

Optimizing wind farms

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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 – A heritage of technical excellence

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.

Our skills are based on decades of experience in developing, constructing, and operating all types of generation assets, be they conventional, hydro, nuclear, or renewables, including energy networks and gas pipelines. We deliver engineering and technical solutions to optimize your commercial and technical performance in whichever market you operate.

We offer new perspectives on energy. As your partners in energy, we have the know-how to work with you to achieve full value from your wind farm projects and your assets, and to deliver solutions for the challenges of the future.

Your benefits

Increase availability

We will support you to plan maintenance strategies to increase availability, leveraging our independent advanced condition monitoring system which identifies disruptive component failures up to six months in advance of replacement.

Achieve lowest levelized cost of energy (LCOE)

Partner with us to improve levelized cost of energy and maximize your return on investment. Our WindArchitect™ will help you to optimize your financials.

Optimize CAPEX

Optimize your capital expenditure by leveraging our experience. Our CableArchitect™ gives you the chance to achieve the most efficient layout of inter-array cabling.

Reduce OPEX

Optimize your maintenance strategy with us as your partner. We will streamline planned interventions, reduce spares holding, and ensure access requirements/opportunities to deliver maximum impact to the operation of your wind farm.

Benefit from our proprietary solutions



Advanced condition monitoring
WindArchitect™
CableArchitect™
Vellella™ software



OEM independence, operator understanding

Sharing our understanding of owning and operating wind farms helps you to succeed. Our expertise from across the energy industry enables us to focus on key business drivers.

We leverage our experience and independence of original equipment and component suppliers (OEMs) to choose the best solution. Ask for our independent solutions that help you optimize value for money.

Our multidisciplinary engineering and consulting expertise adds value at every stage in the development, construction, and operation of your wind farm projects.



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. As owner's engineer we play a critical role supporting and supplementing your resources, acting as an independent advocate. We provide technical and engineering advice, provide governance and engineering standards, or environmental monitoring. We ensure that wind farm operation and maintenance, upgrades, and modifications deliver value, meet safety requirements, and are compliant with standards. Our in-house capabilities across all relevant engineering disciplines and experience throughout the energy industry are the basis of our value proposition.

Feasibility, Construction, Commissioning

We balance both technical and economic aspects to optimize projects, reducing development costs and schedule and planning risks. We provide original equipment and ensure completed systems are fully compliant to specification. We analyze wind and wave data to challenge the design approach of offshore turbine structures and foundations focussing on realistic lifetime requirements.

Asset Management & Optimization

We provide a through-life asset management strategy that integrates life management, obsolescence assessments, performance management, and cost-effective upgrades. Additionally, our global commodities trading organization provides market access and offers structured products to guarantee returns on assets.

Operation & Maintenance

We ensure the safe and reliable operation of your wind farm. Our OEM independence enables us to develop a structured maintenance philosophy based upon actual plant condition rather than time-based schedules. We use our in-house monitoring solution to further extend asset life and give a greater understanding of component issues such as turbine blade life.

Repowering, Relifing and Replanting

We have first-hand experience managing the end-of-life options for wind farm assets. We can assess the remnant life of equipment, identifying best solutions for life extension, ranging from plant upgrades to recover lost performance through to complete replanting solutions. Our advice assesses regulatory requirements, access to the grid, and optimal size and number of replacement WTGs.

Our Energy Services in detail

Through-life Services

- Owner's engineering services
- Engineering governance standards
- Technical and engineering consultancy
- Compliance assessment and management
- Modifications and upgrades
- Environmental monitoring and management
- Project management

Recovery of lost revenue and damages



An offshore wind farm operator entrusted us to investigate the cause of a cable failure resulting in a loss of output. Our experts did a thorough root cause investigation and identified a fundamental manufacturing defect in the cable as a pre-existing condition. The same defect was believed to exist in multiple locations within the cables. Based on the results of our experts' analysis, the wind farm operator was able to recover not only the cost of replacement of the failed cable and associated export cables under the warranty from the manufacturer, but also the loss in revenue incurred.

Feasibility, Construction, Commissioning

- Wind resource assessment, modeling and optimization
- Conceptual and design studies
- Foundation feasibility and protection studies
- Functional design and specifications
- Array and/or cable layout optimization
- Electrical system and component design
- Grid code compliance and grid connection
- Civil and structural design specifications
- Environmental assessment, consultation, and compliance
- Applications and permitting
- Construction, engineering and commercial project management
- Supplier quality assurance
- Acceptance and handover
- Technical due diligence

CableArchitect™ – Reduction in cable cost



For the development of a German offshore wind farm, our client entrusted us with the revision of the cable layout. CableArchitect™, our proprietary cable layout optimizer, was the ideal tool for this purpose. We produced a new layout based on the turbine positions, grid, and other parameters supplied by the client. By considerably reducing the length of cable required, our customer achieved a 4.4% off the CAPEX.

WindArchitect™ – Optimized levelized cost of energy (LCOE)



The developer of a UK offshore wind farm entrusted us with the revision of a turbine layout created by traditional methodology. This is when our in-house software WindArchitect™ came into play. We used WindArchitect™ to optimize the turbine layout based on site data, parameters, and constraints supplied by our client. Our proposed new layout led to a 2.5% reduction in LCOE for our client.



Operation & Maintenance

- Performance monitoring and assessment
- Management of imbalance costs
- Advanced condition monitoring
- Transformer condition monitoring
- Optimized maintenance strategies
- Mechanical engineering assessment
- Site infrastructure inspections
- Tower structure inspections
- Failure investigation and root cause analysis
- End of warranty inspections and claim management

Independent vibration monitoring – Early detection avoids expensive repair



A UK client sought to prevent the major failure of expensive wind turbine drive train components by early detection of potential problems. Our vibration monitoring solution was ideal for this purpose. We installed the system on the turbines and connected the sensors and related site data to our online platform. This early warning system allowed us to detect a crack which was developing in a main generator bearing. Our customer could execute an in-situ repair, which avoided a major failure.

Vellella™ software package – Imbalance charges reduced



A client with a 1GW wind portfolio faced regular and significant imbalance charges from the transmission system operator caused by a discrepancy between forecast and actual power. Our Vellella™ software package offered the perfect solution. We streamed power forecasts, turbine outage and maintenance data, and weather uncertainty into our Vellella™ software package. Our expert advice enabled the client to reduce the imbalance charge by around 10% per annum.

Asset Management & Optimization

- Asset management strategy
- Component life management and extension
- Wind and wave data analysis
- Blade life management
- Independent technical reviews
- Due diligence reviews
- Evaluation of manufacturer upgrade packages
- Obsolescence assessment and management
- Energy market access
- Structured financial energy product

Independent advanced condition monitoring – Improve insight into asset health



Benefit from real-time understanding of the health of your remote onshore and offshore assets by connecting to our range of condition monitoring services. Our operational experts deliver real-time insights into the health of your assets, providing actionable alerts to any abnormal behavior, allowing you to prioritize, plan, and execute an optimized asset maintenance strategy.

Maximize your maintenance strategies



Our client's offshore wind farm was at risk of potential cable failure and loss of output caused by scour affecting exposed array cables. We identified high-risk elements for each turbine and assessed asset life dependent on the length of exposed cable. Through our support the operator was able to revise its maintenance approach based upon the risk of failure and the cost of options for cable repair/replacement.



Repowering, Relifing and Replanting

- Scenario planning for lifetime optimization
- Optimize life extension and repowering decisions
- Inspection regimes and WTG lifetime analysis
- Structural and civil fatigue assessment
- Environmental and consenting advice
- Economic and commercial assessment
- Grid connections and upgrades to electrical infrastructure

Repowering – Upgrade and extend life

Our client needed to optimize the long-term commercial value of an early 1990s wind farm. We provided both technical and commercial support to justify continued safe operation of the existing plant beyond the original design life, whilst developing the environmental permitting requirements for a repowered site. The final design proposed by us took advantage of the latest technology advancements. The repowered site now has less than half the original number of wind turbines but has an increased power output maximizing the electrical grid connection capacity.

Energy Services

Contact us for a reference list of projects
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