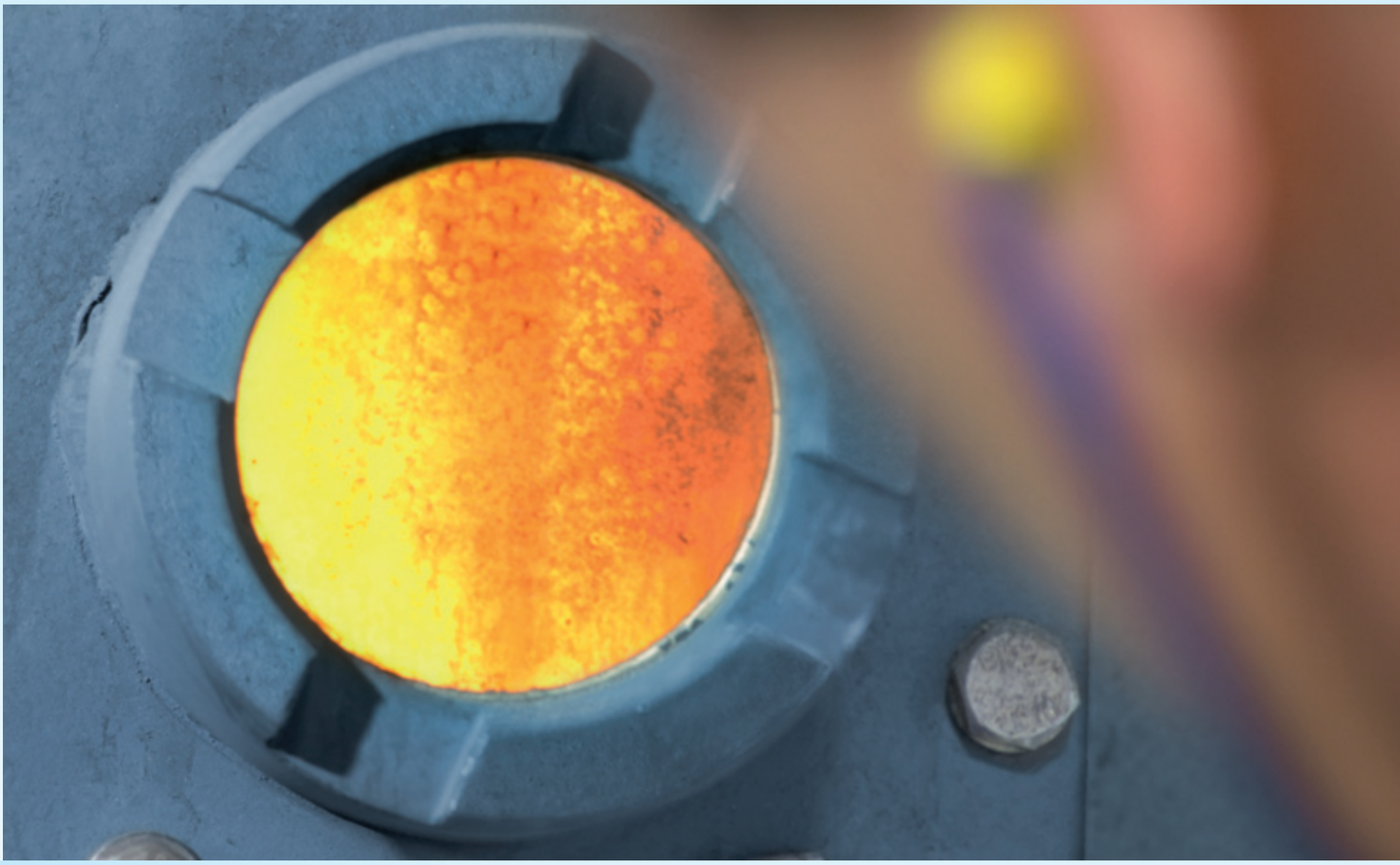
RWE Innogy Cogen GmbH



THE ENERGY TO LEAD WITH INNOVATIVE SOLUTIONS FOR DISTRIBUTED ENERGY GENERATION

RWE
The energy to lead

EXPLOITING EXPERIENCE - BEING INNOVATIVE

Modern distributed energy generation plants based on cogeneration and biomass are opening up new perspectives and opportunities.

As a leading company in distributed energy generation, we have many years of experience in building and operating biomass-fired combined heat-and-power plants. For us, being innovative means bringing economic and ecological requirements into harmony. With our plants we make a sustainable contribution to climate protection and improved energy efficiency.

Exploiting experience

RWE Innogy Cogen is a subsidiary of RWE Innogy. The company pools the activities of RWE in the field of renewable energies. Under this umbrella, our company is responsible for cogeneration and biomass. One focal point is biomass-fired combined heat-and-power plants with a capacity of more than 5 MW electric.

Our company counts around 300 employees working for it in Germany and internationally. When putting our teams together we rely on a balanced proportion of experienced and highly-qualified junior staff. Our teams stand for reliability and innovative power at the same time. That puts us in a position to develop economically and ecologically rational solutions for any site.

Expanding cogeneration

A core competence of our company is distributed energy generation. We develop, plan, build and operate modern cogeneration plants tailor-made to the respective site. We erect new power plants, extend existing ones and modernise old facilities.

Cogeneration is setting trends. Combined generation of power and heat/steam permits exceptionally high efficiency levels. Under favourable conditions, the primary energy input can be converted into usable energy at rates of up to 90 %. This high level of energy efficiency is creating broad acceptance for cogeneration in the political arena and in society. RWE Innogy's avowed goal is to drive use of this technology – especially in conjunction with biomass as fuel – still further.

A key prerequisite for realisation of cogeneration plants is sites with a high need for heat and/or steam. These can be found above all wherever companies with energy-intensive production processes are located. Local and/or municipal heating networks offer still further potential. In this market we plan to cooperate more strongly in the future with municipal and local utilities.

The biomass-fired combined heat-and-power plant in Berlin-Neukölln supplies the 20,000 homes in the "Gropiusstadt" district with heat.

Being innovative

Our focus on biomass is proving to be an additional innovation engine for our company. We prefer wood as a fuel for our plants. Wood is a regenerative resource. It burns CO_2-neutral, i. e. when used to generate energy it produces no more CO_2 than the trees themselves absorbed during their growth process.

We handle the fuel procurement – involving local partners – largely under our own control. Our staff, which includes forestry experts, are performing pioneering work in doing so. As one of the first energy producers we are relying increasingly on forestry biomass. This mainly involves surplus wood produced in large volumes in forestry and landscaping operations. With this segment, which is suitable neither for the wood-processing nor for the paper industry, we are opening up a hitherto largely unused yet renewable source of energy. We base its production on ecological sustainability criteria to prevent the nutrient cycle of the forests from being disrupted.

In addition, we are planning to create fuel-wood plantations which are dedicated exclusively to the use of wood as a source of energy. When creating these plantations, we concentrate primarily on reforestation zones and on – often fallow – agricultural land with low-yield soils. So we do not compete with land for growing foodstuffs.

By the use of biomass, we are also decoupling ourselves from the risks associated with the fossil fuels and CO_2 trading.

Internationally aligned

Our foreign operations have so far been focused mainly on the Czech Republic. As part of our ambitious growth strategy, we intend to open up new markets for ourselves across the EU and even beyond. One main target market is Southern Europe, where favourable climatic conditions for planting fuel-wood plantations often prevail.

Applying technology optimally

At the heart of our solutions is intelligent use of efficient plant technology. As an operator of plants with different technical designs, we have years of experience with different power plant technologies, turbine types and firing techniques at our disposal. This experience enables us to develop the optimum process for the site concerned. As our business is long-term by nature, we attach great value to quality and reliability when selecting the technical components.

Leading with energy together

Want a modern, economical and reliable energy supply for your site? Talk to us. Together with you, we'll develop a solution tailor-made to your individual requirements. With the technology we prefer, we can at the same time make a collective contribution to achieving key sustainability goals.

OUR SERVICES

Machine-bundling to use wood residuals.

Consulting, developing, planning, building, operating:
We have all the skills that are crucial to success.
Those include:

Determining the fundamentals
- Stocktaking and review of the existing equipment
- Defining the media needed (power, steam, heat, refrigeration, etc.)

Creating the technical concept
- Development and evaluation of the technical options
- Review of special factors (emissions, historical contamination, etc.)
- Review of the permit requirements under emissions law

Developing fuel concepts
- Forecasts of fuel price trends
- Structuring the fuel supply
- CO_2 management
- Finding disposal routes for residues

Developing business models
- Viability calculation
- Guarantees and availabilities
- Risk assessment

Project handling
- Permit engineering
- Drawing up the tender specifications
- Project management

Plant operations
- Securing availability
- Procuring fuels
- CO_2 monitoring

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BIOMASS-FIRED POWER PLANT HKW KEHL GMBH

Contracting is becoming increasingly attractive for industrial and commercial customers. Harpen designed an innovative solution at Kehl. State-of-the-art CHP technology and the utilisation of biomass as primary fuel offer significant advantages.

Customer
- Koehler Kehl GmbH, Kehl

Project company
- Heizkraftwerk Kehl GmbH, Kehl, a joint venture with the paper mill August Koehler AG, Oberkirch

Scope
- Steam supply for paper mill
- Supply of electricity into the public grid in compliance with the German Renewable Energy Act (EEG)

Deliverables
- Feasibility study and initial design
- Detailed plant design/licensing
- Financing
- Full commissioning
- Construction management
- Technical and commercial operation

Plant components
- Circulating fluidised bed boiler
- Steam turbine
- Wood storage facility

Data of the plant
- Heat recovery steam generator: 48 MW_{th}
- Steam parameters: 500 °C, 90 bar
- Electrical capacity: 8.6 MW_{el}
- Fuel consumption (biomass): approx. 100,000 t/a

Business model
- Build-Own-Operate (BOO)

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CHP PLANT AT HEIDELBERG

"Less energy utilised more efficiently" was one of our goals for the modernisation of the central heating plant of Universitätsklinikum Heidelberg. The combined heat, cooling and power installation simultaneously accomplished a highly reliable utility supply as well as reduced emissions and lower energy costs.

Customers
- Universitätsklinikum Heidelberg
- Deutsches Krebsforschungszentrum
- Technologiepark AG
- Max-Planck-Institut

Scope
- Reliable and efficient supply of heat, steam and electricity to the Heidelberg university campus
- Generation and supply of electricity into the public grid of Heidelberg

Deliverables
- Feasibility study and initial design
- Detailed plant design/licensing
- Financing
- Full commissioning
- Construction management
- Technical and commercial operation

Plant components
- Gas turbine
- Heat recovery steam generator
- Additional steam generator
- Refrigeration equipment
- District cooling line
- District heating line

Data of the plant
- Gas turbine: 13.5 MW_{el}
- Installed power: 197.6 MW_{th}
- Cooling output: 30 MW_{th}

Business model
- Build-Own-Operate (BOO)

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INDUSTRIAL POWER PLANT BAIENFURT OHG

Reduced costs and protection of the environment were the primary goals for the modernisation of the industrial power plant at the Baienfurt paper mill. The solution: An innovative energy contracting scheme. The core component is a highly efficient CCGT unit in combination with a circulating fluidised bed combustor for the utilisation of production process residues.

Customer
- Stora Enso Baienfurt GmbH & Co. KG

Project company
- Baienfurt oHG Industrial Power Plant: a joint venture of RWE and EnBW

Scope
- Construction of a state-of-the-art power/heat supply unit based on the utilisation of paper process residues on site

Deliverables
- Feasibility study and initial design
- Detailed plant design/licensing
- Financing
- Full commissioning
- Construction management
- Technical and commercial operation

Plant components
- Gas turbine
- Heat recovery steam generator
- Circulating fluidised bed combustor
- Integration into existing steam turbine plant

Data of the plant
- Gas turbine: 25 MW_{el}
- Steam generation: max. 97 t/h
- Steam parameters: 435 °C, 41 bar
- Steam turbine: max. 13 MW_{el}

Business model
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BIOMASS-FIRED POWER PLANT AT BERGKAMEN

The use of wood as fuel for power generation is neutral in terms of CO_2 emissions and therefore an essential element of climate protection. At Bergkamen, we have erected a furnace plant for power generation from used wood. The electrical energy produced is fed into the public electricity grid in compliance with the German Renewable Energy Act. The plant is suitable for the use of used wood of categories AI to AIV and meets the requirements of the 17th German Federal Emission Control Ordinance (BImSchV).

Scope
- Supply of electricity into the public grid in compliance with the German Renewable Energy Act (EEG)

Deliverables
- Basic and detailed engineering
- License engineering
- Project management
- Construction management
- Fuel and electricity management
- Technical and commercial operation

Plant components
- Circulating fluidised bed
- Steam turbine
- Wood silo facility

Data of the plant
- Boiler capacity: 61.3 MW_{th}
- Live steam parameters: 500 °C, 90 bar
- Electrical capacity: 20 MW_{el}
- Biomass input: 140,000 t/a

Business model
- Build-Own-Operate (BOO)

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BIOMASS COGENERATION PLANT AT BERLIN-NEUKÖLLN

The Gropiusstadt borough of Berlin with approximately 50,000 inhabitants is supplied by a wood-fired combined heat and power plant in a reliable and environmentally friendly way. The usage of wood leads to an annual CO_2 reduction of approx. 235,000 t compared to the previous solution based on hard coal. Thus the combined heat and power plant makes an important contribution to climate protection.

Customer
- Several large housing societies as well as trades

Scope
- Heat supply for Gropiusstadt (district of Berlin)
- Supply of electricity into the public grid in compliance with the German Renewable Energy Act (EEG)

Deliverables
- Feasibility study and initial design
- Financing
- Full commissioning
- Construction management
- Technical and commercial operation

Plant components
- Fuel logistics
- Grate stoker furnace with gravity circulation boiler
- Steam turbine
- Pollution abatement

Data of the plant
- Fuel input: 106 MW
- Heat recovery steam generators: 66 MW_{th}
- Electrical capacity: 20 MW_{el}
- Fuel consumption (biomass): approx. 220,000 t/a
- Peak boiler (gas): 3 x 33 MW_{th} (rated heat output)

Business model
- Build-Own-Operate (BOO)

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BIOMASS-FIRED CHP PLANT AT SIEGEN-WITTGENSTEIN

3-D computer animation

The combined heat-and-power (CHP) plant in the inter-communal industrial park in Wittgenstein supplies a neighbouring wood briquette factory with heat while feeding "green" power into the public grid. Wood residues from forestry and landscaping operations are used as fuel. Because using wood as a fuel is CO_2-neutral, the plant is climate-friendly. Its total efficiency level is comparatively high at 70 %.

Scope
- Build a biomass-fired CHP plant to use renewable resources and operate as a cogeneration plant

Deliverables
- Conceptual design
- Detailed planning
- Financing
- Tender procedure
- Plant construction
- Materials flow management/fuel logistics
- Technical and business management

Plant components
- Grate firing with natural-circulation boiler
- Extraction-condensation turbine
- Wood storage area and conveyor installations

Data of the plant
- Boiler rating: 30.5 MW_{th}
- Steam generation: 30 t/h
- Steam parameters: 480 °C, 64 bar
- Steam turbine: max. 7.5 MW_{el}
- Biomass used: approx. 80,000 tonnes p. a.

Business model
- Build-Own-Operate (BOO)

Commissioning (planned)
- Autumn 2009

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