

The global scrap tire market currently stands for about 30.9 million tons p.a.

... increasingly stringent environmental regulations force companies and even entire countries to act
Scrap tires worldwide in 2019
Increasingly stringent regulations

The world's largest tire dump in Kuwait can be seen from space and has been burning since August 2021

Global Scrap Tire Volume: 30,9 mio tons 3,4 mio tons (EU)

burnt or landfill:

-56%

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



Landfill storage prohibited since 2000 Landfill disposal of complete and shredded waste tires is prohibited

Burning partially banned

Countries such as Belgium, Sweden and Finland have already banned the burning of used tires



Extended manufacturer liability (EPR)

Recycling is becoming more important, and the percentage of raw materials recycled is also increasing.



CO

New EU regulations for rubber granules in 2023 Rubber granules will be banned in many places.

Rising CO² costs

Burning old tires is becoming too expensive due to CO² certificates



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Pyrum has a patented technology that is unique...

... Polymers become reusable raw materials for industry - thermolysis oil, rCB and gas How Pyrum creates new values?



3

PARI

Pyrum since the beginning of continuous industrial operation

....since May 2020, TAD1 (Dillingen 1 thermolysis plant) has been in 24/7 operation.

Input material (waste tire quantities in tons)

Accepted scrap tires (tons) .14 Ω 2022 Mai ~ 27% 2021 : ~ 71% of total capacity¹ Increase 2021 2022

Ausgangsstoff am Beispiel Öl



The forward-based information on this slide is shown as an example of a possible future development and is therefore solely for illustrative purposes. Such figures are based on multiple assumptions and there are no agreements entered into to support development illustrated. Such figures are not estimates or forecast and should therefore not be relied upon. Actual figures may therefore deviate materially. Notes: (1)



Pyrum is years ahead of its competitors and is now rolling out

... Pyrum already operates a TRL 9 plant, which is absolutely unique.

Milestones



PIRUM

5



Quelle: Firmenangaben



Sustainability is at the core of Pyrum...

... Pyrum has been proven to reduce CO² emissions from 1 ton of scrap tires by 750 kg **EU Taxonomy**

Sustainability objectives of the UN





Construction Phases TAD 2+3

.... what happened in 2021

Currently we are on schedule, despite war and Corona





PAR

Construction Phases TAD 2+3

... what happened in 2022

Currently we are on schedule, despite war and Corona





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Construction Site Pyrum Production Lines 2 and 3 ...

... Status of the construction work on July 12th, 2022

Aerial view from 100 meters



Explanations

- Shredding plant from ELDAN: Granulates whole tires up to 140 cm in diameter and separates steel and textile
- Pyrum Reactor: Patented heart of the plant consisting of a 25 meter high tower. Here, rubber granulate is converted into oil, rCB and gas
- Cooling System: For cooling the process and all end products
- Underground oil tanks (2 x 60,000 liters) incl. fueling station: for loading trucks and trains
- Carbon milling and pelletizing: turns raw Pyrum coke into marketable rCB in pellet form
- Gas Turbines: Generate the energy for the Pyrum reactors and the heat for pelletizing
- Storage tank Pyrum Gas: Buffer storage between Pyrum plant and gas turbines

Control room: control center for the entire plant



Construction Site Pyrum Production Lines 2 and 3...

... Status of the construction work on July 12th, 2022

A few recent pictures. Viewing possible after the general assembly









PIR

Pictures of the Construction Site TAD 2+3

... Status end of June 2022

Can be viewed live after the general assembly







PLA

Pyrum is planning plants across Europe with partners and alone...

... many projects are well advanced

Pyrum's roadmap

	Project No	Country		Approx. Location	Base Plant Structure clear	SPV contract clear	Location clear/ secured	20% Equity Capital	Approval preliminary application	Company founded by notary public	
SPV	1	Germany	•	Bavaria	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
SPV	2	Germany		Baden Württemberg	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
SPV	3	Germany		Hessen	\checkmark		\checkmark	\checkmark			UNITANK
100%	4	Germany Luxemburg	•	Border / Moselle	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
SPV	5	Germany		Lower-Saxony	\checkmark		\checkmark	\checkmark		(1)	UNITANK
SPV	6	Belgium	•	Antwerpen	\checkmark		\checkmark		\checkmark	\checkmark	
SPV	7	ик		lpswitch	\checkmark			\checkmark	\checkmark		
SPV	8	Ireland		Waterford	\checkmark	\checkmark	\checkmark		\checkmark		



P.P.

PIRUM

News from Process Engineering

Process Engineering (PE) is constantly working on optimizations of the Pyrum plants and on their planning...

Milestones 2021

- Certification ISCC+ by TermoTireOil
- Basic tests thermal cleaning
- TAD 2+3
 - Preparing the approval documents
 - Basic Engineering
 - Design of all tanks in the towerAuslegung
 - Conveyor technology rubber granules
 - New concept for gas-fired power generation





Milestones 1 half year 2022

- Introduction of thermal cleaning as a new production process = reactor not completely shut down from January 2022 to June → Significant reduction in downtime
- Certification ISO 9001
- Production of 50+10 tons "Black Cycle oil"
- Successful Due Dilligence of Fa. Unitank
- Certification ISCC+ thermolysis carbon
- BImSchG Approval Agglomeration
- Optimization of start-up process: "good" coke directly after revision → Coke is "circulated" several times before rubber granules are fed in order to achieve better temperature distribution in the reactor
- Thermolysis Plant Dillingen 2+3 (TAD 2+3):
 - Planning in the tower completed
 - Planning of all ancillary facilities
 - Design conveyor coke
 - Design of rubber granulate storage in the shredder hall and automated conveying to the tower.



Planning and Construction of Pelletizing TAD 1

From Coke to Recovered Carbon Black (rCB)



Pelletizing TAD 1 – Pictures





PLAUM



MSR : Measurement and Control Technology

... Software und control technology made by Pyrum

The years 2021 and 1. half year 2022

2021

- · Optimization operator control process control system
 - Design study with operating personnel
 - Optimization of the alarm management
 - Early detection of fault conditions
 - Increase of the plant availability
- Control loop optimization
 - Cycle time minimization of the reactor feed system
- Basic engineering thermolysis plant Dillingen 2&3
 - Concept development
 - Issue of factory standards
 - > Quality standards for customer installations

1. half year 2022

- Implementation of a HAZOP study
 - HAZOP = hazard and operability
- Implementation of an OTS (Operator Training System)
 - Training of furture operators
 - Holistic training concept with experienced personnel from Dillingen
- Development of a mathematical model for the Pyrum reactor
 - further optimization of the overall system and process control





Research & Development

... we do not only want to recycle old tires



Installation and equipment of a laboratory container

2022

"PYROMATIC"

Construction of the continuous laboratory plant completed



Project duration: May '20 – Aug '23 2021

- Completion of process optimization on a laboratory scale
- Provision of 40,000 liters of oil for the production of sCB → Successful "proof-ofconcept"

2022

- Completion of process optimization on an industrial scale
- Provision of 60,000 liters of optimized oil for the production of sCB

netabolon

Technology

TH Köln

Arts Sciences





Project duration: July '20 – Sep '22 2021

- Test planning of laboratory-scale optimization
- Conduct laboratory testing and provision of pyrolysis coke

2022

- Execution of further laboratory tests with textile portion as well as biomass for product quality increase
- Characterization of all pyrolysis products



PITTI

Project: Bicycle Tires -Recycling



Project duration: May '21 – Apr '23 2021

- Test planning of laboratory-scale optimization
- Conduct laboratory testing and provide rCB

2022

- Production of demonstrator rubber compounds for bicycle tubes from rCB
- Structure of the Schwalbe collection system

Übersicht im Antrag befindlicher, staatlich geförderter Projekte

Project duration: Jan '23 – Dec '25

Pyrolytic aromatics reduction in the production of rCB from scrap tire treatment

"ReCoPy" Recycling of polyester and Epoxidharz of the coating industry by means of pyrolysis

Project duration: Jan '23 – June '25

SEBASTIAN RWITHAACHEN TER

Research and Development

.....we do not only want to recycle old tires.

Übersicht weiterer Projekte



Project duration: April '22 – Dec '24

2022

- Research cooperation with Continental to establish a closed loop recycling concept
 - Recovery of industrial carbon black from scrap tires for reuse in new tires
 - $ightarrow \,$ 100% sustainably produced materials in Continental tire products by 2050 at the latest
 - Fewer fossil raw materials and CO2 emissions
- Project Planning
 - > Determination of the work packages and contents as well as the target setting of the project
 - Selection of technology for physical treatment of rCB
 - Planning and ordering of laboratory containers for mechanical process engineering

Contract Research

Conduct feasibility studies of critical waste streams

ightarrow High interest from various industries due to growing sustainability awareness.

Pyrum has the necessary know-how to conduct these studies

- ✓ Knowledge about the handling of pyrolysis products
- ✓ Availability of a wide range of pyrolysis equipment with different capacities
- ✓ Experience in industrial implementation

Overview of Cooperations 2021 & 2022:





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Expansion of Laboratory Facilities

Expansion of laboratory facilities for R&D and analytical equipment for quality assurance

Ausbau seit 2021



Batch Pyrolysis



Cont. Pyrolysis for CFK

Laboratory Facilities



Cont. Pyrolysis for rubber material



Destillation for oils

Premises



Lab Container for CFK-Pyrolysis



Measuring Devices





UV/Vis-spectrophotometer



Wet sieving



Flash point

Laser diffraction



Sieve tower

Pellet hardness

C. ALLA









Special Research large scale Plant

... 1:1 Models for reactor optimization

These special research projects are carried out in a separate department

Optimization of the existing plant and TAD 2&3 through simulations in 1:1 models.

Analysis and basic tests of the solid flow in the reactor

- Improvement of the output
- Extension of the travel time
- Estimation of future revision tasks
- Ultimately, to increase the yield

Material test trials on optimized design of reactor in 1:1 model

- Confirmation of the selected welding process with regard to dimensional accuracy and tightness under thermal cycling stresses
- Exploration of the limit above the processrelevant range (determination of the safety buffer)







Pyrum Consolidated Profit and Loss Statement

Reconciliation of sales to total output





Angaben in TEUR



PLA

Pyrum Consolidated Profit and Loss Statement 2021

Reconciliation of sales to EBITDA



Research Grants (432, prev. year 160)

Investment Grants (262, prev. year 50)

Insurance Benefits (246)





Includes TEUR 1,865 required for the preparation of own work capitalized





PAR

Angaben in TEUR

Pyrum Consolidated Profit and Loss Statement 2021

ement 2021



Reconciliation of sales to EBITDA







Costs IPO (2.882)

👅 Bereinigt 🛛 👅 Kosten Listing

Angaben in TEUR

Pyrum (consolidated) profit and loss statement Financial Year 2021

Total view

KPI	2021	2020	Δ EUR PL	Δ % PL
Revenues	922	663	260	39,16%
Increase/decrease of finished goods	-28	-44	16	
Other own work capitalised	2.807	1.175	1.632	138,93%
Total output	3.701	1.794	1.908	106,35%
Other operating income	1.106	375	731	195, 14%
Expenses for materials	2.584	1.214	1.371	112,93%
Personnel expenses	3.459	1.891	1.568	82,90%
Other operating expenses	5.285	1.296	3.989	307,69%
EBITDA	-6.521	-2.233	-4.288	192,08%
Depreciation, amortisation and write-downs	1.626	1.225	401	32,71%
EBIT	-8.146	-3.458	-4.689	135,61%
Income from non-current loans	7	15	-9	
Interest and similar expenses	202	129	73	56,66%
Result before taxes	-8.342	-3.571	-4.771	133,58%
Taxes on income and profit	0	0	0	
Result after taxes	-8.342	-3.571	-4.771	133,58%
Adjusted for IPO costs :	-5.469			

Information in TEUR



PAR

Pyrum Consolidated Balance Sheet (Abstract)

TEUR	2021	2020	Share in capital 2021
Non-current assets			
Non-current intangible assets	7.378	16	14,4%
Property, plant, and equipment	9.064	6.196	17,7%
Non-current financial assets	0	296	0,0%
	16.442	6.508	
Current assets			
Inventories	58	86	0,1%
Receivables and other current assets	346	156	0,7%
Cash at hand and in bank	34.446	9.739	67,1%
	34.850	9.981	
Deferred expenses	29	29	0,1%
Equity	39.699	6.883	77,4%
thereof accumulated losses	-15.612	-7.261	
Provisions and Accrued Liabilities	3.481	2.118	6,8%
Liabilities	8.140	7.518	15,9%
Total equity and liabilities	51.321	16.519	
Equity capital ratio	77,4%	41,7%	

Annotations:

 Non-current intangible assets: Purchase price Pyrum S.A. TEUR 6.500

 Tangible Assets: Land acquisition TEUR 750 Prepayments and assets under construction TEUR 2.521 (prev. year 1.394)

 Cash at hand and in bank: Net accrual of capital from capital increase TEUR 39.369

Reduction TEUR 6.500 Payment of purchase price Pyrum S.A.





Pyrum General Assembly 2022 – Report of the Executive Board

Corporate Actions

Report to the Annual General Meeting of Pyrum Innovations AG on the partial utilization of the

authorized aapital with exclusion of shareholders' subscription rights in September 2021



Pyrum Outlook

Rollout Plan and Break-Even

Rollout plan calls for more than 20 plants by 2030



Short-term Target: Break-Even

• Fiscal 2022 will continue to be characterized by investments in the successful implementation of the rollout plan and will therefore show a negative result.

- Break-even on EBITDA basis targeted in fiscal year 2023
- Break-even targeted on the basis of net income in fiscal 2024

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TOP NEWS : July 4th, 2022

... breaking news from the last few days! SIEMENS Partnership

- Partnership Goals
 - Siemens wants to learn from Pyrum how modern recycling plants are operated
 - · Pyrum learns from Siemens the latest innovations in control technology
 - Pyrum is the first plant in the world to be allowed to use the new Siemens PCS NEO (successor to PCS 7)
 - Siemens advertises worldwide at trade fairs and media platforms with PCS NEO and Pyrum becomes the reference
- Benefits for Pyrum
 - New know-how is gained + access to 150 Siemens engineers
 - Pyrum, as a worldwide reference customer, receives preferential delivery: NO long waiting times for electrical components
 - Free, worldwide advertising for the Pyrum technology





Presentation to Siemens top management at the start of the partnership (July 4th, 2022)



TOP NEWS : July 13th, 2022

... breaking news from the last few days! Schwalbe Recycling System







TOP NEWS : July 12th, 2022

... breaking news from the last few days! Foundation of first SPV: Revalit GmbH in Straubing



Foundation of the first Pyrum Joint Venture Plant

Location: Harbor Straubing-Sand

Plant size: 20,000 tons scrap tires per annum

Shareholders:

– Mcapital GmbH :	25%
– Textor GmbH:	25%
– Auer Holding GmbH:	25%
– Pyrum Innovations AG:	25%

Share capital: 100,000 EUR

Status:

- Claim for approval BImSch
- Premises reserved at the harbor Straubing





TOP NEWS : August 1st, 2022

... breaking news from the last few days! Mission scrap tires

Aim of the action: Increase awareness/acceptance of Pyrum in Saarland.

Term: Aug 1, 2022 to Sep 2, 2022 Stakeholders: Citizens in the Saarland

Actions:

- In Saarland, two illegal tire dumps are to be eliminated
- Reporting of illegal dumpsites is done via a landing page for the action (pyrum.net/mission-altreifen), where citizens can upload information and pictures about the illegal dumpsite via a contact form
- Two vouchers à 500,00 € will be raffled among all participants.

Promotion of this Action:

- Posts & adverts on Facebook, Instagram und LinkedIn
- Radio advertising on radio station SR1 with Reiner Calmund as speaker (not confirmed yet)
- Press releases in the regional press





