eew
Energy from Waste

Taking the lead.

Welcome to EEW Energy from Waste.

Energy is essential to everyday life: It powers our industrial and service-based society, guarantees mobility and is the basis for digitalisation and networking. In our everyday lives, we rely on electricity from the socket and central heating to provide entertainment, warmth and comfort in our homes. In short: A secure energy supply is invaluable to both our society and the economy. However, it is not a given that energy is reliably available anywhere and anytime. Since the availability of fossil fuels, such as coal, oil and natural gas, is limited, the use of waste as a resource to produce energy – at least 50 per cent of which is renewable energy – is becoming increasingly important.

EEW Energy from Waste GmbH (EEW) is one of the leading companies in Europe in the field of thermal recovery of waste and sewage sludge. EEW Energy from Waste is already making an important contribution towards protecting the climate and resources and is a key player in the circular economy. Our corporate group currently operates 17 sites that can process around 5 million tonnes of waste per year. The more than 1,400 employees at our plants ensure that the energy stored in waste is utilised, the volume of waste is reduced, the hazards caused by waste are eliminated safely and without negative impact, and that scrap metals and compound materials are recycled. Moreover, we efficiently utilise the energy contained in waste to generate process steam for industrial plants, district heating for residential areas and environmentally sustainable electricity. In line with our vision for the future, we have set a goal to be climate neutral by 2030 and climate positive by 2040. A key measure in addition to carbon reduction will be carbon capture at our facilities. The captured carbon will be partly stored underground or utilised as a valuable feedstock for chemical products in a carbon-neutral economy of the future.


LEDLENSER

Contents.


Taking the lead
with environmentally
friendly energy from waste.

We tackle the future.
And assume responsibility.

Every year, around 237 million tonnes of municipal waste are generated in Europe. While a large per centage of Germany's municipal waste is already thermally treated to generate energy, more than 54 million tonnes of waste across the EU are still being sent to landfill. As a leading producer of electricity and heat from thermal waste recovery, we are working towards ensuring that the outdated model of waste landfills will soon be a thing of the past in Europe. Because we recognise that every tonne of waste that is not recycled or used for energy recovery represents a loss for the environment and less energy for our sustainable supply.

EEW Energy from Waste. Leading in waste treatment.
With our expertise and innovative strength, we have transformed conventional waste incineration into a highly efficient process combining waste recovery with energy production. Today we are able to take household, commercial and industrial waste and bring these resources back into circulation with our energy from waste technology. We treat this waste, turning it into energy for households and industrial firms, recycling the useful materials it contains and recovering building materials from the incineration residues. As such, we are an important player in a responsible raw materials management industry.

EEW Energy from Waste. Leading the way in sludge recovery.
One challenge is the disposal of sewage sludge, the waste product of sewage treatment. For decades it was standard practice to use this pollutant-ridden sludge as a fertiliser in the agricultural industry. But lawmakers have laid the foundation for far a more environmentally friendly approach to sludge recovery. We have taken on this important challenge and we aim to take the lead with a pioneering approach to resource-conserving sewage sludge recovery. As a partner to municipalities, we are ready to develop customised, forwardlooking solutions for sustainable thermal sewage sludge recovery. Particularly at current EEW sites, this will lead to beneficial synergies with the existing energy from waste plants.

Taking the lead is our mission.
For us, taking the lead means being excellent today and even better tomorrow. Our team of around 1,400 highly qualified, committed employees works to advance thermal waste treatment and energy recovery as an intelligent component of the transition to renewable energies. And we always keep in mind the three pillars of a responsible energy sector: efficiency, security of supply and environmental sustainability.

At EEW Energy from Waste, we guarantee municipalities and companies reliable waste management as well as ground-breaking, environmentally friendly energy generation and always customised solutions that are sustainable and forward-looking. We want to be measured by our performance, our low emissions and our success.

The EEW Energy from Waste management team (left to right):
Timo Poppe (CEO), Dr. Joachim Manns (COO), Stefan Schmidt (CFO)

State-of-the-art technology and forward-looking employees in the EEW team ensure the safe and smooth operation of EEW's plants.


eew
Energy from Waste

150 years of progress. Our expertise.

Our company's history is inseparably linked with the history of energy generation and waste recovery. Our company was founded in Berlin in 1873 as Braunschweigische Kohlen-Bergwerke (BKB). It started out in brown coal mining, but a few years later began producing electricity as well. The Second World War, the division of Germany, the oil crisis, the continually rising energy consumption … As a result of its consistent alignment with changing market requirements and forward-thinking investments in new technologies, BKB developed into a leading company and specialist on the German market. The company entered the thermal waste treatment sector as early as 1990. In an era when waste was being sent to landfill and the German municipal waste management sector was adding nearly 38 million tonnes of environmentally harmful gases to the atmosphere, BKB recognised the signs of the times and started to build and operate energy from waste plants.

With Germany's introduction of the Technical Instructions on Municipal Waste (TASi) in 1993 and the Act to Promote Circular Economy and Safeguard the Environmentally Compatible Management of Waste (KrW-/AbfG) in 1996, thermal waste recovery started becoming increasingly important. The waste management industry became a material flow management industry and BKB AG became a sought-after partner on the market. BKB became the centre of excellence for waste combustion in the E.ON Group in 2003.

The takeover of SOTEC in 2008 created Germany's largest thermal waste treatment company, then known as E.ON Energy from Waste. Just two years later, the company made its first foray into international markets with the start of operations at the energy from waste plants in Delfzijl (the Netherlands) and Leudelange (Luxembourg). The company was spun off from the E.ON Group when a majority stake was sold to EQT in 2013 and E.ON Energy from Waste became today's EEW Energy from Waste. Its success increased the attractiveness of the EEW corporate group, leading to Beijing Enterprises acquiring 100 per cent of our corporate shares in 2016.

150 years after our company was founded, EEW Energy from Waste has the most experience and expertise in generating energy from thermal waste treatment. As Germany's leading company, we contribute to a sustainable energy supply and the reduction of greenhouse gas emissions. As landfilling was phased out, emissions of greenhouses gases in the waste management sector were reduced by more than 70 per cent between 1990 and 2015. In addition, the waste management sector contributes to climate protection because the recovered secondary raw materials reduce by up to half the energy required, for instance, in the production of glass, paper or plastic. Thus, more carbon dioxide is saved each year than is emitted (source: Federal Environment Agency).

We aim to continue to set standards with pioneering sludge recovery and to further develop the future model of energy from waste.

17
plants in Germany and neighbouring countries

1,400
employees

Around
5,000,000
tonnes of energy from waste capacity

References:
Electricity, district heating and steam volumes produced by 17 EEW Energy from Waste plants in 2022. Assumed average annual household energy consumption: 3,190 kWh.

Around

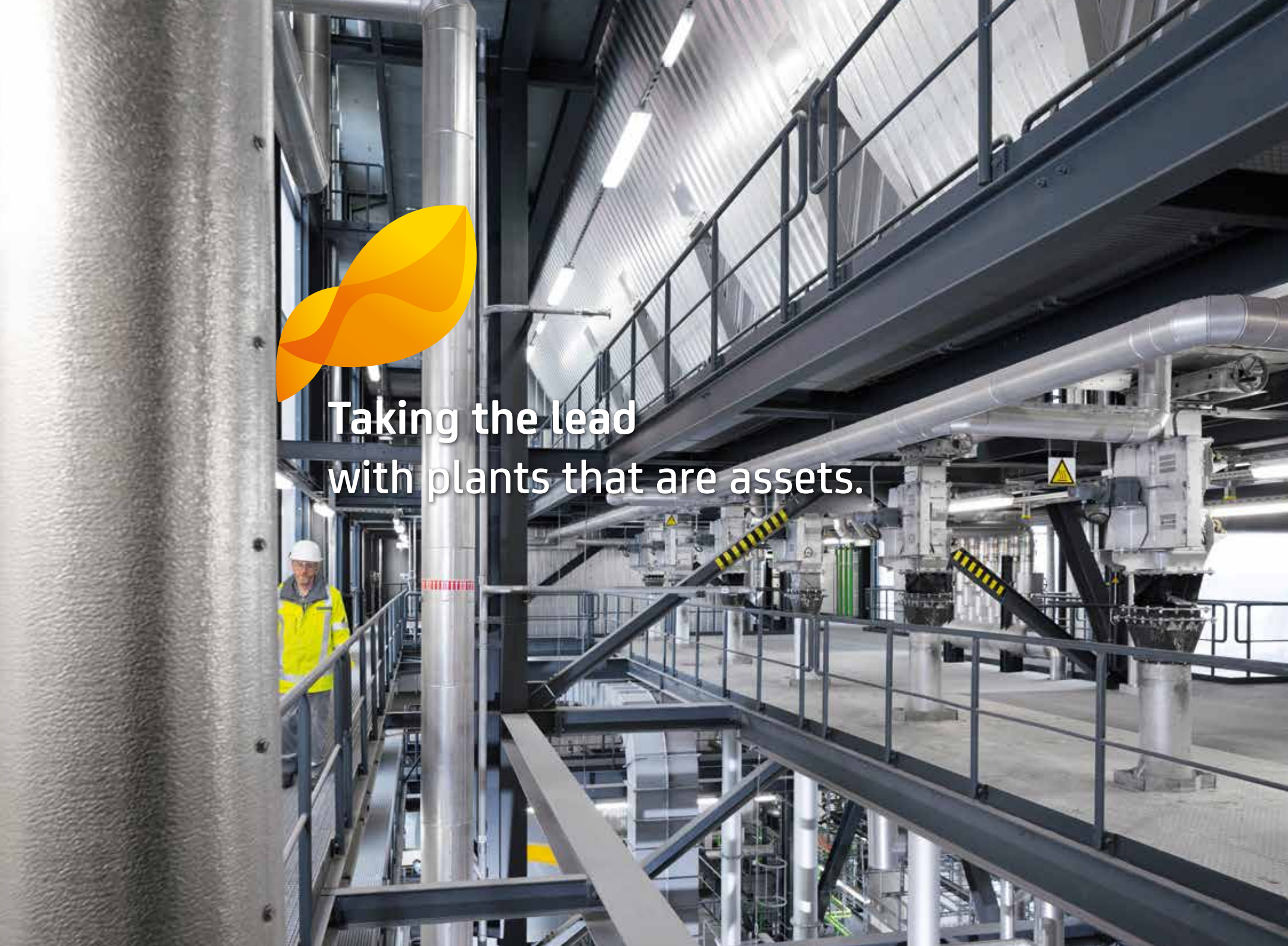
4,450,000

megawatt hours of process steam and district heating generated in a resource-friendly manner

Electricity generated for the equivalent of around

700,000

households


Taking the lead
with plants that are assets.

Close to our customers.
With 17 plants in Germany and neighbouring countries.

Energy from waste plants are a special kind of high-quality power plant. They not only have to meet the strictest requirements with regard to emission limits, they must also satisfy the highest technical demands and are therefore continuously monitored and optimised.

For around 30 years, the EEW Energy from Waste Group has been planning, building and operating thermal waste recovery plants that set standards across Europe. As the leading company in Germany, we currently have the largest and most modern network of plants for the production of energy from thermal waste treatment. We also have the largest wealth of experience as well as the necessary innovative strength to be able to offer our customers the best solutions for their needs, whether in conventional thermal waste treatment or pioneering sewage sludge recovery.

With EEW Energy from Waste, municipalities are ideally prepared for the demands of the future. We develop customised solutions for pioneering, resource-conserving sewage sludge recovery. Particularly at current EEW sites, this will lead to beneficial synergies with the existing energy from waste plants. The use of leading technology in sludge mono-incineration enables a phosphorus recovery rate of over 80 per cent in subsequent processes – thus ensuring that the legal requirements are reliably fulfilled.

EEW Energy from Waste's thermal treatment facilities are impressive in all respects: from the layout of the facility, which takes into account both economical operations and the future development of the site and market, to the functional architecture and the leading technology for combustion and air pollution control. In the vicinity of our plants, which stand out for their low emissions, high efficiency and excellent workplace safety, new companies and thus new jobs are being created. At the same time, nearby industrial enterprises benefit from using the energy EEW generates.

Knowledge is our advantage. And it represents the capital which benefits our partners in the planning, construction and operation of an energy from waste plant. Every EEW plant is an investment in the future that pays off with sustainable results.

1 tonne of waste = 600 KWh of electricity

Electricity generated from waste is an important resource. The calorific value of the material is comparable to that of brown coal, making it virtually predestined for energy generation.

An overview of how an EEW plant works.

1

The waste is brought to our energy from waste plants by lorry, rail or ship 52 weeks a year. After arrival, the waste is automatically weighed and temporarily stored in the waste bunker.

2

A waste bunker has capacity for up to 10,000 tonnes of waste. The air pressure here is kept slightly negative so that no odours can escape. Environmental protection is therefore integral right from the start.

3

The waste is mixed by the crane operator and continuously added to the feed hopper. From there, it enters the boiler via the combustion grate.

4

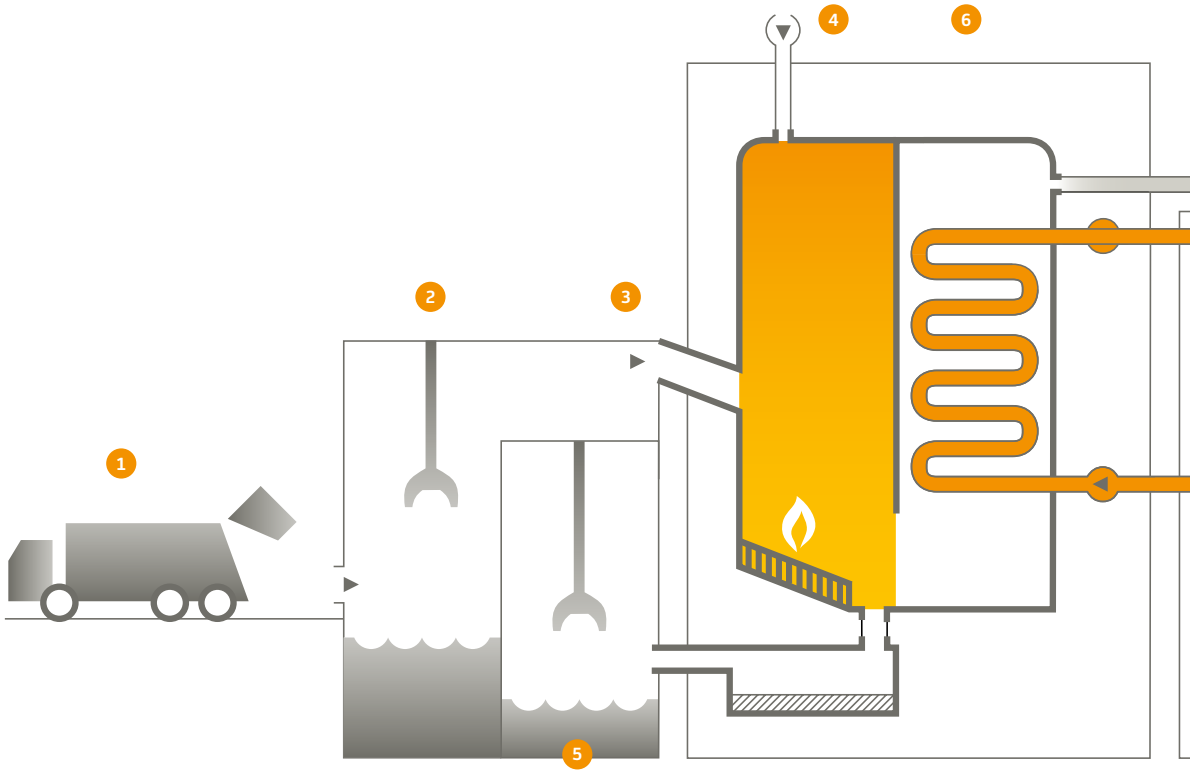
As the waste self-combusts at the high temperatures in the boiler, no additional fossil fuels are required. Burners are activated when the boiler is powered up or down in order to guarantee the minimum temperature of 850°C. This extremely high temperature is necessary to ensure that pollutants are mostly destroyed. At the same time, nitrogen oxides are converted into environmentally neutral nitrogen and water by adding ammonia solution.

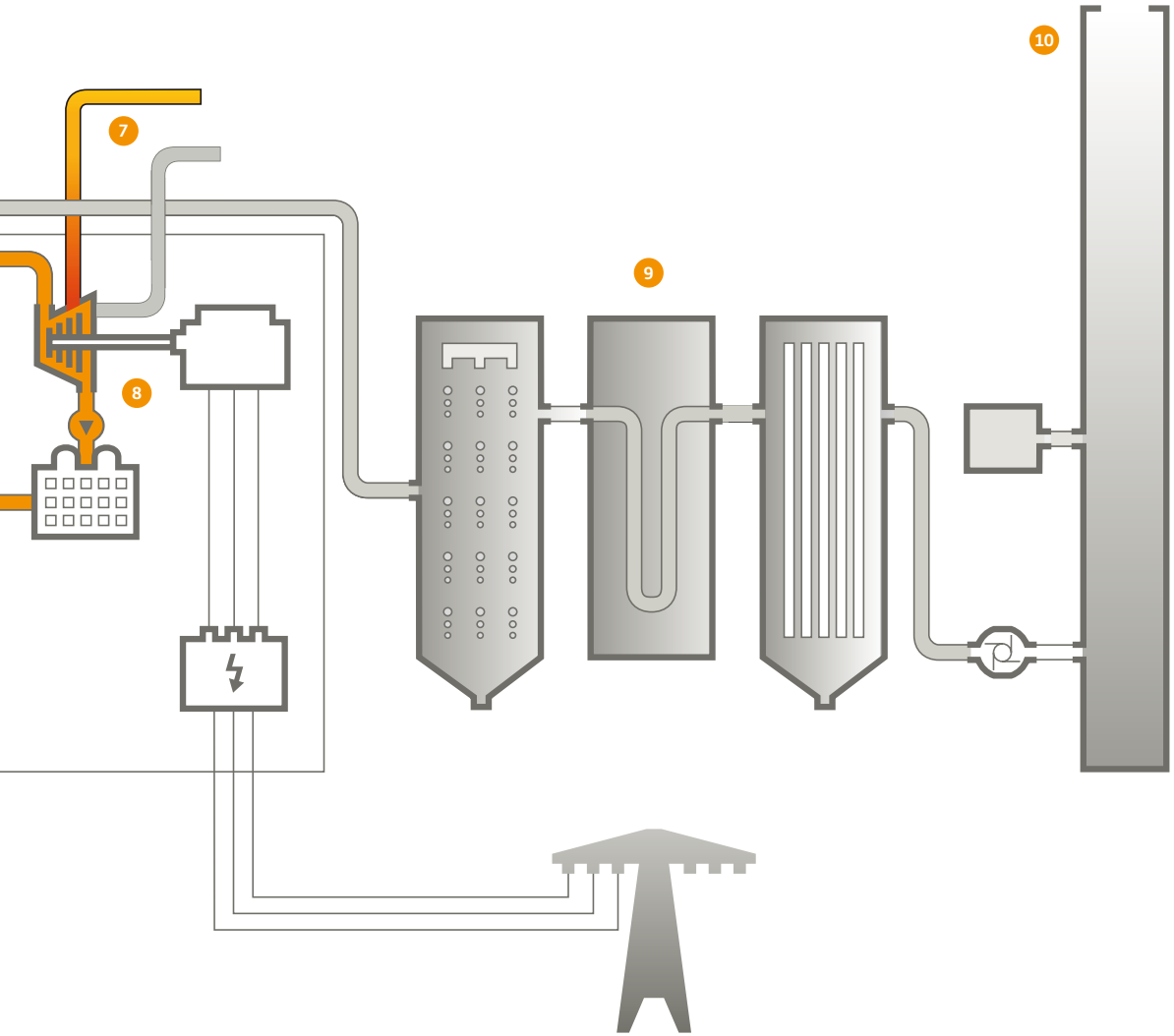
5

After around 60 minutes, the waste has been completely combusted and reduced to around 10 per cent of the original volume. The remaining material is bottom ash, which is used, for instance, in road construction.

6

With the thermal energy in the boiler, we produce steam with a temperature of 400°C and pressure of 40 bar. This steam powers a turbine connected to a generator. Our plants thus produce electrical energy which is then fed into the public grid.





7

Most of our plants use the especially energy-efficient combined heat and power (CHP) process, which means we can extract steam and heat in addition to electrical energy.

8

Our plants have an annual energy recovery capacity of around 5.0 million tonnes of waste. We can thus produce around 2.2 million megawatt hours of electricity, more than 3.35 million megawatt hours of process steam and around 1.1 million megawatt hours of district heating.* EEW's electricity output alone corresponds to the power required by around 700,000 households.**

9

The flue gases leave the boiler at a temperature of approximately 200 °C and then directly undergo several stages of flue gas cleaning. With the use of electrostatic or fabric filters and the addition of lime milk, active carbon, hearth furnace coke, lime hydrate and caustic soda, these processes remove dust, gaseous substances and heavy metals from the flue gases. The cleansed gas then leaves the stack with the aid of suction extraction.

10

Our modern energy from waste plants easily comply with the strict emission limits set by the EU. The emissions are continuously measured and monitored by measuring stations at every stack.

References:

* Electricity, district heating and steam volume produced by 17 EEW Energy from Waste plants in 2022

** Assumed annual average consumption per household: 3,190 kWh


Taking the lead
with waste management
that focuses on one thing: everything.

We always take 100%.
That is the EEW waste management guarantee.

Growing environmental awareness and the systematic expansion of thermal waste recovery have caused a paradigm shift in the waste management sector. Aiming for sustainable resource management within the framework of a functioning circular economy, the EU-wide waste hierarchy establishes that waste should first be avoided, then reused, recycled, used to produce energy and finally sent for disposal as a last option.

The EEW Energy from Waste Group offers municipalities and companies an environmentally friendly waste management solution that has one thing in its sights: everything. We have extensive expertise in the construction, operation and optimisation of energy from waste plants. By using state-of-the-art technologies, we ensure a high degree of efficiency, availability and environmental protection. In addition to the expertise we have acquired over the years, our size is also an advantage for our customers. In EEW's current network of 17 plants in Germany and neighbouring countries, we have created a unique logistical infrastructure which offers maximum flexibility in acceptance capacity and therefore guarantees reliable waste management in both the short and long term.

Close to our customers. Our energy from waste plants are close to our customers, which not only reduces transport costs but also benefits the environment. Being close to our customers also means we truly understand them and their concerns. This is the essential foundation for developing customised waste management concepts – including everything from the vehicle systems used and ideal delivery times, to the composition of the waste, classification and suitable combustion technology as well as compliance with the statutory waste transfer documentation.

Our highly qualified specialists give municipalities the certainty that our solutions are precisely tailored to the region's requirements and will meet with a high level of acceptance among residents. We offer companies a broad service portfolio for thermal waste recovery which is attractive to both long-standing partners as well as spot market customers.

Discover how you can benefit from working with EEW Energy from Waste, a company which takes the lead in terms of service, reliability and sustainable waste management.

Complex and simply ingenious: EEW's material flow management.
Planning for the unpredictable is the best way to achieve security. At EEW Energy from Waste, material flow management ensures waste is effectively distributed to the plant network. This model enables EEW to react at short notice to unforeseeable situations such as plant downtimes as well as to scheduled maintenance. An interactive database depicts the availability and the volume situation at EEW's energy from waste plants. By revealing free capacity as well as excess demand, it enables us to take action accordingly. EEW material flow management reroutes volumes from individual contracts to the nearest plants and guarantees our customers the waste management reliability they require.

Each year, 646 million tonnes of household waste are generated in Germany. This means that every person in Germany produces around 609 kg of municipal solid waste annually.

Depending on the size of the plant, the amount of electricity produced corresponds to the average annual consumption of between around 27,000 households (EEW Energy from Waste Göppingen) and up to 87,000 households (EEW Energy from Waste Helmstedt).


Taking the lead
as a partner for pioneering
sludge recovery.

We are prepared to do what is important. Pioneering sewage sludge recovery with EEW Energy from Waste.

Sludge is the waste product of sewage treatment. It contains everything that modern sewage treatment plants filter out of sewage in a complex process in order to maintain the purity of rivers, oceans, groundwater and – not least – our drinking water.

In particular, the sludge from sewage treatment plants in cities and conurbations is significantly polluted with harmful substances such as heavy metals, organic pollutants, pharmaceutical residues, pathogens and microplastics. However, sludge also contains the resource phosphorus. This nutrient is essential for life and encourages plant growth, which is one reason why sewage sludge has been used as an agricultural fertiliser for decades.

Over time, the agricultural use of sewage sludge has attracted growing criticism. Despite pre-treatment, sewage sludge contains harmful substances which spread through the soil and water, and ultimately also find their way into our food chains. In addition, an excess of phosphates leads to the eutrophication or over-fertilisation of streams, rivers and lakes.

After years of discussion, in 2017 German lawmakers laid the groundwork for significantly more sustainable management of sewage sludge. Two German regulations – the Sewage Sludge Ordinance (AbfKlärV) and the Fertiliser Ordinance (DüMV) – create a need for immediate action. The amended Fertiliser Ordinance impacts the kind of sewage sludge that can be used agriculturally. From the beginning of 2019, fertilisers containing synthetic polymers can only be used if the quantity of synthetic polymers does not exceed 45 kilograms of active substance per hectare within three years. This means that from 1 January 2019 many sludges can no longer be used as fertilisers.

Municipalities must therefore set the stage for resource-efficient sludge management. So let's think ahead together. EEW Energy from Waste takes on responsibility. As an experienced leader in the field of waste management, we will continue to take the lead with pioneering sewage sludge recovery. We offer municipalities custom-made solutions for thermal sludge recovery which protect our environment, conserve our resources and set economic standards.

We rely on the leading technology of sludge mono-incineration. Research has clearly shown that today's sludge mono-incineration with subsequent phosphorus recovery in downstream processes represents a particularly efficient recovery method for sewage sludge. Thermal treatment reliably destroys the harmful organic substances contained in the sewage sludge and kills off any possible pathogens. At the same time, the inorganic substances (heavy metals, SO2, HCl) contained in the sludge are effectively removed by the flue gas cleaning technology.

Another important factor is that, in terms of resource conservation, mono-incineration with subsequent phosphorus recovery is unbeatable. Only this method enables a phosphorus recovery rate of over 80 per cent in downstream procedures. This ensures that the legal requirements are reliably met. The construction of an EEW sewage sludge mono-incineration plant at an EEW plant site is an investment in the future which will have sustainable benefits. Our expertise in plant construction guarantees proactive planning with an eye on the overall picture and the needs of your region.

Phosphorus: A vital resource.
Without phosphorus there can be no life on Earth. This element is a component of DNA, bones and teeth and plays a key role in cell metabolism. Since phosphorus is also largely responsible for plant health and development, it is an essential component of fertilisers and therefore indispensable in the agricultural sector.

Phosphorus cannot be synthesised, so we are dependent on natural deposits. But global phosphorus reserves are limited. Neither Germany nor the EU has any known deposits of rock phosphate, so we depend on imports from a few source countries. At the same time, harvesting the mineral is becoming ever more complex and expensive. It can therefore be assumed that prices will rise in the future.

Sewage sludge today: contaminated and a source of risk.

Agricultural application is still a standard method of managing sewage sludge in Germany. Approximately one-sixth of sewage sludge arisings is applied to our fields as a fertiliser after pre-treatment. Given the current knowledge about the harmful substances sludge contains and the unforeseeable damage to health and the environment, this is irresponsible.

Heavy metals

The heavy metals contained in sewage sludge, such as arsenic, copper and nickel, contaminate our soils and can get washed out into groundwater and surface water.*

Pathogens

Sewage sludge contains bacteria, viruses, parasites and worm eggs. By coming into contact with pharmaceutical residues, the pathogens can develop resistance to antibiotics. If these resistant germs get into the environment, they represent a considerable health risk.

Organic contaminants

Sewage sludge contains harmful organic substances from water used by industrial and commercial enterprises as well as households.

Pharmaceuticals

Pharmaceutical residues get into the sewage system through excretions following therapeutic use or through improper and illegal disposal of left-over medications in the wastewater system, and they have been detected in sewage sludge.

Microplastics

Minute plastic particles from cosmetics and skincare products and plastic fibres from clothing which come off in the wash present a growing hazard for bodies of water.

* Zwiener, C., Grathwohl, P. & Walz, A. (2014): Final Report on the Project “Screening for contaminants in sewage sludge.” University of Tübingen, Tübingen 2014.

Sewage sludge tomorrow: a resource and source of energy.

EEW Energy from Waste can transform sewage sludge, currently a source of contaminants and risks, into a valuable resource and a source of energy. We convert the waste product into precious energy, while our mono-incineration achieves a recovery rate of at least 80 per cent for the vital resource phosphorus.

Environmental protection

With exemplary sustainability, the emissions of the EEW plants are below the strict statutory limits. Our network of plants across Germany means short transport routes for this nascent recovery model. Thermal conversion of organic carbons in the sewage sludge reduces methane emissions and improves the carbon footprint of the recovery method.

Resource conservation

The use of cutting-edge sewage sludge mono-incineration technology enables a phosphorus recovery rate in subsequent processes of more than 80 per cent – an important contribution to resource conservation.

Safety

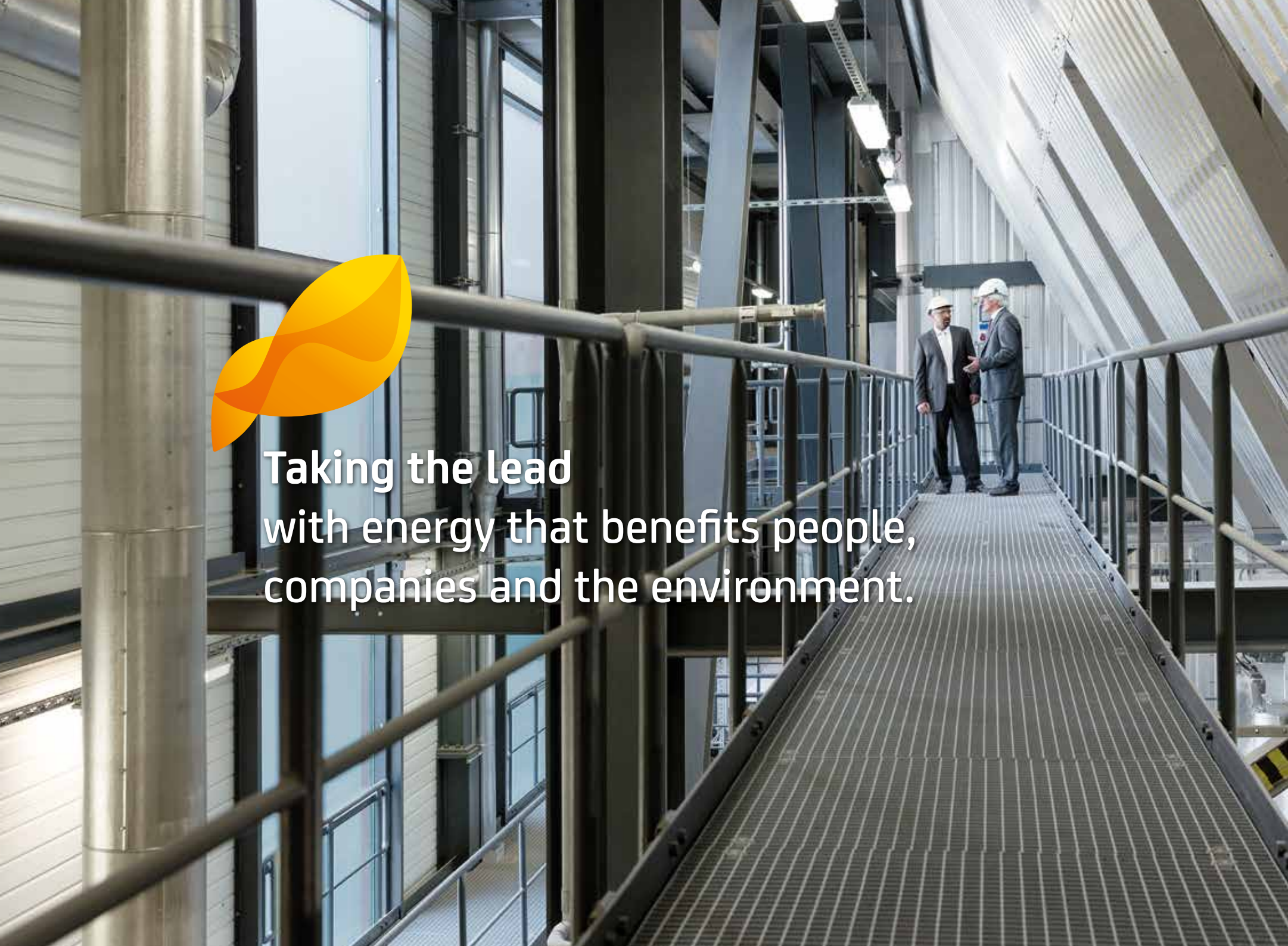
Thermal treatment reliably destroys the harmful organic substances contained in the sludge and kills off any possible pathogens.

Energy production

Thermal treatment in an EEW mono-incineration plant ensures optimal energy yield.

Fertiliser

Furthermore, following a subsequent phosphorus recovery process, the phosphorus essential to plant growth can be supplied to farmers for direct application as a fertiliser or to industry for use as a raw material.


Taking the lead
with energy that benefits people,
companies and the environment.

We not only produce electricity, steam and heat, we create connections.

Waste is an essential component of the energy mix for a sustainable and reliable energy supply. The high energy content of the waste is comparable to that of brown coal, making it virtually predestined for energy generation. In addition, waste self-combusts so it does not require any further primary energy inputs, such as gas, oil or coal, except for during ignition. This means that the combustion process produces considerably more energy than it consumes.

The technically sophisticated, highly efficient EEW energy from waste plants make optimum use of the energy potential of the waste. Precisely coordinated work processes ensure a high level of workplace health and safety. A large majority of our plants work with combined heat and power (CHP) technology. This means that the steam can not only be used for power generation, it can also be fed into the district heating grid as needed and supplied to industrial companies as process steam.

We work to ensure that no energy is lost – neither in waste recovery nor in the collaboration with our business partners. Municipalities value us as a responsible energy producer and have often put their trust in the services of EEW Energy from Waste over decades. For industrial customers, our EEW competence team develops individual energy roadmaps that are precisely tailored to the required production processes. Our solutions – which take a view of the whole as well as every last detail – guarantee customers an energy supply customised to their requirements, with environmentally friendly energy from waste.

Environmentally friendly electricity from waste: Welcome home.
EEW's 17 energy from waste plants generate 2,200,000 MWh of environmentally friendly electricity every year – valuable energy that equates to the annual consumption of around 700,000 households*.

District heating: an ideal local solution.
Whereas conventional power plants often lose up to 40 per cent of the energy as waste heat, EEW energy from waste plants further utilise this heat with combined heat and power (CHP). In parallel to the supply of electricity to the regional power grid, heat is supplied to municipal utilities when needed or to consumers via local district heating grids. Whether private households or companies in the vicinity of the plant – this heating system means that district heating consumers do not require other energy sources, such as oil and gas, or space for their own heating boilers.

Reference:
* assumed average annual household energy consumption: 3,190 kWh

Steam for industrial processes: more than hot air.

As another product of combined heat and power, we produce process steam for industrial production processes, which is increasingly being used by industrial companies in the proximity of our plants. This is a further contribution to protecting our resources.


Taking the lead
to ensure clean air.

We shrink the carbon footprint.
A benefit for the environment.

Generating energy from waste actively contributes to environmental protection in many ways: As waste contains 50 per cent biogenic substances on average, it is recognised that energy from waste plants produce energy from renewable sources pursuant to the Germany's Renewable Energy Sources Act (EEG) and thus contribute to reaching the climate targets in Germany and Europe. By utilising waste to generate energy, the use of primary energy sources such as coal, natural gas and oil can be avoided. At the same time, the energy recovery of the fuels used in EEW's plants leads to a smaller carbon footprint.

Sustainability needs reliability. The availability of energy from the key renewable sources wind, water and photovoltaics is, by its very nature, subject to weather-related fluctuations. Waste, however, is always available in foreseeable quantities – and we reliably produce electricity and heat from it day and night.

EEW's technologically sophisticated plants provide safe and environmentally friendly waste treatment. In the combustion process, the pollutants contained in the waste are either destroyed or removed from the materials loop. Filtered-out raw materials and residues, such as bottom ash for road construction, are recovered and brought back into the material cycle. This value-adding process reduces the overall waste volume by approximately 90 per cent. Another area where we take the lead: Emissions from EEW plants are substantially below the strict statutory limits. In most cases, the air that leaves our plants is considerably less contaminated than city air.

At EEW Energy from Waste, waste that cannot be avoided or recycled is given one important, final task: We put waste to work for climate protection.

The generation of electricity and heat from thermal waste treatment avoids the use of primary energy sources in power plants fired with fossil fuels and, thanks to the high biogenic content, results in a reduction in CO2 emissions.

Three of the roughly 1,400 skilled and dedicated employees on the EEW team.


Taking the lead
with sustainable strategies
and new ideas, together.

Joining forces to forge new paths into the future.

Energy supplies and waste management are fundamental needs that require responsible, collaborative planning with vision. In its business relationships, too, EEW Energy from Waste always prioritises sustainability. This creates new perspectives that not only have a positive influence on us but also on the development of society. Let’s take the lead together. We look forward to it!

Taking the lead
with excellent services.

Measurable quality is also reflected in certifications. They underline the excellent collaboration and the outstanding performance of our plants and our company headquarters.

– Certified quality management system (ISO 9001)
– Certified occupational health and safety management system (ISO 45001)
– Certified environmental management system (ISO 14001)
– Certified energy management system (ISO 50001)
– Certified waste management facility pursuant to the Ordinance on Specialised Waste Management Companies (EfbV)

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