DIEFFENBACHER
MOVE FORWARD. TOGETHER.

Maximum energy output from gas, hydrogen and liquid fuels

Boost your economic success with our gas- and liquid-fuel-fired power plants. Our power plant solutions offer high efficiency, maximum plant availability and operational flexibility. As your reliable partner, we work with you to develop the optimal plant configuration tailored to your requirements for high-performance electricity and heat generation.

How can we take your power and heat generation further?

CONTENT

1. Together toward efficient and reliable energy solutions 4

At DIEFFENBACHER energy, we provide customized power plant solutions. Let's take your energy supply to the next level of efficiency and reliability – together.

2. Combined cycle power plants (CCPPs) 9

State-of-the-art technology combined with proven components ensures reliable and cost-effective operation.

3. Success story: Combined cycle power plants (CCPPs) 10

From basic and detailed engineering to commissioning and final acceptance, we deliver complete plant, boiler and machinery technology from a single source.

4. Heat recovery boilers connected to gas turbines for steam and hot water production 13

Ideal for combined heat and power generation – offering high energy utilization and operational safety.

5. Success stories: Heat recovery boilers connected to gas turbines for steam and hot water production 14

Tailored solutions for specific requirements such as heat recovery operation, supplementary firing, fresh air operation and multiple gas turbines connected to a single HRSG – for maximum efficiency and flexibility.

6. Steam and hot water boilers fired with gas and liquid fuels 21

Reliable steam and hot water generation for industrial processes and district heating.

7. Success stories: Steam and hot water boilers fired with gas and liquid fuels 22

Efficient utilization of conventional fuels as well as process-derived fuels.

8. Lifecycle-management & service 27

To maintain your power plant's maximum availability, we remain at your side with partner-based lifecycle support for both your own and third-party plants.

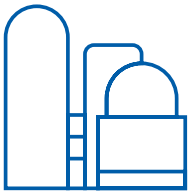
1. MOVING TOGETHER TOWARD EFFICIENT AND RELIABLE ENERGY SOLUTIONS

Achieve the next level of reliable energy generation with DIEFFENBACHER at your side:

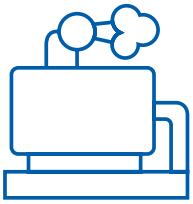
- Customized concept development derived from comprehensive technological know-how
- Compliance with emission limits with low consumption of operating resources
- High flexibility due to high load-change rates during plant operation
- Water-steam cycle optimized for maximum efficiency
- High fuel flexibility
- High plant availability

Our employees' expertise is based on delivering more than:

110
power plants



90
heat recovery systems



2.700
process equipment

*Data as of 01/2023

EXPERTISE AND TECHNOLOGIES FOR YOUR ENERGY GENERATION

Enhance your profitability with our decades of experience, and benefit from a wide range of successfully implemented projects in the fields of power plant systems, process equipment and heat recovery solutions. Our experts apply their extensive engineering and manufacturing expertise to the complete realization of your energy project.

To help you achieve your goals, we support you with:

- Project development by technical experts, taking into account normative and legal requirements
- Plant design and engineering according to your specific requirements and site specifications
- Project and procurement management for smooth processes in compliance with the highest quality, safety and environmental protection standards
- Assembly and installation with the highest standards of safety, health and environmental protection on the construction site
- Commissioning, including electrical grid connection and electrical switchgear integration
- Comprehensive lifecycle management

Minimal emissions, maximum efficiency: We deliver customized power plant solutions. Let's take your energy supply to the next level of efficiency and reliability – together.

NUMEROUS REFERENCE PLANTS DEMONSTRATE EXTENDED RELIABILITY

Depending on the ratio of electricity, heat and steam demand, as well as your specific requirements – such as operational flexibility – we implement a wide range of plant concepts. You receive an optimized power plant solution with perfectly matched components, including gas turbines, steam generators, steam turbines and hot water generators. Our steam and hot water generators are based on long-established design and construction principles that have been proven over many years of operation. Numerous reference plants with extended operating times demonstrate the reliability of our systems. Discover the reliability of our systems in operation, and arrange a power plant visit with us.

We offer the following configurations:

- Combined Cycle Power Plants (CCPPs)
- Combined Heat and Power Plants (CHPs)
- Heat Recovery Boiler (HRB)
  - Heat Recovery Steam Generators (HRSGs)
  - Heat Recovery Hot Water Boilers (HRWBs)
- Steam and Hot Water Boilers fired with gas and liquid fuels

CUSTOMIZED PLANT DESIGN

Whether your project is a brownfield or greenfield site, involves integration into existing buildings or has a limited realization period, you need a progressive and reliable partner to focus on your individual requirements. We work with you to realize your power plant project with the appropriate boiler technology.


MM
KARTON

2. COMBINED CYCLE POWER PLANTS (CCPPs)

Customized Solutions for Maximum Efficiency and Flexibility
Combined Cycle Power Plants (CCPPs) are an efficient and environmentally friendly form of energy generation. By integrating gas and steam turbines, fuel utilization is optimized – resulting in high overall efficiency and exceptional operational reliability.

YOUR BENEFITS AT A GLANCE

Proven, high-efficiency power plant technology
State-of-the-art systems combined with long-established components ensure reliable and cost-effective operation.

Complete solutions from a single source
From basic and detailed engineering to commissioning and final acceptance – we deliver the entire plant, boiler and machinery technology – from one trusted partner.

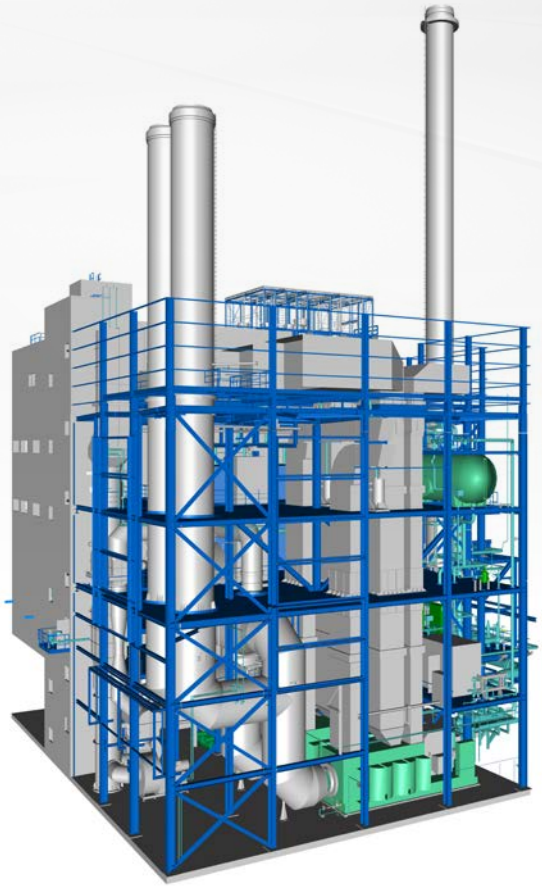
Maximum flexibility in component selection
Project-specific selection of plant components, independent of specific OEMs, enables customized solutions tailored to your requirements.

Customer-specific equipment brand preferences (optional)
Upon request, we incorporate your preferred manufacturers and equipment brands into the design and procurement process.

Cost optimization through owner-supplied components (optional)
You may provide your own components to reduce capital investment costs.

SUCCESS STORY

COMBINED CYCLE POWER PLANTS (CCPPs)



This project involved replacing the aging boiler systems and modernizing the entire energy supply. As the EPC contractor, we implemented a CCPP with supplementary firing, fresh air operation and bypass stacks.

The CCPP is designed as the sole supplier of process steam for the production facilities and to cover the majority of the site's electricity demand. The plant's functionality and availability are therefore critical to the entire production operation.

Our scope of supply and services included the complete power plant. The boiler can operate in either

Combined Cycle Power Plant
Austria

Power plant details and performance parameters:
Fuels: Natural gas, biogas
Electrical output per gas turbine: 8 MW
Electrical output of steam turbine: 15 MW
Firing capacity steam boiler: 106 MW
Live steam parameters: 120 t/h | 71 bar(a) | 490 °C
Hot water output: 3 MW

Requirements:
- Complete modernization of the energy supply
- Reliable provision of process steam and electricity for the entire production facility
- High availability and operational flexibility of the power plant
- Operational reliability in case of component failure or maintenance (e.g., gas turbines)
- Future-proof design enabling integration of renewable fuels and emission reduction technologies

Solutions:
- Implementation of a CCPP as EPC contractor, including supplementary firing, fresh air operation and bypass stacks
- Flexible operating modes: heat recovery operation with one or two gas turbines; fresh air operation in case of turbine outage
- Independent operation of each gas turbine via diverter dampers and bypass stacks
- Burner connections prepared for future biogas utilization
- Provisions for future retrofit of an SCR system, including installation of storage tanks

heat recovery mode or fresh air mode. In heat recovery mode, two gas turbines provide exhaust gas as combustion air for three burners. Depending on the site's electricity demand, either both gas turbines or just one can be operated. Each gas turbine functions as a fully independent unit and can be operated via a bypass stack without the boiler. For this purpose, a diverter damper is installed between each gas turbine and the boiler. In the event of a gas turbine outage or scheduled maintenance, a fresh air fan supplies combustion air. Two of the installed burners are equipped with connections for future biogas utilization. The potential future integration of an SCR system was considered during the planning phase, and the required storage tanks have already been installed.

4. HEAT RECOVERY BOILERS (HRBs) CONNECTED TO GAS TURBINES FOR STEAM AND HOT WATER PRODUCTION

Increased efficiency for modern energy supply
Heat Recovery Boilers (HRBs) downstream of gas turbines enable the efficient use of hot exhaust gases for steam and hot water generation. This technology is a key component of modern CHP systems and significantly contributes to reducing primary energy consumption and emissions.

YOUR BENEFITS AT A GLANCE

Proven, high-efficiency boiler technology
Ideal for combined power and heat generation – with high energy utilization and operational reliability.

Complete solutions from a single source
From basic and detailed engineering to commissioning and final acceptance – we deliver the entire plant, boiler and machinery technology – from one trusted partner.

Flexible operation through diverter systems
Decoupling of power and heat generation via diverters and separate exhaust paths for the gas turbines enables demand-driven and cost-efficient operation.

Customized boiler configurations
Tailored solutions for specific requirements such as heat recovery mode, supplementary firing or fresh air operation – ensuring maximum efficiency and flexibility.

Multiple gas turbines connected to a single heat recovery boiler
One of our specialties is integrating two or more gas turbines with a shared heat recovery boiler. The advantages are clear: increased flexibility through rapid load changes, reduced space requirements and lower capital costs through shared heat recovery infrastructure.

Minimized emissions
The use of advanced flue gas cleaning technologies such as Selective Catalytic Reduction (SCR) and CO oxidation significantly reduces pollutant emissions.

SUCCESS STORY

HRBs CONNECTED TO GAS TURBINES FOR STEAM AND HOT WATER PRODUCTION

As part of the German coal phase-out, the coal-fired boilers at EnBW's Stuttgart-Münster site are scheduled for decommissioning in 2026. To compensate for the loss of district heating capacity, we implemented two heat recovery steam generators (HRSG) with a total capacity of 180 MWth as part of a state-of-the-art combined heat and power plant (CHP). Designed as a mid-load plant, it is used to reliably supply electricity and district heating, whereby the entire power plant with its new CHP is primarily operated with heat control. In addition, the CHP is H2-ready, meaning that it can burn hydrogen content of up to 30% by volume in the future. The CHP is prepared for 100 Vol.% hydrogen, whereby only a short standstill is required for the adaptation.

The HRSGs use duct burners to increase output. An SCR is used to achieve the required emission values.

EnBW
Germany

Power plant details and performance parameters:
Fuels: Natural gas, hydrogen
Electrical output per gas turbine: 62 MW
Supplementary firing capacity per boiler: 27 MW
Live steam parameters: 110 t/h | 61 bar(a) | 510 °C
Hot water output per boiler: 11 MW

Requirements:
- Replacement of coal-fired boilers as part of the coal phase-out
- Reliable and flexible steam generation in heat-controlled operation mode for district heating supply in the city of Stuttgart
- Flexible operation with decoupling of power and heat generation
- Future-proof design with hydrogen (H_2) compatibility
- Compliance with strict NO_x emission limits
- Reduction of visible emission structures (e.g., stacks)
- Compliance with stringent noise control regulations due to surrounding residential areas

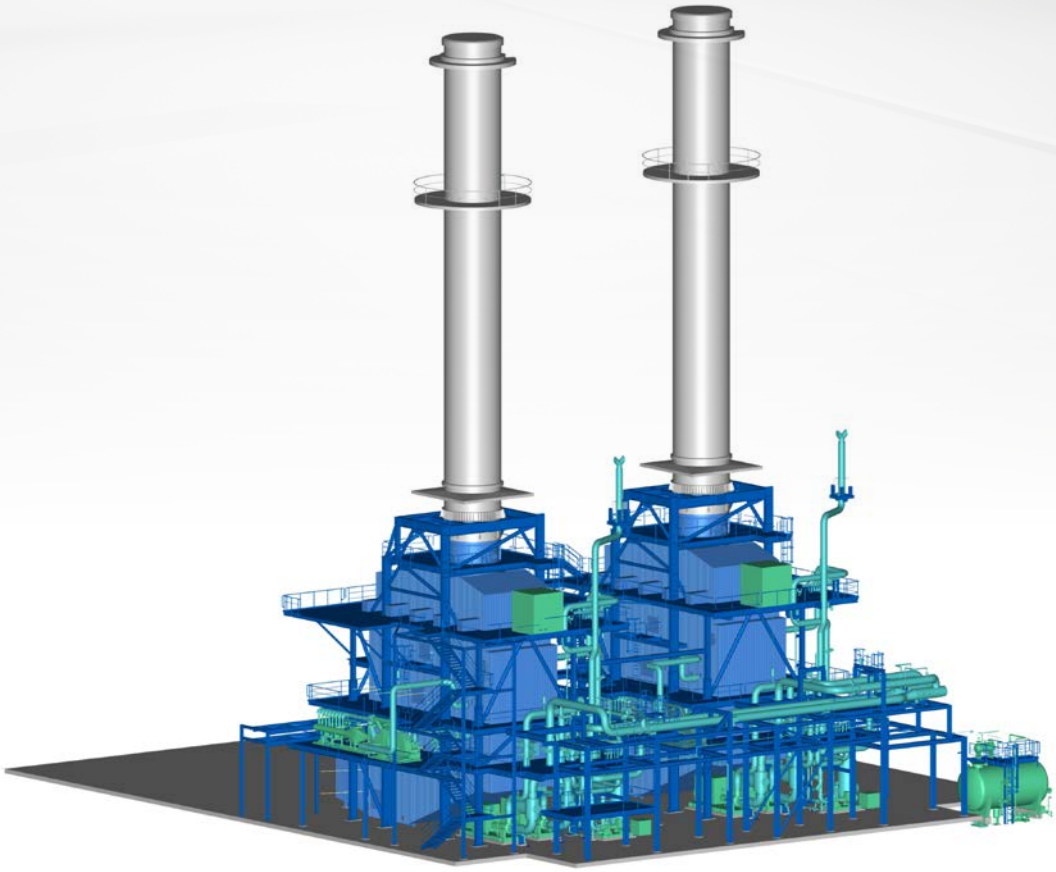
Solutions:
- Construction of an H_2-ready gas turbine CHP plant
- Supplementary firing with duct burners to increase output and efficiency
- Integration of an SCR system for NO_x reduction
- Flexible operating modes via diverter system (single or combined operation)
- Shared stack configuration to minimize visible emission points
- Noise mitigation measures designed to meet regulatory requirements

For flexible plant operation, power and heat generation can be decoupled. For electricity-only production, the gas turbines operate in standalone mode via a dedicated exhaust path. For combined power and heat generation, the turbine exhaust gases are routed through the HRSG. Switching between these operating modes is managed via a diverter system.

One particular feature is that the HRSGs do not have their own stacks. Instead, the exhaust gases are discharged via the gas turbine stacks. As a result, the number of externally visible stacks could be reduced by half, helping to preserve the cityscape. Noise emissions are carefully considered due to nearby residential areas. The combined steel construction for the gas turbine and boiler house and HRSGs reduced the steel mass, building height and overall costs compared to the original design. Additionally, approximately 150 m of BoP pipelines were routed to the existing plant.

SUCCESS STORY

HRBs CONNECTED TO GAS TURBINES FOR STEAM AND HOT WATER PRODUCTION



These two heat recovery boilers for hot water generation are part of a new CHP plant designed to supply electricity and district heating. Strict emission limits are reliably met through an exhaust gas cleaning system based on SCR and a CO oxidation catalyst.

Heat Recovery Boilers for Hot Water Generation
Germany

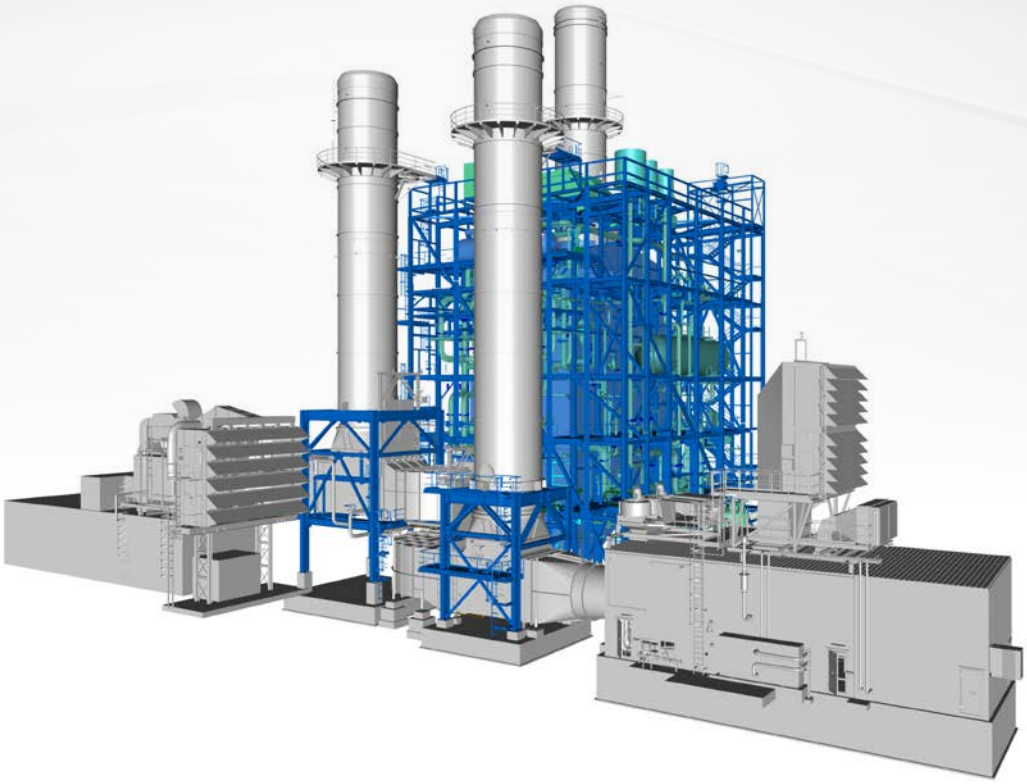
Power plant details and performance parameters:
Fuels: Natural gas, hydrogen
Electrical output per gas turbine: 62 MW
Hot water output per boiler: 80 MW

Requirements:
- Flexible electricity generation while ensuring continuous heat supply
- Efficient use of natural gas with consideration for future conversion to hydrogen
- Integration into an existing district heating network with high technical complexity
- Decoupling of power and heat generation for demand-driven operation
- Compliance with stringent emission regulations

Solutions:
- Construction of an H_2-ready gas turbine CHP plant with two flexible turbines
- Use of waste heat via hot water generators for district heating supply
- Integration of a thermal energy storage system to enhance operational flexibility
- Technical integration of all systems into the district heating network
- Exhaust gas treatment using SCR technology and a CO oxidation catalyst

SUCCESS STORY

HRBs CONNECTED TO GAS TURBINES FOR STEAM AND HOT WATER PRODUCTION



As part of the modernization and expansion of its CCPP, our customer implemented a state-of-the-art energy supply system at their chemical site. The new CCPP stands out for its increased output, high efficiency and maximum operational flexibility, ensuring reliable electricity and steam supply to the site's industrial consumers.

The centerpiece of the plant is the HRSG, designed and delivered by our expert team. A key technical feature is the connection of two gas turbines of different types – one existing and one newly installed – to the HRSG. The system is engineered for flexible operation in both parallel- and single-turbine modes.

Combined Cycle Power Plant
Germany

Power plant details and performance parameters:
Fuel: Natural gas
Electrical output of gas turbines: 57 und 39 MW
Supplementary firing capacity: 42 MW
Live steam parameters: 202 t/h | 90 bar(a) | 525 °C
Hot water output: 1,6 MW

Requirements:
- Reliable supply of electricity and steam
- Integration of the existing gas turbine into the new CCPP
- Maximum flexibility in operating one or two gas turbines of different types
- Uninterrupted steam generation during single gas turbine startup or shutdown
- Compliance with strict emission regulations

Solutions:
- Modern CCPP consisting of two gas turbines and a vertical HRSG
- Compact layout with vertical boiler design
- Configuration for parallel- and single-turbine operation
- Separate exhaust systems and supplementary firing for each turbine
- Emission control via SCR and CO oxidation catalyst

To further enhance operational flexibility, each gas turbine is equipped with its own exhaust system and a separate supplementary firing system using duct burners. Compliance with strict emission limits is ensured through the use of SCR and a CO oxidation catalyst.

Due to the size and transport weight of the boiler modules, each unit was delivered in three sections. To minimize the impact on site logistics and assembly processes, a customized installation concept was developed and successfully implemented.

6. STEAM AND HOT WATER BOILERS FIRED WITH GAS AND LIQUID FUELS

Efficient Heat Supply with Proven Boiler Technology
Steam and hot water boilers fired with gas or liquid fuels offer a reliable and cost-effective solution for industrial processes and district heating applications. They enable flexible fuel utilization and can be seamlessly integrated into existing infrastructure.

YOUR BENEFITS AT A GLANCE

Efficient fuel utilization
Efficient combustion of both conventional fuels and process-derived fuels.

Proven and reliable boiler technology
Long-established design and construction principles ensure maximum operational reliability.

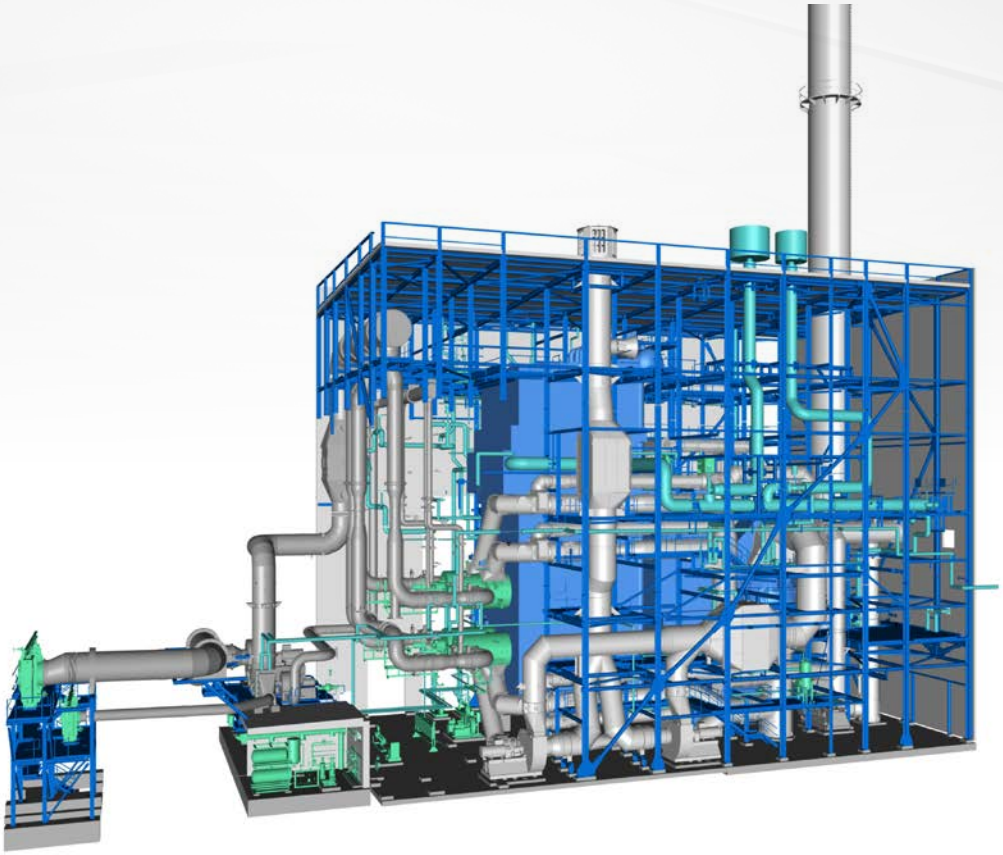
Reliable steam and hot water generation
Ideal for providing a reliable energy supply at your site – delivering process steam and hot water for production and district heating.

Complete solutions from a single source
From basic and detailed engineering to commissioning and final acceptance – we deliver the entire plant, boiler and machinery technology – from one trusted partner.

Tailored system concepts
We can accommodate site-specific requirements, including integration into existing facilities and buildings.

SUCCESS STORY

STEAM AND HOT WATER BOILERS FIRED WITH GAS AND LIQUID FUELS



voestalpine Stahl GmbH Linz
Austria

Power plant details and performance parameters:
Fuels: Blast furnace gas, coke gas, natural gas, heating oil
Firing capacity: 115 MW
Live steam parameters: 166 t/h | 121 bar(a) | 535 °C

Requirements:
- Utilization of process gases (blast furnace gas, coke gas)
- Reliable electricity and heat generation for the steel mill
- Flexible fuel strategy to ensure supply security
- Compliance with strict emission limits despite multi-fuel operation
- Efficient extraction of process steam and heat from the steam turbine

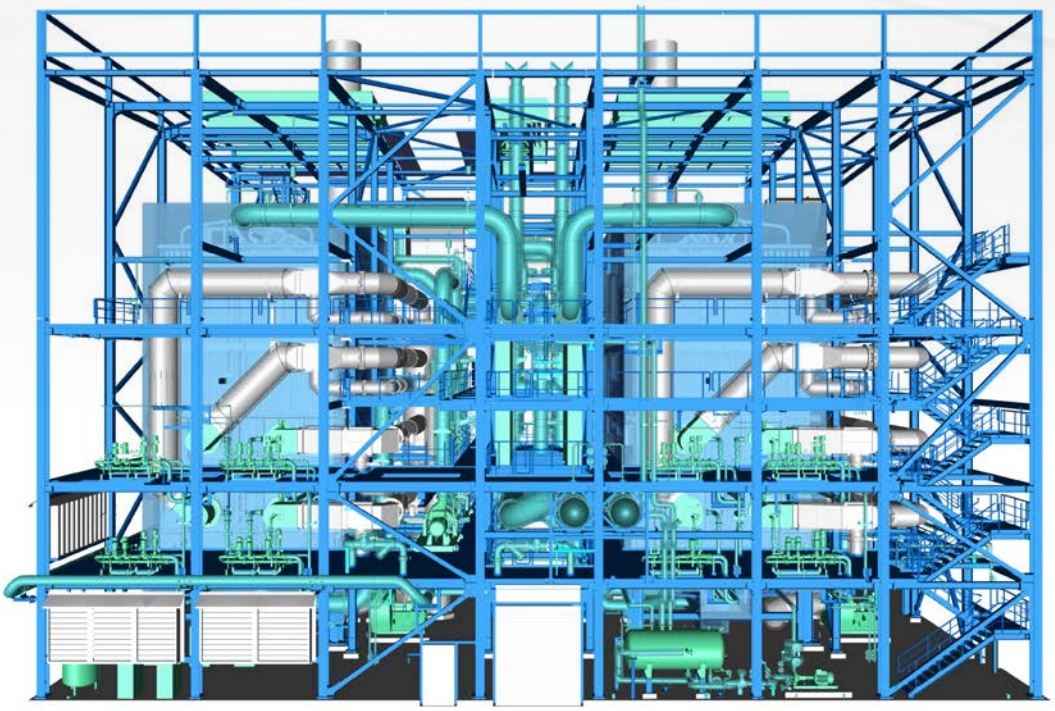
Solutions:
- Combustion of blast furnace and coke gas as primary fuels in a high-pressure steam boiler
- Use of natural gas and heating oil as backup fuels for supply reliability
- Simultaneous firing of all four fuels via each of the four boiler burners
- SCR system for NOx reduction and compliance with emission regulations

The new power plant supplies power and heat to the steel mill in Linz. The steel mill's gases (blast furnace gas and coke gas) are used in the steam boiler to generate high-pressure steam for running a steam turbine with 45 MW electrical output. Process steam and heat can be extracted from the steam turbine.

To secure the power and heat supply, natural gas and heating oil can be used as substitute fuels. All four fuels (blast furnace gas, coke gas, natural gas and heating oil) can be fired in any of the four boiler burners simultaneously. A denitrification system (DeNOx) with selective catalytic reduction (SCR) inside the boiler ensures compliance with the required emission limits.

SUCCESS STORY

STEAM AND HOT WATER BOILERS FIRED WITH GAS AND LIQUID FUELS



MVV Grüne Wärme GmbH
Germany

Power plant details and performance parameters:
Fuel: Natural gas
Fuel thermal input per boiler: 150 MW
Hot water output per boiler: 142 MW

Requirements:
- Ensuring district heating supply during peak load conditions and in the event of potential outages of other generators in the district heating network Integration into existing infrastructure, particularly the district heating and natural gas networks
- Implementation of a technically complex new facility
- Compliance with increasingly stringent emission regulations

Solutions:
- Construction of a complete boiler system, including peripherals and boiler house
- Reliable peak load coverage through natural gas-fired boilers to secure the heat supply
- Load flexibility (short start-up times, low minimum load, rapid load changes)
- Connection to the natural gas network and district heating pipeline for hydraulic integration
- Retrofitting of an SCR system was taken into account during planning

The BeRUN district heating reliability plant operated by MVV Grüne Wärme GmbH in Mannheim, a subsidiary of the energy company MVV, was constructed as part of the heat transition in order to ensure long-term security of supply for district heating during peak load conditions and in the event of potential outages of other generators. The facility consists of two gas-fired hot-water boilers, a gas pressure reduction station, and a district heating pump station for feeding heat into the district heating network. The compact two-pass boilers are each equipped with four natural gas front burners and are installed inside a boiler house. The plant is designed to allow future retrofitting with an SCR system for emission reduction as well as a subsequent conversion to hydrogen.


DIEFFENBACHER

8. LIFECYCLE-MANAGEMENT & SERVICE

MAXIMUM POWER PLANT AVAILABILITY WITH PARTNERSHIP-BASED LIFETIME SERVICE

To ensure the maximum availability of your power plant, our highly qualified service personnel provide lifecycle support. The entire range of technical services applies to our own and third-party systems:

Consulting
- Mass and energy balances
- Thermal engineering calculations
- Process engineering testing
- Flow analyses
- Preliminary planning of conversion projects
- Advice on upcoming inspections and plant shutdowns

Basic support
- Recording and assessing the system status
- Development of an extended maintenance strategy
- Development of improvement options

Spare and wear parts management
- Ensuring the availability of spare parts
- System-specific spare and wear parts

Conversion and modernization
- Replacement or adaptation of existing systems to changed framework conditions
- Simplification of existing system's operations

Optimization
- Projects for operational and system optimization

Repair
- Fault diagnosis for the cause and elimination of faults
- Report generation for fault diagnosis
- Restoring functionality

Maintenance and inspection work
- Checking the system for operational safety and functionality
- Systematic identification of potential faults
- Replacement with original spare parts

Remote service
- Advice on application and operating problems
- Fault diagnosis and situation analysis via phone
- System support via remote connection

DIEFFENBACHER
MOVE FORWARD. TOGETHER.

Discover how we can help you reach next-level energy efficiency

DIEFFENBACHER Energy GmbH, based in Bludenz, develops, designs and sells energy plants. As part of the DIEFFENBACHER Group, we offer advanced, energy-efficient and resource-saving solutions. In the energy-transition era, we also contribute to lower emissions and reduce energy costs.

DIEFFENBACHER is an international group of companies in the field of mechanical and plant engineering. With 1,850 employees and 19 production and sales locations worldwide, we are a leading manufacturer of press systems and complete production plants for the wood-based materials, automotive, aviation and recycling industries. We design and build power plants and heat recovery systems for sustainable energy generation. As an independent family business in its fifth generation, we have stood for reliable partnership and continuous progress for over 150 years.

Your contact person
How can we help you move forward? Contact us.

Sebastian Völker
Chief Sales Officer
sebastian.voelker@dieffenbacher.com
+43 5552 6135 572

DIEFFENBACHER ENERGY GmbH
Untersteinstraße 4
6700 Bludenz Austria

www.dieffenbacher.com/de/energy