,734.13	40,801.20	0.00	0.00	60,535.33	0.00	0.00	0.00	0.00	60,535.33	19,734.13
	183,050.72	50,823.20	0.00	0.00	233,873.92	61,615.59	36,682.00	0.00	98,297.59	135,576.33	121,435.13
II. Property, plant, and equipment											
1. Land and buildings	4,112,288.69	44,049.64	0.00	0.00	4,156,338.33	103,071.85	96,849.64	0.00	199,921.49	3,956,416.84	4,009,216.84
2. Technical equipment and machinery	9,694,169.48	19,980.12	0.00	1,302,110.95	11,016,260.55	6,293,631.48	705,063.07	0.00	6,998,694.55	4,017,566.00	3,400,538.00
3. Other equipment, operating and office equipment	2,067,782.75	179,352.40	53,606.79	0.00	2,193,528.36	795,223.75	354,911.15	33,054.54	1,117,080.36	1,076,448.00	1,272,559.00
4. Advances paid and assets under construction	20,027,994.92	11,671,322.46	15,000.00	-1,302,110.95	30,382,206.43	0.00	0.00	0.00	0.00	30,382,206.43	20,027,994.92
	35,902,235.84	11,914,704.62	68,606.79	0.00	47,748,333.67	7,191,927.08	1,156,823.86	33,054.54	8,315,696.40	39,432,637.27	28,710,308.76
III. Non-current financial assets											
1. Shares in affiliated companies	6,544,700.00	0.00	0.00	0.00	6,544,700.00	0.00	0.00	0.00	0.00	6,544,700.00	6,544,700.00
2. Loans to affiliated companies	314,345.40	9,430.36	0.00	0.00	323,775.76	0.00	0.00	0.00	0.00	323,775.76	314,345.40
3. Other loans	50,000.00	0.00	0.00	0.00	50,000.00	0.00	0.00	0.00	0.00	50,000.00	50,000.00
	6,909,045.40	9,430.36	0.00	0.00	6,918,475.76	0.00	0.00	0.00	0.00	6,918,475.76	6,909,045.40
	42,994,331.96	11,974,958.18	68,606.79	0.00	54,900,683.35	7,253,542.67	1,193,505.86	33,054.54	8,413,993.99	46,486,689.36	35,740,789.29

2. Current assets, prepaid expenses

Inventories primarily comprise intermediate and finished products from the operation of the plant in Dillingen and customer orders in progress. It is also possible to sell the intermediate products of the recycling process from the individual processing stages. Further processing into higher-quality end products is envisaged for the major share, however.

There are no trade receivables with a remaining term of more than one year. No write-downs have been necessary.

EUR 0.00 (previous year: EUR 6,882.26) of other assets have a remaining term of more than one year.

3. Equity

The development of consolidated equity is shown in the consolidated statement of changes in equity.

4. Share capital, authorised capital

On 31 December 2023, the share capital of Pyrum Innovations AG consisted of 3,253,735 bearer shares in total, each with a nominal amount of EUR 1.00.

By way of resolution of the Annual General Meeting on 13 July 2023, the Executive Board was authorised, with the approval of the Supervisory Board, to increase the share capital up to a total amount of not more than EUR 1,301,494 in return for cash or non-cash contributions, once or in tranches, until the end of 12 July 2028. Shareholders' pre-emption rights can be disapplied under certain conditions.

As at 31 December 2023, there is still authorised capital of EUR 1,301,494, equivalent to 1,301,494 shares.

5. Capital reserves

The capital reserves are still held in full by the parent company.

The capital reserves in accordance with section 272(2) no. 1 HGB amounted to EUR 43,815,165.06 as at 31 December 2023 and were unchanged from the previous year.

The capital reserves in accordance with section 272(2) no. 4 HGB amounted to EUR 8,242,976 as at 31 December 2023 and were unchanged from the previous year.

6. Contingent capital, convertible loan

By way of resolution of the Annual General Meeting on 9 September 2020, the Executive Board was authorised to issue convertible bonds of EUR 6,600,000 with a coupon of 3% until 31 December 2024. Shareholders' direct pre-emption rights were disapplied. BASF Antwerpen NV is permitted to subscribe to the convertible bond.

The Annual General Meeting on 9 September 2020 also resolved a contingent increase of the share capital of Pyrum Innovations AG of EUR 199,576 (Contingent Capital 2020/I). The contingent capital increase will only be carried out to the extent that the holder of the convertible bonds is permitted to exercise and actually exercises its conversion right.

On 9 September 2020, the Executive Board of Pyrum Innovations AG, with the approval of the Supervisory Board and Pyrum Innovations International S.A. as the joint and several debtor, entered into a convertible loan agreement of EUR 7,000,000 with BASF Antwerpen NV. EUR 6,600,000 of the convertible loan agreement relates to Pyrum Innovations AG and EUR 400,000 to Pyrum Innovations International S.A. The loan bears interest at 3% p.a. The loan will be paid out in tranches on the achievement of certain milestones. The term of each tranche is 10 years. Repayment starts at the beginning of the third year after extension of the loan. Ordinary termination is not permitted. The lender is authorised to terminate the loan for cause. The lender's option of conversion into shares in accordance with the above conversion ratio only applies in the event of termination for cause. The nominal amount for the shares arising on conversion is to be settled in cash. The conversion agreement stipulates dilution protection. The loan liabilities have been subordinated by a corresponding clause.

As the conversion right associated with the loan can only be exercised on termination for cause and the other loan terms are deemed to be in line with market conditions at the time of issue, this conversion right is not assigned a distinct economic value that would have to be transferred to the capital reserves in accordance with section 272(2) no. 3 HGB.

In order to cover the dilution protection, the Annual General Meeting on 13 July 2023 resolved to contingently increase the share capital of Pyrum Innovations AG by EUR 74,335 (Contingent Capital 2023/I). The contingent capital increase will only be carried out to the extent that the holder of the convertible bonds is permitted to exercise and actually exercises its conversion right.

The last tranche of the convertible loan amounting to EUR 2 million was incurred in the third quarter of 2023 on the basis of the agreed milestone plan. Thus, the convertible loan of EUR 7 million in total was fully paid as at 31 December 2023.

7. Restriction on distribution in accordance with section 268(8) HGB

The total amount subject to a restriction on distribution in accordance with section 268(8) HGB was EUR 118,796 and relates to the capitalisation of internally generated intangible fixed assets.

8. Provisions

Other provisions break down as follows:

(EUR)	31 December 2023	31 December 2022
Obligations from cooperation agreements	1,597,747	1,624,957
Inventor remuneration (Pyrum S.A.)	909,162	987,913
Provisions for personnel	392,220	239,600
Preparation of financial statements, audits, legal and consulting expenses	203,688	183,200
Outstanding invoices, other	85,205	78,228
	3,188,022	3,113,898

Except for a portion of the provisions for the financial statements and audit costs of EUR 9,177.34 (EUR 8,750.00) and the provision for inventor remuneration, all provisions relate to Pyrum Innovations AG.

Long-term obligations from cooperation agreements result from the construction phase of the first plant in Dillingen. Multiple cooperation partners have deferred claims to remuneration until the completion of the subsequent plants. In conjunction with the construction of thermolysis lines 2 and 3 in Dillingen, claims were made on some of these obligations when orders were placed for new plant components in the 2022 financial year.

There is an agreement with the inventor of the tyre thermolysis process to the effect that the inventor will receive remuneration of EUR 1,000,000 based on the profits of Pyrum Innovation S.A. The obligation has been recognised in the consolidated financial statements at discounted presented value based on when this is likely to occur.

9. Liabilities

The Group's liabilities break down as follows:

(EUR)	Remaining term of less than one year		Remaining term of more than one year	
	31 December 2023	31 December 2022	31 December 2023	31 December 2022
Liabilities to banks	458,760	461,604	3,140,414	3,599,174
Advance payments received	651,115	100,000	0	0
Trade payables	2,050,820	2,075,264	162,122	605,824
thereof hire-purchase liabilities	489,389	481,813	162,122	605,824
Other	4,159,974	1,892,591	14,735,054	6,117,676
thereof convertible loan	288,315	294,327	6,417,358	4,705,673
thereof other loans	136,227	117,448	8,317,696	1,426,104
thereof from government grants	3,415,424	1,166,107	0	0
thereof taxes	90,206	68,025	0	0
thereof social security	13,374	21,571	0	0
Total	7,320,669	4,529,459	18,037,590	10,322,674

Group liabilities with a remaining term of more than five years amount to:

(EUR)	Remaining term more than five years	
	31 December 2023	31 December 2022
Liabilities to banks	1,886,551	2,147,719
Other	7,568,808	2,628,505
thereof convertible loan	3,181,626	2,628,505
thereof other loans	4,387,182	0
Total	9,455,359	4,776,224

The liabilities of the parent company break down as follows:

(EUR)	Remaining term of less than one year		Remaining term of more than one year	
	31 December 2023	31 December 2022	31 December 2023	31 December 2022
Liabilities to banks	458,760	461,604	3,140,414	3,599,174
Advance payments received	651,115	100,000	0	0
Trade payables	2,046,631	2,066,262	162,122	605,824
thereof hire-purchase liabilities	489,389	481,813	162,122	605,824
Other	4,134,206	1,866,735	14,350,012	5,835,336
thereof convertible loan	271,017	276,667	6,032,316	4,423,333
thereof other loans	136,227	117,448	8,317,696	1,426,104
thereof from government grants	3,415,424	1,166,107	0	0
thereof taxes	85,067	63,158	0	0
thereof social security	13,374	21,571	0	0
Total	7,290,712	4,494,601	17,652,548	10,040,334

The share of Pyrum Innovations AG's liabilities with a remaining term of more than five years amounted to:

Remaining term more than five years

(EUR)	31 December 2023	31 December 2022
Liabilities to banks	1,886,551	2,147,719
Other	7,377,910	2,470,795
thereof convertible loan	2,990,728	2,470,795
Thereof other loans	4,387,182	0
Total	9,264,461	4,618,514

Liabilities to banks of EUR 3,156,586.23 are secured by mortgages on fixed assets. Liabilities of EUR 65,211.93 are secured by cash. Liabilities to banks relate exclusively to the parent company.

Hire-purchase liabilities of EUR 651,510.99 are secured by retention of title or the assignment of fixed assets as collateral.

A manufacturer loan of EUR 156,359.11 (previous year: EUR 287,907.69) reported under other liabilities is secured the assignment of the asset as collateral.

The other loans reported under other liabilities include EUR 13,705,673 from BASF NV as at 31 December 2023. Further loans, including interest liabilities, amounting to EUR 1,297,564 (previous year EUR 1,255,643.98) have been granted by other shareholders of the company. They are unsecured, have terms of up to four years and interest rates of between 2.5% and 6.0%.

10. Off-balance sheet financial commitments

There are other financial commitments in addition to the liabilities shown in the balance sheet.

Lease obligations:	kEUR
Due 2024	154
Due 2025	109
Due 2026	64
Later	<u>19</u>
	346

The purchase commitment from purchase agreements for plant components amounts to EUR 6,405,062.00, of which EUR 2,500,000.00 with a long-term maturity.

Contingent liabilities in connection with the cooperation agreements amount to EUR 341 thousand. The Executive Board of Pyrum Innovations AG considers it unlikely that claims will be made on these contingent liabilities as it is currently expected that it will be possible to use all the related components in other systems.

In addition to the above financial commitments in the consolidated financial statements, Pyrum Innovations AG has joint and several liability for the loan liabilities of its subsidiaries under the convertible bond agreement jointly entered into with BASF Antwerpen NV. The liability increased by EUR 120,000 year-on-year to EUR 402,340.40 (previous year: EUR 300,000) upon the disbursement of the last tranche of the convertible loan of BASF Antwerpen NV.

Furthermore, under this agreement, in the event of the conversion of the loan relating to the subsidiary after termination by the lender for cause, Pyrum Innovations AG has an obligation to admit the lender as a minority shareholder with an interest of up to 7.4%.

The Executive Board of Pyrum Innovations AG considers it unlikely that a claim will be made on this contingent liability as its subsidiary has sufficient financial resources to fulfil its obligations under the agreement as they become due.

VI. Income statement disclosures

Sales break down as follows:

(EUR)	Financial year	Previous year
Operation of the recycling plant	1,014,892	853,565
Research orders	39,162	42,564
Rental income	95,174	85,167
Other sales/sales reductions	-2,564	657
	1,146,664	981,951

Sales are generated with customers in Germany and the European Union; the transaction currency is the euro.

The other own work capitalised in 2023 of EUR 11,712,123.66 essentially resulted from the expansion and optimisation of facilities in Dillingen/Saar. In 2023, this mainly relates to the construction and commissioning of thermolysis lines 2 and 3 and the new shredder.

The own work includes the total expense for internally generated tangible assets for the year, primarily comprising the use of materials (EUR 9,062 thousand; previous year: EUR 15,802 thousand), third-party services (EUR 1,599 thousand; previous year: EUR 1,160 thousand) and own work by Pyrum staff measured at full cost (EUR 1,051 thousand; previous year: EUR 848 thousand).

The other operating income of EUR 714,704.88 (previous year: EUR 1,318,003.19) essentially includes investment grants of EUR 150 thousand (previous year: EUR 10 thousand) and ongoing research project grants of EUR 253 thousand (previous year: EUR 1,024 thousand). Moreover, insurance recoveries are included at EUR 5 thousand (previous year: EUR 1 thousand).

The income from currency translation in the Group and at Pyrum Innovations AG amounted to EUR 168 (previous year: EUR 0).

Personnel expenses include all wages and salaries of the staff and the Executive Board, expenses for temporary work and mini jobs, and the employer's share of social security costs.

Pension costs amount to EUR 7,024 (previous year: EUR 5,208).

Other operating expenses break down as follows:

(EUR)	Financial year	Previous year
Private placement and listing	0	285,330
Current stock exchange (follow-up) costs	394,833	243,104
Financial statement, audit, legal and consulting expenses	716,055	666,779
Repairs and maintenance	717,485	873,109
Operating expenses	259,571	210,870
Land, building rents and ancillary costs	373,420	322,157
Insurance, contributions, levies	323,618	293,487
Vehicle costs	322,220	216,025
Miscellaneous operating expenses	626,277	470,449
	3,733,477	3,581,309

The other operating expenses attributable to Pyrum Innovations International S.A.'s include EUR 45,727.36 (previous year: EUR 42,001.75) in legal and consulting expenses, EUR 4,200 (previous year: EUR 4,320) in rent and incidental expenses and EUR 4,638.76 (previous year: EUR 13,232.54) in miscellaneous operating expenses.

Legal and consulting expenses also include technical, economic and tax consulting and analysis.

Total research and development expenses amounted to EUR 1,337 thousand in the financial year (previous year: EUR 821 thousand). EUR 41 thousand (previous year: EUR 19 thousand) of this amount was attributed to internally generated intangible assets.

EUR 9,430.36 (previous year: EUR 9,155.68) of the income from long-term loans reported under financial assets in the annual financial statements of Pyrum Innovations AG related to income from affiliated companies.

Interest and similar expenses include interest income from the discounting of provisions of EUR 87,111.10 (previous year: EUR 32,159.86).

The interest expenses essentially served to finance fixed assets. The expenses from the compounding of long-term provisions amounted to EUR 0.00 (previous year EUR 2,835.53) in the Group and EUR 0.00 (previous year EUR 0.00) in the single-entity financial statements.

Deferred taxes

To calculate deferred taxes on differences between the accounting carrying amounts of assets and liabilities and their tax carrying amounts or on tax loss carryforwards, the amounts of the resulting tax benefits and expenses at the time of reversal are measured using tax rates specific to the company and not discounted. Differences due to consolidation adjustments are also taken into account. The tax rates used are 30.53% (Pyrum Innovations AG) and 27.19% (Pyrum Innovations International S.A.).

Deferred tax assets from tax loss carryforwards of Pyrum Innovations AG and Pyrum Innovations International S.A. were recognised in the amount of the excess of liabilities at the respective company after netting deferred tax assets and liabilities from temporary differences.

The corporation and trade tax loss carryforwards of Pyrum Innovations AG can be offset against future taxable profits indefinitely; at Pyrum Innovations International S.A. this period is limited to 17 years from the year of origin.

The amounts of the deferred tax assets and liabilities are as follows:

(EUR)	Financial year		Previous year	
	Group	AG	Group	AG
Loss carryforwards	323,869	53,014	530,949	199,709
Long-term provisions	388,984	141,783	316,880	48,267
Purchased intangible assets	-518,056	0	-599,853	0
Internally generated intangible assets	-36,263	-36,263	-23,882	-23,882
Tangible assets	-76,625	-76,625	-119,552	-119,552
Government grants	-81,909	-81,909	-104,542	-104,542
Remainder after netting	0	0	0	0

VII. Related parties

Related parties have been defined in accordance with the international accounting standard IAS 24.

The following are classed as related parties:

- all members of the Executive Board and the companies they control;
- all members of the Supervisory Board and the companies they control;
- all employees at the first level of management below the Executive Board and the companies they control;

and on the basis of the amount of its investment, possibly with other factors, the shareholders BASF Antwerpen NV and Amel Holding S.A.

Pyrum Innovation International S.A. is similarly a related party and has also been an affiliated company since 7 October 2021.

All transactions with related parties are entered into and carried out at arm's length.

Key transactions and relationships with related parties are described below:

In line with the convertible loan agreement entered into in September 2020, the final tranche of the BASF convertible loan was disbursed in the 2023 financial year. The loan is reported under other liabilities. In addition, BASF provided a further loan of EUR 4,000,000 between May and August 2023 and signed a new cooperation agreement in November 2023 that provides for a credit facility of up to EUR 50,000,000. EUR 3,000,000 of this was granted in 2023. The new loans bear interest at market rates and have terms of 10 years; collateral must be provided for the loan agreed in November.

Interest-bearing loan liabilities continue to exist as before to the shareholder Benifin GmbH (EUR 109 thousand), the top executive of which is Alf Schmidt, chair of the Supervisory Board, and to the shareholder and Supervisory Board member Jürgen Opitz and the companies that he controls (totalling EUR 663 thousand).

VIII. Cash flow statement

Cash funds break down as follows:

(EUR)	31 December 2023	31 December 2022
Cash-in-hand and bank balances	4,482,957	12,725,508
less balances pledged as collateral	-207,653	-207,003
Cash funds	4,275,034	12,518,505

A bank balance of Pyrum AG in the amount of EUR 208 thousand has been pledged as collateral for bank loans of Pyrum AG.

The cash flow from operating activities has been presented using the indirect method.

In accordance with the amended accounting standard DRS 21, payments received from public and expense grants, in particular the research grants from public funding bodies that are based on the actual costs incurred, are now reported in the cash flow from operating activities. This figure also includes the majority of payments from subsidised research expenditures. The figures reported in the prior year have been restated to improve comparability.

Investments not directly recognised as cash flows were conducted by entering into hire-purchase agreements. The planned repayments are recognised as a cash outflow of the cash flow from financing activities.

IX. Significant events after the reporting date

In January 2024, a new subsidiary – Pyrum Green Factory II GmbH – was founded, and this will operate the second Pyrum-owned plant in Perl-Besch (Saarland).

At the start of February 2024, the municipal council of Perl-Besch approved the development plan for the site of the new plant with a large majority. Around three weeks later, on 26 February, permission was granted for the clear-cutting, which was carried out on the same day, paving the way for the planned construction works this year. A compensatory area will be reforested elsewhere by Pyrum with higher quality woodland.

At the start of February 2024, the new Reactor 2 in Dillingen was gradually ramped up to 75% of its rated output.

In addition, a consulting agreement was signed with GreenTech Recycling Tires AB at the end of February. This provides for the approval planning for the construction of a joint recycling plant in Sweden.

X. Other disclosures

1. Employees

The average number of employees in the company was 73 in the reporting period (previous year: 63). Of these, 32 are industrial employees and 39 are salaried employees.

2. Fees of the auditor of the annual and consolidated financial statements

The fee for the auditor of the consolidated financial statements for the 2023 financial year amounted to EUR 78,000; EUR 53,000 of this for audits of financial statements, EUR 15,000 for other assurance services and EUR 10,000 for other services.

3. Executive bodies of the company

The Supervisory Board

Alf Schmidt

Chairman

Managing Director of IBG Industrie-Beteiligungs-Gesellschaft mbH & Co. KG

Renata Bandov

Deputy Chairwoman

Executive Director (in-house lawyer) - Listing Service & Rule Enforcement at Deutsche Börse AG

Manfred Alt (until 13 July 2023)

Deputy Chairman

Of Counsel at ALT + Kollegen Steuerberatungsgesellschaft mbH

Jürgen Opitz

Managing Director of Satherm GmbH

Matthias Lindner

Division controller at BASF Petrochemicals Division

Hans-Jürgen Maas (since 13 July 2023)

Auditor and tax consultant, managing director of THS

Treuhand Saar Steuerberatungsgesellschaft mbH, Saarbrücken.

The Supervisory Board member Matthias Lindner was seconded by the shareholder BASF Antwerpen NV on the basis of the right of secondment added to the Articles of Association on 9 September 2020.

The total remuneration of the Supervisory Board amounted to EUR 65,040 in the 2023 financial year.

Members of the Executive Board

Pascal Klein
CEO

Michael Kapf
Deputy Chairman
Executive Board member for IT & Personnel

Kai Winkelmann
CFO

The total remuneration granted to the Executive Board for its work in the 2023 financial year amounted to EUR 677,715.

Preparation of the annual and consolidated financial statements

The Executive Board today prepared the annual and consolidated financial statements of Pyrum Innovations AG for the period from 1 January to 31 December 2023 and approved them for publication.

Pyrum Innovations AG

Dillingen/Saar, 15 May 2024



Pascal Klein
CEO



Michael Kapf
Member of the
Executive Board



Kai Winkelmann
Member of the
Executive Board

Independent Auditor's Report

To Pyrum Innovations AG
Dillingen / Saar

Opinions to the Annual Financial Statements and the Combined Management Report for the Financial Year 2023

We have audited the annual financial statements of Pyrum Innovations AG, Dillingen / Saar, which comprise the balance sheet as at December 31, 2023 and the statement of income for the financial year from January 1 to December 31, 2023, and the combined Notes to the annual financial statements and group financial statements, including the recognition and measurement policies presented therein. In addition, we have audited the combined management report of Pyrum Innovations AG for the financial year from January 1 to December 31, 2023.

In our opinion, on the basis of the knowledge obtained in the audit,

- the accompanying annual financial statements comply, in all material respects, with the requirements of German commercial law applicable to business corporations and give a true and fair view of the assets, liabilities and financial position of the company and the group as at December 31, 2023 and of its financial performance for the financial year from January 1 to December 31, 2023 in compliance with German Legally Required Accounting Principles, and
- the accompanying combined management report as a whole provides an appropriate view of the company's position. In all material respects, this combined management report is consistent with the annual financial statements, complies with the German legal requirements and appropriately presents the opportunities and risks of future development.

Pursuant to Section 322 (3) sentence 1 HGB [Handelsgesetzbuch: German Commercial Code], we declare that our audit has not led to any reservations relating to the legal compliance of the annual financial statements and the combined management report.

Opinions to the Group Financial Statements and the Combined Management Report for the Fiscal Year 2023

We have audited the group financial statements of Pyrum Innovations AG and its subsidiary, which comprise the group balance sheet as at December 31, 2023, and the group statement of income, the group statement of changes in equity, and the group cash flow statement for the financial year from January 1 to December 31, 2023 and the combined Notes to the annual financial statements and group financial statements, including the recognition and measurement policies presented therein. In addition, we have audited the combined management report of Pyrum Innovations AG for the financial year from January 1 to December 31, 2023.

In our opinion, on the basis of the knowledge obtained in the audit,

- the accompanying group financial statements comply, in all material respects, with the requirements of German commercial law and give a true and fair view of the assets, liabilities and financial position of the group as at December 31, 2023 and of its financial performance for the financial year from January 1 to December 31, 2023 in compliance with German Legally Required Accounting Principles, and

[translation of the sole authoritative German report]

- the accompanying combined management report as a whole provides an appropriate view of the group's position. In all material respects, this combined management report is consistent with the group financial statements, complies with the German legal requirements and appropriately presents the opportunities and risks of future development.

Pursuant to Section 322 (3) sentence 1 HGB, we declare that our audit has not led to any reservations relating to the legal compliance of the group financial statements and the combined management report.

Basis for the Opinions

We conducted our audit of the annual financial statements, the group financial statements, and the combined management report in accordance with Section 317 HGB and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Our responsibilities under those requirements and principles are further described in the "Auditor's Responsibilities for the Audit of the annual financial statements, the group financial statements, and the combined management report" section of my auditor's report. We are independent of the parent company and its subsidiaries in accordance with the requirements of German commercial and professional law, and we have fulfilled our other German professional responsibilities in accordance with these requirements. We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinions on the annual financial statements, the group financial statements, and the combined management report.

Other Information

The legal representatives are responsible for the other information. The other information comprises the remaining parts of the annual report of Pyrum Innovations AG from May 15, 2024.

Our opinions on the annual financial statements, the group financial statements, and the combined management report do not cover the other information and, accordingly, we do not express an opinion or any other form of assurance conclusion on it.

In connection with our audit, our responsibility is to read the other information referred to above and, in doing so, to consider whether the other information

- is materially inconsistent with the annual financial statements, the consolidated financial statements, the combined management report or our knowledge obtained in the audit, or
- otherwise appears to be materially misstated.

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

Responsibilities of the Legal Representatives and the Supervisory Board for the Annual Financial Statements, the Group Financial Statements and the Combined Management Report

The legal representatives are responsible for the preparation of the annual financial statements that comply, in all material respects, with the requirements of German commercial law applicable to business corporations, for the preparation of the group financial statements that comply, in all material respects, with the requirements of German

[translation of the sole authoritative German report]

commercial law, and that the annual financial statements and the group financial statements give a true and fair view of the assets, liabilities, financial position and financial performance of the company and the group in compliance with German Legally Required Accounting Principles. In addition, the legal representatives are responsible for such internal control as they, in accordance with German Legally Required Accounting Principles, have determined necessary to enable the preparation of annual financial statements and the group financial statements that are free from material misstatement, whether due to fraud (i.e. fraudulent financial reporting and misappropriation of assets) or error.

In preparing the annual financial statements and the group financial statements, the legal representatives are responsible for assessing the company's and the group's ability to continue as a going concern. They also have the responsibility for disclosing, as applicable, matters related to going concern. In addition, they are responsible for financial reporting based on the going concern basis of accounting, provided no actual or legal circumstances conflict therewith.

Furthermore, the legal representatives are responsible for the preparation of the combined management report that, as a whole, provides an appropriate view of the company's and the group's position and is, in all material respects, consistent with the annual financial statements and the group financial statements, complies with the German legal requirements, and appropriately presents the opportunities and risks of future development. In addition, the legal representatives is responsible for such arrangements and measures (systems) as they have considered necessary to enable the preparation of a combined management report that is in accordance with the applicable German legal requirements, and are able to provide sufficient appropriate evidence for the assertions in the combined management report.

The Supervisory Board is responsible for overseeing the company's financial reporting process for the preparation of the annual financial statements, the group financial statements, and the combined management report.

Auditor's Responsibilities for the Audit of the Annual Financial Statements, the Group Financial Statements, and the Combined Management Report

Our objectives are to obtain reasonable assurance about whether the annual financial statements and the group financial statements as a whole are free from material misstatement, whether due to fraud or error, and whether the combined management report as a whole provides an appropriate view of the company's and the group's position and, in all material respects, is consistent with the annual financial statements and the group financial statements and the knowledge obtained in the audit, complies with the German legal requirements and appropriately presents the opportunities and risks of future development, as well as to issue an auditor's report that includes our opinions on the annual financial statements, on the group financial statements, and on the combined management report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Section 317 HGB and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer (IDW) will always detect a material misstatement. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these annual financial statements, these group financial statements, and this combined management report.

[translation of the sole authoritative German report]

We exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the annual financial statements, of the group financial statements, and of the combined management report, 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 opinions. 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 controls.
- Obtain an understanding of internal control system relevant to the audit of the annual financial statements and the group financial statements and of arrangements and measures relevant of the audit of the combined management report 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 these systems of the company and the group.
- Evaluate the appropriateness of accounting policies used by the legal representatives and the reasonableness of estimates made by the legal representatives and related disclosures.
- Conclude on the appropriateness of the legal representatives' 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 or the group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in the auditor's report to the related disclosures in the annual financial statements, the group financial statements, and the combined management report or, if such disclosures are inadequate, to modify our respective opinions. Our conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the company or the group to cease to be able to continue as a going concern.
- Evaluate the overall presentation, structure and content of the annual financial statements and the group financial statements, including the disclosures, and whether the annual financial statements and the group financial statements present the underlying transactions and events in a manner that the annual financial statements and the group financial statements give a true and fair view of the assets, liabilities, financial position and financial performance of the company and the group in compliance with German Legally Required Accounting Principles.
- We obtain sufficient appropriate audit evidence about the accounting information of the entities or business activities within the group to express an opinion on the group financial statements and on the combined management report. We are responsible for directing, supervising and performing the group audit. We are solely responsible for our audit opinions.
- Evaluate the consistency of the combined management report with the annual financial statements and the group financial statements, its conformity with [German] law and the view of the company's and the group's position it provides.
- Perform audit procedures on the prospective information presented by the legal representatives in the combined management report. On the basis of sufficient appropriate audit evidence I evaluate, in particular, the significant assumptions used by the legal representatives as a basis for prospective information, and evaluate the proper derivation of the prospective information from these assumptions. We do not

[translation of the sole authoritative German report]

BRBD Reger Hecht GmbH

Wirtschaftsprüfungsgesellschaft Steuerberatungsgesellschaft

express a separate opinion on the prospective information and on the assumptions used as a basis. There is a substantial unavoidable risk that future events will differ materially from the prospective information.

We communicate with the supervisory board 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 my audit.

Frankfurt am Main, May 15, 2024

BRBD Reger Hecht GmbH
Wirtschaftsprüfungsgesellschaft
Steuerberatungsgesellschaft

[original version signed by:]

[original version: professional seal]

Christian Hecht
Wirtschaftsprüfer [German Public Accountant]

[translation of the sole authoritative German report]

Financial calendar for 2024

28 June 2024	Publication of the quarterly report as at 31 March 2024
18 July 2024	Annual General Meeting
27 September 2024	Publication of the half-year report as at 30 June 2024
22 November 2024	Publication of the quarterly report as at 30 September 2024

Investor Relations



Kai Winkelmann
Pyrum Innovations AG
e-mail: presse@pyrum.net



Dariush Manssuri
IR.on AG
Tel.: +49 221 9140-970
e-mail: pyrum@ir-on.com



Frederic Hilke
IR.on AG
Tel.: +49 221 9140-970
e-mail: pyrum@ir-on.com

Legal notice

Pyrum Innovations AG
Dieselstrasse 8
66763 Dillingen/Saar