

Your experts for
coal assets

**uni
per**

We are Uniper

We are a leading international energy company with operations in more than 40 countries and around 13,000 employees. We combine a balanced portfolio of modern assets with comprehensive technical and commercial expertise. Our assets and capabilities enable us to deliver bespoke, competitively priced energy products and services with agility, precision, and speed.

Uniper Energy Services – Your one-stop-shop solutions provider

We are an experienced international energy company with a new name. Uniper's know-how is based on a heritage of power industry expertise that dates back a hundred years. Our family tree includes some of the leading companies involved in energy generation and gas networks in Europe – businesses known for their reliability and technical excellence.

We deliver engineering, asset management and operation, energy sales, and technical solutions to optimize your commercial and technical performance in whichever market you operate.

We have the know-how to work with you to achieve full value from your existing assets. As your partners in energy, we are your independent advocate for new projects. We deliver solutions for future challenges. Our experience is comprehensive and covers all areas of your plant operation, from coal preparation through to energy production, plus management and control of emissions.

Your benefits

Reduce CAPEX

By sharing our comprehensive engineering resources and operational experience, we help you to reduce costs and improve scheduling and quality control, right from the inception of your new build and upgrade projects.

Reduce OPEX

We help you to optimize investment decisions and budget spend across your plant. Based on our operational experience, we can offer expert advice and a broad range of operation and maintenance services, up to full O&M contracting.

Reduce fuel costs

Benefit from our engineering insight into the impact of coal quality, to gain flexibility and optimize your fuel mix. Our leading trading activities with our experience of coal handling and logistics will also help you to optimize fuel procurement and supply.

Optimize outage strategy

Manage your plant outages for optimum benefit and minimum operational risk. We offer management of all aspects of the outage process supported by in-house software to identify the most cost-effective strategy.

Optimize maintenance

We work with you to identify current operational performance benchmarks and how these can be developed. Our operational maturity assessment helps you to understand and develop your current competencies, and to optimize your maintenance strategies.

Improve performance

Improve your plant performance with our specialist engineering and risk management services. Our risk management tool, called AERO, establishes the current condition of your coal asset and identifies opportunities to improve performance.

Stay compliant

Ensure your plants remain compliant with changes in legislation while continuing to be profitable. We monitor norms, codes, and standards, and alert and consult you in case of changes. We have firsthand knowledge of the demands of environmental legislation.

Extend plant life

Establish the remaining life of components, challenge unnecessary replacement and gain OEM-independent repair options as a result of our systematic reviews of asset condition.



One-stop-shop OEM independence

Comprehensive skills from a single source reduces complexity and risk.

We take a holistic approach to your needs, acting cohesively and in a multi-disciplinary way to respond quickly and solve your problems. Our teams work hand-in-hand to proactively prevent issues in the future and reduce complexity.

Based on our experience in operating and continually optimizing a large portfolio of coal-fired assets, we add value to the construction of new generation capacity worldwide. A large number of new-build projects in Europe, Russia, and South America have extended our comprehensive know-how and expertise.

We are one of Europe's largest energy traders. Our trading team is active worldwide, which enables us to provide expert advice on fuel sourcing and energy sales strategies.

We leverage our experience and independence of original equipment and component manufacturers (OEMs) to choose the best solution.

Maximizing value across the entire asset life cycle

Through-life Services

Our focus is to add value at all life-cycle stages of your asset. By combining our through-life solutions with our expert specialized services, we provide you with a unique value proposition. As owner's engineer we play a critical role supporting and supplementing your resources, acting as your independent advocate. We provide technical advice from inception of your new project until the end of the asset life. We ensure compliance, and minimize your exposure to risk with technical and environmental codes and standards. Together with our project management, operation and maintenance, asset management, and energy trading expertise we support your project or asset wherever you need it.

Feasibility, Construction, Commissioning

Use our experience in project development and construction to make the most of your new assets. From the earliest project phases until commissioning of your new coal-fired plant, we provide specialist technical advice, tailoring our solutions and scope according to your needs. We support all planning, permitting and construction activities, as owner's engineer or project managers or by providing specific services such as inspections.

Asset Management & Optimization

Identify how performance can be optimized with our technical review of assets and asset management services. We provide solutions for structured maintenance strategies, plant optimizations, modifications and upgrades, all based on thorough understanding of your current plant condition. We identify, manage and balance process safety, operational risks and plant economics, to help you overcome your challenges.

Operation & Maintenance

To ensure maximum benefit from expenditure and plant downtime we offer a full range of services, from outage coordination to full outage management and we can operate assets on your behalf. We challenge OEMs and develop solutions based upon actual plant condition. We continuously monitor plant health to identify potential problems before they develop into failures.

Decommissioning

We have firsthand experience managing the end-of-life options of your coal-fired assets. We maximize the value of your assets and ensure high levels of safety and compliance at all times, from preservation of coal fired plant with a shortened return to service time, to fully mothballed and eventual complete site remediation.

Through-life Services

- Owner's engineering services
- Project management
- Electrical, mechanical and civil engineering
- Operational maturity assessment
- Continuous improvement solutions
- Commercial analysis solutions
- Technical consultancy
- Supplier quality services
- Environmental compliance and management
- Health and safety management
- Stakeholder engagement
- Training and development

Fuel costs reduced

Our client entrusted us to improve the fuel flexibility of a high order merit fleet. We assessed the technical configuration, including the increased damage potential and following our recommendations, several technical parameters were adapted. These made it possible to increase the use of lower-cost coal with heterogeneous coal quality. With our support the improved fuel selection reduced coal costs across the fleet by approximately €10m per year.

Plant life extended

A full environmental upgrade and plant life extension was carried out at a UK coal-fired plant, with installation of selective catalytic reduction, enabling compliance with EU Industrial Emissions Directive well beyond the plant's original design life. The project, delivered to time, quality and cost, depended heavily on the life extension of the plant, optimizing the run, repair, and replace strategies for future operation to include base load and flexible operation. Our services were estimated to have saved €80m on a total budget of €930m.

Feasibility, Construction, Commissioning

- Business case assessment
- Conceptual and basic design (FEED)
- Feasibility studies
- Environmental impact assessment
- Survey, audits, and peer reviews
- Due diligence
- Governance and compliance
- Technical design
- Planning permitting and impact assessment
- Project and site management
- Environmental compliance and governance
- Tendering and procurement support
- Quality assurance
- Commissioning
- Risk management
- Inspections
- Claim and variation management

Building new coal plants

We have provided turnkey services for new 1,100 MW hard coal-fired plants across Europe and an 800 MW lignite-fired plant in Russia. All were designed with supercritical steam parameters to achieve state-of-the-art, high plant efficiency values. The client focused on their core business while we used proven skills and experience to take care of project governance, project management, engineering, procurement, and site and commissioning management.

Delivering design benefits

Our client chose us to integrate innovative value adding concepts to its new 1,100 MW coal and biomass-fired plant in the Netherlands. Our team was able to make modifications to the original design to maximize benefits from the coastal location, such as increased output due to seawater cooling. While our operational experience helped deliver gains including improved safety, cost and time savings and technologies for high efficiency and availability.



Operation & Maintenance

- Technical operational and management expertise
- Advanced condition monitoring
- Performance monitoring and modeling
- Plant and component performance testing
- Outage inspection requirements
- Outage quality management
- Workshop and field services
- Parts life extension
- Spare parts management
- Failure root cause analysis
- Specialist NDT techniques
- Visual inspection and assessment
- Structural condition assessment
- Fuel sampling, analysis and assessment
- Oil management
- Biomass sourcing advice
- Combustion testing and optimization
- Emissions testing
- Catalyst management
- Process and plant safety training

Loss of generation avoided

Our client contacted us following a routine inspection at an advanced super-critical power plant, where defects were identified in reheater 2 welds. Our root cause analysis identified relaxation cracking and stress corrosion cracking. We were able to propose a safety case, including exclusion zones, to enable operation while longer term solutions were developed. Two months lost generation at the highest generation prices was avoided.

Outage optimized

A client with both coal and gas-fired plants needed to reduce costs due to challenging power markets. Using our in-house optimum pressure systems inspection strategies we proposed an increase in outage periods, which enabled our client to extend inspections by one year on four units and by three years on three other units.

Asset Management & Optimization

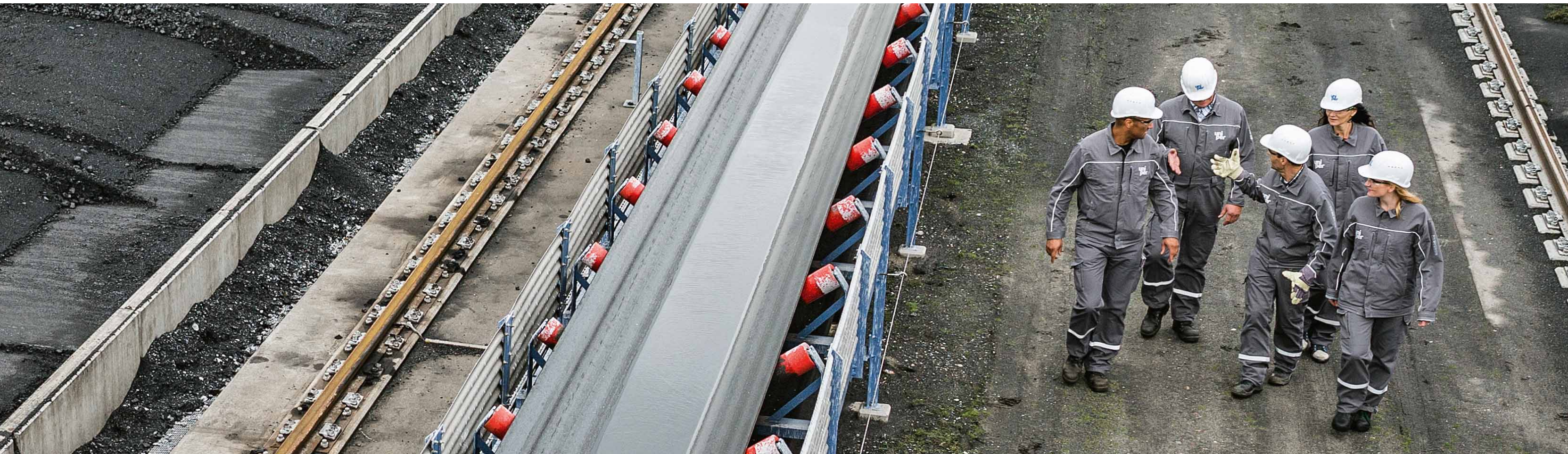
- Maintenance strategy, management and optimization
- Long-term service agreement consultancy and services
- Modifications, upgrades and innovation
- Risk management
- Plant area flexibility assessment
- Plant preservation strategy
- Plant status review
- Plant performance optimization
- Plant and process improvement/optimization
- Plant start-up optimization
- Operational maturity assessment
- Benchmarking studies
- Governance and standards
- Grid connection strategy

Optimizing critical procedures

We were entrusted by our client operating a coal-fired plant in the UK to optimize their oil consumption during start-up. By applying our Operations Strategy Task Risk Analysis (OSTRA) methodology we were able to deliver a 28% oil consumption reduction during warm start-ups, with an estimated saving of €4,500 per start. Our improvements in critical recurrent activities enabled significant savings while operating the asset on a business as usual basis.

Reducing risks and maximizing value

Our risk management methodology, called AERO, has allowed our client to effectively manage the technical risks of a 32 GW power generation portfolio in an easy and standardized way. With our help, risk levels have been categorized and are now more easy to compare and prioritize.



Decommissioning

- Planning permitting and impact assessment
- Decommissioning strategy
- Managed shutdown
- Mothballing
- Dismantling
- Site and safety management
- Disentanglement and preservation
- Return to service strategies

Innovative solution for managing end of life

We are sharing our expertise to support a UK generator's decommissioning strategy for their large coal-fired asset. Our feasibility studies into the disentanglement of various systems will allow for resale opportunities and the long-term preservation of boiler components for future developments. This is part of the ongoing work we are doing with our client to provide innovative solutions in the decommissioning and demolition phases in order to maximize any potential value opportunities.

Energy Services

Contact us for a reference list of projects
energy.services@uniper.energy

Uniper Technologies GmbH
Uniper Technologies Ltd
Uniper Kraftwerke GmbH
Uniper UK Ltd
Uniper Anlagenservice GmbH
Uniper Energy Sales GmbH
Uniper Global Commodities SE

energy.services@uniper.energy

**Uniper SE
Energy Services
Holzstraße 6
40221 Düsseldorf
Germany**

www.uniper.energy

energy.services@uniper.energy

April 2017