TIRE RECYCLING DAY

Welcome

azur PARTNER
ALLIANZ ZUKUNFT REIFEN

ZEPPELIN
WE CREATE SOLUTIONS

WELCOME

TIRE RECYCLING DAY

Guido Veit

Vice President Projects
Zeppelin Systems GmbH

zeppelin-systems.com

Patrick Buder

Sustainability Strategy
Zeppelin Systems GmbH

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Juliane Bartos

Partner Manager & Marketing
Zeppelin Systems GmbH

zeppelin-systems.com

Christina Guth

Network Coordination
AZuR Netzwerk

azur-netzwerk.de

THE ZEPPELIN FOUNDATION

ZEPPELIN-STIFTUNG
Unsere Stiftung – Ganz nah am Menschen

Luftschiffbau Zeppelin GmbH
Friedrichshafen, Germany

ZF AG Friedrichshafen	
Key Data 2022:	
Turnover:	43.8 bn €
Employees:	around 165.000
Locations:	ca. 168

Zeppelin GmbH Friedrichshafen/Garching	
Key Data 2022:	
Turnover:	3.84 bn €
Employees:	over 10,000
Locations:	over 340

ZEPPELIN GROUP HISTORY

HISTORICAL DIGRESSION

1908

Founding
Luftschiffbau Zeppelin GmbH
and the Zeppelin Foundation

1950

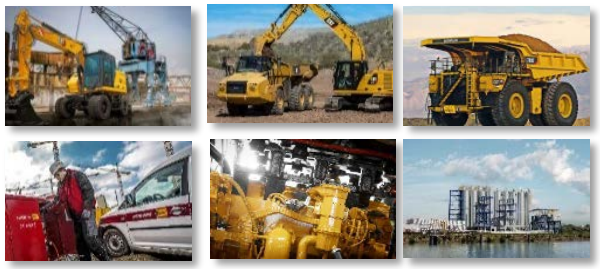
METALLWERK FRIEDRICHSHAFEN GMBH.

Founding
Metallwerk-Friedrichshafen GmbH,
now Zeppelin GmbH

1954

Zeppelin becomes a
Caterpillar dealer

2020



Group IT Services

5 strategic business units +
1 strategic management center +
1 management holding company
= Zeppelin Group

THE ZEPPELIN GROUP TODAY

Construction Equipment Germany / Austria

Distribution and service of construction machines

Construction Equipment International

Distribution and service of construction machines

Rental

Rental and project solutions for construction and industry

Power Systems

Drive and energy systems

Plant Engineering

Engineering and plant engineering

Group IT Services: Strategic Management Center for Group IT Services

€ 3.84 billion euros in sales

More than 10,000 employees

over 340 sites in 26 countries and regions

OUR BUSINESS SEGMENTS

Polyolefin plants

Performance materials

Silo technology

Service

Rubber plants

Food processing plants

Components

Modernization/revamping

Recycling

Batteries

Mixing Technology

RUBBER PLANTS

CUTTING-EDGE TECHNOLOGY FOR THE RUBBER AND TIRE INDUSTRY

- Consulting and FEED studies
- Raw material receiving and storage systems
- Weighing, dosing and conveying technology for soot, silica, additives and liquids
- Automatic small component weighing systems
- Automation and mixing room controls
- Commissioning and after-sales service
- Turnkey mixing rooms

SILO TECHNOLOGY

INNOVATIVE, EFFICIENT, CUSTOMIZED

Mixing technology:

Multi-flow mixing silos, multi-channel mixing silos, degassing silos

Construction types:

Workshop-welded silos, construction site assembly by bolting, construction site assembly by welding

Applications:

Storage, mixing, degassing, heating/cooling

BOLT TEC®

WELD-TEC*

PANEL-TEC®*

* FSW technology (Friction stir welding)

* FSW technology (Friction stir welding)

PLEASE OBSERVE OUR SAFETY REGULATIONS!

Zeppelin: Confi

ZEPPELIN SYSTEMS

NO PHOTOS OR VIDEO ALLOWED

- Zeppelin will provide pictures and videos after the Event

Please don’t take any pictures or videos during the production & technology center tour!

ZEPPELIN SYSTEMS

SOLUTION PROVIDER FOR THE TIRE INDUSTRY FOR OVER 40 YEARS

- As a foundation company, we are committed to the infinity principle and also ensure economic sustainability with our solutions.
- We rely on holistic recycling processes in the sense of the Circular Economy in order to obtain high-quality recyclates.
- In doing so, we set new standards: Together with our partners, we ensure consistently high quality and sufficient availability of recyclates to reuse them for the production of new tires.

WE CREATE SOLUTIONS!

With our plants we combine economy and ecology to a symbiosis. A win-win situation for:

Our customers and our environment!

ZEPPELIN SYSTEMS

TIRE COLLECTION CAMPAIGN

Recycling

TYREWOLF RECYCLING AND RETHINKING

ELM RECYCLING

Container Service

Männer
DEM KREISLAUF VERPFLICHTET

Donation Project

BUND
FRIENDS OF THE EARTH GERMANY

StreuObstGarten
WEILERMÜHLE

ZEPPELIN SYSTEMS

TIRE COLLECTION CAMPAIGN

TIRE RECYCLING DAY

AGENDA

09:00 – 10:00 Uhr	**REGISTRATION & GET-TOGETHER**	
10:00 – 10:15 Uhr	**Welcome**	
10:15 – 11:00 Uhr	**Keynote Speech by Climate Researcher**	
11:00 – 11:30 Uhr	**Live Demonstration Tire Sorting**	
	KURZ	Manual sorting & explanation
	REGOM	Automated sorting solution
11:30 – 13:00 Uhr	**Zeppelin Sustainable Tire Alliance**	
	Zeppelin	Introduction – Zeppelin Sustainable Tire Alliance
	Zeppelin | Recykl	Recycling of tire textile
	ReOil	Pyrolysis
	RCB Nanotechnologies	Recovered Carbon Black purification
	Siemens	Management of dynamic carbon footprint
		Digital Twin for a sustainable design of product and production
13:00 – 14:00 Uhr	**Lunch Break / Networking**	
14:00 – 15:15 Uhr	**Production and Technology Center Tour**	
15:15 – 16:15 Uhr	**Podium Discussion**	
16:15 – 16:30 Uhr	**Q & A**	
16:30	**Closing / Networking**	

WELCOME

TIRE RECYCLING DAY

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ALLIANZ ZUKUNFT REIFEN

Christina Guth

Network Coordination
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azur
ALLIANZ ZUKUNFT
REIFEN

Closed-Loop Tire Economy for Germany and Europe

Tire Manufacturers Complete the Loop

Collaborating to Innovate Tire Recycling


azur
ALLIANZ ZUKUNFT REIFEN
CIRCULAR ECONOMY AWARD
NEW LIFE
INITIATIVE-NEW-LIFE.DE
RUND ERNEUERT
NACHHALTIG UND RESSOURCENSCHONEND
ZEPPELIN
WE CREATE SOLUTIONS
ZARE
Zertifizierte Altreifen Entsorger
Eine Arbeitsgemeinschaft im Bundesverband Reifenhandel und Vulkaniseur-Handwerk e.V.


ZEPPELIN®
WE CREATE SOLUTIONS
azur
ALLIANZ ZUKUNFT REIFEN
CIRCULAR ECONOMY AWARD


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REIFEN

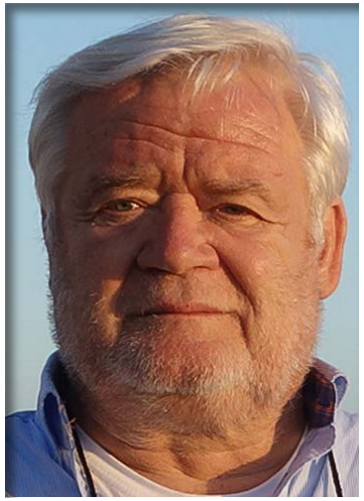

Thank you for your attention.
We look forward to working with you.

CLIMATE RESEARCH

Keynote Speech

CLIMATE RESEARCH

KEYNOTE SPEECH



Nico Stehr

Knowledge Society

TIRE SORTING

Live Demonstration

LIVE DEMONSTRATION TIRE SORTING

Lucile Cassier

Sales & Marketing
REGOM

regommachinery.com

Daniel Kwint

Office Management
KURZ Karkassenhandel

kurz-karkassenhandel.de

ZEPPELIN SUSTAINABLE TIRE ALLIANCE

ZEPPELIN SUSTAINABLE TIRE ALLIANCE

INTRODUCTION

ZEPPELIN
WE CREATE SOLUTIONS

Guido Veit

Vice President Projects
Zeppelin Systems GmbH

zeppelin-systems.com

ZEPPELIN SUSTAINABLE TIRE ALLIANCE

The Zeppelin Sustainable Tire Alliance is a technology alliance and offers solutions along the recycling value chain in the area of material and raw material recycling. Today we count 8 marketing, technology and process partners as a member.

Zeppelin Sustainable Tire Alliance stands for Tire-to-Tire Recycling. We will act in the market as a system integrator, solution provider and bridge builder between the recycling and (tyre) industry. In this way, we will close the cycle of secondary raw materials again and will make a sustainable contribution to the circular economy.

TIRE RECYCLING DAY

Teaser Video Tire Recycling

ZEPPELIN SUSTAINABLE TIRE ALLIANCE

Zeppelin Role

- International sales & marketing partner
- International implementation partner & service provider
- Integration of technologies and processes into holistic process solutions
- Global plant competence
- Support in development "technology readiness level
- Implementation strength & capacity
- Product & industry know-how

RECYKL

REGOM
TYRES REUSE SOLUTIONS

ENTEX

EVONIK
Leading Beyond Chemistry

RECOVERED CARBON BLACK

ZEPPELIN
WE CREATE SOLUTIONS

VERTECH

REJL

RubberJet Valley

SIEMENS

PARTNER AND NETWORK STRUCTURE

Pyrolyse

ReOil
RCB Nano

Pyrolyse-Oil

TBD

Commodity Trader

Zeppelin

Sort/Classify

Regom
- RFID
- Reifenidentifizierung
- Big data

Material recovery

Recykl/Rubberjet
- Stahl
- Separierung des Reifens
- Green-Tire - Produktionsschrott

Retreading

- Maschinenhersteller
- Material-Hersteller
- Runderneuerer

Devulcanization

ENTEX
- thermische Devulkanisation
- chemische Devulkanisation

Raw material innovation

- Rohstoffaufbereiter
- Rohstoff-Innovatoren

Complementary partners

Siemens
(SaaS -Kreislaufwirtschaft)
Evonik
(komplementäreGüter)

VISION

VISION 1
Together with the Zeppelin Sustainable Tire Alliance, Zeppelin Systems is an international shaper in the sustainable tire market as well as a contact for the tire industry and for innovative, sustainable companies in the rubber industry.

VISION 2
The Zeppelin Sustainable Tire Alliance is a powerful network in the field of tire recycling.

VISION 3
In conjunction with the Zeppelin Sustainable Tire Alliance, Zeppelin Systems is a competent consultant and implementer of sustainable solutions in tire production.

THE BASIS OF THE NETWORK

ESTABLISHED RULES

1

No companies will become partners of the network, which are in direct competition.

2

The network sees itself as an international, sustainable technology alliance.

3

Companies that become partners must sign a voluntary commitment.

4

Zeppelin Systems selects suitable partners based on experience.

5

The network has the claim to be effective along the entire process chain.

6

The network operates economically and offers added value to all partners.

STRONG PARTNERS

ZEPPELIN SUSTAINABLE TIRE ALLIANCE

A successful partnership:

Together with strong partners of the "Zeppelin Sustainable Tire Alliance" we are the ideal solution provider and best system integrator for the industry for the (sustainable) tire production.

Our common goal:

Increase in high-grade recyclates in the tire manufacturing process, while maintaining the same quality and quantity.

We give old tires a new life!

TOGETHER
We Create Solutions!

TIRE RECYCLING

TWO DIFFERENT RECYCLING METHODES

Mechanical Recycling
(Werkstoffliches Recycling)

- Sorting and Separation
- Cryogenic Grinding
- Ambient Grinding
- WaterJet
- Cryogenic Milling
- Ambient Milling
- Micronization
- Devulcanization

75% Rubber Granules and Powder

15% Steel

10% Textile

Raw Material Recycling
(Stoffliches Recycling)

- Ambient Grinding
- Pyrolysis
- Purification
- Post Treatment

34% Oil

33% Carbon Black

10% Gas

14% Steel

Zeppelin: Confi

RECYCLING TIRE TEXTILE

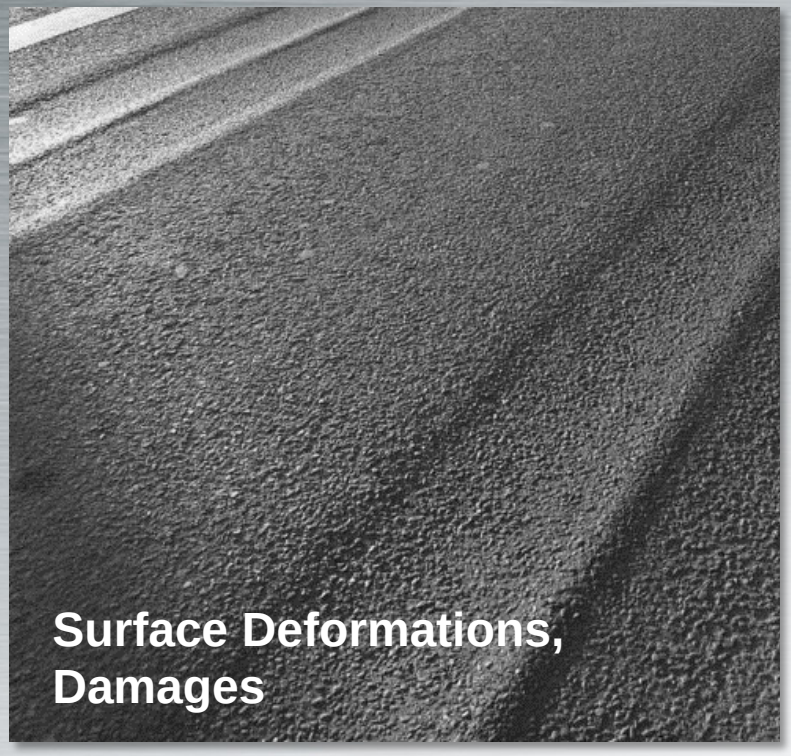
SMAPOL®

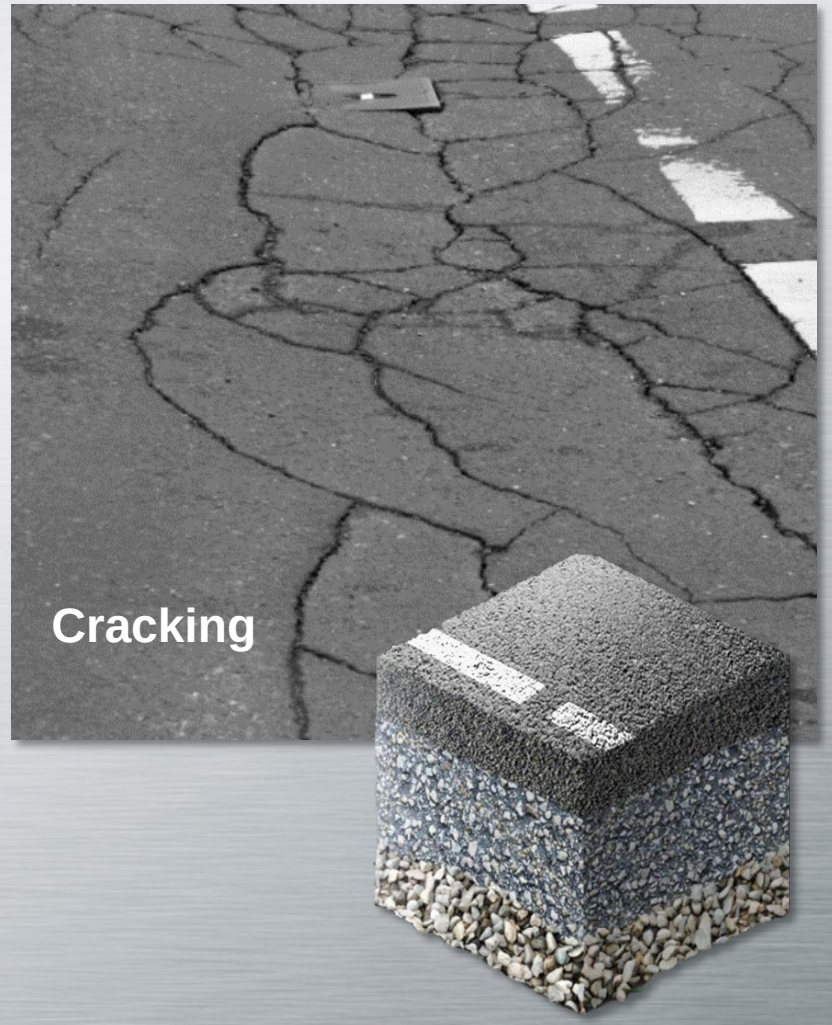
Just Additive

… for stabilization and disperse reinforcement of asphalt concretes

NEEDED: RELIABLE PAVEMENT FOR A SUSTAINABLE FUTURE

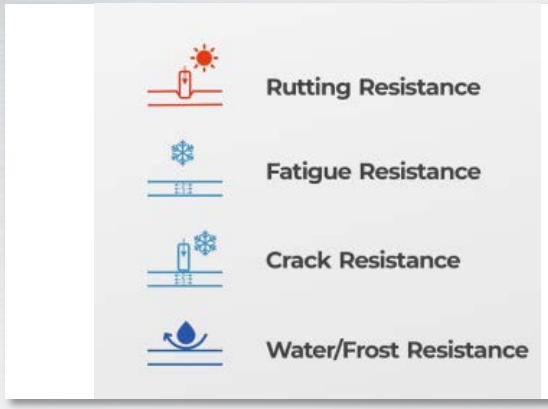
THE PROBLEM: PAVEMENT SITUATION TODAY

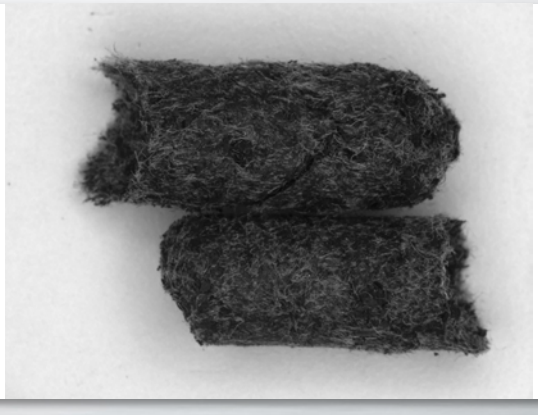




JUST ADDITIVE

SOLUTION: SMAPOL®





Zeppelin: Confi

ROAD FOR TIRES – TIRES FOR ROADS

SMAPOL®

Benefits

- Increased resistance to penetration of water
- Increased mechanical strength
- Increased resistance to routing
- Solving the problem of the textile across the recycling industry
- Volumes to satisfy the demand of road construction business

Zeppelin: Confi

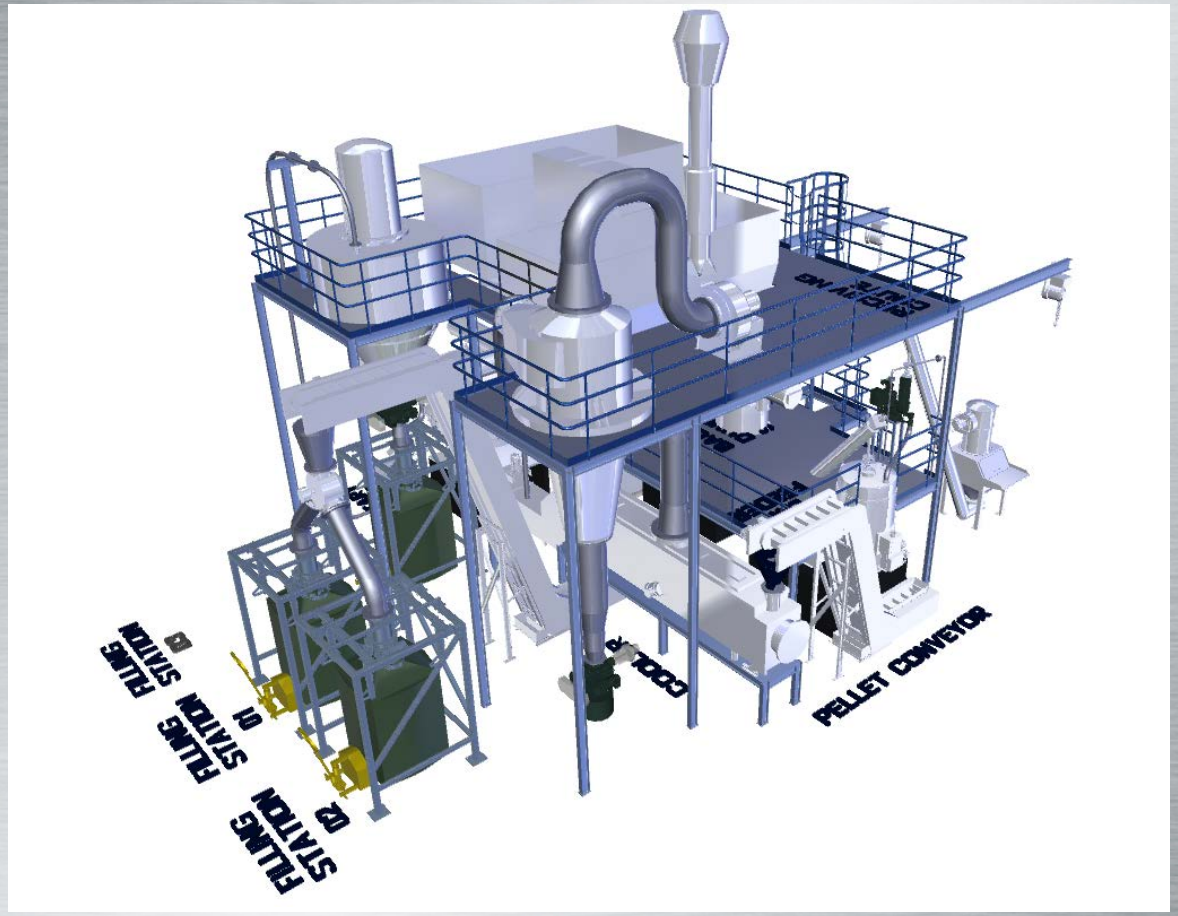
ROAD FOR TIRES – TIRES FOR ROADS

SMAPOL® PRODUCTION SYSTEM

Designed for Tire Recycling Facilities

as Stand-Alone Solution

- System Integrator — Zeppelin
- Licenser — Recykl
- Production capacity — 24 t/day
- Footprint — 80m²
- ROI — 2.5years



PYROLYSIS

TIRE RECYCLING DAY

Michal Mikuskiewicz

Founder
ReOil

reoil.pl

REJL

Industrial scale continuous pyrolysis plant

Presentation plan

I. Reoil's past and present

II. Pyrolysis process and the current plant capacities

III. The second plant and the development for the following years

IV. Cooperation with Zeppelin System

I. **Reoil's** past and present

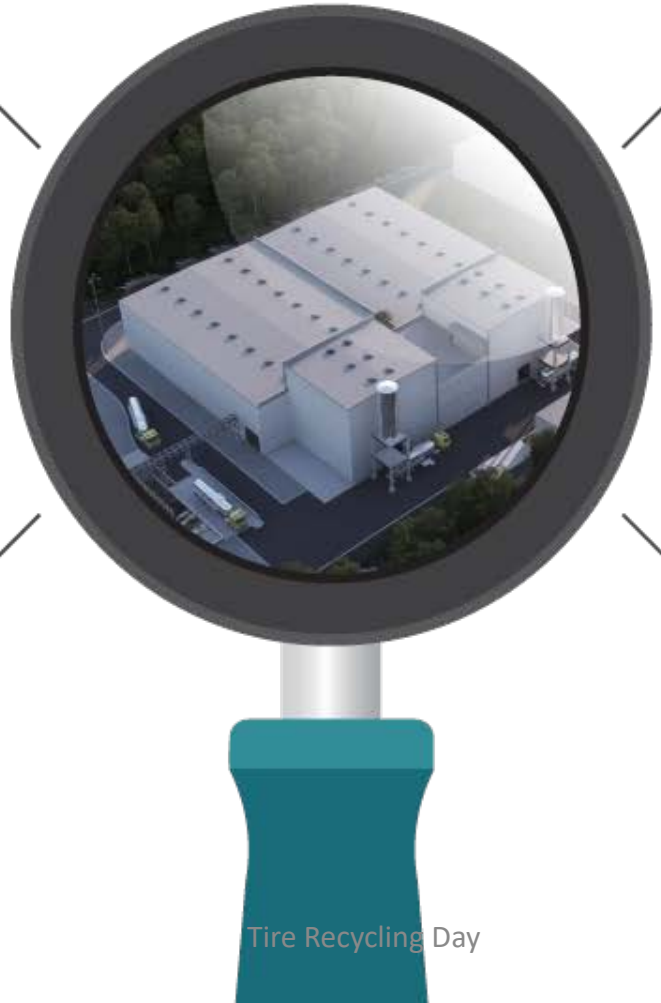
The current Reoil plant has been in operation since 2015. In the years that followed, the technology was enhanced and improved to achieve the full continuous process in 2019.

Reoil has been cash-positive since 2020. In 2023 Reoil will reach a revenue of 11 mln Euro with EBITDA of 5,8 mln EUR, which allows the financing of ongoing development and preparation for investment in the second plant (feed engineering, permits, land preparation) without the involvement of external investors.

I. **Reoil's** past and present

Reoil's entire production is contracted for the coming years and the company operates with practically no stocks **of its products.**

To accelerate the project's expansion in 2022 an agreement was signed with Rubicon Partners to attract an investor for Reoil. This process is in its **final stages.**

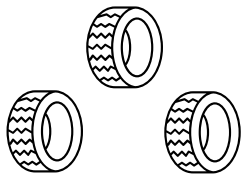


Reoil is differentiated from its competitors in the chemical tyre recycling industry by the continuity of the process leading to a highly profitable business, not in the plans, but already today, and has **been for 3 years.**

Till today Reoil has processed more than 70,000 tonnes of end-of-life tires turning them into **valuable products.**

II. **Pyrolysis** process

End-of-life tyres
20 000 MT per annum



Front-End Pre-Processing

Tyre Crumb

Steel
2600 MT per annum

Textile
400 MT per annum

Pyrolysis process
2 lines = 4 rotary kilns

Pyrolysis Kiln/ Reactor

Quench Cleaning System

SYNGAS used in production

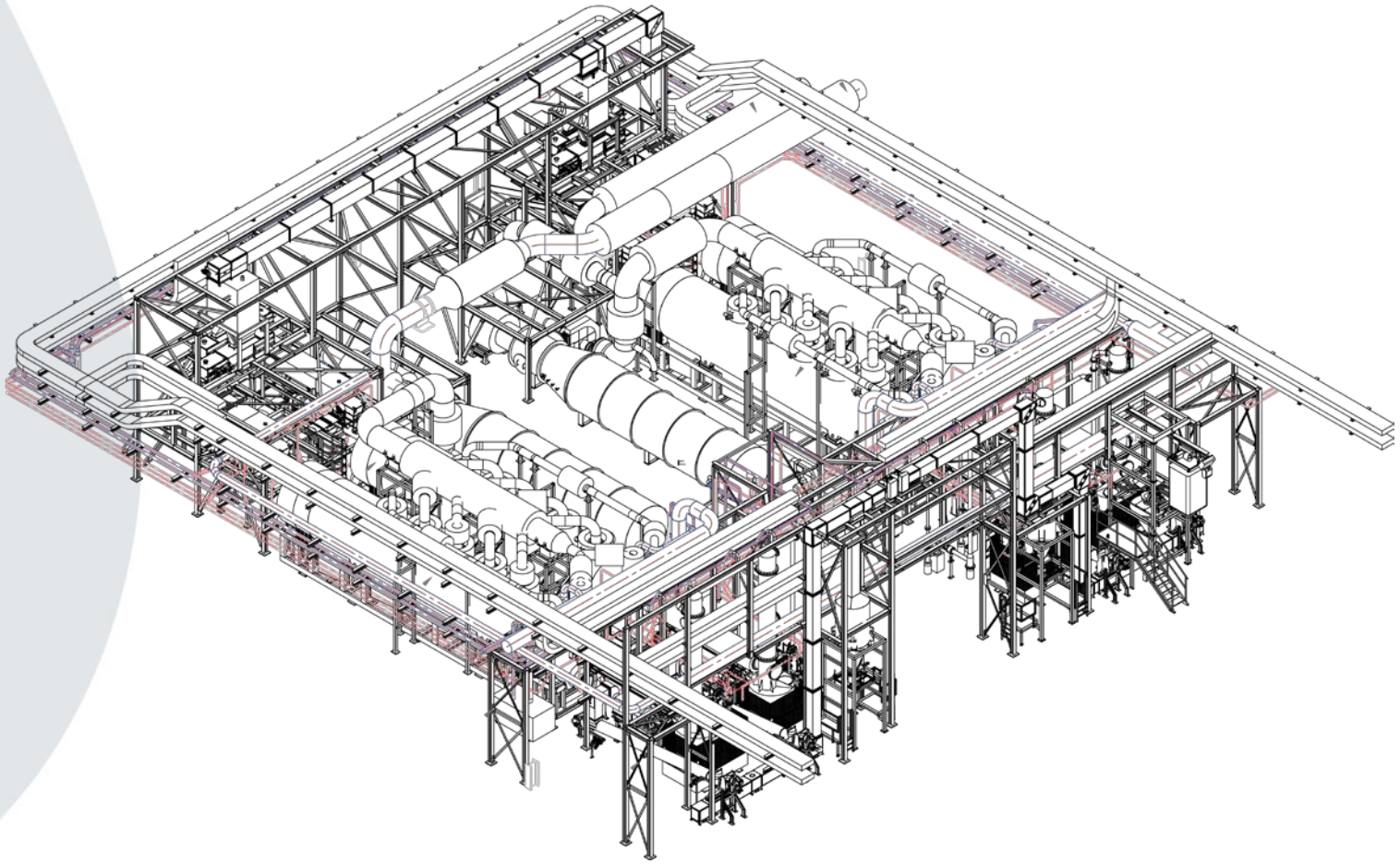
rCB
Recovered carbon black
6400 MT per annum

Tyre pyrolysis oil (TPO)
8600 MT per annum

7 800 hours of operation per annum
40 days of maintenance per annum
The completely **automatic control process** by SCADA system

II. **Current** plant

- two **production lines**
- complete facility for **recovered Carbon Black**
- Laboratories **for TPO and rCB**



II. Capacity of the plant

20 000 tonnes of **tyres** per annum

2 lines **= 4 rotary kilns**

oil: 8600 tonnes per annum

rCB: 6400 tonnes per annum

steel: 2600 tonnes per annum

7800 h/per annum

Automatic **process control** by SCADA system

maximum **40 days** per annum for maintenance

III. The second **plant**

In 2020 the land for the second plant was acquired (12 hectares). The following year the development plan was amended in accordance with Reoil's guidelines and in September 2023, the preparation of the land for the investment was completed.

Unnecessary buildings were removed, the land was cleared of 400,000 tonnes of soil, and an environmental report was prepared.

RECOVERED CARBON BLACK PURIFICATION

TIRE RECYCLING DAY

RECOVERED CARBON BLACK

RCB Nanotechnologies GmbH

Niels Raeder

CEO & Founder
RCB Nanotechnologies

recovered-carbon-black.com

RECOVERED CARBON BLACK
RCB Nanotechnologies GmbH

INNOVATIVE RECOVERY OF CARBON BLACK FROM WASTE TIRES AS KEY TO A CIRCULAR ECONOMY

TIRE RECYCLING DAY, 26.10.2023

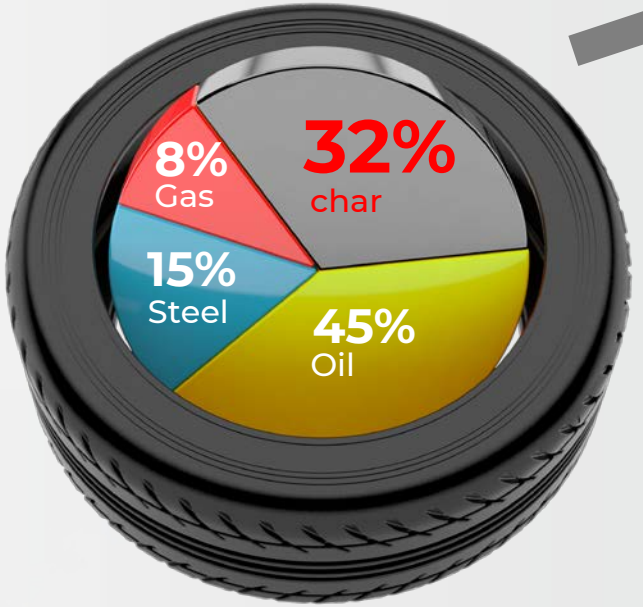
IN COORPORATION WITH:

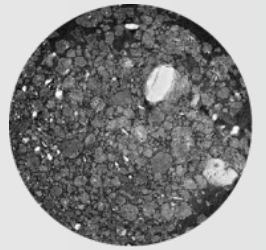
Fraunhofer IBP

LIMIT OF TODAYS TIRE RECYCLING

- Through a thermal process (pyrolysis) waste tires are processed and separated into **steel, oil** and **char**.
- **Existing markets for oil and steel**. New projects like “Chemcycle” created by BASF are already using the oil.
- The **gas** is used as process energy.
- The char contains **Carbon Black** and up to 25% of additives, mainly **Silica** and **Zinc** components.

The goal is separating the char into pure recovered Carbon Black , Silica and Zinc to be reused in the industry.

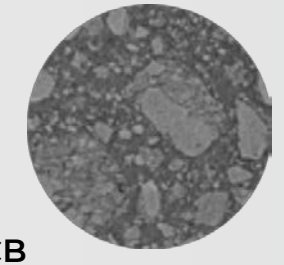




char

Recovered Carbon Black content < 75%
impurities of residual oil, Zn- and Si-fractions (white particles)

≠



virgin CB

virgin Carbon Black N550 used in todays tire production
no impurities of Zn- and Si-fractions (no white particles)

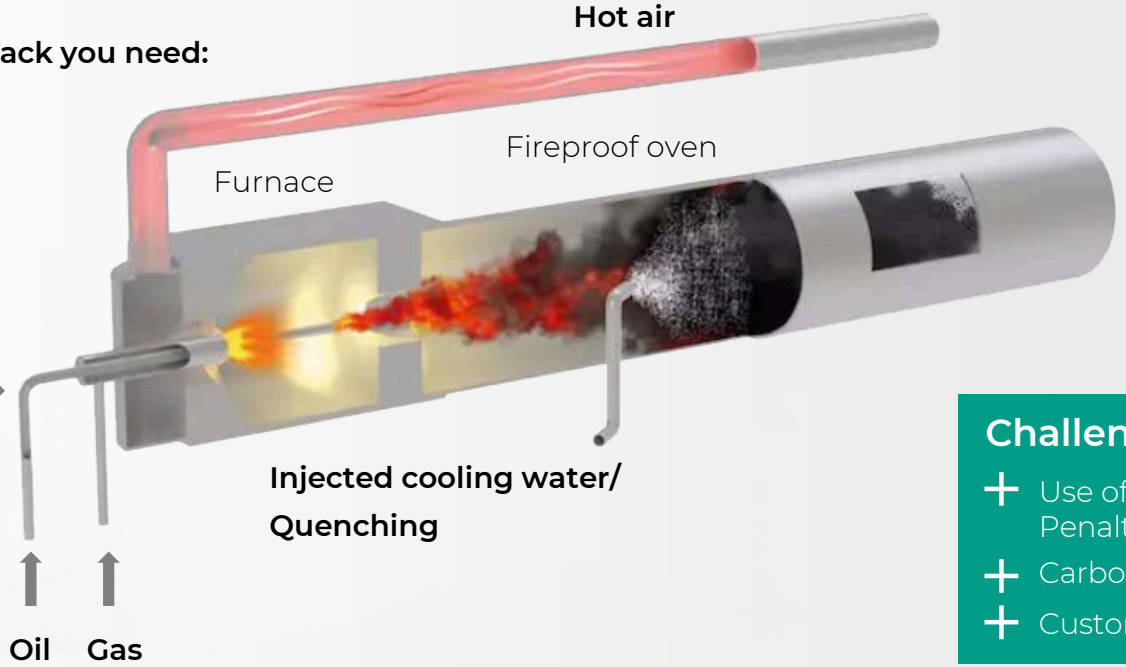
Figures (1): micro CT comparison by Fraunhofer IBP 2021 of Carbon Black types (from standard pyrolysis. Nano rCB and conventional produced)

NON-SUSTAINABLE TRADITIONAL CARBON BLACK PRODUCTION

- Invented in 1889
- Based on fossil resources
- Significant air pollution
- Cabot, Birla, Orion, Tokai, Black Cat >50% global production

To produce 1 ton of carbon black you need:

Up to
2 tons oil + gas



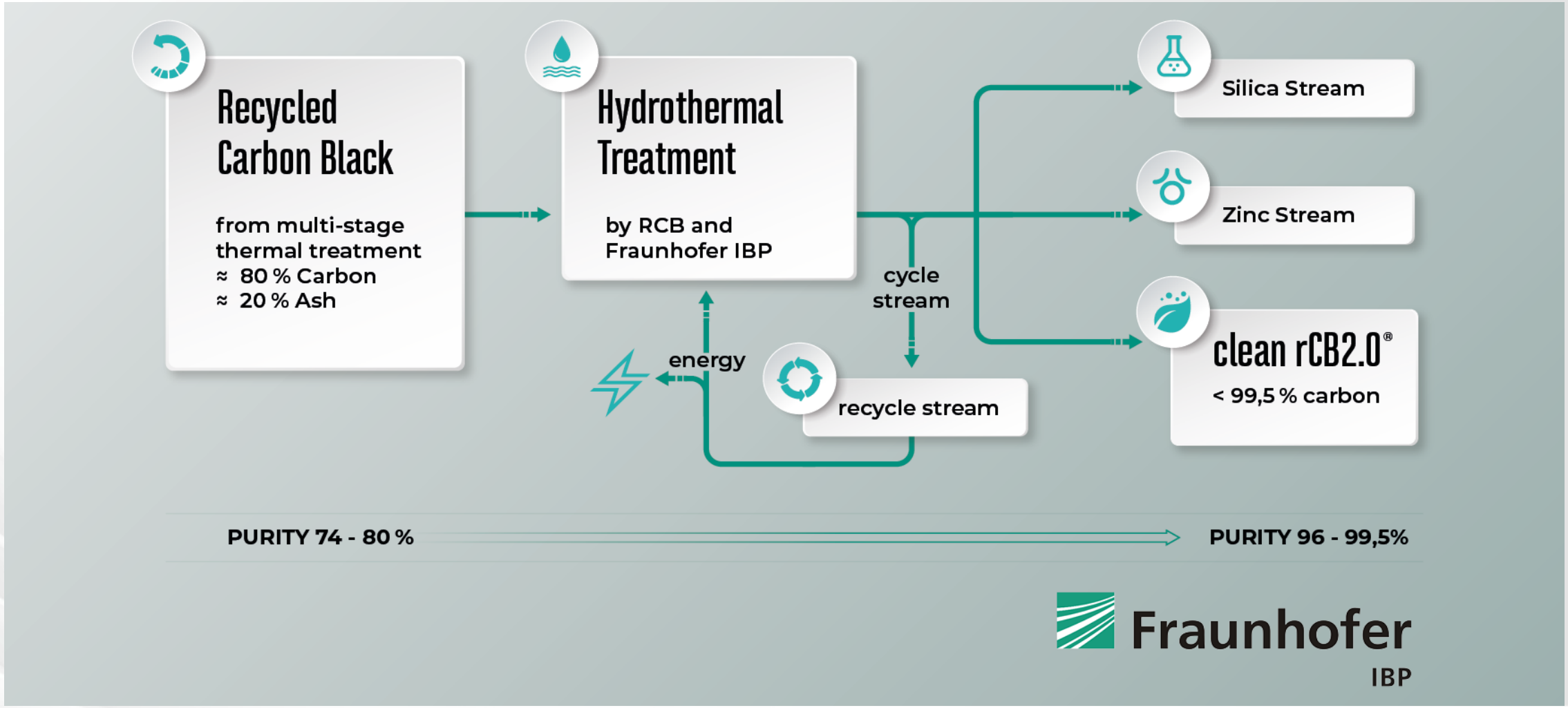
Up to
3 tons of CO_2

1 ton of Carbon Black

Challenges for the Carbon Black industry

- Use of fossil resources will be limited in the near future
  Penalties on CO_2 will significantly increase
- Carbon Black prices will increase dramatically
- Customers are demanding real sustainable alternatives

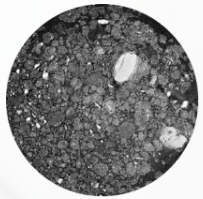
RECOVERING SOLUTION



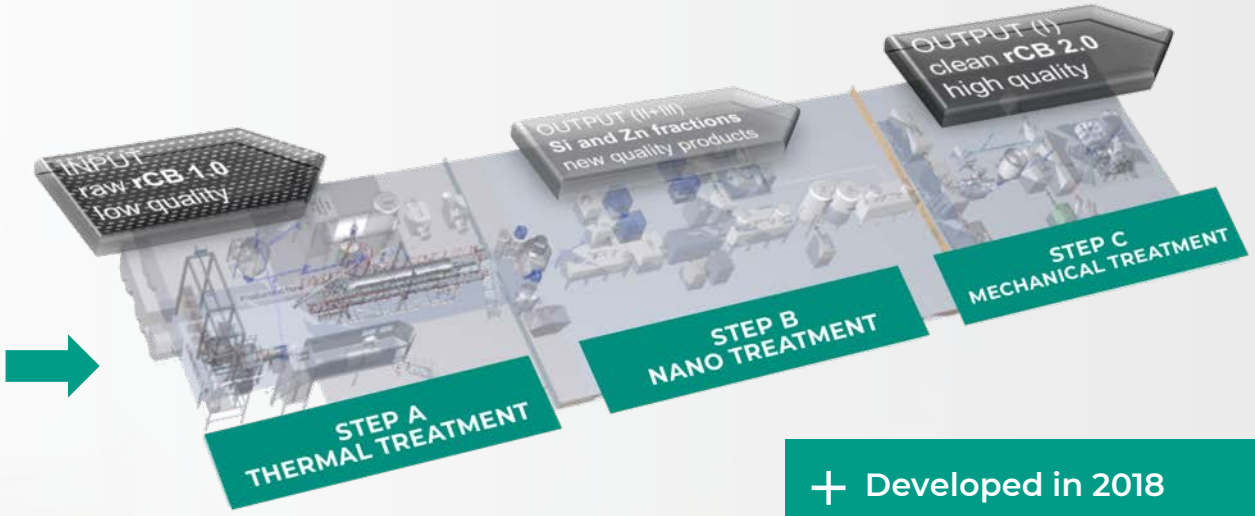
RCBs DISRUPTIVE SOLUTION IN COOPERATION WITH Fraunhofer IBP

RCB has developed **a technologically and environmentally sustainable solution** for the production of **clean rCB 2.0®** (recovered Carbon Black). Standard raw-rCB (Char) is processed in our **industrial 3-step process** into new material using an innovative and patented technology.

1.2 tons of raw-rCB



Made of 3,6 tons of waste tires



+ Developed in 2018
+ Patent filed in 2019
+ Industrialized in 2020-2022

1 ton of recovered Carbon Black 2.0®

rCB® pure RECOVERED CARBON BLACK

0.2 tons of recovered Silica and Zinc

rSi® RECOVERED SILICA

rZn® RECOVERED ZINC

Figures (2): micro CT comparison by Fraunhofer IBP 2021 of Carbon Black types (from standard pyrolysis. Nano rCB and conventional produced)

Figures (3): Nano rCB industrial standard module

RESULTS

recovered rCB 2.0®

(Carbon content 96-99%) no impurities of Zn and Si fractions (no white particles)

STEP A

Thermal treatment

A controlled thermal process removes the volatile content of the raw-rCB (Char) while keeping the properties of the carbon black intact. This thermal process has been specially developed by RCB Nanotechnologies to prepare the input material for the Chemical post-treatment.

STEP B

Nano treatment

Fraunhofer, the leading European research institute, invented and developed on behalf of RCB Nanotechnologies a chemical post-treatment of raw-rCB (Char) resulting in up to 99% pure carbon rCB 2.0®. Ash content is reduced, as silica and zinc are separated and marketed as new sustainably recovered products.

STEP C

Mechanical Treatment

After the cleaning process, the new rCB 2.0® is now in particle sizes <10 µm and formed into pellets tailored to the industry's application requirements and matches or exceeds the recognized ASTM standard grades.

Figures (4): micro CT comparison by Fraunhofer IBP 2021 of Carbon Black types (from standard pyrolysis. Nano rCB and conventional produced)

RESULTS

Optimisation of the RCB Nanotechnologies process has resulted in a high quality, pelletised, rCB 2.0® product that exceeds the expected performance envelope of recovered carbon black. The key improvements noted over previous samples were:

+ Further increased carbon content of the rCB 2.0®.
+ Significantly enhanced dispersion, elevating tensile strength in-line with N550.

“Overall, the rCB 2.0® provides a very good match to N550, something that has not been achieved to date.”
Chris Norris, General Manager Artis

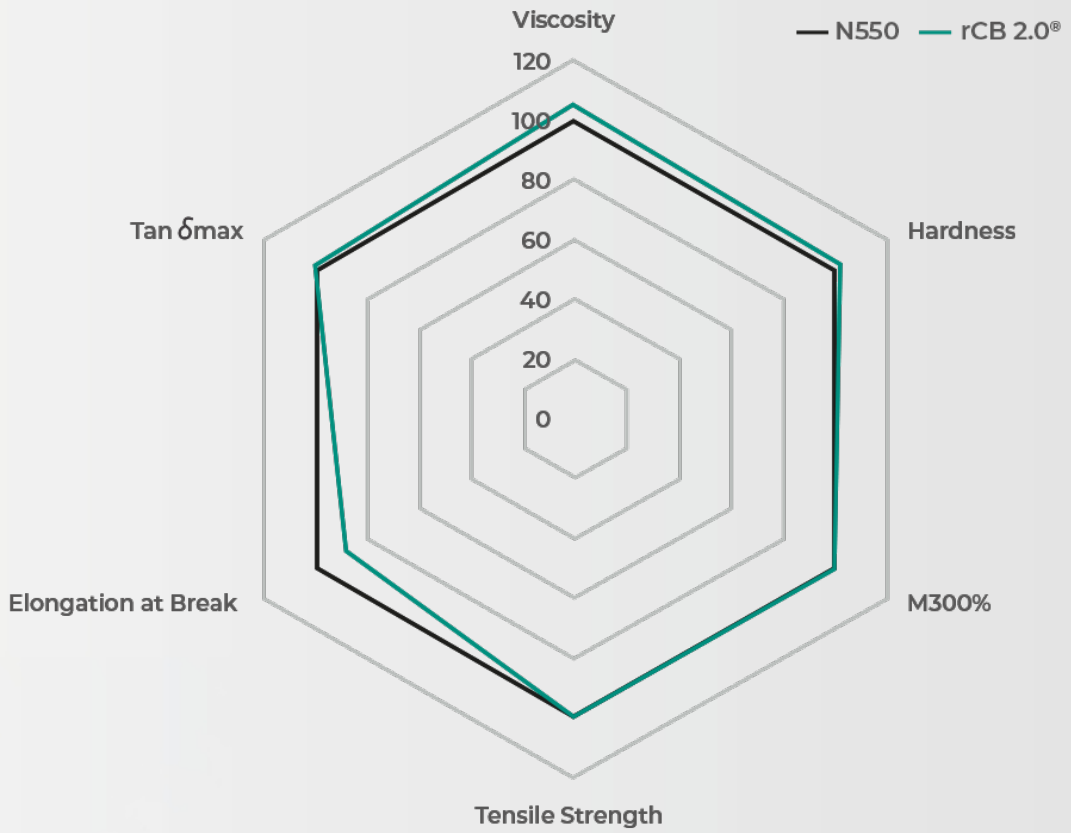


Figure (5): In rubber properties of rCB 2.0® compared to N550

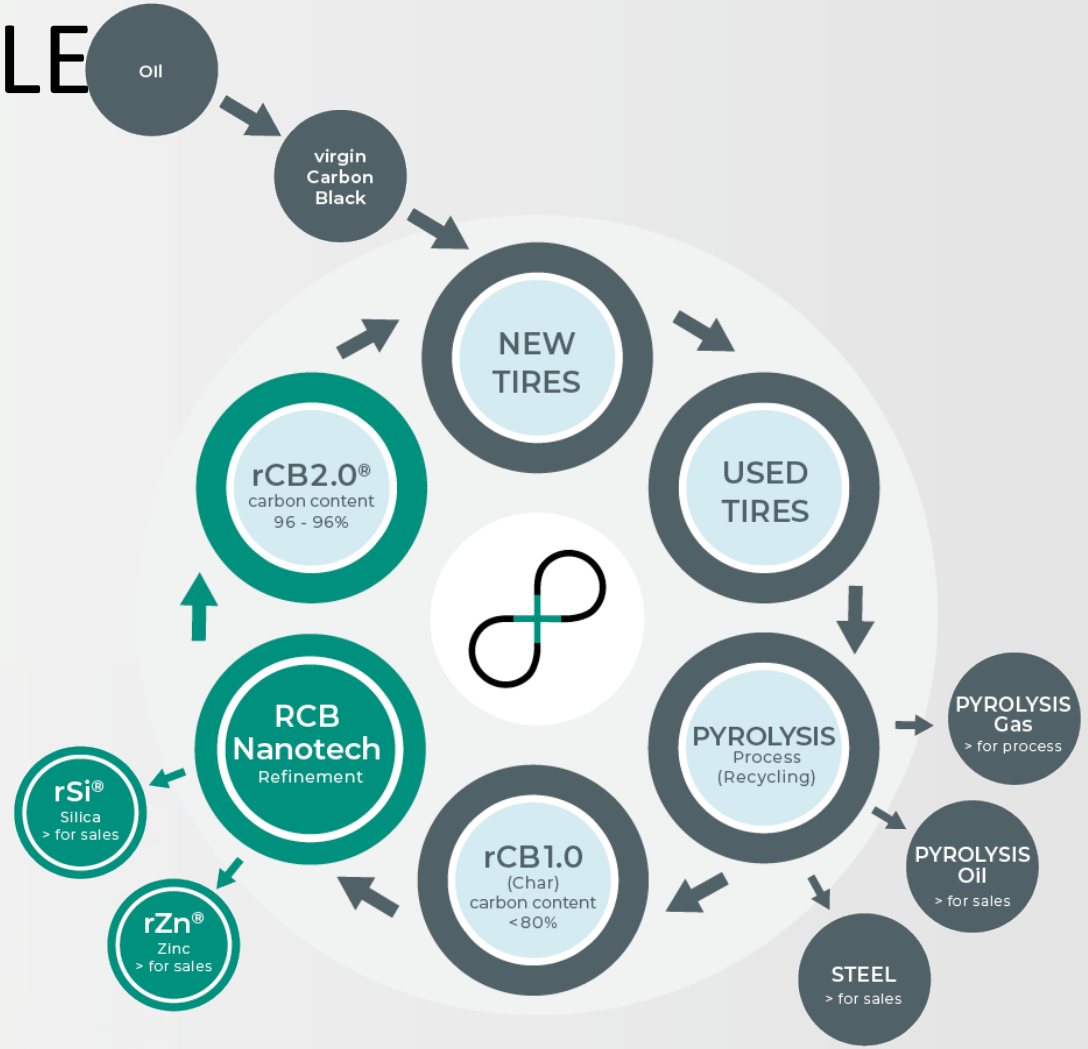
Quotes from customer feedback:

“In overall the new reclaimed carbon material showed similar behavior as a standard carbon black grade.”
Global leading producer of Black Masterbatch

“Compared to standard rCB the new rCB has higher reinforcing properties and is very similar to N550, as described in the Artis report. ”
One of the Global Top 15 tire manufacturer

UNIQUE TIRE VALUE CIRCLE

- The refinement process of RCB Nanotechnologies upgrades Raw-rCB Char to a real sustainable alternative to virgin Carbon Black.
- At the same time valuable new products are gained from the removed ash fraction.
- These rSi®- and rZn®-products can also be used for the production of new tires.
- rCB 2.0® can replace different virgin Carbon Black grades such as N550 in the tire and mechanical rubber industry as well as in plastic and masterbatch applications, pigments and coatings.



FUTURE ENVIRONMENTAL INITATIVE

Under the name of **KOLIBRI** an alliance of industry partners (DLR Köln, Fraunhofer IBP, BBG, RCB, E-Lyte, UniverCell, Zeppelin) have started a pan-European joint project (by BMWK) **developing sustainable components of Li-ions batteries**. rCB 2.0® plays a critical part by substituting the batteries anode and other Carbon materials. In September 2022 the German government confirmed non-refundable grants of up to EUR 4 mio.

MANAGEMENT OF DYNAMIC CARBON FOOTPRINT

TIRE RECYCLING DAY

SIEMENS

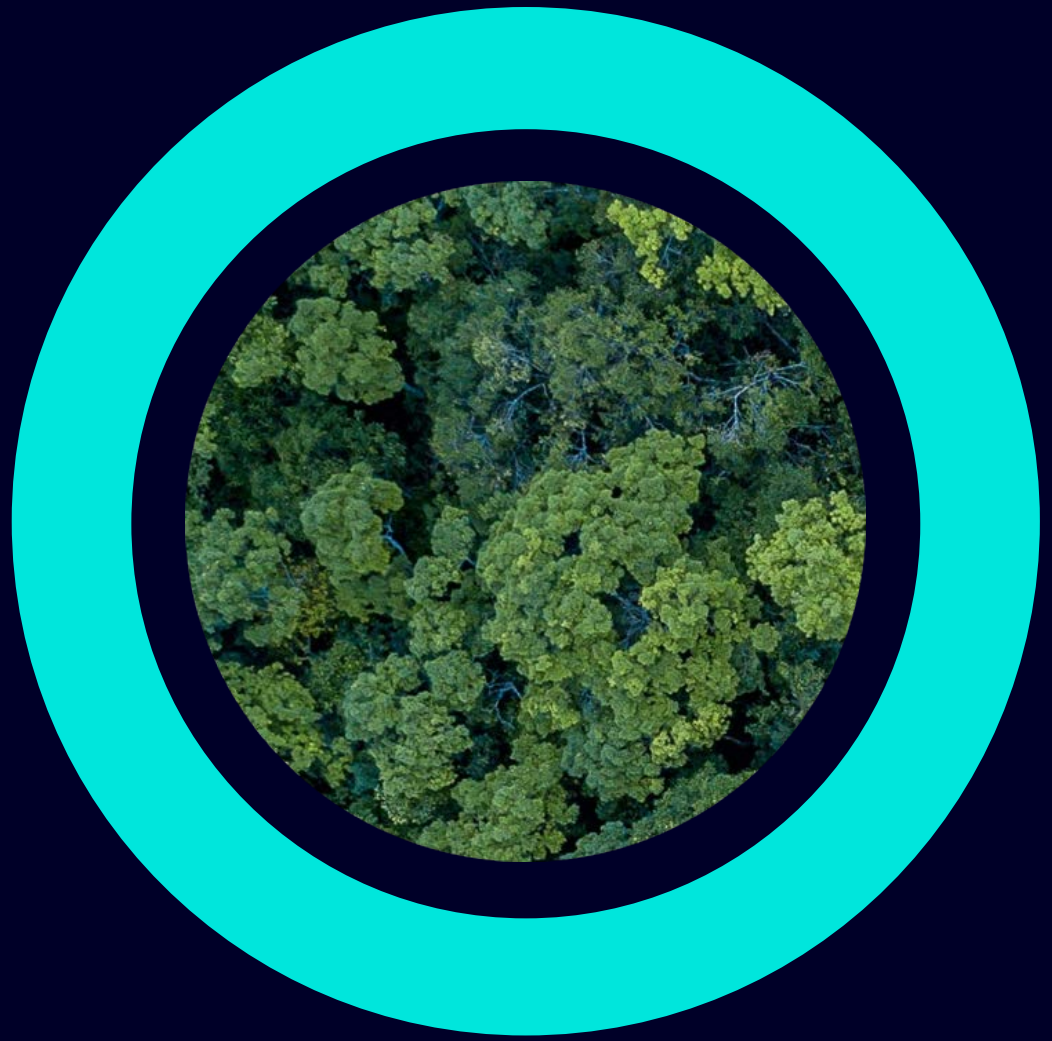
Maximilian Sackerer

Factory Automation
Siemens

siemens.com

Sustainability
in the Tire Industry

Multiply impact for the world we want to
live in today and tomorrow



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Sustainability is crucial for the industry

Decarbonization

30%

of global CO_2 emissions come from industry

(Source: McKinsey)

Energy efficiency

38%

of the global energy is consumed by industries

(Source: IEA)

Resource efficiency

Only **13%**

of all global waste is recycled

(Source: Accenture)

The tire industry is facing global challenges that require a transformative change – making sustainability the #1 strategic topic

Decarbonization

Net zero commitments, reporting & compliance

End to end transparency of carbon footprint across the whole supply chain

Energy efficiency

Eliminate energy waste while cutting costs and reducing CO2

Optimum use of renewable energy

Resource efficiency

Resource scarcity and the transition to the circular economy

Create more value while reducing dependence on limited resources

Legal regulation

More and more countries want to become CO2 neutral and are making legal requirements in this regard.

Investor requirement

Capital is flowing toward sustainability

First countries such as New Zealand have set up climate change laws for financial companies.

Trends, impacts and challenges regarding sustainability that need to be addressed by tire manufacturers, system integrators, machine builders, and material suppliers

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Where are the industry players currently?

A variety of questions that have not yet been answered

How advanced am I in my sustainability journey today?

How do I reach net zero emissions?

How do I build on what I already have (e.g., existing energy efficiency technology)?

How to reduce my resource consumption (e.g., primary materials, water)?

How can technology & digitalization help?

What financing opportunities do I have?

How do I fulfill my investor's requirements for non-financial disclosure?

Which new regulations are upcoming and how to cope with these? (e.g., EU Green Deal, Human Rights Due Diligence Law)

With whom to partner?

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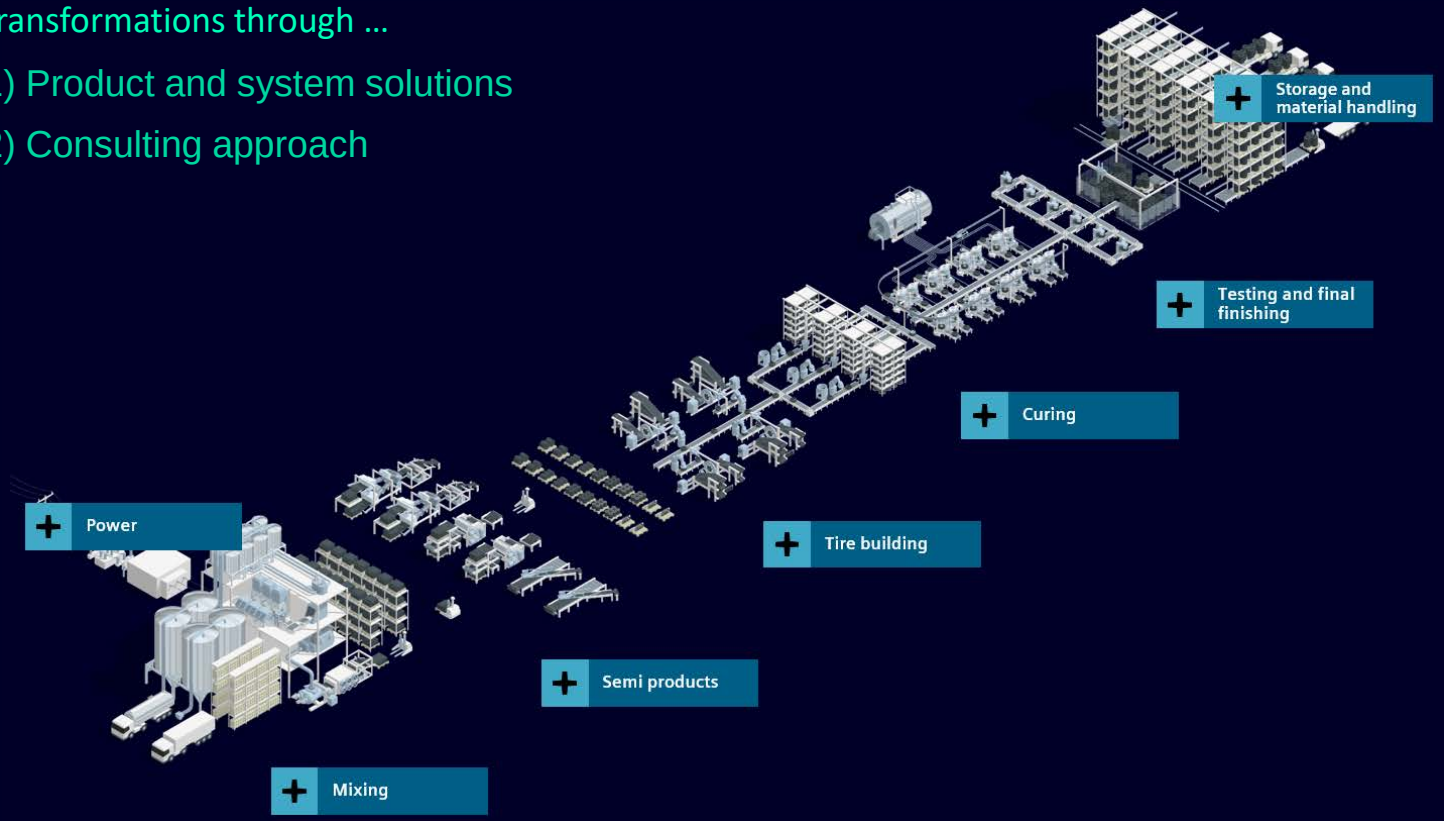
Sustainable Tire Production

Building a more sustainable tire by using optimized processes & infrastructure

We support our customers across their key sustainability transformations through …

1) Product and system solutions

2) Consulting approach



Decrease CO_2 footprint & increase energy efficiency

CO_2 Transparency
CO_2 monitoring & tracking along production process

Energy Mgmt.
Reduced energy consumption & improved efficiency (via load management)

Digital Twin
Sustainable design of product and production

Reduce waste & increase asset-lifetime

Retreading & Recycling
New recycling workflows and new start-ups

Energy Measurement
Transparency on energy consumption and load peaks

On-site Renewables
On-site CO_2 reduced power generation

Process Electrification
Heat electrification solutions with reliable power supply

Decarbonization & energy efficiency

Resource efficiency & circularity

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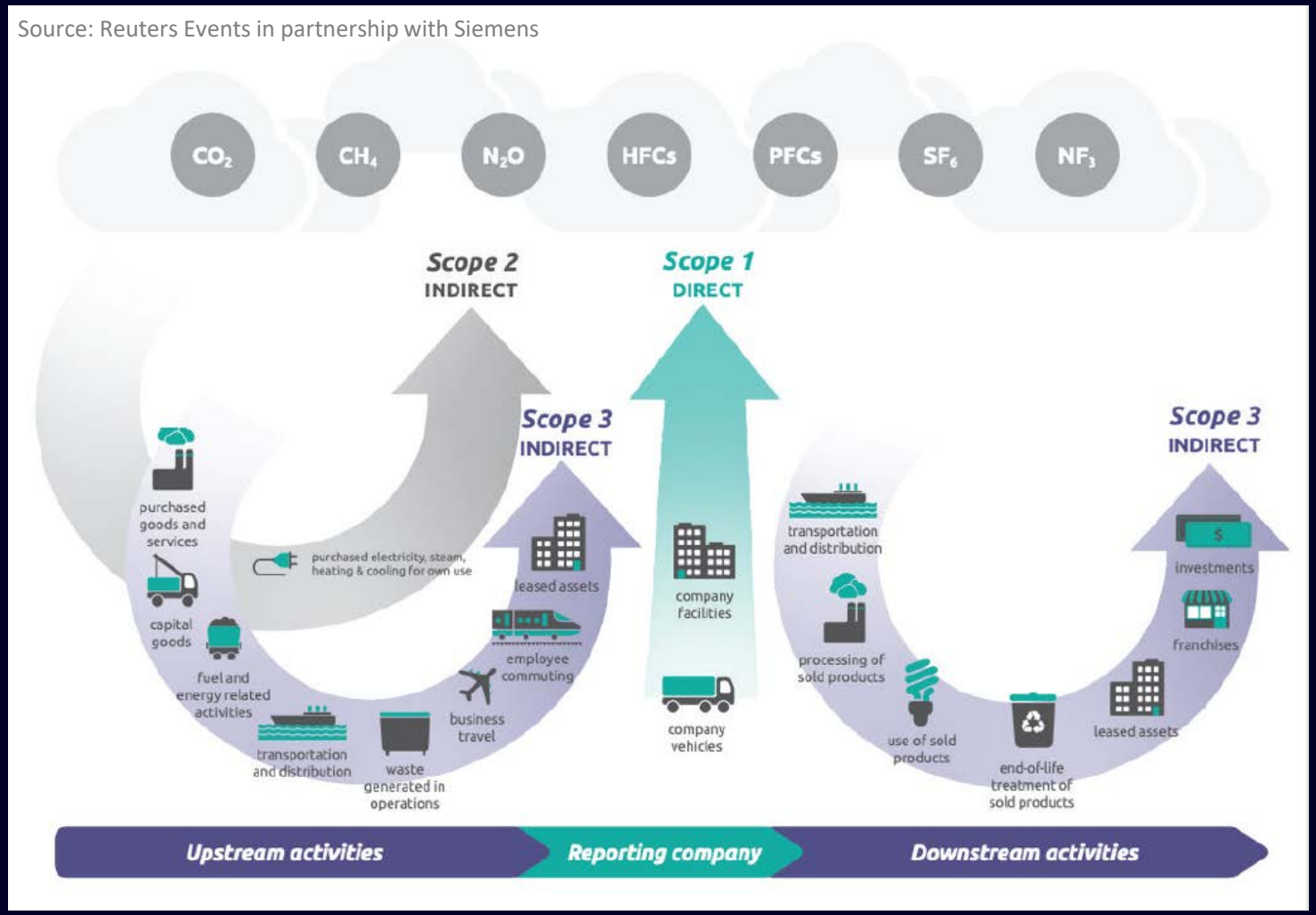
Understanding your emissions
The key to navigate ESG[1] regulation

- Overview of Greenhouse Gas Protocol scopes and emissions across the value chain (source Greenhouse Gas Protocol).
- Growing regulatory and stakeholder pressure requires industrial companies to record and disclose emissions which are under their direct control, as well as emissions from energy generated or purchased outside the company.
- Scope 1 emissions are direct emissions in production or through processes within the company itself.
- Scope 2 / 3 emissions are indirect emissions such as purchasing of energy, supply chain or use of the product
- There is a growing move to account emissions created by a company's supply chain and the use of its products. More than 70% of a company's emissions may fall under this scope.

Source: Reuters Events in partnership with Siemens



1) ESG: Environmental, Social, and Governance

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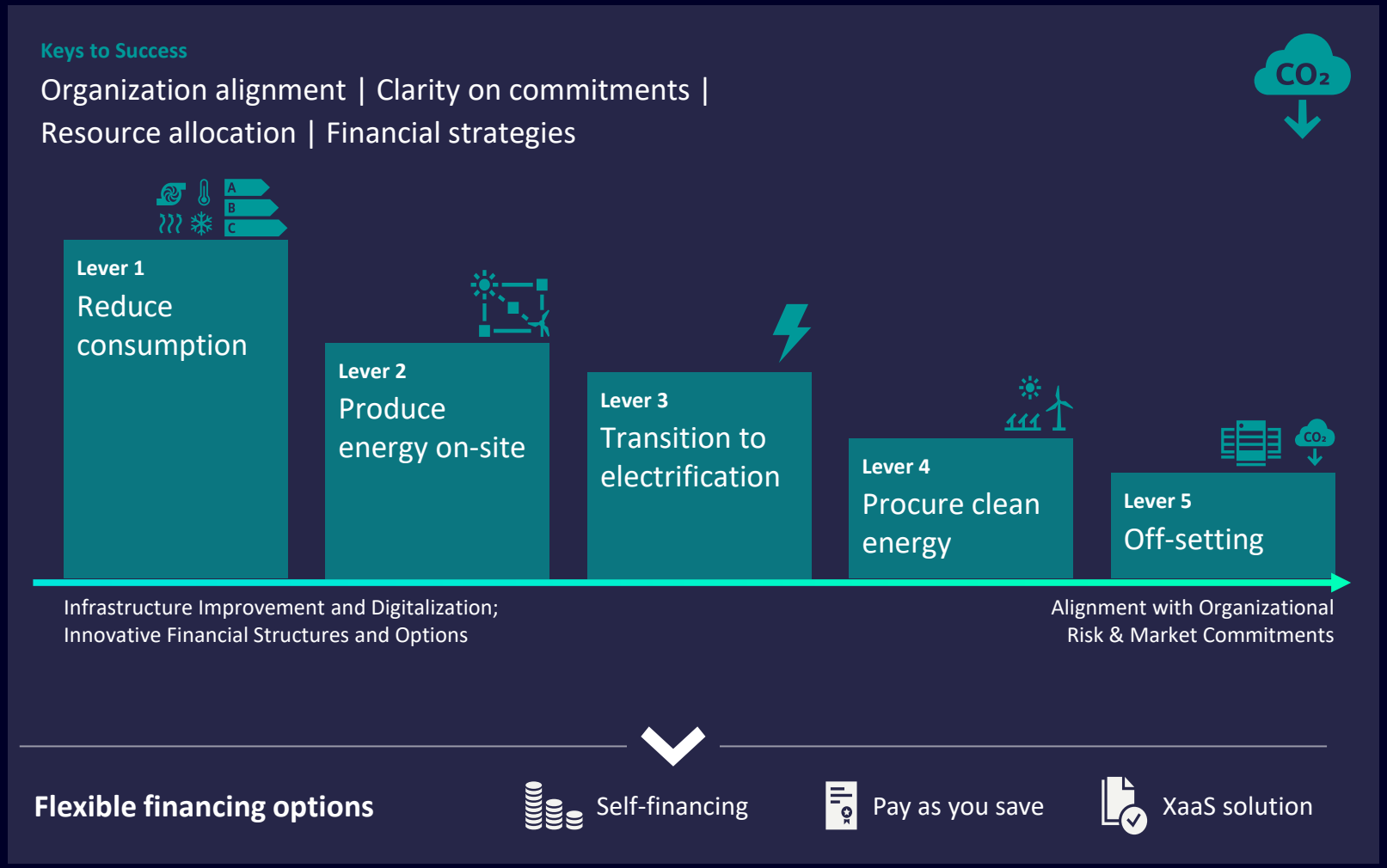
Decarbonization programs is complex and requires financial and organizational commitment

Siemens as a trustworthy consulting partner



Solution

- **Sustainability programs: End-to-end consulting and decarbonization implementation approach**
- **Flexible financing models: CapEx or OpEx based, including off-balance sheet solutions**
- **Support of your individual goals: flexible models and service options with performance guarantee**

Sustainability Relevance

End-to-end decarbonization & sustainability programs help in achieving **decarbonization/sustainability goals** with clearly defined steps and roadmaps

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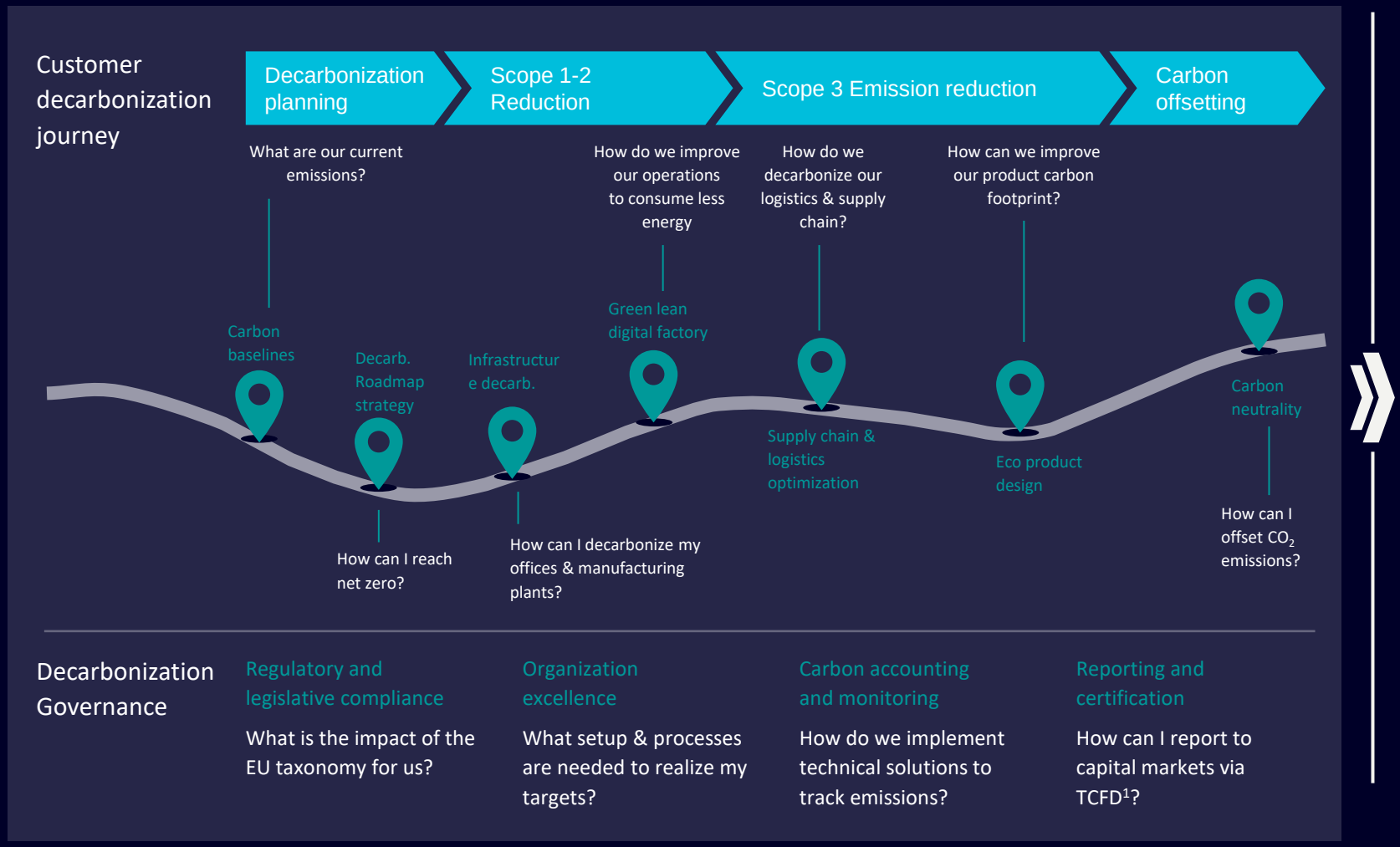
End-to-end decarbonization programs and consulting

The road to carbon neutrality is difficult when you don’t know where to start and which lever has the biggest impact



Solution

- **Baseline** your current **emission status**
- Identify business **opportunities** & **risks**
- **Develop** decarbonization **strategy** & **roadmap**
- **Define measures to decarbonize** e.g., product design, energy efficient infrastructure

Sustainability Relevance

Facilitate the energy transition/ decarbonization journey by optimizing energy consumption and reducing carbon footprint

1) TCFD: Task Force on Climate-Related Financial Disclosures

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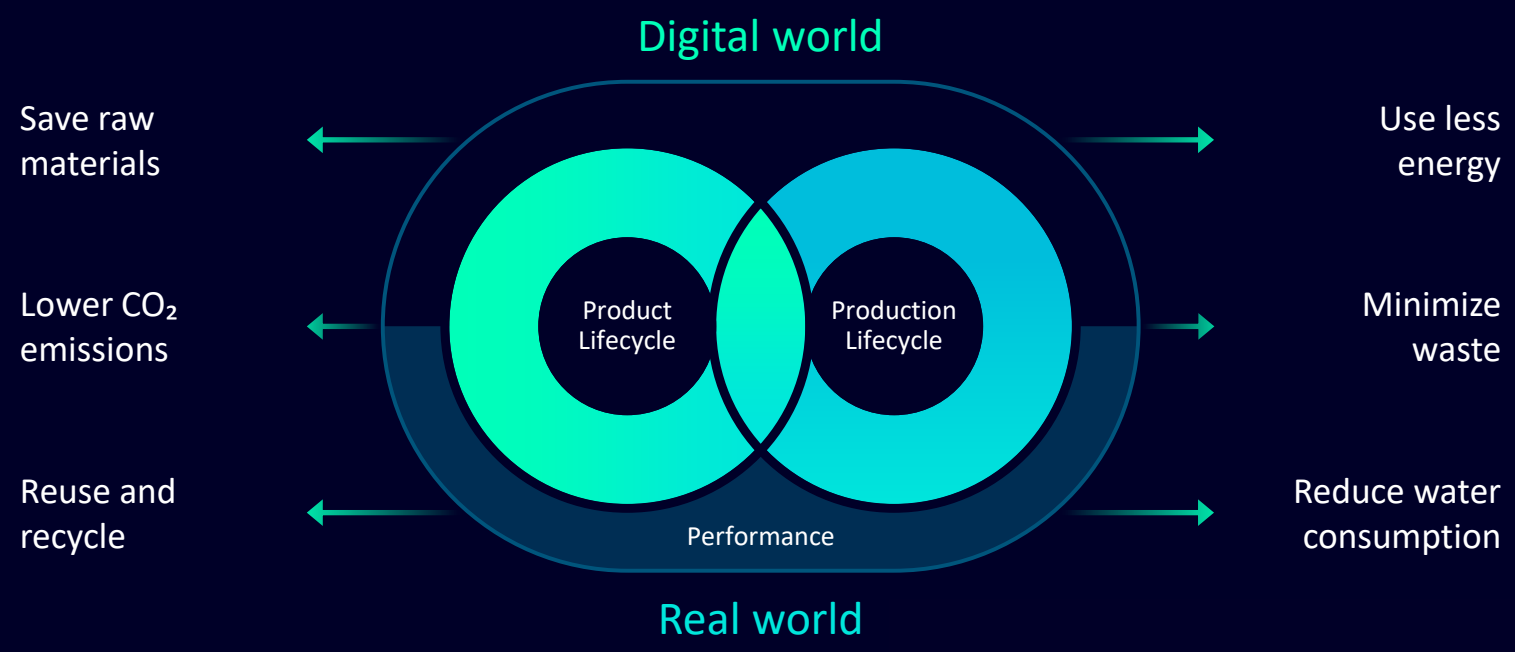
Capture real-world data | Holistic Digital Twin: Optimizing product design and production processes to produce more sustainable products and processes while balancing cost, reliability, and productivity



Decarbonization	Energy efficiency	Resource efficiency
up to 40% carbon saving	up to 40% energy saving	up to 50% material saving

Comprehensive digital twin approach

- Seamless flow of information from the real and digital worlds
- Holistic view of sustainability impacts along the value chain
- Continuous optimization loop to achieve greater sustainability (design concept, production and performance optimization)
- Track material and product compliance

Sustainability Relevance

The digital twin approach to sustainable product design allows for confident decision making for optimizations of resources, waste and CO_2 emissions

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Driving decarbonization with SiGREEN

End to end transparency of carbon footprint across the whole supply chain

Ecosystems for scaling

Catena-X Automotive Network

wbcsd

TOGETHER FOR SUSTAINABILITY

ESTAINIUM Network

WORLD ECONOMIC FORUM

SiGREEN works with open data ecosystems and standards …

SiGREEN

Customers

Suppliers

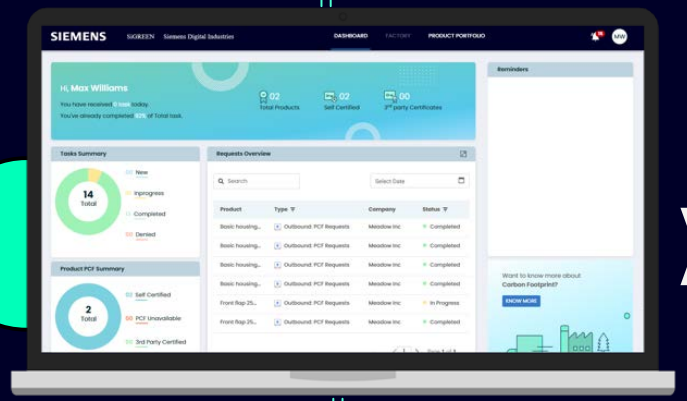
Manufacturers

Carbon Sinks[1]

… to enable collaboration with your partners up- and downstream

ERP systems

3rd party software



OT

IT

Solution

- Central platform to create **transparency on PCFs** based on primary data
- **Automated PCF calculations** from internal data sources via IT/OT connectivity
- Adopt trust technology for **peer-to-peer sharing of verifiable PCF** while securing confidentiality

Sustainability Relevance

End to end transparency of carbon footprint across the whole supply chain (Certification, verifiable credentials, data). Making ESG data actionable!

Multi-standard compliant | cross-industrial

Leveraging Siemens' industry expertise

1) Interface development in progress / PCF = Product Carbon Footprint

SIEMENS

Driving decarbonization with SiGREEN

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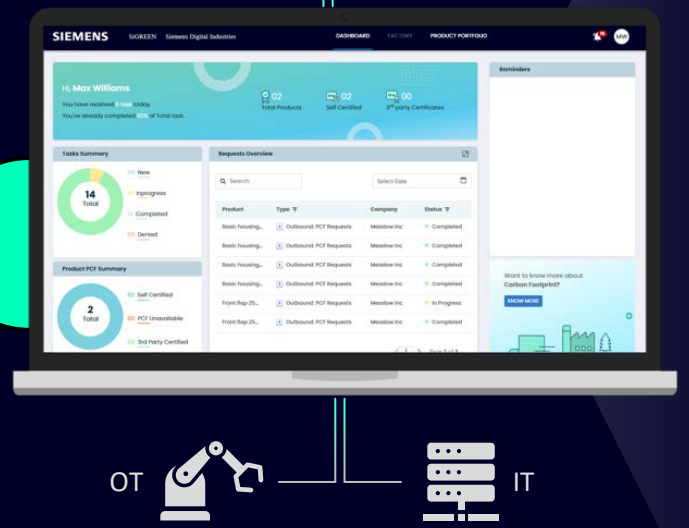

SaaS application to exchange dynamic Product Carbon Footprint (PCF) along the entire supply chain

Efficient acquisition and secure exchange of real-time emission data enabling transparency and optimization

Confidential and decentralized data due to blockchain technology

Verifiable credentials for data trustworthiness

Open APIs to connect IT/OT for automatic data collection

Multi-standard compliant | cross-industrial

Leveraging Siemens' industry expertise

1) Interface development in progress / PCF = Product Carbon Footprint

SIEMENS

Let’s drive sustainability together!

Maximilian Sackerer

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Senior Business Consultant

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Thank you for your attention!

SIEMENS

LUNCH & NETWORKING

ZEHRER
GASTRONOMIE

PRODUCTION & TECHNOLOGY CENTER TOUR

PRODUCTION AND TECHNOLOGY CENTER TOUR

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PRODUCTION AND TECHNOLOGY CENTER

Meeting Point Foyer:
Please carry your numbered visitor badges with you!

Schedule: 2 p.m.

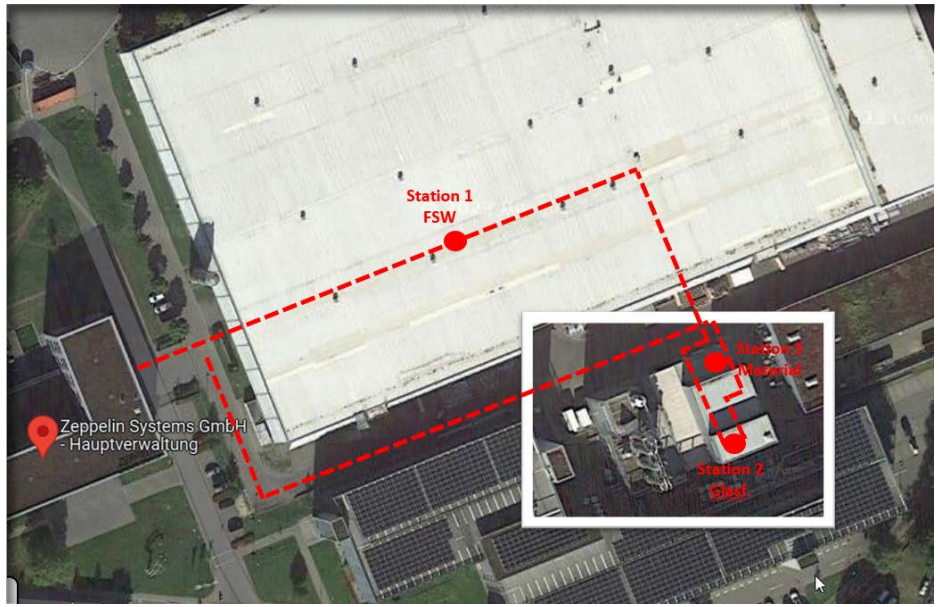
PRODUCTION AND TECHNOLOGY CENTER

- Please do not leave the marked walkways
- Production stop during the tour
- Therefore no PPE necessary

Friction-Stir-Welding System

Conveying system

Materials testing



TIRE RECYCLING DAY

Podium Discussion

PODIUM DISCUSSION

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ZEPPELIN SYSTEMS GMBH

Press Release

Zeppelin Systems and ReOil build superlative Tire Recycling Plant in Poland

YOUR QUESTIONS PLEASE

TIRE RECYCLING DAY

Thank you!

azur PARTNER
ALLIANZ ZUKUNFT REIFEN

ZEPPELIN
WE CREATE SOLUTIONS


ZEPPELIN
Rental
ZEPPELIN
WE CREATE SOLUTIONS