

Wind energy
Waste-to-energy
Thermal power
District energy
Power transmission
Asset management
Renewable energy
Energy strategy

POWER

CAPABILITY STATEMENT

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RAMBOLL

CONSULTANCY SERVICES WITHIN POWER

85 per cent of the world's energy production comes from fossil-fuelled power plants. Ongoing efforts focus on making existing plants more efficient by optimizing the energy production, more flexible by introducing multi-fuels and more sustainable by converting them to energy production based on renewables such as biomass. The challenge is to produce sustainable and energy-efficient solutions that counter the effects of climate change and resource depletion and stand the test of time.

We provide consultancy to conventional power plants as well as to plants with bio solutions, bio and fossil fuel co-firing and multi-fuel boilers. Our expertise includes all sub-systems such as steam and gas turbine systems, environmental systems, electrical systems, central automation and process controls, piping and district heating systems and milling plants.

Our consultancy is centred on six unique service areas:

Bio conversion

The trend in power generation is to convert coal-fired power plants to various degrees of co-firing and to construct new units fuelled with biomass such as straw, wood chips and pellets. Our expertise encompasses the full range of knowledge needed to successfully convert/new build a plant from fuel receipt and logistics to supply of power and heat.

Lifetime extension

Retrofitting for lifetime extension adds new technologies to existing systems and deals with plant efficiency, increasing output, fuel flexibility and emission reduction. In such projects Ramboll typically supports the client from feasibility

study until commissioning and acceptance testing.

CHP & fuel efficiency

For both new and retrofit CHP projects we offer our clients all services that are necessary for fuel and plant optimisation including turbine processes, heat accumulators and district heating systems - from analysis, planning and design to procurement, implementation, quality control and operation.

High-efficiency power plants

Optimal, efficient and flexible power plants are paramount in the competitive power markets. USC and fuel flexible power, fossil or biomass based plants are an inherent part of our design solutions for new plants as well as optimization of existing plants.

O&M support

Ramboll is qualified in all parts of power plant O&M necessary to achieve high availability, performance, profitability and safety. We use our experience with tried and tested management and planning methods and with specific technical issues to deliver solutions that streamline our clients' operating and maintenance economy.

Process risk & safety

Ramboll's risk and safety engineering starts already at the design, but can also be used on an existing power plant to secure safe operation and check-up on installed safety mechanisms. Ramboll has knowledge and understanding of related standards and norms and have used the tools on both new and existing plants.

What is thermal power?

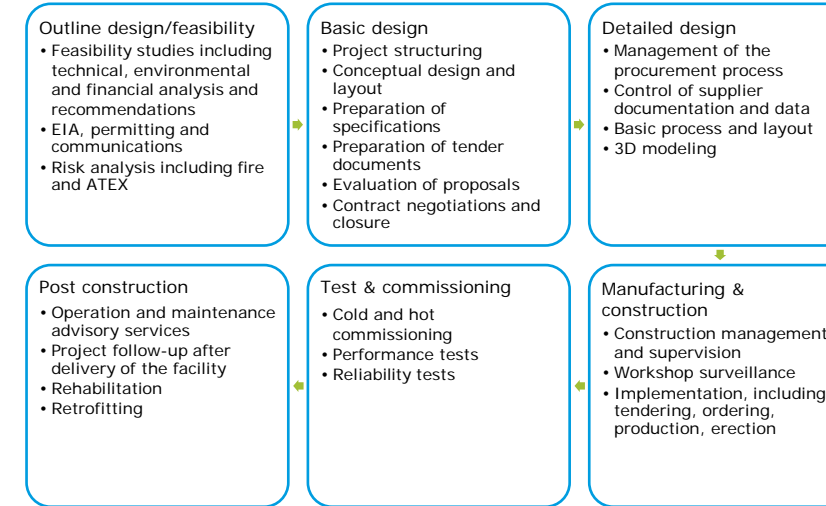
A thermal power station is a power plant in which the prime mover is steam driven. Water is heated, turns into steam and spins a steam turbine which drives an electrical generator. After it passes through the turbine, the steam is condensed in a condenser and recycled to where it was heated.

The greatest variation in the design of thermal power stations is due to the different fuel sources, which may include fossil fuels or renewable sources such as biomass in different forms.

In addition to electricity, some thermal power plants also deliver heat energy for industrial purposes, for district energy, or for desalination of water.

Ramboll's services

On power projects Ramboll typically acts as the owner's engineer and technical consultant in connection with EPC, EPCM, specialist assignments, trouble shooting, strategic evaluation, due diligence and O&M support. Our clients include utility companies, EPC contractors, governments and communities, and our services include:



Selected project references

- Avedøre & Studstrup Power Stations, Denmark:** DONG Energy, conversion from coal to biomass, 250 MWe/331MJ/s, 350 MWe/455 MJ/s, overall advice about the conversion process, 2012-2015
- Herning CHP Station, Denmark:** DONG Energy, conversion from fossil fuel to multi-fuel, 97 MWe/180 MJ/s, owner's engineer from project analysis to commissioning and O&M, 2001-2011
- Mongstad CHP Station, Norway:** DONG Energy, combined cycle CHP station, 280 MWe/350 MJ/s, owner's engineer from project analysis to commissioning and O&M, 2003-2010
- Immingham, UK:** Associated British Ports/IRFT, large scale terminal for wood pellets, design review, 2013-2014
- Sandvik CHP Station, Växjö, Sweden:** VEAB, biomass fired CHP station with local fuels, 40 MWe/65 MJ/s, project management and technical responsibility for the boiler island, 2011-2015.

Why choose Ramboll for your power project?

- Have designed, constructed and provided operational support to more than 90 major power plants
- Comprehensive international experience
- Fully abreast of all the latest technical developments
- Unique hands-on experience from plant operation
- Very familiar with and well known by all the main contractors/suppliers in the business – important in relation to obtaining contracts of a high quality at competitive prices.

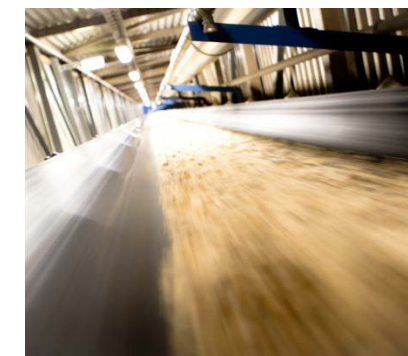
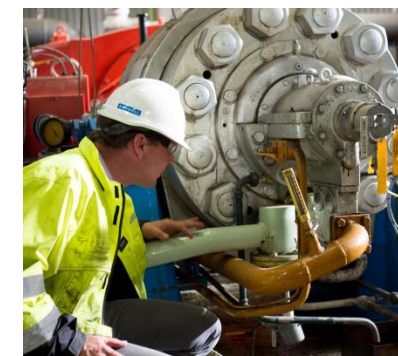


Ramboll's geographical major power project experience

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Power in Ramboll

Number of specialists: 250
Annual turnover: €30Million
Years of experience: 20+