Let’s learn from:yesterday

Page 8

Knowledge, skills and extensive experience – a strong foundation for our journey into the future.

Let’s act:today

Page 20

A new impulse every day – for sustainability, art and equal opportunity.

Let’s talk about:tomorrow

Page 40

Transformation and diversification – new approaches to future waste utilisation and resources.

In dialogue for **sustainability**

www.lets-talk-about-tomorrow.com

eew
Energy from Waste

In dialogue for **sustainability**

50

Lighthouse project for the **transformation**

Let's learn from:yesterday

from page *8*

Let's act:today

from page *20*

Let's talk about:tomorrow

from page *40*

Read about other topics and our sustainability report at:
www.lets-talk-about-tomorrow.com

Environment
Company
Employees
Society
Value chain

Each of the articles here corresponds to one or more of our **areas of action** (see page 26 for more info).

22

In dialogue for **sustainability**

28

Photographer **Lukas Hoffmann**

Clear goals for the future
EEW Energy from Waste



(from left to right) Markus Hauck, Bernard M. Kemper, Dr Joachim Manns

There are three questions that drove EEW and the people in our company in 2022: How can we reduce emissions? How can we secure valuable resources? And how can we strengthen the circular economy? The answer to all three questions in a nutshell: By making our business increasingly sustainable. To do this, we want and need to continuously engage in dialogue and drive forward the transformation of our long-established company. At the same time, it is clear to us that sustainable development is not a goal in itself – the aim of our work is to reliably provide waste treatment services and energy. As one of the leading European companies producing energy from waste and sewage sludge, we make an important contribution to climate protection and the circular economy – and this contribution will grow further.

To close more resource loops, we are also developing new business areas. This includes investing in our core business to further optimise our plants and ensure they are always fit for the future. And we are also investing in innovative projects that will enable us to continue providing reliable services in the public interest for our customers.

A well-planned approach sets out a – quick, safe and efficient – path to reaching these goals. As a company with a clear strategic direction, we have prepared ourselves for the challenges of tomorrow. This includes our sustainability strategy with specific targets we have derived from our updated materiality analysis. Our innovative strength and motivation are what drive us to successfully reach our goals. In doing so, we take our responsibility seriously and work every day on innovative solutions and technologies to further improve our environmental footprint. In this context, one thing is important to us: When we say "we," we primarily mean the people who work at EEW. They are the ones working every day to shape a sustainable a future.

As we celebrate our 150th anniversary, we are reminded how important it is to never stand still. In this publication, we document what motivates us and what we are achieving. It offers glimpses of yesterday, today and tomorrow at EEW. We appreciate every question and all input that helps us move forward on our path to a sustainable future. We hope you enjoy reading this publication!

Markus Hauck
Chief Financial Officer

Bernard M. Kemper
Chief Executive Officer

Dr Joachim Manns
Chief Operating Officer

Watch the message
from our Board of Management

Read our
Sustainability Report 2022

A long history
and a bright future

Xiong Bin

EEW can look back on a long history and much has changed during this time. But one thing has remained the same: Energy has always been at the core of the work carried out by people in this company and it will remain so in the future. Energy is also the common thread that weaves its way from the year 1873 to the present day and into the future.

Compared to the company's long history, the seven years in which EEW and BEHL have been working together is a relatively short time period. But in these few years, a partnership based on mutual respect has been established. Together we have brought our motto "One Family – One Goal!" to life. We are learning from each other and growing as a team. This is also true in terms of sustainable business: Sustainability is firmly anchored in both our organisations and embedded at the highest levels. It is an aspiration of great importance, which will only grow.

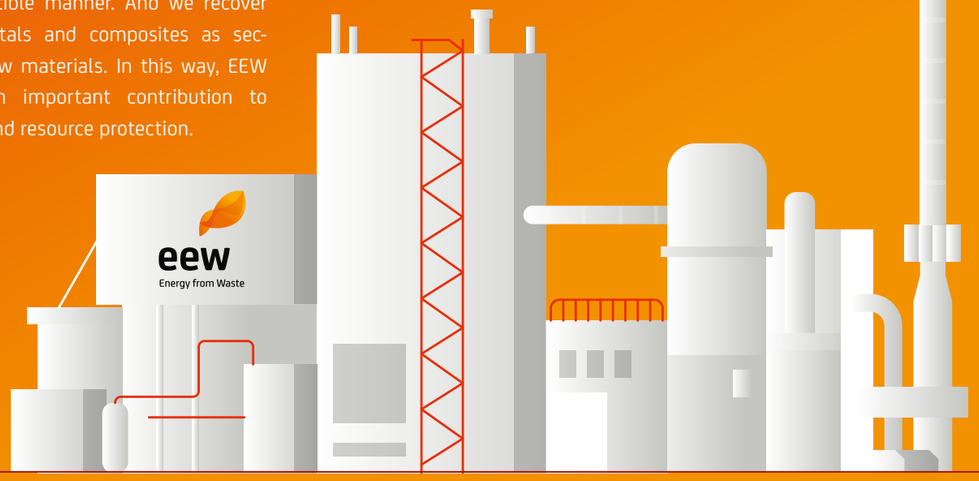
EEW has shown a tremendous capacity for transformation over the years, which has been fuelled by the desire for change and by the power of innovation. Employees have been the main driving force behind this, and we want to express our heartfelt thanks for their dedication and successful work.

XIONG Bin
Executive Director and CEO,
Beijing Enterprises Holdings Limited

EEW Energy from Waste:

A key player in the circular economy in Europe

EEW Energy from Waste (EEW) is one of Europe's leading companies in the thermal utilisation of waste and sewage sludge. At its sites, EEW uses residual waste to produce energy. We also dispose of the hazards contained in the waste in a safe and environmentally compatible manner. And we recover scrap metals and composites as secondary raw materials. In this way, EEW makes an important contribution to climate and resource protection.



5

sewage sludge mono-incineration plants
in operation or under construction

about **1,400**

employees

5,000,000

t/a thermal treatment
capacity for residual waste

approx.

1,060,000

MWh/a district heating
produced in a resource-conserving manner

approx.

3,350,000

MWh/a of process
steam produced

approx.

2,235,000

MWh electricity produced in a climate-friendly manner
for the equivalent of around 700,000 households*

17

energy from waste plants
operated by EEW in Germany
and neighbouring countries

Find out more about EEW
www.eew-energyfromwaste.com

* Assumed average electricity demand of 3,190 kWh per household, according to Destatis

“Change processes are stable if they have strong roots based in knowledge and ability.

Harry Korban
is a Head of Operations, responsible for the safe operations of the plant at the Premnitz site. During the construction of the new second line, EEW benefited from his many years of experience. Having worked at the company for nearly five decades, he is also EEW’s longest-serving employee.

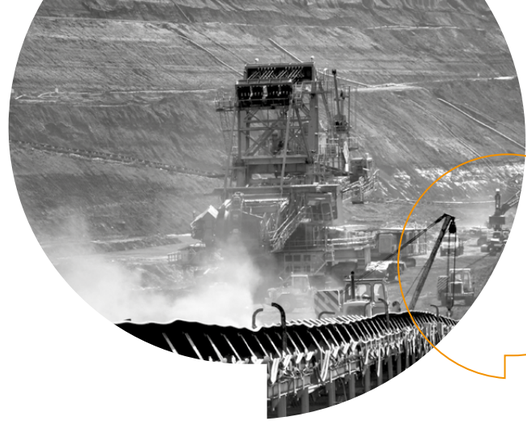
Let’s learn from:yesterday

EEW is a modern, forward-looking company that takes on responsibility. The seeds for EEW’s future success were sown in the past. This is exemplified by the two new turbines at the existing facilities in Neunkirchen and Pirmasens: They increase energy efficiency by as much as 25%. Another example is occupational safety. The Großräschen site marked a milestone at the end of 2022: more than 5,000 days (equivalent to around 14 years) without an accident. The City of Brandenburg will be able to rely on district heating because the long-established power plant site in Premnitz is being upgraded for the future. Or, as Harry Korban, Head of Operations in Premnitz, sums it up: “Change processes are stable if they have strong roots based in knowledge and ability.”

Find out more online
www.lets-talk-about-tomorrow.com

150 eew

ENERGIE FÜR ZUKUNFT



Let's learn from:yesterday

Not many companies can look back on a history spanning more than 150 years – too much has happened, too much has changed. Companies that have survived times of major crises and have not been overtaken by rapid technological change often have one thing in common: They are drivers, not driven by external forces. This describes the path EEW has followed and continues to follow: from the processing of coal to the circular economy, from resource incineration to environmentally efficient resource management.

With roots in the coal mining firm Braunschweigische Kohlen-Bergwerke AG (BKB), the long history of the Helmstedt-based company stretches all the way back to 1873. At that time, the firm was focused solely on mining brown coal, selling raw coal, and later, producing briquettes. Today, EEW's approximately 1,400 employees no longer work for a mining company but rather one of the leading companies in thermal waste utilisation with sites in Germany, Luxembourg and the Netherlands.

Nevertheless, for more than 150 years, energy has been the common thread. While brown coal was the fuel in the early days, today it is residual waste that is thermally utilised by EEW. The new name says it all: EEW Energy from Waste. Now, the company formerly known as BKB is not only a reliable and successful energy supplier. It is also an important partner to local authorities and industrial customers, providing waste management services for residual waste and sewage sludge.

It is less commonly known that energy from waste is now a firm pillar of an environmentally compatible energy supply and accounts for nearly 4% of the electricity produced in Germany. With a share of around 16%, waste is also the second-most important source of energy after natural gas for providing district heating. Utilising waste to generate energy can avoid the use of primary fossil energy sources such as coal, natural gas and oil, and thus reduce the carbon footprint.

Besides energy, there has been another common thread since 1873: The company is an important employer in the Helmstedt region and remains a powerful economic factor. And this is, of course, also true for the other sites in Germany and abroad.

1873

Founding of coal-mining firm **Braunschweigische Kohlen-Bergwerke AG** (known as BKB).

1888

Start of power generation - a generator is used for the first time in the **Prinz Wilhelm mine**.

1947

Nearly **8,000 employees** work for the company.

1952

Construction of **Offleben power plant** begins near Helmstedt.

1974

Briquette production and sales of raw coal cease – BKB becomes a pure-play electricity producer.

1985

The **Buschhaus power plant** goes online.

1990

New statutes: Activities expand to include construction and operation of waste management facilities.

1999

Commissioning of the Buschhaus **thermal waste treatment plant.**

2003

BKB is the centre of excellence for thermal waste utilisation within the E.ON Group.

2008

Company focuses exclusively on thermal waste utilisation **– BKB renamed E.ON Energy from Waste**.

2013

EQT acquires 51 per cent stake in the company and **name changes to EEW Energy from Waste**.

2016

Beijing Enterprises Holdings Limited acquires EEW.

2022

Commissioning of the **first EEW sewage sludge mono-incineration plant**.

Find out more about our history:

Highlights of the year

EEW 2022

May

EEW, Engie and OCI launch a partnership in the Netherlands with the aim of establishing the first industrial value chain to produce e-methanol in Europe. EEW will develop the plant, which will capture the required CO_2.

More on page 53

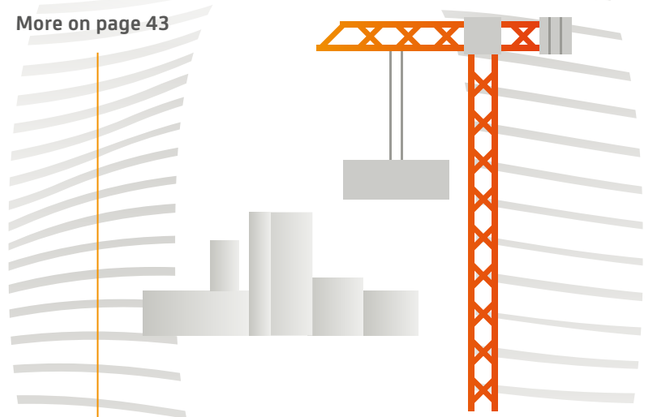
February

Following the reactivation of a rail line in the Helmstedt area, residual waste from Braunschweig can be transported via train to the Buschhaus plant, located near Helmstedt, eliminating the need for up to 4,000 lorry journeys per year.

June

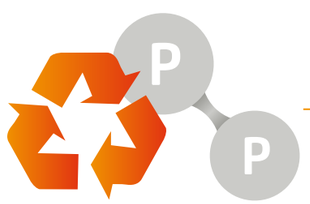
Laying of the foundation stone for the third block of the Magdeburg-Rothensee thermal treatment plant for waste and sewage sludge.

More on page 43



At the Buschhaus site, sewage sludge is combusted for the first time in the fluidised bed furnace of the mono-incineration plant, laying the foundation for high-quality phosphorus recycling.

More on page 18



July

Construction starts on sewage sludge mono-incineration plant in Delfzijl, the Netherlands.

More on page 50

Commissioning of the second line in Premnitz: Replacement investment with efficiency gains – for more electricity and heat from waste.

More on page 16

November

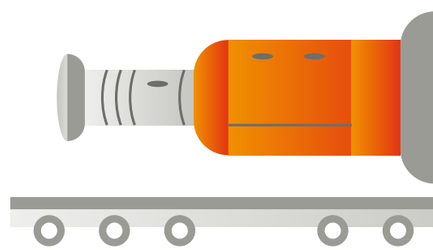
Foundation stone laying for the new replacement facility and the sewage sludge mono-incineration plant in Stapelfeld.

More on page 42

December

New turbines at the Pirmasens and Neunkirchen plants increase energy efficiency by up to 25%.

More on page 17



Protecting human health

Health is the top priority – this is especially true and self-evident at EEW. Prevention is the best-known and most effective tool. Health protection encompasses everything from our own employees working in offices and plants to the employees of our partner companies.

Occupational safety and occupational health promotion are as a matter of course embedded in our day-to-day operations at EEW. Measures and programmes are developed and implemented both centrally as well as at the individual sites, to ensure they are always tailored to the particular activities of the employees.

At our plant sites, it is extremely important to us to raise awareness of safety-conscious behaviour and health protection among our own employees as well as employees of partner firms. Based on risk assessments for key activities, there are corresponding instructions, regular trainings and other measures relating to the topic “safe working practices in the workplace.” Providing employees with comprehensive information is important to ensure daily implementation of occupational safety and health protection. We also want to incorporate employees’ experience and knowledge into our operational processes. This is carried out at all sites by trained safety experts and safety officers, as well as through employer-employee committees.

5,226

accident-free days were recorded as of 31 December 2022 at the Großräschen site.

Accident-free days and the Safety Award

One of EEW’s key goals is to prevent all types of accidents. At the end of 2022, the Großräschen site was a stellar example in this regard. Since the plant was commissioned on 25 September 2008, there has not been a single reportable work-related accident.

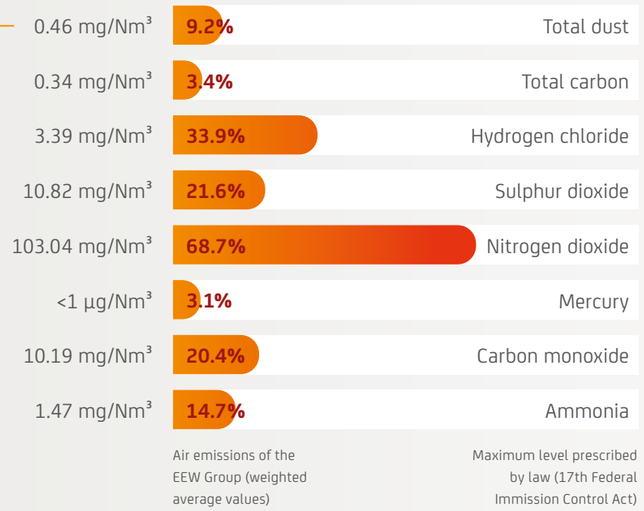
Marko Szewczyk is one of the safety officers in Großräschen and considered “an institution” at the plant. The 53-year-old trained electrician has been working at the site since 1988. He worked on the construction of the new plant and then became a work scheduler in the maintenance department before training to become a safety officer. When asked about the “secret” behind the impressive number of accident-free days, he says there is no such thing. “The most important thing is that a seasoned team has been working together here for years and decades and everyone has an in-depth understanding of the topic of occupational safety,” says Marko Szewczyk. “It can be described as a form of culture,” he says, adding: “What we do have is a motto and it is short and easy to understand: ‘First, we work safely, and then properly and quickly.’” Making things safe can also mean, for example, discussing in advance of a planned maintenance shutdown which steps of the project must be done in which way. This assessment also ensures that the work is carried out more efficiently because nothing has to be done twice. And what about new colleagues? “It’s very simple: We get them on board right away.” During maintenance shutdowns, a particular challenge is also coordinating up to 250 employees from approximately 30 partner firms. “Here, too, it is important to convey the right understanding and provide really thorough instructions, starting with the topics of protective goggles, helmets and shoes,” says Marko Szewczyk. For this thoroughness, the site was recognised as the winner of the internal Safety Award for the year 2021 and placed second in 2022.

> *“The most important thing is that a seasoned team has been working together here for years and decades and everyone has an in-depth understanding of the topic of occupational safety.*

Marko Szewczyk
Safety Officer, EEW Energy from Waste Großräschen

State-of-the-art technology ensures low-emission operations

Breakdown of our significant air emissions
(in relation to the maximum levels prescribed by law)

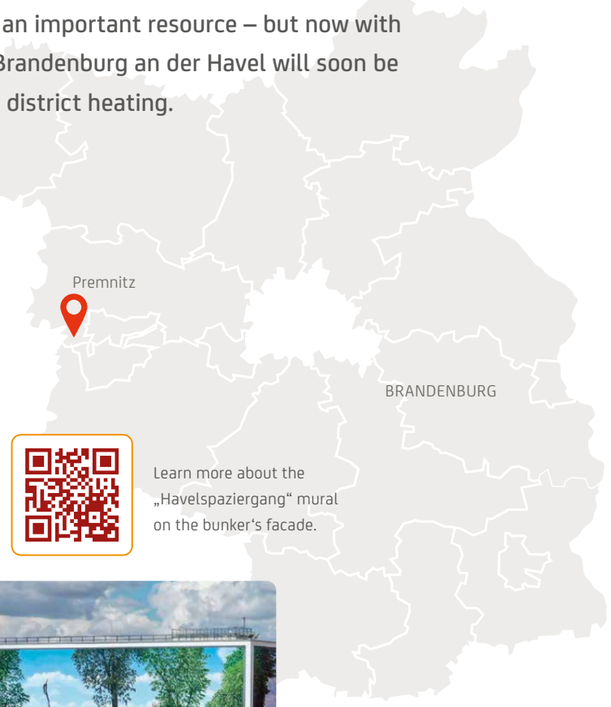


The thermal treatment of waste and sewage sludge produces flue gases which contain many different compounds. These include carbon monoxide, sulphur dioxide and hydrogen chloride as well as nitrous oxides, ammonia, heavy metals, mercury or uncombusted hydrocarbons. EEW uses state-of-the-art technology to prevent as much as possible that these pollutants enter the environment. To do this, heavy metals and some organic materials are mostly bound. Pollutants such as hydrogen chloride or sulphur oxide and their compounds are also bound through the addition of reagents and can be filtered out. EEW removes the resulting nitrogen oxides from the flue gas using ammonia or ammonia compounds. This leaves behind nitrogen and water – both of which are part of the natural environment. In addition, EEW continuously monitors all emissions. To do this, we use a measuring technology certified by the German Technical Inspection Association (TÜV) and the German Environment Agency, which is inspected and calibrated by external experts at predetermined intervals. As a result, all our plants safely comply with the statutory requirements. Our employees are also sensitised to this topic in training sessions.

Energy *for Brandenburg*

Premnitz is a small city in the Havelland district, located around 90 km west of Berlin. Here, the second grate firing line at the thermal waste treatment plant was inaugurated in 2022. This site will continue to generate electricity and heat using waste as an important resource – but now with greater efficiency. And the City of Brandenburg an der Havel will soon be supplied with district heating.

Mural artist Marco Brzozowski designed the walls at the top of the bunker at EEW's plant in Premnitz.



Learn more about the „Havelspaziergang" mural on the bunker's facade.

Premnitz is not a "newcomer" among the power plant sites; energy has been generated here for more than 50 years. EEW has been responsible for the site for the past 25 years and is advancing the transformation process here, too. As part of this, the fluidised bed firing plant operated in the Premnitz industrial park, with its treatment capacity of 120,000 t/a, was decommissioned in July 2021. As a replacement, a grate firing line with an investment volume of €70m was built. Another element of the work was the replacement of the 50-year-old turbine generator: The new turbine and generator increase energy efficiency by 16%.

16%

greater energy efficiency thanks to a new turbine generator in Premnitz

With this second line, EEW's treatment capacity for household and commercial waste in Premnitz is now around 300,000 t/a. Together, the two lines decouple energy from waste to produce process steam for the industrial park Premnitz, electricity for 23,000 households and district heating for Premnitz – and soon for Brandenburg an der Havel, too. As part of this partnership, a 20-kilometre-long district heating pipeline was built from Premnitz to Brandenburg. This project can substitute other fuels, such as oil or natural gas, as sources of district heat and will be able to supply heat and hot water to more than 12,000 households in the city on the banks of the Havel river. In terms of climate impact, this can potentially save up to 70,000 t/a of CO_2 emissions. The construction of the district heating pipeline started in 2021 and is scheduled to be completed in 2023. With all the new developments at the Premnitz site, one thing has remained unchanged: the sense of connection to the region. This is visibly demonstrated by the "Havelspaziergang" ["Havel walk"] mural by artist Marco Brzozowski on the upper façade of the bunker at the thermal waste recovery plant. Covering an area of 2,250 m² (nearly the size of nine double tennis courts), it is the largest painting in Brandenburg. It took the artist 186 days of work and more than 1,200 litres of paint in approximately 400 different shades to complete the mural. It is noteworthy that the residents of Premnitz were the ones who chose the theme of the painting in a vote.

With the new turbines, more energy can be decoupled from the same waste inputs.

Investments in *energy efficiency*

A new turbine makes the generation of energy from waste even more efficient at EEW's site in Neunkirchen. In future, up to 25% more energy will be recovered from waste to produce electricity and district heating. Simultaneously, the number of potential district heating connections will rise from 2,400 to 3,000 households. In terms of electricity, the number of households will increase by 6,000 to more than 27,000. Compared to conventional coal-generated electricity production, the new turbine will save around 10,000 t/a of CO_2.

Although EEW is operating the Pirmasens plant until the end of 2023 on behalf of the local special purpose waste management association ZAS and will only take ownership of the facility in 2024, it took a forward-looking approach and invested in a new turbine in 2022. The investment volume was around €9m and the energy efficiency increased by as much as 25%. As a result of the new turbine, annual electricity production will grow by around 18,000 MWh to more than 110,000 MWh. This volume is enough to supply around 30,000 households.

25%

greater energy efficiency thanks to new turbines in Neunkirchen and Pirmasens

Launch in Helmstedt:
Sewage sludge mono-incineration

The process of transformation is not just ramping up – it is already in full swing at the Buschhaus site, located near Helmstedt. Here, EEW started up the first sewage sludge mono-incineration plant in the state of Lower Saxony in July 2022. The numbers show the importance of this facility: 160,000 tonnes of original substance are treated here annually, equivalent to 20% of the sewage sludge generated in Lower Saxony.

Find out more on our virtual plant tour

It was already remarkable before construction started that the necessary permitting process took just 20 months – in part because there was and is a high level of acceptance for this project among the public. One reason for this is the Helmstedt area's long-standing history of energy generation. For more than 100 years, energy was produced here from brown coal. About 25 years ago, with the construction of the Buschhaus thermal waste treatment plant, waste began to replace coal as a fuel. Today, around 280,000 MWh/a of electricity are produced here by utilising more than 520,000 t/a of waste from the region – safely and with low emissions. This volume of electricity is enough to supply more than 80,000 households. With the sewage sludge mono-incineration plant, the process of transformation towards a circular economy and EEW's diversification at this site has taken a giant step forward.

20%

of the sewage sludge generated in lower Saxony can be processed in Helmstedt

One reason for the public's acceptance: Even those without technical know-how can easily understand that generating energy from waste and sewage sludge conserves resources and actively protects the environment. Moreover, sludge from sewage treatment plants in big cities and metropolitan regions in particular contains large volumes of various pollutants. These can include heavy metals, organic compounds or pharmaceutical residues as well as pathogens and microplastics. In particular, the heavy metals are concentrated from the exhaust gas during flue gas cleaning and are safely deposited in underground landfills. Organic pollutants, microplastics and pharmaceutical residues are safely destroyed and pathogens are killed off.

At the same time, sewage sludge also contains valuable phosphorus. This element is essential for the growth of plants and for life itself. This was one reason why sewage sludge was a popular fertiliser for many years. As of 2029, legislation stipulates that at least 80% of the phosphorus must be recovered from combustion ash. The fluidised bed process deployed at the Helmstedt site achieves a remarkably high phosphorus recovery rate from the combustion ash. EEW's goal is to reclaim more than 90% of this phosphate.

In a nutshell: With this first sewage sludge mono-incineration plant, EEW is taking on responsibility on behalf of local authorities to safely eliminate the pollutants contained in the sludge and keep the vital resource phosphorus in circulation.

Stavenhagen plant

Start of construction: September 2021
Commissioning: scheduled for autumn 2023
Technology: fluidised bed process
Throughput capacity: 160,000 t/a of original substance

Stapelfeld plant

Start of construction: May 2021
Commissioning: scheduled for late 2024
Technology: fluidised bed process
Throughput capacity: 135,000 t/a of original substance

Overview of other projects

Magdeburg-Rothensee plant

Start of construction: October 2021
Commissioning: scheduled for 2024
Technology: fluidised bed process
Throughput capacity: 55,000 t/a of original substance

Delfzijl plant

Start of construction: July 2022
Commissioning: scheduled for 2024
Technology: fluidised bed process
Throughput capacity: 185,000 t/a of original substance

“Today’s preparation leads to tomorrow’s success – also at EEW.

Sabrina Poschinger
is a Technical Administrator at the Göppingen site. She helps to integrate sustainability into everyday operations, for example, through environmental protection activities or in specific sustainability projects at her site.

Employee portrait
Sabrina Poschinger

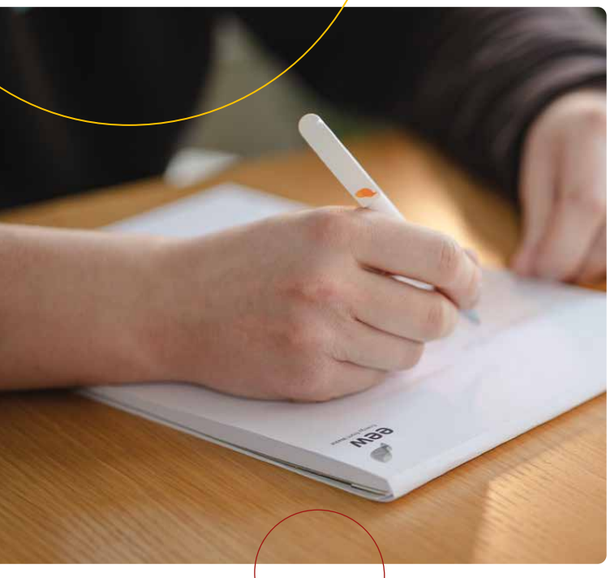
Let’s act:today

Our roadmap is the central instrument for EEW’s sustainable development. It shows our goals, paths and the numbers we strive to achieve. To take steam as an example: The majority of EEW plants are combined heat and power (CHP) plants which also produce steam that plays an important role in industry as process steam. This steam is also used for district heating, which is increasingly relied on to heat homes in a climate-friendly way. Another practical example is the EEW Academy, which is working today to counteract future skills shortages. This benefits employees and the company alike. Sabrina Poschinger works as a Technical Administrator at the Göppingen site and summarises the goals of the roadmap: “Today’s preparation leads to tomorrow’s success – also at EEW.”

Find out more online
www.lets-talk-about-tomorrow.com

In dialogue for **sustainability**

EEW has set itself major goals related to sustainability. Climate protection is a key part of this – but certainly not the only part. Utilising waste and sewage sludge in an environmentally and economically viable manner and securing valuable resources – i.e., strengthening the circular economy – are just two other topics under this umbrella. This and many other aspects of sustainability at EEW were discussed by Bernard M. Kemper (CEO), Birgit Fröhlig (Head of Corporate Sustainability) and Marvin Herlemann (apprentice at the Buschhaus plant, located near Helmstedt).



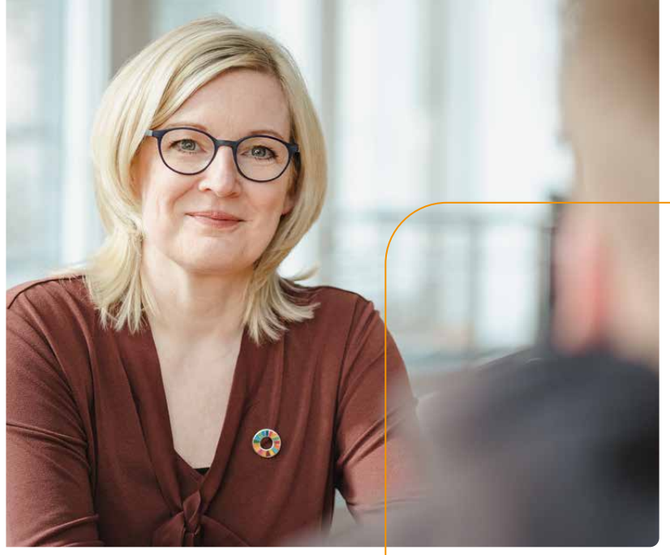
Kemper: We have reasons to celebrate. First of all, this year we can look back on a history that stretches 150 years into the past – something very few companies in Germany can do. Second, our fifth sustainability report has been published and we have developed a clear sustainability strategy for the future. When I look at previous issues of our sustainability report, one thing really stands out to me: Sustainability has become a major part of our day-to-day business and our journey into the future. One example is the recovery of the resource phosphorus. We are currently building plants that will make this vital element available in the near future. Back in 2018, such plans were still in the distant future.

Marvin Herlemann

Herlemann: For example, at our site in Helmstedt, where I am doing my vocational training. The EEW Group's first sewage sludge mono-incineration plant has been in operation here since last July. But I think it's important to note that not only do we recover phosphorus, we also capture heavy metals such as lead, chromium, cadmium, copper and others, so they don't get into the air. I always wonder: How sustainable is the disposal of our residues from flue gas cleaning?

Kemper: At the moment, underground disposal is still predominant. However, in our sustainability roadmap we have set ourselves a recycling target of 80% and therefore we are working closely with research institutes in this area. The aim of these efforts is to transform residues from thermal waste treatment into valuable secondary raw materials, for example, for the cement, metal and chemical industries.

> *"And what is the significance of sustainability at EEW in general?*
>
> **Marvin Herlemann**
> Apprentice



Birgit Fröhlig

"We want to capture at least 270,000 tonnes of CO_2 per year at the Delfzijl site."

Birgit Fröhlig
Head of Corporate Sustainability

Fröhlig: I would like to take a wider view and bring to the fore the topic of climate protection, also with a view to our goal of becoming climate-neutral by 2030 and climate-positive by 2040. I am enormously impressed by what our investments are creating at the Delfzijl site right now. One figure makes this particularly apparent: We want to capture at least 270,000 tonnes of CO_2 at the site per year and use it as a raw material, for example to produce e-methanol, and thus remove it from the atmosphere. This is a milestone – not only for us at EEW.

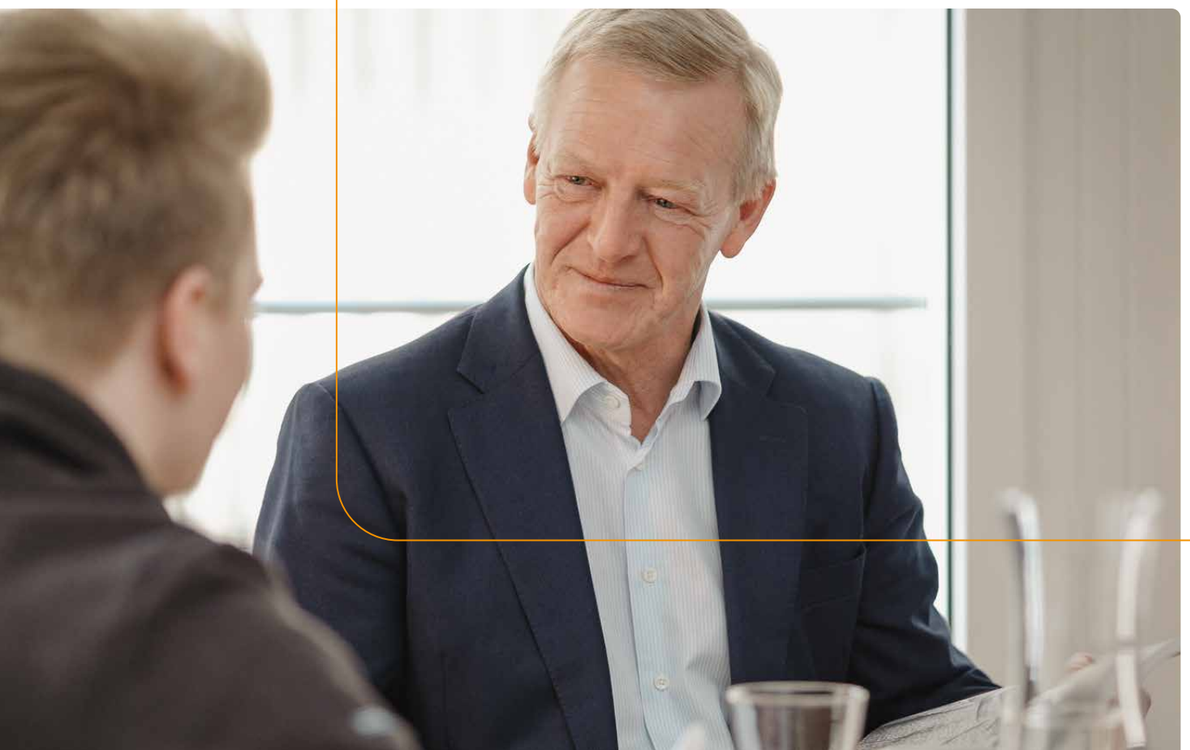
Herlemann: And what is the significance of sustainability for us in general? What is EEW's greatest challenge relating to sustainability?

Kemper: Sustainability is firmly anchored in our corporate strategy. Our greatest challenge is to treat all dimensions of sustainability equally – meaning environmental, economic and social factors. A very important section of our corporate strategy, which we have not yet talked about, is our employees. It sounds like a platitude but is nonetheless absolutely true: The people who work at EEW are what make the company successful. Since we want this to be true in future as well, we aim for at least 40 hours of further training per employee per year. Another important goal in this context is that we want to double the share of women in leadership positions and thus make our management team more diverse.

"Sustainability is firmly anchored in our corporate strategy."

Bernard M. Kemper
Chairman of the Board of Management

Bernard M. Kemper



Herlemann: How, in practical terms, do we tackle sustainability topics? Is there something like a master plan? And if so, are we achieving it?

Fröhlig: Yes, we have one. That is our sustainability roadmap, which sets out our goals – often expressed in figures. This roadmap was developed based on our materiality analysis and with the involvement of many people. It forms the foundation of our sustainability strategy. For each of our goals, we have defined a pathway. It incorporates all sustainability aspects, including occupational safety, further training and digitalisation – all areas where we have already made a lot of progress. To answer your question about whether we will adhere to our roadmap, I can say: Yes, we will. At the same time, I have to add that, of course, everything does not always happen smoothly and immediately. Like other things in life, the details sometimes have to be replanned or adjusted.

Herlemann: What is the link between digitalisation and sustainability?

Kemper: Digitalisation and sustainability are very closely related because digital processes make many things more efficient and each efficiency gain saves energy and time. Sensors, for example, can continuously record certain parameters and these can be merged and analysed using software. Based on the resulting data, we can optimally steer processes. One especially practical example is the 3D scan of our plants. This creates the basis for digital twins of our plants – enabling inspections and maintenance shutdowns to be prepared virtually, which significantly reduces travel and resource expenditures.

Fröhlig: I would like to add here that it is not only the technology to operate our plants that is becoming increasingly digital and saving us resources and time. Similarly, there is ongoing digitalisation of our processes and collaborations, which will also be reflected in our business and customer relationships. In a nutshell, we will become more digital and thus more agile and efficient.

Kemper: Yes, not only digital innovations but innovations in general are our driver for more sustainable business models and products in the context of the energy transition, the circular economy and resource, environmental and climate protection. They ensure that we remain fit for the future and successful and therefore can safeguard jobs and create new ones – this, too, is sustainable. For these reasons, in the past, we have continuously invested in new technologies and solutions. And almost even more importantly: We will continue to do so in future.

Our sustainability roadmap to 2030

14 goals in five areas of action

EMPLOYEE HEALTH AND SAFETY

We aim for a health rate of at least 95%.

EMPLOYEE DEVELOPMENT

We are increasing the number of further training hours per employee to at least 40 hours per year.

EMPLOYEE DEVELOPMENT

We will double the share of women in managerial positions.

EMPLOYEE HEALTH AND SAFETY

Our goal is to prevent reportable injuries.

Employees

WORKING CONDITIONS AND CORPORATE CULTURE

Committed employees guarantee the future of EEW. We aspire to achieve an employee satisfaction level of "good" or higher.

DIGITALISATION

Our goal is that at least 70% of employees take part in at least one day of training per year to strengthen their digital skills.

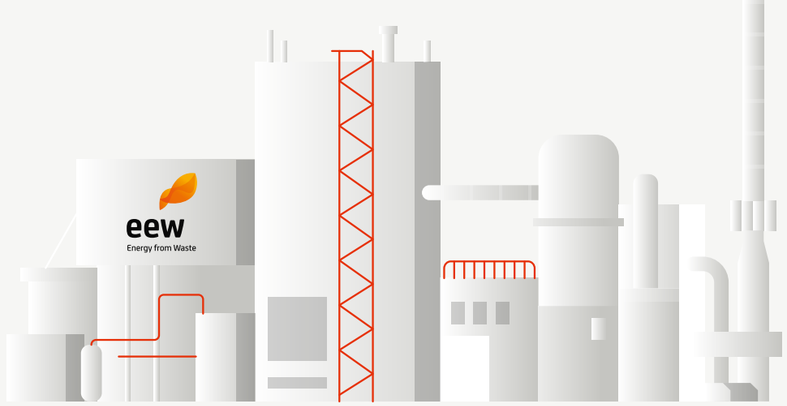
INNOVATION

Innovation-driven growth projects contribute at least 20% to total revenues.

ETHICS AND INTEGRITY

Our goal is to prevent infringements of laws, guidelines and our code of conduct.

Company



Society

INVOLVEMENT IN POLITICAL AND SOCIETAL PROCESSES

We want to host at least five dialogue events per site each year.

(ADDITIONAL) OUTPUT MATERIALS/ RESOURCES

We want to achieve a recycling rate of at least 70% for our residues.

CLIMATE-RELEVANT EMISSIONS (OUTPUT)

We are reducing our greenhouse gas emissions by at least 20%.

Environment

WASTE (INPUT)

We strive to offer reliable waste treatment capacity by achieving at least 92% time availability for all thermal treatment plants.

ENERGY (OUTPUT)

We are increasing the energy efficiency of our thermal waste treatment plants by 15% on average.

Value chain

CUSTOMER RELATIONSHIPS

Customer satisfaction is the foundation for our success. That is why we want evaluations of our performance to reach at least "good" on average.

Find out more about our sustainability goals in our EEW Sustainability Report www.lets-talk-about-tomorrow.com:

EEW *Art*

Photographer Lukas Hoffmann

"I like concentrating on the essential."

Lukas Hoffmann
Photographer

Find out more about EEW Art:
www.lets-talk-about-tomorrow.com

At EEW, sustainability is practiced in our day-to-day operations and guides our path into the future. Since 2020, the complex topic area of sustainability has also been the focus of EEW Art, an annual program that offers photographers an opportunity to explore an aspect of their choosing at our company. In 2022, Swiss photographer Lukas Hoffmann was invited. The hallmark of his pictures is that he rejects the spectacular in favour of the seemingly unspectacular, where he finds compositions.

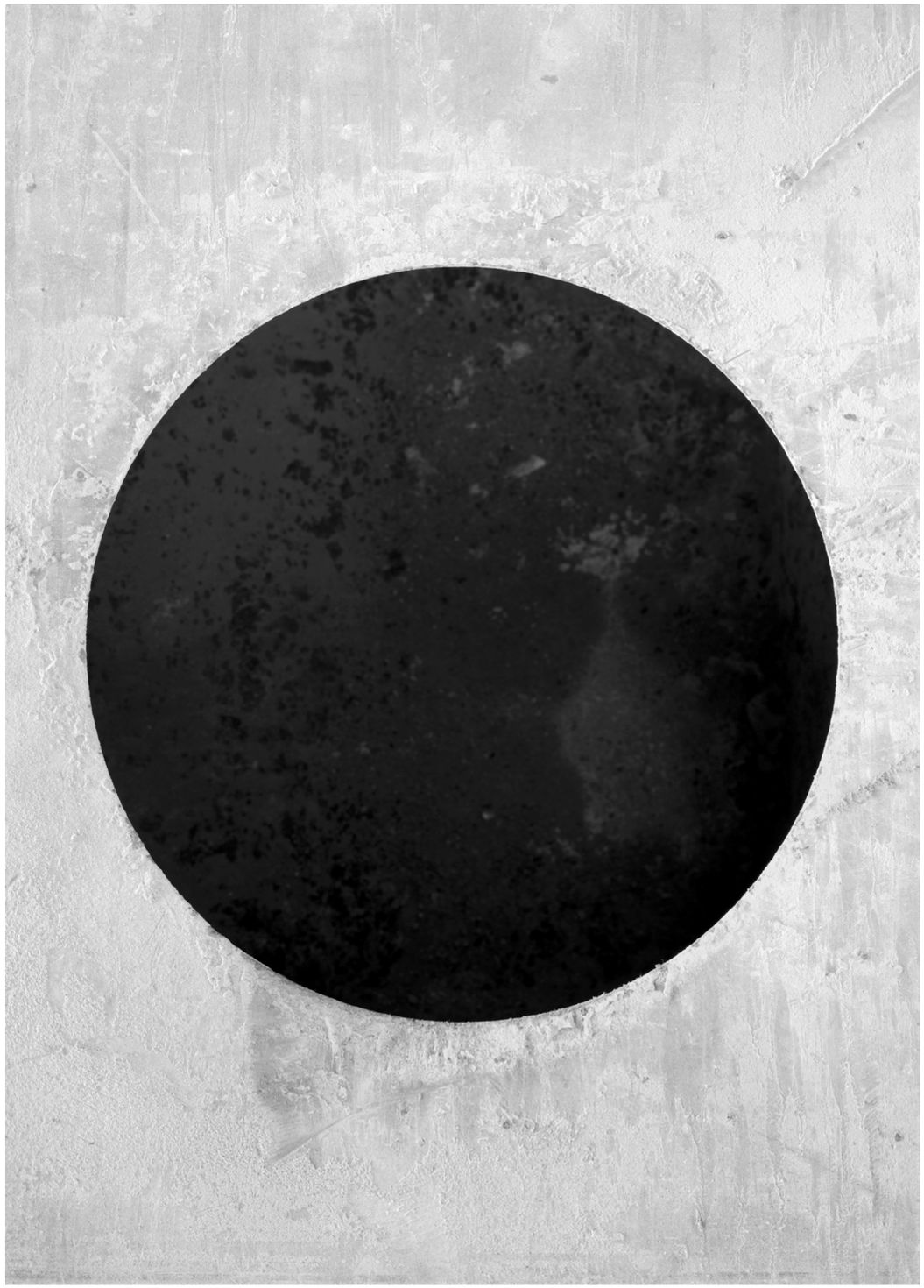
It depends on the context whether a phrase is a phrase or simply describes something very accurately. The latter is true when it comes to Lukas Hoffmann's "concentration on the essential." In numerous respects, his pictures show the moments of tilt between macro- and microscopic views, between graphics and copies and between yesterday and today. Or, as he puts it: "I like the moment of ambiguity." And that is what he focuses on. But he definitely does not want to be considered a "surface photographer." To him, it is important "that when looking at the pictures, one can jump back and forth between the surface and the depth, that I can't be nailed down – I would not like that."

Hoffmann was born in 1981 in Zug, Switzerland, and studied fine art at École Nationale Supérieure des Beaux-Arts in Paris. His works have been shown in numerous solo and group exhibitions as well as photography festivals and trade shows. They can be found in private and public collections across Europe. The Centre Georges Pompidou in Paris recently purchased some of his works. In addition, he has won prizes and fellowships for his work.

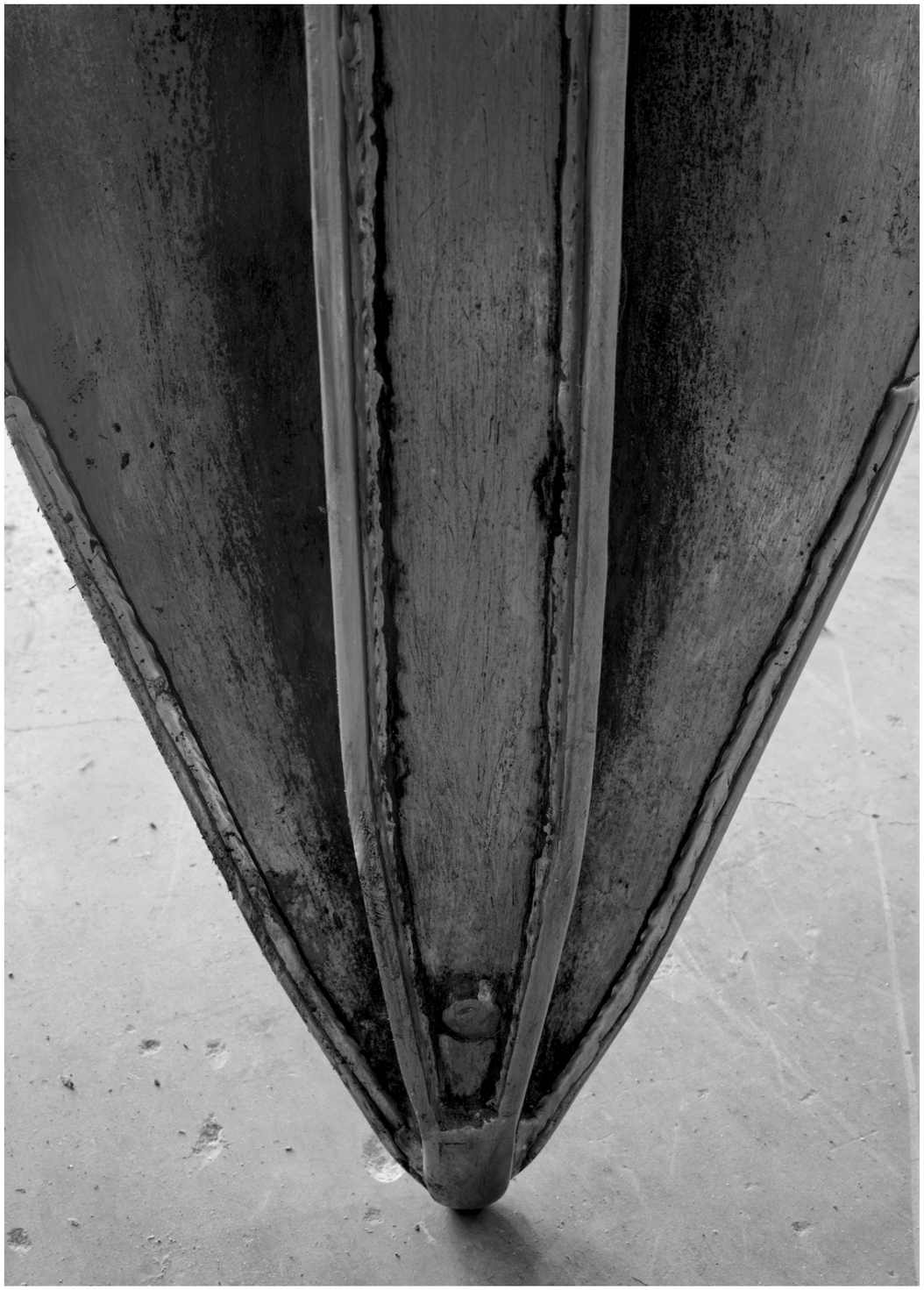
Lukas Hoffmann lives and works in Berlin. He takes his pictures in daylight – "artificial light makes a lot of things flat and dead" – with an analogue large-format camera. His work is therefore arduous and weather-dependent, forcing him to take a well-planned and deliberate approach. He spent two days at each of the EEW sites in Heringen (in the state of Hesse) and Premnitz (in the state of Brandenburg). In both cases, the first day was spent searching for a motif and the right light in order to develop a time and lighting plan for the second day and thus for the actual photography. Although it may seem that this complicated technique is the reason why not many pictures are created, it is mainly because that is Hoffmann's way of working: "It is about the autonomy of the individual picture. The effect does not come from the bush or the street I am photographing but instead comes from the definition of what is left out." The picture is finished before he pushes the shutter release. "When you work in this way, you soon find you are taking very few pictures." The process of concentration continues in the lab and the studio, as the final cut and the framing are part of this compression.

The term "transformation" plays an important role for EEW – just as it does for Lukas Hoffmann. But with a different interpretation, as the photographer explains: "The collaboration with EEW changes my work. The company gave me access to places that would otherwise be behind locked gates. This enhances my work. At the same time, the people at EEW get a different view of their company, which might change their image of EEW."

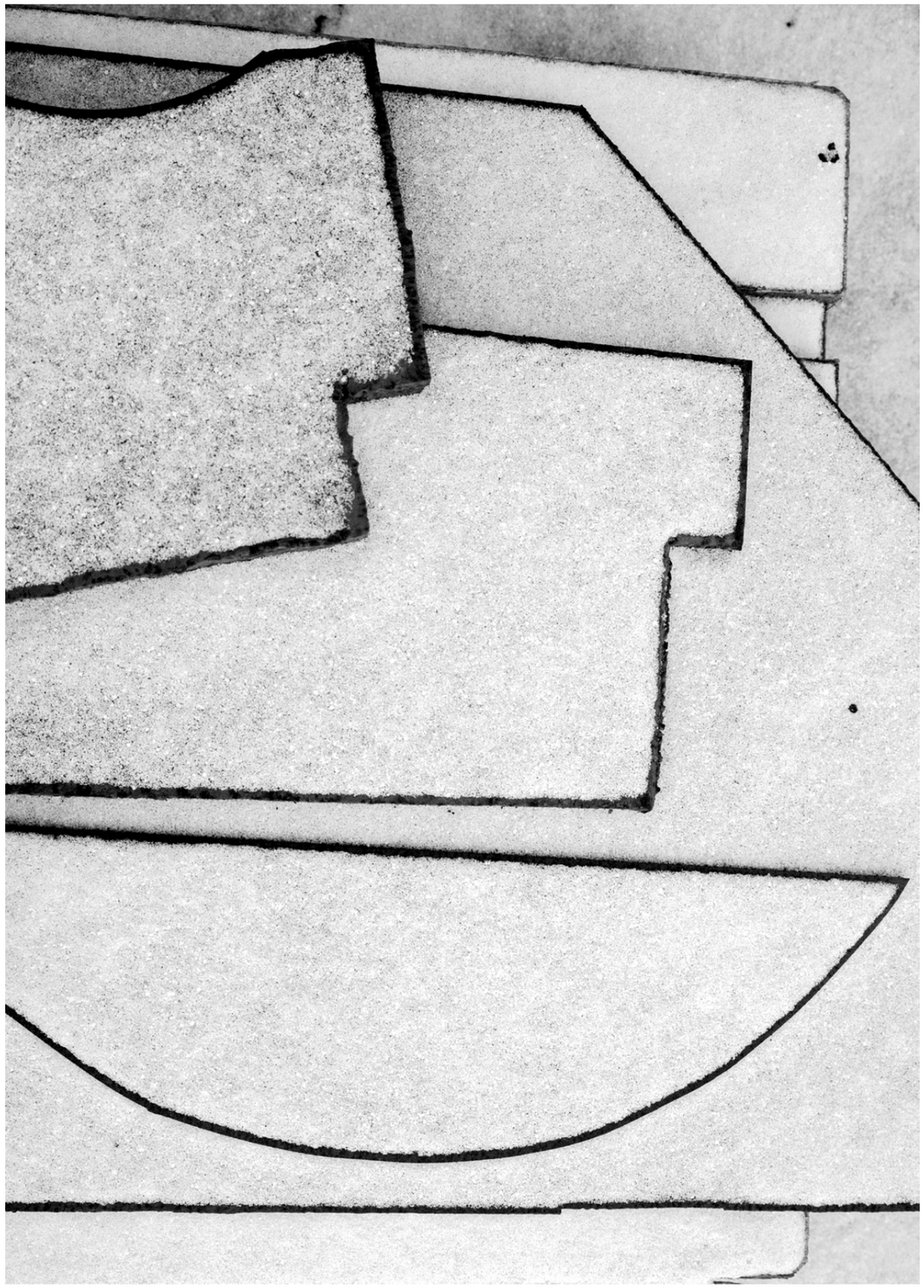
EEW Premnitz (window), 2023, silver gelatine print, 67 x 48 cm



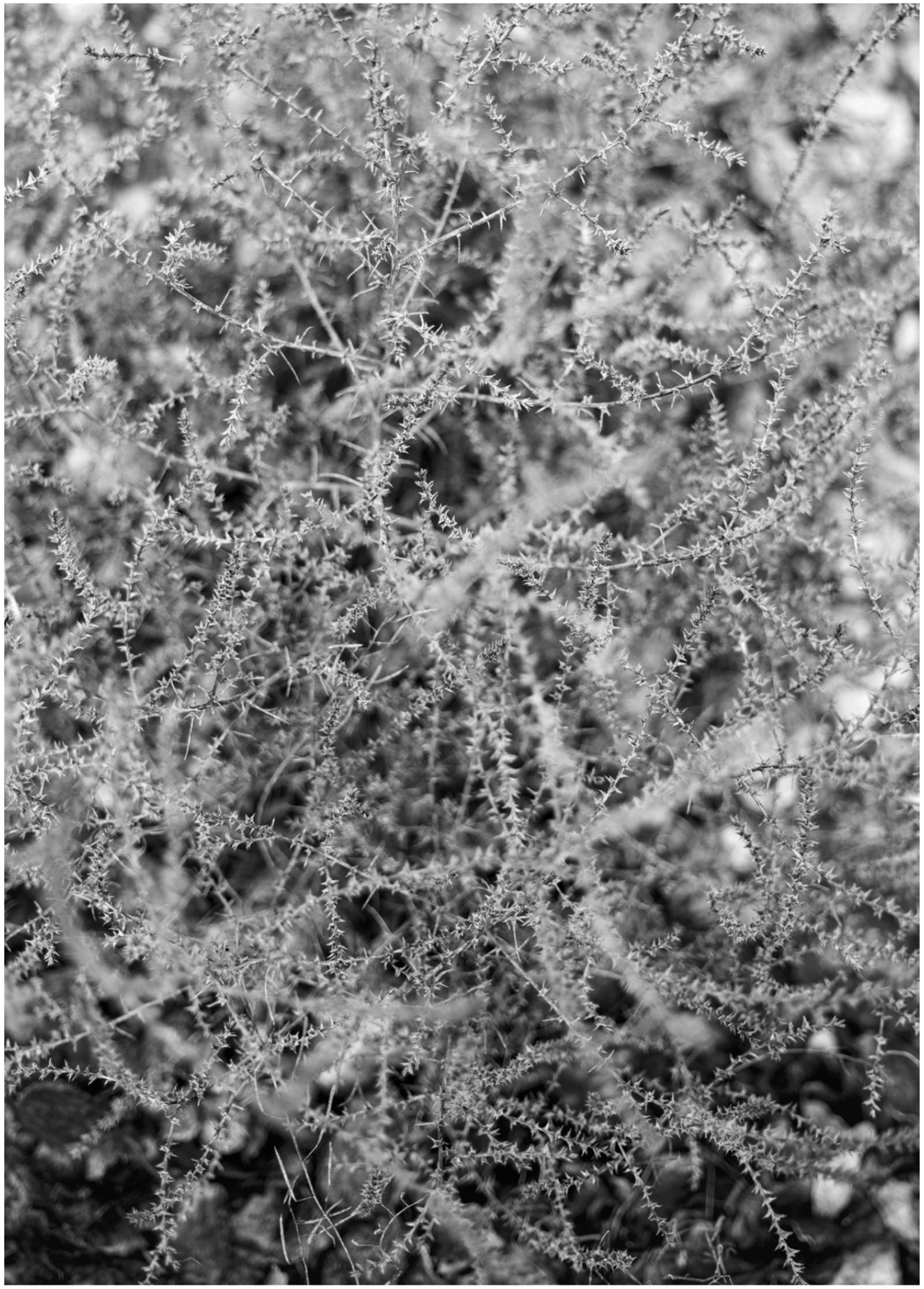
EEW Premnitz (container), 2023, silver gelatine print, 67 x 48 cm



EEW Heringen (claw), 2022, silver gelatine print, 67 x 48 cm



EEW Heringen (steel plates), 2022, silver gelatine print, 67 x 48 cm



EEW Premnitz (bush), 2023, silver gelatine print, 67 x 48 cm

Right page: EEW Heringen (floor), 2022, C-print, 175 x 125 cm

Heat from *waste used as a resource*

District heating generated with combined heat and power (CHP) utilises fuel inputs remarkably efficiently. If waste is used as a fuel, it is also considered climate-friendly. As part of its transformation and diversification, EEW is focusing on a future with increased district heating.

EEW's technically sophisticated and highly efficient energy from waste (EfW) plants optimally exploit the energy potential of the waste. The majority of EEW plants operate with CHP – in addition to electricity, they also produce steam that is captured from the turbine. This process steam plays an important role in industrial production. But this steam can also be used to heat homes via district heating networks. And this is climate-friendly heat, since the waste consists of roughly half biogenic material. This means approximately half of the energy is bioenergy and is recognised as renewable heat under Germany's Renewable Energy Sources Act (EEG). Moreover, the supply is reliable because our plants are dependably available for more than 8,000 hours per year.

In addition, district heating generated with residual waste eliminates dependency on the global market prices for fossil fuels. Particularly in the geopolitical situation of 2022, it became very apparent that dependency on imports from abroad can have a very dramatic impact – on the economy in general but also on individual private households.

For EEW, district heating is not a new business area. In fact, various sites have been providing district heating for many years. One example is Göppingen, nestled in the wonderful countryside of the Swabian Alb, where EEW takes on a special responsibility and utilises waste arisings in an energy-efficient way. The plant produces 59,000 MWh of district heating every year for the Klinik am Eichert hospital, the Bergfeld residential estate and the nearby riot police station. Further, the plant produces 75,000 MWh of electricity, enough to meet the energy needs of around 21,000 households in the region.

One project that will soon bring heat into the homes of many people is nearing completion in Brandenburg an der Havel. Our Premnitz plant is slated to be connected to a 20-kilometre-long district heating pipeline linking it to Brandenburg in 2023. This will not be our only project, as there is still enormous potential for renewable heat from waste in Germany. EEW will therefore actively pursue opportunities to expand its provision of district heating going forward.

With production of around

1,000,000

MWh/a of district heating, 10 EEW plants supply residential areas, industrial and commercial parks, a hospital, a swimming pool and a riot police station.

Vocational and further training *with the EEW Academy*

The EEW Academy was launched as a project in 2022 and will be part of EEW's day-to-day operations as of 2023. The Academy is not a building with tables and chairs, teachers and students; it is a structure that creates solutions for the challenges of today and tomorrow. Or to put it another way: The Academy and the people can be found wherever they are needed. One of these challenges is training employees, especially those who have joined EEW as lateral hires. While most applicants to date have a career history in the energy generation sector, this will be rarer going forward. Due in part to demographic change, the people employed in our plants will have previously worked as, for example, bakers or carpenters. We also founded this Academy because we wanted to create a mouthpiece for the entire group to advocate for harmonised efforts in the area of power plant personnel training. In future, this will also apply for other external providers of power plant personnel training.

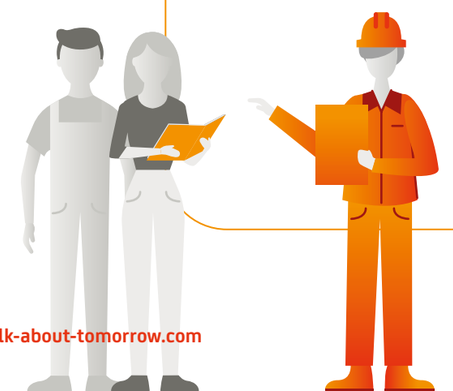
> *"The Academy follows the principle of "encouragement and expectations."*
>
> **Ralf Meyer**
> Technical Managing Director, EEW Energy from Waste Helmstedt GmbH, and co-initiator of the EEW Academy

In the first phase, the Academy will focus its work on two apprenticeships: Operator training for control room operators and training for power plant shift supervisors or deputy shift supervisors in a thermal waste treatment plant. Both vocational groups are being trained at KWS Energy Knowledge in Essen, the central training site for all combustion processes, but the EEW Academy will prepare learners for this training via knowledge quizzes and qualification measures and will later support them while they attend KWS. The approach is more holistic, going beyond the employees' subject-matter instruction. If employees are found to have a need for training, for example, to deal with exam stress or difficulties with public speaking, they will be able to access suitable personal development measures.

In practice, the further training coordinators play a key role at the sites and between the sites. They serve as contact persons in the plant for the training participants and play an interface role to the Academy. The Academy, in turn, stays in contact with KWS. The coordinators are ready to jump in when support is needed and ensure that employees have enough time in their daily routines, for example, to prepare for their exams.

18

employees will be enrolled in the EEW Academy as of 2023



Promoting equal opportunities
EEW encourages women's careers

Mandy Pöthe
Shift supervisor, EEW Großräschen

EEW encourages female employees to take on leadership roles in the company. Not only is this anchored in the company's goals, it is also increasingly apparent in day-to-day business operations. Two of these women are Mandy Pöthe and Eva-Maria Schütze.

Großräschen is a small city in the Lower Lusatia region, southwest of Cottbus. Energy production has long been part of the city's history, as brown coal was mined here for more than 100 years. Today, the local power plant utilises waste in an energy-efficient and environmentally compatible manner. A hundred years ago, it would have been inconceivable that a woman could be working here as a shift manager. Today, that has changed – although it must be said that Mandy Pöthe is the first and so far only woman working as a shift supervisor in the EEW Group.

What does her day-to-day work look like? "I prepare malfunction reports and distribute the resulting work permits and work clearance documents to our employees and external contractors. In doing so, I monitor the processes with an eye on occupational safety, health protection and environmental protection, so that all of the required thresholds are complied with, especially the flue gas values." Mandy Pöthe typically works in her shift group with a crane operator, a control room operator and a plant operator. In daily operations, she sometimes has a different view than her three male colleagues, but they then have open discussions.

Was it a difficult path to becoming a shift supervisor? "I am accustomed to fighting, but the management supported my efforts, also because mixed groups work more successfully. I also know this from experience, from when I did my training as an administrative assistant." Mandy Pöthe is satisfied with her role because she has arrived where she wanted to be. "I would like to be part of a maintenance shutdown project at a different EEW site, to learn more. I am otherwise very happy with my job – and I would be happy if I got the chance to greet a female colleague on my shift one day."

But, in her view, having a quota for women employees is not the best way to achieve this. She thinks it would be wiser to engage more with the public and advertise to recruit women for jobs that have been traditionally held by men. For example, schools could get girls more enthusiastic about typical "boys' subjects" such as chemistry or physics at an early age.

> *"Everyone supported me – and my boss was always incredibly supportive of my desire for further training.*

Eva-Maria Schütze
Team Leader, EEW GmbH

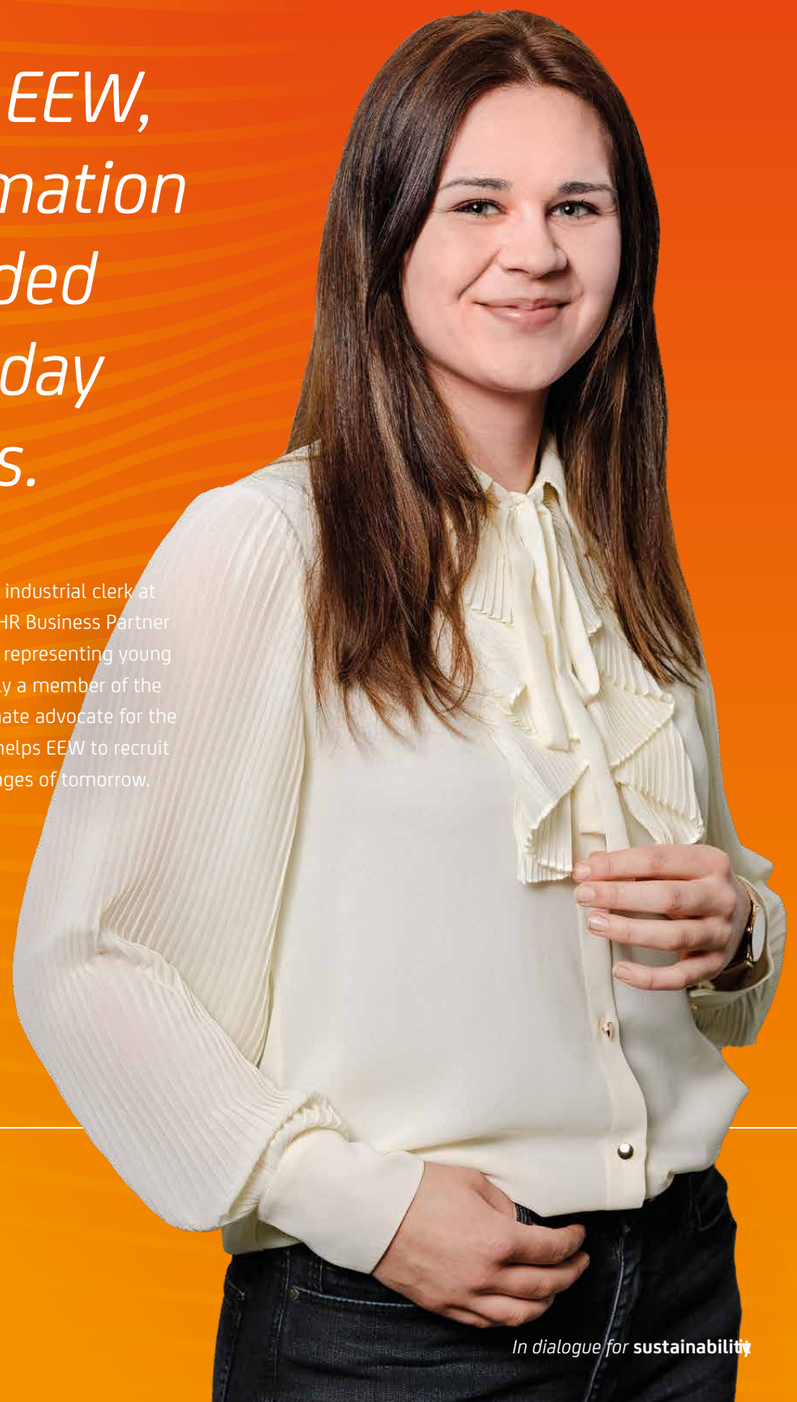
A major leap westward – from Großräschen to the Helmstedt region, where 27-year-old Eva-Maria Schütze lives and works. She shares a very similar opinion, and believes schools should encourage girls to envision that they could become the "boss" one day. Even though she is not yet 30, she leads a team of five employees in the Business Service Centre. There is a fairly balanced gender mix in the administrative departments at EEW, but she jokes that she wishes there were a few more "token" men.

Eva-Maria Schütze has climbed the ladder at EEW thanks to her strong motivation and hard work. She grew up in the region and, after finishing high school, trained as an industrial clerk at EEW and was then "luckily hired in the accounting department." The "luck" she references turned out to be that she was immediately given responsibility for the monthly and annual financial statements of an EEW entity – by no means a matter of course. This was also one reason why she was "very ambitious and completed one further training course after another," she says with a smile. And: "I was very happy to get a job in the accounting department and immediately be able to work independently. I wanted to understand everything, so I could do my job well." This is easy to believe when she lists off the qualifications she achieved between 2017 and 2022: financial accountant, asset accountant, managerial accountant and, finally, international managerial accountant.

Although she has a drive to be independent and not always need to ask someone for help, Eva-Maria Schütze also looked up to her older colleagues: "I would also like to acquire specialist expertise and accounting skills, partly because some of them will be retiring soon." And what did the older colleagues think of her rapid advancement? "Everyone supported me – and my boss was always incredibly supportive of my desire for further training and was pleased when I passed my exams. Not to mention, EEW financed everything from the technical college and distance-learning courses to the Chamber of Industry and Commerce (IHK) exams."

Let’s talk about:tomorrow

“It’s true: At EEW, the transformation is embedded in day-to-day business.



Angelina Mechow
completed her vocational training as an industrial clerk at EEW and now works as a member of the HR Business Partner team. As a former chair of the committee representing young employees and apprentices, and currently a member of the works council, she is a particularly passionate advocate for the interests of the younger generation. She helps EEW to recruit and train skilled workers for the challenges of tomorrow.

Transformation embedded in day-to-day business – does that sound too ambitious? No, because when looking at daily operations, the transformation towards greater sustainability is readily apparent in many places at EEW. This can be seen for example in the DIGITAL CREEW, a coalition of EEW employees. Its members are enthusiastic volunteers who act as multipliers for digitalisation topics in the company and come from a wide variety of corporate units. Nearly 10% of the workforce is taking part. NEEW Ventures GmbH, on the other hand, was founded as an EEW subsidiary to develop start-ups that tap previously underutilised material and energy potential in waste streams using digital solutions. At the heart of this is always the desire to the circular economy – also in partnership with others. The transformation is especially evident in the Netherlands, specifically in Delfzijl, where there are plans to use CO_2 for the production of renewable fuels. As an employee in human resources management, Angelina Mechow has a broad view of EEW and she says: “It’s true: At EEW, transformation embedded in day-to-day business.

Find out more online
www.lets-talk-about-tomorrow.com

Investments in the future

for even more reliable waste management and energy supply

STAPELFELD

Stapelfeld, situated between Hamburg and Ahrensburg in the state of Schleswig-Holstein, is a popular residential community with proximity to both the big city and recreational areas. And Stapelfeld is also an attractive location for business. The thermal waste treatment plant has been in operation since 1979 and part of today's EEW Group since 2003. The plant treats around 350,000 t/a of municipal and commercial waste.

In 2022, Schleswig-Holstein's Premier, Daniel Günther, attended the symbolic foundation stone laying ceremony for a new, highly efficient replacement facility and the construction of a sewage sludge mono-incineration plant. In total, around €220m is being invested in the two infrastructure projects.

Until now, the existing power plant has provided 32,000 households in the region with electricity sustainably generated from waste. Once the new power plant is commissioned, as of 2024 more than twice as much electricity and the same amount of district heating will be produced from up to 350,000 t/a of waste, meaning the energy efficiency of electricity production will also double. If there is higher demand in future, the district heating supply can also be expanded from 250,000 MWh/a to as high as 400,000 MWh/a. With the new sewage sludge mono-incineration plant, which has a capacity of 32,500 t/a dry substance, EEW is also helping local municipalities to comply with the amended statutory requirements regarding sludge management.

"Once the replacement facility is completed, our Stapelfeld plant will be able to supply twice as many households in the region with sustainably produced electricity.

Morten Holpert
Technical Managing Director,
EEW Energy from Waste Stapelfeld GmbH

More than

64,000

households can be supplied with sustainably produced electricity

Around

€220m

in investments

More than

975,000

t/a of residual waste and sewage sludge will be safely treated and transformed into energy

Up to

35

new jobs will be created

MAGDEBURG-ROTHENSEE

The Rothensee energy from waste plant, which EEW operates in collaboration with the local utility company SWM Magdeburg, is situated north of Magdeburg. Since 2006, its four lines have been treating around 650,000 t/a of waste – safely and with low emissions. The new Block 3 now under construction will add thermal treatment capacity for commercial and industrial waste as well as a sewage sludge incineration plant. This new milestone was marked on 17 June 2022 with the symbolic laying of the foundation stone and placement of a time capsule, attended by the current Mayor of Magdeburg, Simone Borris, and many other guests.

A total of around €220m will be invested in this expansion, creating treatment capacity for a further 270,000 t/a of commercial waste from 2024. With the new integrated sewage sludge incineration plant, a total of 55,000 t/a of sludge per year can be combusted in an environmentally friendly manner. Phosphorus will be recovered from the ash for use as agricultural fertiliser.

The total capacity of the Magdeburg-Rothensee site will increase to 975,000 t/a, making it the largest in Germany. As a result, electricity and district heating can be supplied to tens of thousands more households and many companies in Magdeburg. In addition, the new facility will generate process steam for industrial companies, making their production significantly more eco-friendly. And last but not least: The expansion of the site will create 35 new jobs in Magdeburg.

A strong and important *partnership*

Simone Borris and representatives from EEW, SWM Magdeburg and the Rothensee plant at the foundation stone-laying ceremony for the third block.

Circular economy in Magdeburg

Magdeburg is a city with big plans for its future. Turning these plans into successes requires a solid foundation and this includes the responsible management of waste as well as a secure supply of energy. We are therefore very happy that with the Rothensee plant and its two shareholders – EEW Energy from Waste and Städtische Werke Magdeburg (SWM) – we can rely on partners who are not only dependable in every sense but are also investing in Magdeburg's future. Today, around 45,000 households in our city are already benefiting from electricity and heat produced in the Rothensee power plant – and during a time when the supply of gas and oil has become significantly more complicated worldwide. Starting in 2024, the capacity expansion will enable additional tens of thousands of households in Magdeburg to source sustainable energy. At the same time, we are hoping that the expanded energy production from waste will decouple us somewhat from fossil fuel prices. And, just as importantly, the creation of around 35 new jobs offers additional perspectives.

Promoting companies working in the circular economy, recycling sector and environmental protection technology is one goal of our municipal economic policy. Accordingly, this segment was identified as a particularly important local industry by our City Council in our economic vision statement. The current circular economy legislation offers many opportunities for companies in the waste and recycling industry to strengthen, expand or even tap new fields of business with innovative technologies and intelligent linking of material streams. This is exactly what the Rothensee plant is doing. The safe management of our non-recyclable residual waste via thermal treatment is an essential component of today's circular economy.

Today, around 45,000 households in our city are already benefiting from electricity and heat produced in the Rothensee power plant – and during a time when the supply of gas and oil has become significantly more complicated worldwide.

On this occasion, I would also like to express my thanks for the Rothensee plant's years of participation in our spring clean-up initiative "Magdeburg cleans up!". In 2022, a total of 6,571 people from Magdeburg took part in 302 clean-up groups and collected around 200 tonnes of waste, helping to beautify Magdeburg. The Rothensee plant has always been an important sponsor for projects in the state capital and is a firmly established part of the community.

Simone Borris
Mayor of the City of Magdeburg

Actively encouraging dialogue

EEW seeks out local contact

EEW is an important part of everyday life in many towns and regions – as a provider of waste management services and energy in the municipalities. To ensure everything functions smoothly on a day-to-day basis, there needs to be coordination between the site and the local municipal bodies, i.e., public administration and municipal undertakings. They are EEW's customers.

At some sites, we have set up a dedicated body known as an Advisory Council to perform this function. One of these Advisory Councils is located at the Rothensee plant. "The Advisory Council meets at least twice a year and discusses, for example, current big topics such as dates for maintenance work or new-build projects," explains Rolf Oesterhoff, Managing Director of the Rothensee plant. "Another task is always planning for the coming year to estimate which volumes and types of waste and in which quality will be delivered by whom."

The Advisory Council's agenda last year at the meetings in Magdeburg primarily focused on the expansion of the thermal treatment plant for commercial waste and the construction of the new sewage sludge incineration facility. "In connection with this, we also visit the building site," says Oesterhoff. He adds: "The meetings are hosted by the various Advisory Council members and this helps us to get to know everyone's work." Another current topic for Advisory Council these days are the changes in relation to Germany's Fuel Emissions Trading Act (BEHG). But the agenda can also include public relations measures and strategies. When asked who the members of the Council are, Oesterhoff answers: "In accordance with our statutes, the Advisory Council is made up of publicly owned customers, so it brings together very different people: district administrators, council members from local authorities, and representatives of municipal undertakings and administration. Everyone benefits from this 'format' because there is no other equivalent gathering." Olaf Eckardt, head of Peine district's waste management and job-creation divisions and a member of the Advisory Council, adds: "For us, the Advisory Council is the central body for exchanging views – and to ensure reliable waste management at all times."

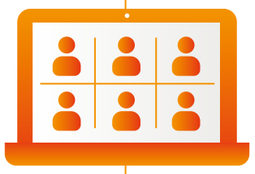
This raises the question: Are there Advisory Councils at all EEW sites? There is no definitive answer: Yes, at some sites. But at others, different forms of exchange have been chosen locally, as these represent the best and most desirable regional solution.

For us, the Advisory Council is the central body for exchanging views – and to ensure reliable waste management at all times.

Olaf Eckardt
Director of waste management and job-creation divisions, Peine district

The DIGITAL CREEW

Open to the future, open to interaction



41

CREEW Camps have taken place so far

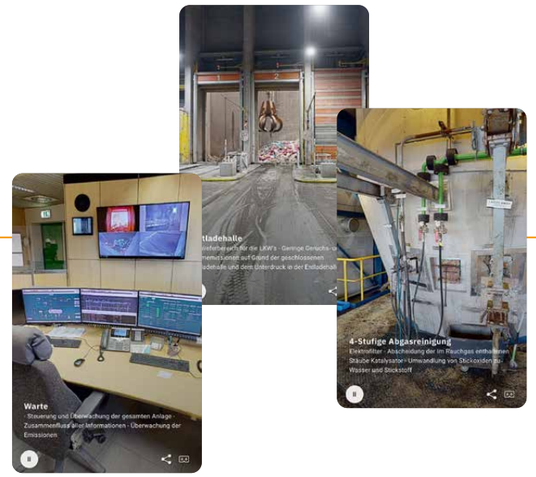
What does the DIGITAL CREEW do at EEW? A good question with a simple answer: It makes digitalisation and the associated opportunities tangible – across all sites and with people from all sites. To do this, the DIGITAL CREEW relies primarily on personal interaction.

However, the DIGITAL CREEW is not a project in the typical sense, it is a coalition of employees within the EEW Group. Participation is open to anyone who is interested, so it is a very heterogeneous group – and that is also the point. The members see themselves not only as multipliers for digitalisation topics in the company, but also as connecting links between the divisions and sites. Moreover, they relay information and impetus from the divisions and sites back to the DIGITAL CREEW.

EEW is proud of the large number of around 115 voluntary members, representing nearly 10% of the company's workforce. Not everyone takes part in everything. At the CREEW Camps, only those interested in a particular topic should participate and that typically means, depending on the topic, between 25 and 35 people. The programmes of the 41 camps carried out so far have included diverse topics such as "TriCAT Spaces avatar-based virtual 3D worlds of learning and work," "AI toolbox: analysis and evaluation of large data volumes using AI," and "SCRUM: Presentation of agile project methodology in a progress report from the technology division." This form of intra-company collaboration is essential for the digital transformation, which is one of EEW's key goals. It requires personal initiative, openness to new things, the desire to experiment and actively share knowledge.

Project example: 3D scan: Virtual plant tours

With 3D scans of our plants, we create the basis for a digital twin, primarily to enable us to remotely carry out preparations for maintenance shutdowns and inspections and identify maintenance needs. This simplifies collaboration between the central engineering teams and the plant as well as with external service providers. It significantly reduces travel and resource expenses. In addition to millimetre-precise measuring functions and virtual staging of 3D objects, many other functionalities are possible.



NEEW Ventures

First spin-off launched

"At NEEW Ventures, we want to take a more differentiated look at circular material streams and develop digital solutions and business models to close gaps in the circular economy.

Philipp Böhm
Managing Director, NEEW Ventures GmbH

Digitalisation continues to be a megatrend. And with it, a new culture has arisen in the business world: start-up culture. Questioning the status quo, seeing new goals, viewing failure as not only failure, and recognising new technologies as opportunities – all these and more are features of this culture.

Because the waste management industry as a whole and EEW in particular see digitalisation as an opportunity, NEEW Ventures GmbH was founded as a subsidiary in 2021. The firm sees itself as a venture builder and develops start-ups that tap previously underutilised material and energy potential in waste streams with the help of digital solutions. The employees are primarily driven by a mission of making the circular economy stronger and more connected, also beyond the borders of EEW – not only in terms of technology but also culture. In practice, this entails establishing contacts between innovative digital experts and employees, customers and other stakeholders. The aim is to create solutions throughout the entire waste management and treatment value chain based on new, digital and transformative solutions.

The first full business year of NEEW Ventures in 2022 was a success, with the spin-off of WASTEER, the first independent start-up. WASTEER is a provider of digital tools to analyse waste and digitally process waste data. For example, it can help to decide where, how and when to treat which types of waste in order to optimise plant operations and utilise the energy potential of the residual waste. NEEW Ventures has big plans for the future. This includes, for example, testing out new, innovative ways of identifying, decoupling and using high-value waste fractions from the residual waste stream and developing data-based solutions for the future circular economy. In addition to the technical implementation, the aims also include establishing partnerships with waste suppliers, waste recyclers, logistics providers and other circular economy start-ups.

Innovations at EEW

Our vision for the future

In our vision of the future, thermal waste utilisation and sewage sludge treatment plants continue to form the foundation of our activities. They are very interconnected with local infrastructure. Material loops are closed using various treatment processes for reclaiming raw materials. Our plants in local communities will therefore be a key element of the future circular economy. Some parts of this picture are already becoming reality.

BASELINE

Reliable waste treatment services and energy supplies

Mixed waste streams

The thermal utilisation of residual waste from households and commercial and industrial businesses is an integral part of the circular economy. It sanitises and reduces the volume of heterogeneous waste and removes numerous pollutants contained in the waste from the environment and material loops.

Energy

The energy contained in the waste, approximately 50% of which is of biogenic origin, is utilised to produce electricity, district heating and process steam. Thermal waste utilisation therefore makes an important contribution to a secure energy supply and replaces fossil fuels such as oil or natural gas.

Process steam | Electricity | District heating

Residues

In addition to producing energy, thermal waste utilisation can also reclaim secondary raw materials, such as ferrous and non-ferrous metals. The combustion process produces bottom ash, which can be used in road construction, for example, to substitute primary materials such as sand and gravel.

Bottom ash | Sewage sludge ash | Air pollution control residues | Metals

Emissions

The combustion of waste produces gaseous mixtures that contain pollutants such as carbon dioxide (CO_2), dust and soot. Modern multi-step flue gas cleaning technologies can minimise a share of the organic and inorganic pollutants at the point of generation, chemically transform another share into harmless or separable compounds, and filter out yet another share.

CO_2

VISION

Ressource and energy efficiency

Recovery of raw materials

Pre-sorting separates recyclable plastic fractions from mixed residual waste prior to the thermal process. These and other specific material streams (e.g., organic waste, roadworks rubble containing tar, e-waste or carbon-fibre reinforced polymer waste) can be further separated using specific engineering processes, such as pyrolysis, chemical recycling or anaerobic digestion, and then refined into valuable secondary raw material products, including recycling, naphtha or biogas.

Plastic recyclate | Naphtha | Biogas | Pyrolysis coke & gas

Electricity storage

In the energy transition, electricity storage systems will complement solar and wind energy by providing a valuable contribution to power supply regulation and frequency stability in the electricity grid.

Battery storage | Heat storage

Transforming residues into valuable raw materials

Residues are no longer merely recovered, they are transformed into higher-value secondary raw materials. For example, the vital resource phosphorus can be obtained from sewage sludge ash. Air pollution control residues are disaggregated via leaching and smelting, depolluted and can be recycled as a climate-friendly substitute for clinker in the cement industry.

Phosphorus | Cement/building materials | Metals

Exhaust gases as resources

Carbon capture and utilisation (CCU): Carbon dioxide (CO_2) is captured from flue gas and can be used as a starting base for raw materials.

NO_x capture and utilisation: Nitrogen oxides can be captured from the flue gas to limit impact on the atmosphere. They can be used, for example, to produce nitrogen fertilisers.

CO_2 | Limestone | Carbonic acid | Soda

Lighthouse project
for the transformation

The Delfzijl industrial park in the Dutch province of Groningen is located next to the Wadden Sea National Parks area, a habitat deserving of special protection. EEW ensures that the company's local power-generating activities are and remain environmentally sound, safe and responsible. In 2022, the Delfzijl site evolved into a lighthouse project, which also reflects the transformation of the EEW group.

1 Thermal waste utilisation
Existing plant

2 CO_2 capture facility
Installation under development

3 Thermal sewage sludge treatment
Installation under construction

4 Pre-sorting plant
Installation under development

around
190,000
MWh p.a. electricity from thermal waste utilisation

In 2022, we started construction of a new sewage sludge mono-incineration plant, which is slated to start operations in 2024. It will process up to 185,000 t/a of sewage sludge, disposing of the pollutants contained in the sludge while returning the vital resource phosphorus back into economic circulation. This site in the Netherlands will thus make a further contribution to climate, environmental and resource protection.

The new plant ideally complements EEW's thermal waste treatment facility, which has been located here since 2010. This facility currently produces 191,000 MWh of electricity and 796,000 MWh/a of process steam to meet the energy needs of nearby companies. Around 576,000 t/a of commercial and household waste as well as refuse derived fuels (RDF) are delivered to the plant by ship, rail or road. In future, having thermal waste and sewage sludge treatment co-located at one site will save not only fossil fuels but also time, energy and staffing resources. At the same time, the facility is an important partner locally, providing reliable energy supplies and waste treatment services.

Natural gas substitution and phosphorus recycling

For context, it is important to know that the Netherlands stopped using sewage sludge as fertiliser in 1995. Subsequently, the sludge was co-incinerated in power plants or exported – also for use as fertiliser in German agriculture. With the new version of the Sewage Sludge Ordinance and fertiliser legislation, Germany is also effectively banning the use of sewage sludge fertiliser. As of 2022, the Netherlands is also gradually phasing out natural gas production, so a new source of energy that is more economical and climate-friendly is needed for sewage sludge drying.

EEW and a partner company were selected by three local water authorities to implement this project, due in part to their convincing plans regarding sustainability aspects such as resource conservation, energy efficiency and low transport-related environmental impact. One example: The new plant replaces the natural gas in the thermal treatment process for sewage sludge drying and it will also generate process steam for the Delfzijl industrial park. In total, this is expected to save around few millions of cubic metres of natural gas per year.

Sewage sludge contains relatively large volumes of phosphate. At the Delfzijl industrial park, EEW also plans from 2026 to start recovering phosphate from the ash of thermally treated sewage sludge and thus make this valuable raw material available for agriculture once again.

around
800,000
MWh/a process steam for industrial partners from thermal waste utilisation

Capturing carbon dioxide: CCU and CCS

As part of its goal to be climate-neutral by 2030 and climate-positive by 2040, carbon capture is the most effective tool for EEW. Carbon capture and utilisation (CCU) means capturing and using CO_2. Carbon dioxide can be used, for example, to produce alternative fuels such as e-methanol or chemicals. Carbon capture and storage (CCS) also involves capturing CO_2 but in contrast to CCU, the carbon dioxide is collected and permanently stored underground.

From 2026, a plant being built at the EEW site in Delfzijl will capture and prevent the emissions of around 270,000 t/a of CO_2 from the flue gas resulting from the thermal treatment of household and commercial waste. By the year 2040, this volume should increase to 400,000 t/a of CO_2.

"We want to use CO_2 to recycle the sodium bicarbonate needed in flue gas cleaning and to produce renewable fuels.

Wilfred de Jager
Technical Managing Director, EEW Delfzijl

Find out more about our carbon capture project

Carbon dioxide as a resource

The carbon dioxide will be utilised in two ways: It will be deployed to recycle sodium bicarbonate, which is used as a chemical for flue gas cleaning at thermal treatment plants. This represents another step towards a circular economy and reduces dependency on supplier firms and primary resources. Second, the CO_2 will be used to produce renewable, synthetic fuels. Another portion of the CO_2 will be stored underground to meet the Dutch government's CO_2 reduction targets.

EEW is not working alone on this renewable fuels project, specifically methanol production, but together with partners from industry: As part of the HyNetherlands project, the company Engie will provide the necessary hydrogen, EEW will provide the carbon dioxide and OCI, Europe's largest producer of biomethanol, will combine these to produce e-methanol. HyNetherlands will produce, among other things, e-methanol for the maritime transport industry. This project will be one of the first industrial production sites of this scale in Europe. HyNetherlands is ideally positioned in the north of the Netherlands because this region has abundant renewable offshore wind energy, which is key for the production of the necessary green hydrogen.

Transformation and diversification

The EEW site in Delfzijl is a lighthouse project for the advancement of combining and intermeshing of various methods to manage waste and sewage sludge while also supplying electricity, process steam and district heating. At the same time, the Delfzijl site exemplifies EEW's approach of forging new paths with new partners in order to implement practical solutions for the most pressing problems facing humanity – the key words here being circular economy and CO_2. In future, a pre-sorting plant will be installed at the site to process the waste deliveries with the aim of diverting plastics for mechanical or chemical recycling. Likewise, this new view of carbon dioxide as a raw material – and not just as a pollutant – is part of the transformation process and the drive for greater diversification. Another aspect is that EEW wants to use wind power at its Delfzijl site.

What is more, EEW innovations are nothing new at the Delfzijl site. Back in 2007, a flue gas cleaning system was developed here, which was and remains cutting-edge in terms of low emissions and high energy efficiency. It still fully complies with the very low emission thresholds set out in the current EU specifications on best available technology.

around
580,000
t/a commercial and household waste as well as refuse derived fuels are transformed into low-emission energy

Sustainability *must be practiced*

Analyses, strategies and roadmaps form a solid foundation for sustainable conduct and sustainable business – on the one hand. On the other hand, a company must also have sustainable "spirit." We have this spirit at EEW, as demonstrated by the following four examples from our company-wide initiative "WANTED – Your Sustainability Story."

7,604 sheets of paper saved

"In Göppingen, we took one small step with great savings potential: When our customers deliver waste or collect residues, instead of getting three weighing documents in paper form they now get just one printed copy. If necessary, we can send the documents electronically. Just in the period from 4 October until 31 December 2022, this saved us 7,604 sheets of paper for 3,802 vehicle weighings."

Simone Kroll
Head of waste and supplies reception and residues disposal, EEW Göppingen

Technical parts reused

"In Inventory Management we inevitably have to phase out technical equipment. Previously, this was disposed of, but in the past few months, we have been passing on these items to colleagues in the vocational training workshop. They are happy to get them because many of these substitute parts can be used for training apprentices."

Andreas Wulf
Employee, Inventory Management, EEW GmbH

1,169 kg CO_2 saved

"Cycling or walking to work to protect the environment and improve health – this was the aim of the movement challenge in Göppingen. Between March and August 2022, employees could count the kilometres they walked or cycled to work. In total, we covered nearly 7,800 km and thus saved 1,169 kg of CO_2."

Sabrina Poschinger
Technical Administrator, EEW Göppingen

"We also see our participation in the cycling initiative "Stadtradeln" as an aspect of sustainability. Those of us participating rode our bikes rather than driving cars for three weeks during the annual event. Last year, Stadtradeln coincided with our plant maintenance shutdown, but that did not stop our colleagues from taking part. They travelled a total of 2,683 km. Our management also financially rewarded our efforts: We were then able to donate a total of €536.60 to the food bank in Trittau."

Anke Ohrdorf
Assistant, EEW Stapelfeld

€536.60 donated

Publication details

Publisher
EEW Energy from Waste GmbH
Schöninger Straße 2–3
38350 Helmstedt, Germany
www.eew-energyfromwaste.com

Contact
Birgit Fröhlig (Head of Corporate Sustainability)
Helena Wassermann (Sustainability Manager)
nachhaltigkeit@eew-energyfromwaste.com
www.lets-talk-about-tomorrow.com

Concept, design and editing
loveto GmbH, Berlin
www.loveto.de

Date of publication
May 2023

Image credits
Cover: © Patricia Haas; p. 2, 4, 8, 20, 22-25, 39, 40: © Patricia Haas; p. 3, 6, 7, 10, 11, 15, 16, 17, 36, 38, 46, 50: © EEW Energy from Waste GmbH; p. 3, 18, 19, 28, 29, 44: © Peter Gercke; p. 5: © Beijing Enterprises Holdings Limited; p. 6, 14: © Markus G. Oh; p. 16: © Tobias Kramer; p. 29, 30, 31, 32, 33, 34, 35: © Lukas Hoffmann; p. 43: © Bastian Ehl

Printer
Druckerei Lokay
www.lokay.de

print production www.natureOffice.com/DE-344-MZ3ET9K carbon neutral through CO2 offsetting

eco zoom natureOffice.com/DE-344-MZ3ET9K Materials Transports Production 306 g CO2e per product CO2e-emissions compensated

Let’s talk here too:

www.lets-talk-about-tomorrow.com

www.eew-energyfromwaste.com/en

www.linkedin.com/company/eew-group

www.xing.com/pages/eewenergyfromwastegmbh

www.youtube.com/@eewenergyfromwastegmbh6187

www.twitter.com/eew_group

www.instagram.com/eew_group

EEW Energy from Waste GmbH
Schöninger Straße 2–3
38350 Helmstedt