Large-scale Power Plants
– taking your energy projects to the next level
Grontmij and Energy – Securing Stable Delivery from Source to End User

Grontmij is the third largest engineering consultancy in Europe with approximately 9,000 professionals. At the heart of our business lies the sustainability by design principle.

With nearly one hundred years of experience, we have developed a market-leading consultancy business serving our clients with best-in-class energy engineering and technology-based solutions. Our services are centered on economic and environmental efficiency of new or already existing facilities in order to reduce costs for the benefit of our customers and their end users.

Realizing and optimizing your technical energy plants

Grontmij has comprehensive knowledge and experience in consulting, planning, construction management, site supervision, and overall management. We support you in the realization and optimization of your technical energy plants.

Our expertise derives from our vast experience in resolving complex challenges concerning large-scale gas- or coal-fired power plants, waste-to-energy plants, and biomass power plants throughout Europe.

Working with Grontmij will provide you with a full-cycle approach to large-scale power plant projects based on solid technical know-how, high legal expertise and a well-founded knowledge of relevant business contexts.
We offer you expert engineers in:

- power engineering & machine technology
- process, mechanical, & piping engineering
- electrical & process control engineering
- structural engineering (building construction & civil engineering)

Our clients are energy supply companies, real estate operators, disposers, industrial power companies, project developers, and contractors. Grontmij Germany is a member of VGB and VIK.

All Grontmij offices have acquired a quality accreditation according to the ISO 9001 standards.

Moreover in most of our countries we maintain an Environmental Management System according to ISO 14001 as well as a Health and Safety Protection System according to OHSAS 18001.

“Safe, stable and efficient energy solutions are the key for society’s continued prosperity. We add new levels of effectiveness to your production, transmission and distribution projects.”

Grontmij works with skilled professionals.
Maximising your Project Solutions
Grontmij skills and knowledge

Management
- Project Control & Project Management
- Licencing Management
- Project Leading
- Risk Management

Consulting & Expert Analysis
- Consultancy
- Due Diligence
- Project Development
- Feasibility Studies
- Economical Analysis
- Environmental Impact Studies & Expert Analysis
- Natura 2000 Impact Studies

Engineering
- Preliminary Design
- Approval Management
- Basic Engineering
- Detailed Engineering
- Tendering
- Bid Approval, Negotiations, & Awarding
- Design Review
- Purchase Management

Site Management Organisation
- Construction Management
- Cost Management
- Quality Management
- Time Management
- Commissioning
- Training
- Documentation Management

Operation
- Optimization
- Operation Analysis
- Maintenance
Economy
Energy Engineering
Ecology
Thermodynamics
Process Engineering
Electrical Engineering
Process Control
Automation
Civil Engineering
Architecture
Structural Engineering
Static Calculation
Coal-fired Power Plants

Coal-fired power plants require specialist knowledge throughout the whole planning and realisation process:

- Coal logistics require specialist transportation by ship, train, and truck.
- The complexity of handling solid fuels, additives, ashes, and other substances leads to complex process technology and high demands on engineering, tendering, contract awarding, and site management.
- Very high steam pressure and temperatures require special materials, specific handling and quality control.
- The specific emissions, inter alia CO₂, indicate professional environmental impact analyses and permitting processes.
- Dealing with a sensitive public in coal-fired power plant projects requires a profound knowledge in the legal demands and a sensitive handling of the monitoring process.
Coal-fired power plant, Krefeld-Uerdingen, Germany
Services: basic design; tendering; approval engineering & approval management; creation of approval documents; preparation of scoping-paper, creation of expert reports, environmental impact study

Coal-fired power plant, Luenen, Germany
Services: approval engineering & approval management, building permission application, creation of approval documents, preparation of scoping-paper and implementation of public hearing, creation of expert reports, environmental impact study; tendering coal storage; tendering operation and maintenance; engineering for district heating

Coal-fired power plant, Lubmin, Germany
Services: approval management

Coal-fired power plant, Eemshaven, Netherlands
Services: support for electrical planning, construction and infrastructure, commissioning of electrical utilities

Coal-fired power plant, Emden, Germany
Services: approval management

Coal-fired power plant, Datteln, Germany
Services: support of approval management; creation of expert reports

Coal-fired Power Plants, Multi-fired Avedøre Power Station (CCGT), Avedøre, Denmark
Prefeasibility Study. Financial and environmental assessment on fuel substitution (coal to biomass) at Avedøre 1 under continued coal-firing at Avedøre 2
Combined Cycle Gas and Steam Turbine Plants [CCGT]

CCGT plants play an increasingly important role in world-wide energy

- Compared to other plants, capital costs and risks are minimized.
- CCGT plants offer high power density in small areas, which means decreased land use.
- They provide the highest electrical efficiency of all power plants and low specific CO₂ emissions.
- They guarantee the most flexible electrical production and a swift start-up time and load changes velocity.

Thus, CCGT plants are the preferred solution to shield the electrical production of renewable energies.

Despite of CCGT plants requiring smaller investments, reducing emissions, and offering more standardized solutions compared to coal-fired plants, the requirements for project management, engineering, licensing processes, or site management are still the same.
References

**Öresundsverket, Malmö, Sweden**  
Services: project management, process (boiler, steam and gas turbine, automation and electricity) QAQC, HSE management, architecture, design services and construction management, environmental impact assessment

**Gas and steam turbine power plant, Krefeld-Uerdingen, Germany**  
Services: feasibility study; basic design; tendering; approval engineering & approval management; creation of approval documents; preparation of scoping-paper, creation of expert reports, environmental impact study

**Gas and steam turbine power plant, Saarbruecken, Germany**  
Services: design services, approval management

**Gas and steam turbine power plant, Bremen, Germany**  
Services: design services, tender process management and contract awards

**Gasturbine power plant, Erfurt, Germany**  
Services: design services, approval management, tender, site management, commissioning, supervision and contract awards
Waste-to-Energy Plants (WtE Plants)

Waste-to-Energy plants have grown in importance in industrialized countries with high population densities. Decreasing space for landfill areas and EU legislation have called for the reduction of waste deposits. An effective reduction of organic waste is only possible by waste incineration combined with energy production.

Even if the energetic capacity of WtE plants is relatively small in comparison to public power plants, the special type of fuel necessitates special process technologies and investments, and therefore specialist knowledge in planning and realization:

- High investments (often more than €100 million) require effective project management, cost calculation, and controlling.
- The diverse consistency of waste requires special efforts in transportation, treatment equipment, storage, and feeders as well as fire-fighting and safety systems.
- The diverse chemical structure of waste causes special requirements for combustion and flue gas cleaning systems.
- Different types of flue gas cleaning offer technically and economically optimal solutions depending on the gas components.
- The complex handling of solid fuels, additives, ashes, and other substances leads to complex process technologies and high demands on engineering, tendering, contract awarding, and site management.
- Flue gas emissions require in depth environmental impact analyses and permitting processes.
- Dealing with members of the public on sensitive issues relating to WtE plant projects requires specialist knowledge of legal demands and process monitoring.
References

**Waste-to-energy plant, Bernburg, Germany**
Services: design services, approval management, tendering and contract awards, site management, commissioning supervision

**Filborna, Helsingborg, Sweden**
Services: project management, process (boiler, turbine, flue gas cleaning, automation and electricity), QAQC, HSE management, construction (building and land) and architecture

**Szczecin Metropolitan Area, Szczecin, Poland**
Services: technical assistance, contract engineering, design documentation, financial planning

**Bionerga power plant, Gent, Belgium**
Services: project management, permitting procedure, environmental impact assessment, environmental permit, building permit, technical engineering of the energy plant (pre-study, pre-design, basic reference design), architectural design and integration into the environment and tendering procedure (bidding)

**Waste-to-energy plant, Erfurt, Germany**
Services: design services, approval management, tendering and contract awards, site management, commissioning supervision

**Inter-Municipal Waste Management, Konin, Poland**
Services: contract engineering

**Waste incineration plant, Solingen, Germany**
Services: design services, approval management, tendering and contract awards, site management, commissioning supervision
Large-scale Biomass Plants

Biomass incineration plants – mostly powered by wood – are an essential component in the CO₂ reduction philosophy of most European countries due to a CO₂-neutral combustion. The importance of biomass power (and heating) is based on its non-reliance on climatic and weather conditions like sunshine or wind. Thus biomass power plants reduce the need for other renewable energy sources.

Even if biomass plants are rather small compared to public power plants, the fuel requires complex process technologies and specific high investments similar to WtE plants. So the know-how for planning and realization is comparable.

High investments require effective project management, cost calculation, and controlling processes:

- The diverse consistency and structure of biomass require special efforts concerning transportation, treatment equipment, storage and feeders as well as fire-fighting and safety or flue gas cleaning systems.
- In case of biomass gasification, gasifiers are sensitive to the inhomogeneous structure of biomass. This can impede the gasification process.
- Biogas needs additional gas cleaning facilities before its combustion in gas engines or before supplying it into public gas nets.
- The complex nature of handling solid fuels, additives, ashes, and other substances leads to complex process technologies thus requiring specialist expertise in engineering, tendering, contract awarding, and site management.
Wood-fired power plant, Bergkamen, Germany
Services: feasibility study, basic engineering, approval management, tendering and contract awards

Biomass power plant, Kapiteltal, Germany
Services: design services, approval management, tendering and contract awards, site management, commissioning supervision, local Health and Safety Coordination

Eldaren, Tidaholm, Sweden
Services: project management, process (boiler, turbine, flue gas cleaning, automation and electricity), QAQC, construction (building and land) and architecture, environmental impact assessment

Junckers Biomass CHP, DONG Energy, Køge, Denmark
Services: due diligence study, technical and economic due diligence

REFA Waste-to-Energy Plant, Nykøbing Falster, Denmark
Services: prefeasibility study, optimisation of Waste-to-Energy heat and power production facilities including a larger biomass heating facility
Combined Heat & Power Plants – CHP

CHP plants are becoming increasingly important - following CO₂ emissions reduction initiatives

- They operate independently from climatic conditions.
- They offer the best reduction of CO₂ emissions apart from renewable energies.
- CHP plants offer the best relationship of CO₂ reduction to costs of all energy systems.
- CHP plants are essential for industrial processes and district heating systems.

Large-scale CHP plants are connected to most industrial heating processes or district heating systems. Therefore they must meet the requirements of various systems:

- They have to offer optimized electricity production according to local or on-site electricity demands taking into account stock market prices.
- CHP plants must provide the necessary heat for industrial processes or district heating nets in a reliable way. In the case of industrial processes, this includes extreme load variations and load changing velocities.

Due to these diverse and often contrary requirements, the engineering of CHP plants requires specialist knowledge:

- analysing the industrial production process from start-up to shutdown of plants.
- taking into consideration instationary process conditions.
- investigation of electricity and heat production with thermodynamic simulation programmes for different load conditions.
- economical cost-benefit analysis (e.g. according to “Total Cost of Ownership”) to hedge high investments.
References

CHP gas turbine power plant, Erfurt, Germany
Services: design services, approval management, tendering and contract awards, site management, commissioning supervision

CHP VEKS District Heating Transmission Company, Denmark
Services: planning, conceptual and detailed design, implementation and supervision of pipe systems, pump stations, SCADA system and connecting installations

Nordforbrænding Waste-to-Energy Plant, Hørsholm, Denmark
Services: energy planning and implementation of extension of district heating network

CHP Plant Värmekällan, Skövde, Sweden
Services: development design requirements, tender documents, incl. technical specifications, procurement, incl. preparation of contract documents, arrangement of project meetings, follow-up of documentation, inspection, trial operation and performance tests

Engine based CHP plant, Munich Airport, Germany
Services: Basic study and basic engineering including the integration into the energy system of the airport
Grontmij is a leading sustainable design and management consultancy, operating in the sectors Planning & Design, Transportation & Mobility, Water & Energy, Monitoring & Testing.

At the core of our business is the principle of sustainability by design which is a leading value proposition for our customers. Grontmij is the third largest engineering consultancy in Europe with almost 9,000 professionals around the world.

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