Sustainable solutions for your Energy from Waste plant

Maximising efficiency with
new technologies and digital tools

iqony

We help you master every challenge.

The importance of thermal waste treatment is growing world-wide. Increasingly, the energy contained in the waste is put to reasonable use for generating electricity and heat. While the first waste incineration plants were optimized in terms of the highest utilization rate, today’s trend is to design these plants to be extremely efficient too.

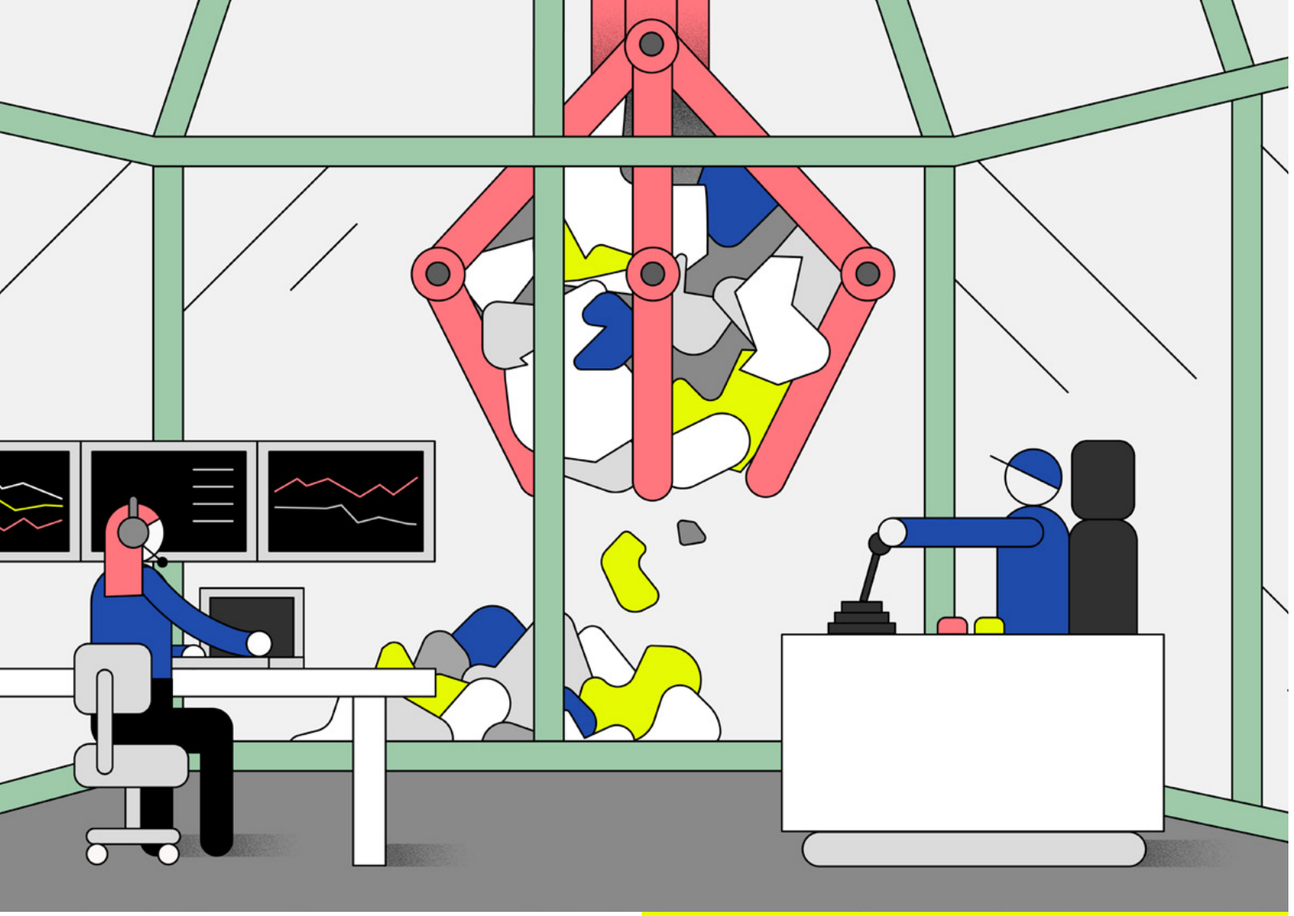
Not only higher steam parameters are required in this context, but also integrative concepts that digititalize and thus optimize thermal waste treatment plants by means of expert solutions or that turn waste into green fuel.

The highly specialized digital solutions developed by us have one common goal: making plants as efficient as possible.

With our solutions, we analyze complex processes in detail. We ensure that technical information is always available up-to-date. Our highlight topics for you in this brochure:

Our early warning system SR::SPC is clever and can analyze the key data on processes and main components from the vast amount of data from the DCS/SCADA system so that creeping and critical changes can be detected early and reliably. Our AI-based solution PiT Navigator Waste helps you toensure a continuous feed and combustion process in spite of fluctuating waste quality and thus to achieve a constant steam capacity.

As a world-wide pioneer, technology leader, and expert problem solver, we not only provide support from the first draft, via the design, implementation, and operation management right up to the plant optimization. We also set new standards regarding your specific requirements that you need to master in our daily operational business.



Your challenges:

- Observing emission limits
- Maximum throughput
- Major changes of the waste quality
- Reduced steam deviation
- Reliable burnout

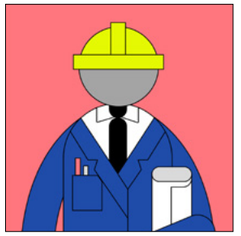
Our highlight topics:

- AI-based combustion control & optimization
- Carbon capture solutions
- Development and implementation of cladding concepts
- Predictive analytics for the early detection of changes in the process and condition

Our services for waste-to-energy plants:

Planning & development

- Preliminary and design planning
- Project development studies
- Approval planning
- Procurement (tenders, bid comparison, award negotiation)



Construction & commissioning

- Project inspection and design review
- Project management
- Detailed planning and implementation planning
- Quality management
- Management / supervision
- Owner’s engineer

Operation & maintenance

- Operation management support
- Operation management control
- Comprehensive operation management
- Troubleshooting
- Plant optimization
- Cladding
- Maintenance & repair
- Training

Monitoring & optimization

- AI-based combustion control & optimization
- Operation management system
- Online monitoring system
- Predictive analytics / maintenance
- Analysis & optimization

Highlight

AI-Based Combustion Control & Optimization Makes Waste Incineration More Efficient

The combustion of waste to generate heat, steam, and electricity is a highly complex process as the fuel is nonhomogeneous. This may lead to faults or suboptimal combustion. By means of digital methods, the quality of the feed as well as of the production process and thus the efficiency of the entire plant can be increased significantly.

The software solution PiT Navigator ensures a continuous feed and combustion process

The solution consists of a combination of video camera and thermograpic camera in a refractory housing and is oriented from the rear towards the endmost combustion zones.
The recorded thermographic images are digitally evaluated. They allow to determine the current temperatures in the furnace, which in turn have an impact on the speed of the feed system, the fan control, and ultimately the emission values. The process runs automatedly owing to the use of AI components.

All process values are improved

The goal of this furnace capacity control is to keep the steam power that drives the turbine to supply steam to the district heating network or to adjacent industries as constant as possible.
Thus if the gross calorific value is insufficient, the speed of the feed will be increased. If the combustion process does not run optimally, which manifests itself e. g. in the emergence of hotspots or a fuel imbalance between the right and the left part of the grate system, the speed will be adjusted as well and the fan will be regulated accordingly. This, in turn, helps to prevent emission peaks of carbon oxides and nitrous oxides and to reduce their emission in general.

Technologically unique solution to date

The combination of a steam prognosis two to five minutes in advance by means of neural networks, enhanced process control, and intelligent data processing is technologically unique to date. It still allows to manually influence the process at any time.
Both, the intelligent control of the combustion process and the experience of the staff members in the case of manual influence, lead to an optimal control of the mutually influencing target variables in the waste incineration process and the steam generation.

Success figures achieved in a project in Spain:

-25%
reduction of steam fluctuations (achieved: 45 %)

+3%
increase in steam quantity

+3%
higher waste throughput (by stabilizing the steam power)

Highlight

Predictive Analytics for the Early Detection of Process and Condition Changes

The permanent monitoring of the plant's health status is of particular importance as due to continuous changes in the operating behavior of thermal waste treatment plants, components are subject to wear and fouling. This affects the condition of the plant; consequential financial losses incur due to increased fuel use, lower throughput as well as lower production rates and qualities. In the event of a total failure of a plant, high repair costs and, in a worstcase scenario, loss of profit as a result of the production stop will often occur as well.

Monitoring plant processes – from now on that's mere child's play!

However, monitoring a dynamic process makes special demands on you as the operator because usually, only fixed limit values exist in the control system. Our solution is the intelligent early warning system SR::SPC for the automatic detection of creeping process and condition changes of technical assets. Thus the system supports you in the optimal operation of your plant.

State-of-the-art data analysis (machine learning and artificial intelligence) on the basis of existing performance values is the fundament of SR::SPC.

With predictive analytics as one of the currently most important big data trends, the current condition of the plant or component is compared to reference conditions from the past: the automatic detection of process and condition changes allows to continuously acquire the key operating parameters in their mutual impact and history. Changes are reported in a reliable way (e. g. by e-mail).

Availability and efficiency: Transparency owing to processed data and derived KPIs

- Early detection of inefficiency and damaged infrastructure
- Prevention of consequential damage
- Improved maintenance planning as well as spare part supply chain
- Optimization of the staff deployment
- Improved availability and efficiency

↑ Increasing the availability and efficiency

↓ Decreasing OPEX

"MVV has evaluated Iqony's predictive analytics IT solution, has proven its economic added value and rolled it out fleetwide. We are delighted with the tool and the cooperation with the team of Iqony."

— Sascha Schmitt, planning engineer, Department for Technology, Engineering, and Digitalization, MVV Umwelt GmbH

Highlight

Cladding: Longer service life for heavily used system parts

One of Iqony‘s specialities is on-site manual and machine cladding. The welding technicians and welders are experts in their field, making Iqony a sought-after service partner.

The term cladding refers to a build-up welding process in which a large-area protective coating is applied to heavily stressed metal components. More precisely, the heavily stressed system parts are first cleaned by grinding. Stainless steel layers are then welded on at a temperature of 1,500 degrees.

This surface protection offers the advantage that components that would otherwise have to be completely replaced due to corrosion have a significantly longer service life. This saves plant operators assembly costs and downtimes in particular. Cladding requires precision work that is accurate to the millimetre, as the quality of the weld seams is the be-all and end-all for sealing system components.

Our experts work with you to develop a customised cladding concept using their technical know-how. Find out more now - our team will be happy to answer any questions you may have!

- Delivery of cladded individual tubes with various welding filler materials, such as Thermanit 625, Thermanit 686, UTP A73G4 etc., layer thicknesses 1 mm, 2 mm or customised including any necessary bends and/or assembly into complete flat coil packages

- Supply of cladded headers, dimensions, filler materials and layer thickness according to customer specifications or requirements

- Delivery of cladded membrane walls, dimensions, welding filler materials and layer thickness according to customer specifications or requirements

- Installation of the above-mentioned delivery components in the boiler, including post-cladding work at transitions and/or joints

- Carrying out large-scale cladding measures and repair cladding in the boiler

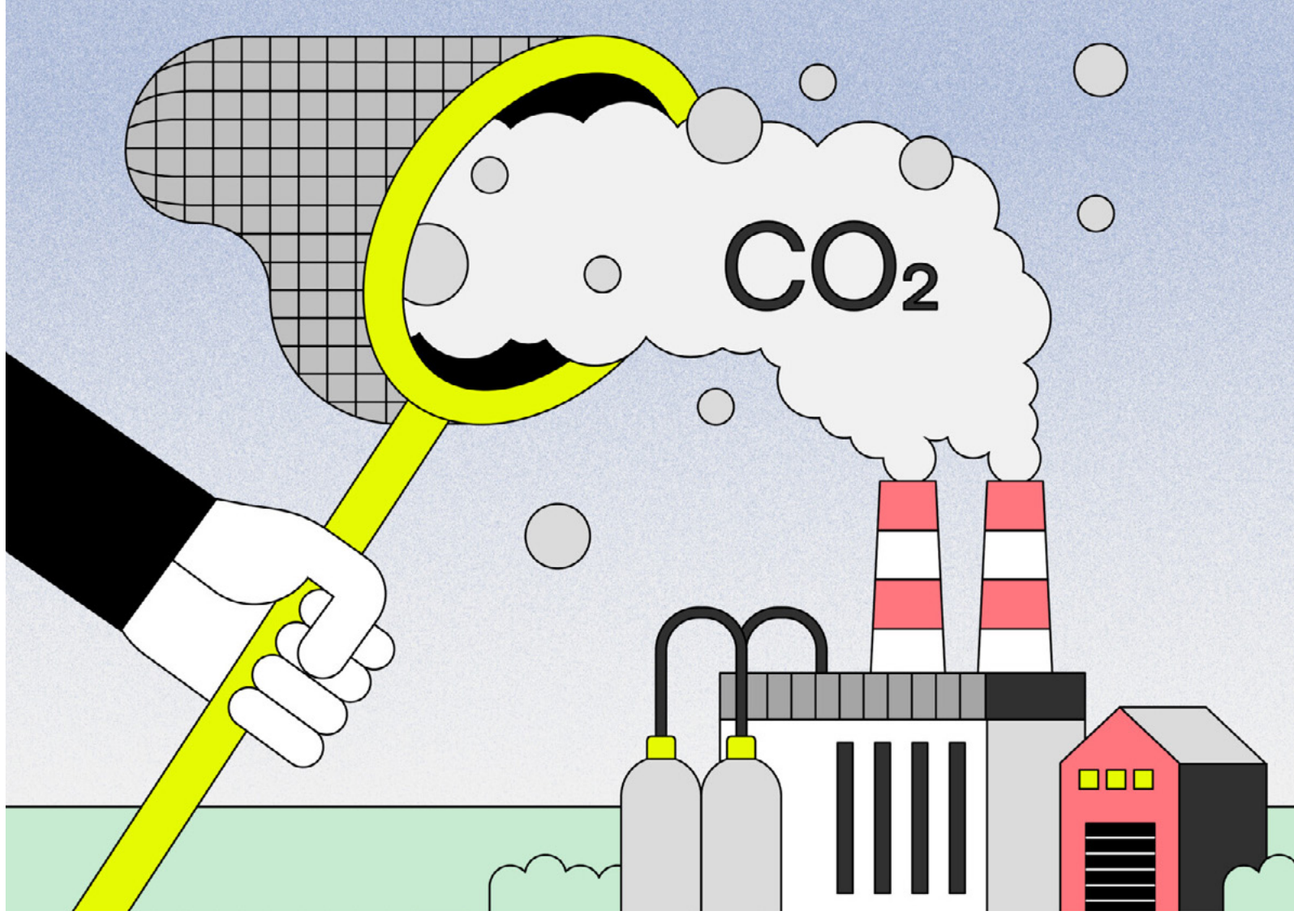
- Use of automatic machines with double burners for larger contiguous areas

- Use of automatic machines with single burner on ceiling pipes

- Use of manual cladding for small areas or inaccessible places (corners, etc.) or for repairs

Highlight

Innovative carbon capture solutions for greater efficiency in thermal waste treatment



Solutions to reduce CO2 emissions into the atmosphere are being worked on at full speed around the world. The need for decarbonisation in order to curb climate change is increasing. In this context, more and more international organisations are introducing certificate regulations for the emission of climate-damaging gases or expanding the existing regulations. For example, CO2 emissions from thermal waste treatment will be included in a Europe-wide emissions trading scheme from 2027, similar to the previous EU Emissions Trading Scheme (ETS), in which large power plants, for example, are integrated. In Germany, the emission of CO2 from thermal waste treatment plants has been linked to the purchase of emission allowances since the beginning of 2024.

The use of renewable energies, sustainable fuels and energy-efficient processes can slow down global warming. But that alone will not be enough. In the short term, there is no way around the capture of CO2, known as carbon capture. This can make a significant contribution to reducing emissions, especially in emission-intensive (industrial) processes.

Challenges for thermal waste treatment

CO2 capture is a tried-and-tested technology, but in industrial applications it has to be customised to the location where it is used. The state of the art is chemical scrubbing with amine solutions. New processes and the optimisation of tried and tested processes are being developed, particularly in the field of chemical scrubbing and physical processes (membrane technology); these processes are aimed in particular at increasing the energy efficiency of the process. Once the CO2 has been captured, it can either be stored (CCS) or used to

produce synthetic substances such as methanol (CCU). There is currently still a significant need for infrastructure development, particularly in the technology path that includes subsequent storage, as well as in the area of legal regulations. The technology path of material utilisation is significantly more energy-intensive, in particular due to the necessary provision of green hydrogen at the plant site.

Customised solutions for environmentally friendly operation of your plant

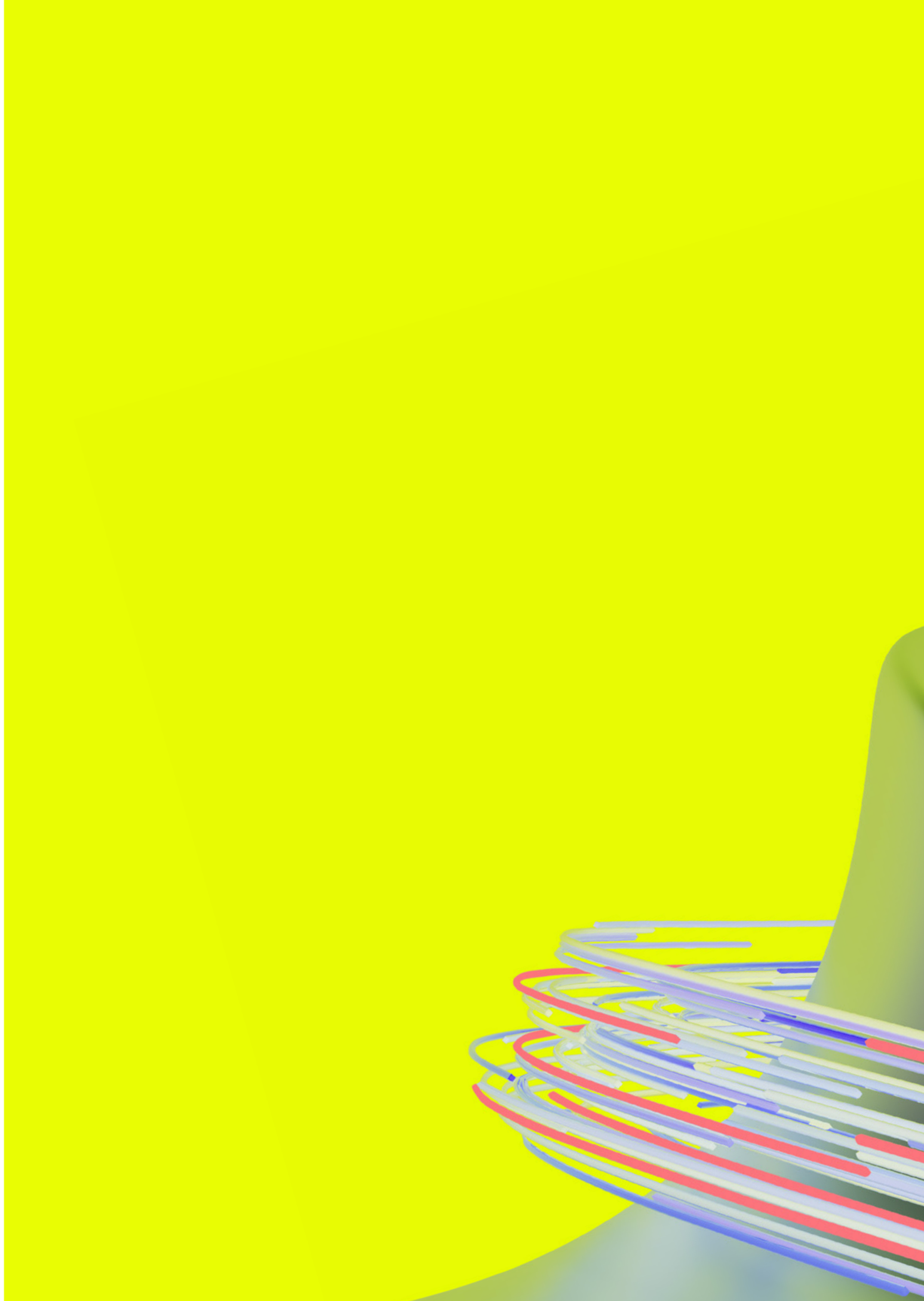
Iqony supports you in all phases of your carbon capture project. From the feasibility study and the creation of concepts to the preparation of preliminary planning and tender documents, you have an experienced solution provider for emission reduction at your side. In our activities, we always focus on the economic viability and sustainability of our clients‘ entire business model. As we work independently of suppliers, we can always offer you the optimum system technology for your specific application.

Our expertise pays off for you

We have been active in the field of CO2 capture for more than 10 years. Back in 2010, we began building test plants for CO2 capture at one of our own power plant sites and were able to determine important basic data relating to integration into the overall system and the energy requirements of the various scrubbing agents.

In the recent past, concepts for CO2 capture have been analysed for our own waste-to-energy plants and initial preliminary planning results have been collected. For IKW Rüdersdorf, we have developed the technical feasibility and a plant concept for CO2 capture, including a transfer station for transporting the CO2, as part of a concept study.

At the Lauta TA site, CO2 capture was analysed as part of the planning of a methanol plant within the overall plant concept. At the Southwest Thuringia residual waste treatment plant site, we undertook the preliminary, design and approval planning for our client for a plant for the production of green methanol, consisting of a CO2 capture plant, electrolyser and methanol synthesis.



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