

**Applying our expertise**  
to meet the world's  
evolving energy  
needs

Petrofac 



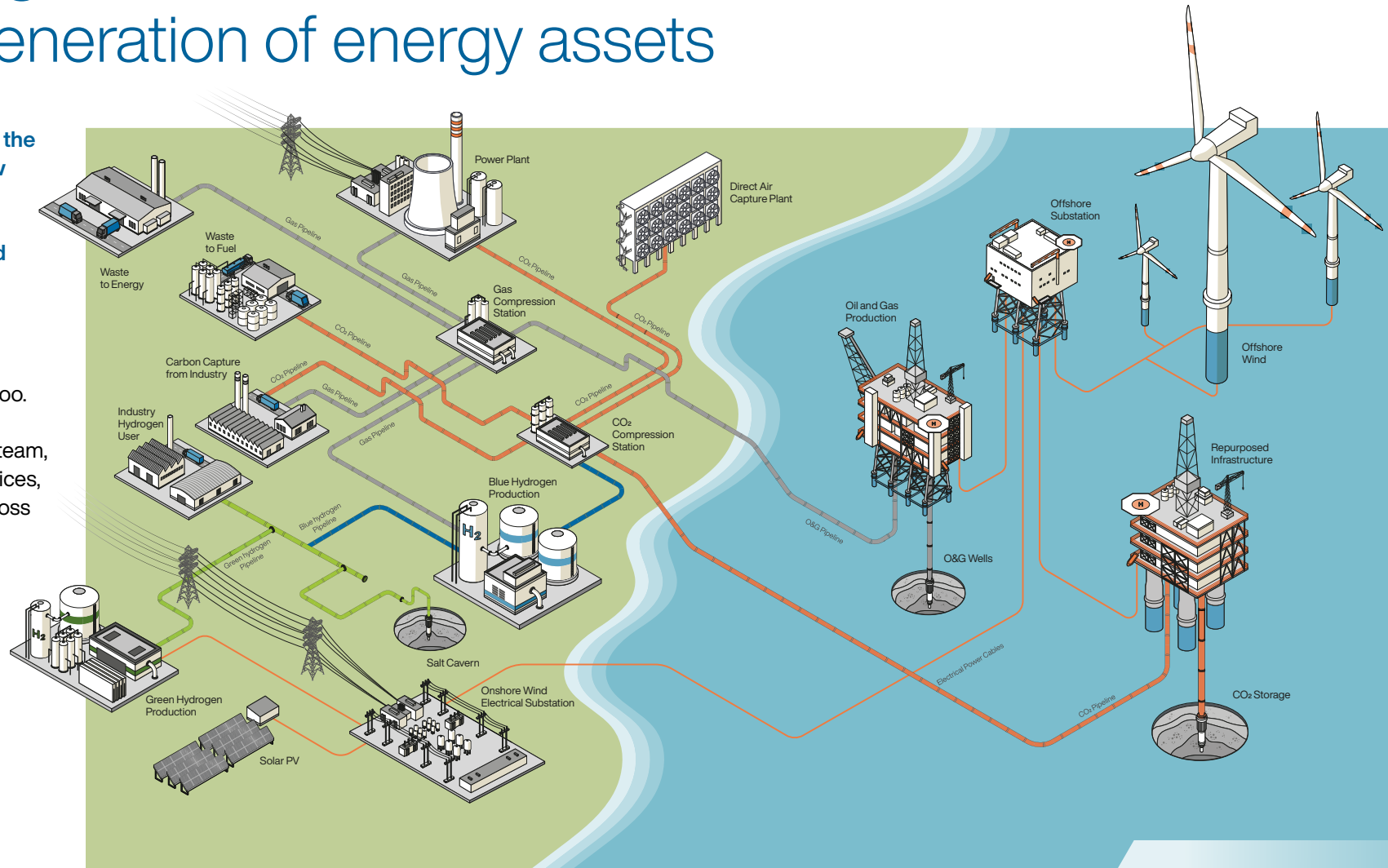
**Our New Energy Services** 

# Engineering solutions for a new generation of energy assets

As a tier-one service provider to the world's energy industry, we draw on a 41-year track record to help you develop, design, and de-risk a new generation of facilities and infrastructure.

Alongside our work in renewables and new energies, we help you to decarbonise your existing assets too.

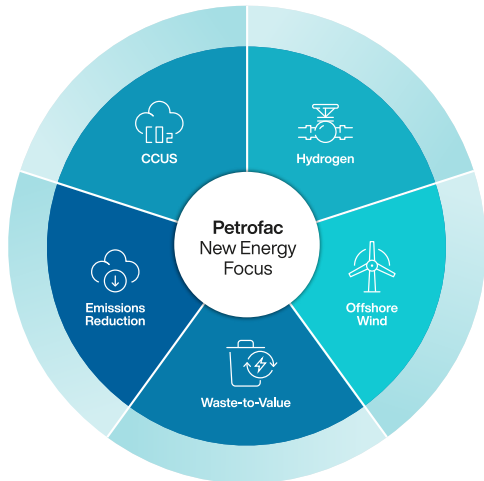
Through our diverse international team, and a network of more than 30 offices, we partner with energy clients across the world.





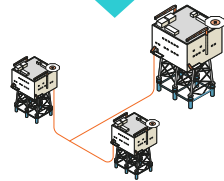
# Established skills, deployed for new energies

Within the energy industry, we are known for our innovative approach to project delivery - challenging norms, applying digital technologies, pioneering new commercial and operational models, and bringing assured delivery to even the most challenging assignments.



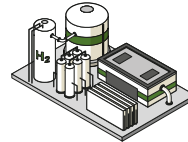
Drawing on our existing experience, we are successfully extending this approach to a new generation of energy assets:

## OFFSHORE WIND



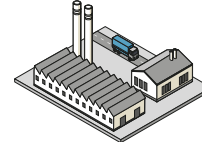
Building on a decade's experience in designing and building HVAC and HVDC electrical substations, we are also harnessing our operations experience to extend our support to the sector.

## HYDROGEN



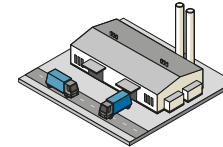
Redirecting our wind, solar and gas capabilities to design and build green hydrogen projects, and our hydrocarbons experience to deliver other large-scale hydrogen solutions.

## CARBON CAPTURE, UTILISATION AND STORAGE



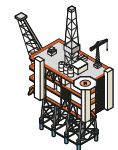
Using our expertise in gas processing, transport and storage to safely and economically capture and store carbon.

## WASTE-TO-VALUE



Using our extensive downstream credentials to transform waste feedstocks into valuable products, such as sustainable land transport and aviation fuels.

## EMISSIONS MANAGEMENT AND REDUCTION



Drawing on a 40-year track record in designing and operating oil and gas assets to reduce the carbon intensity of existing operations, through electrification, flare reduction and improving operational efficiency.

# Thinking through, and working across, the project lifecycle

When you work with us, you partner with a team that has experience across the project lifecycle, from the early conceptual phases, through design and delivery, to operations and maintenance and decommissioning.

With this direct line-of-sight, we put an emphasis on the constructability, operability, sustainability and longevity of your asset – bringing certainty of cost and schedule, and the option of commercial alignment through, for example, risk sharing and performance-related commercial models.

The aim is to establish a solid, long-standing relationships, built on certainty, and backed by best-in-class delivery.



Drawing on our EPC and operational know-how, our teams always think ahead, de-risking project delivery by developing safe, cost-effective and technically-innovative solutions.

**Concept/  
Pre-FEED**



Our construction and commissioning teams are involved through the FEED phase to ensure constructability, operability and cost-control are prioritised.

**Front-end  
engineering  
design (FEED)**



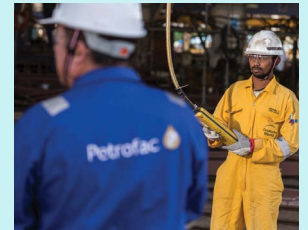
Operating safely, and known for succeeding with challenging projects, we bring certainty in cost and delivery. We offer a choice of flexible commercial models to suit different business models.

**Engineering  
and Construction**



From one-off assignments to fully managed solutions, we deploy ultra-efficient operations to help reduce costs and enhance productivity.

**Operations  
and maintenance**



From assessing capability needs, to creating tailored programmes, we help you to develop engaged, capable, and competent teams.

**Competence  
assurance  
and training**

# Supporting you from concept to construction, and beyond

In the new energies sector, much of our work has been in the early development phases of first-of-a-kind projects, or in the scale-up of pilot schemes.

Through this early development and thinking, we bring a robust understanding of what it takes to give our clients and their stakeholders the confidence they need to advance critical projects. Your priorities are our priorities, so we focus on what you need to achieve project sign-offs, secure final investment decisions, mitigate technical and execution risks, and achieve certainty of cost and schedule.

As a technology neutral organisation, we consider a range of technologies, selecting the best option for every project to ensure optimised solutions. Once a technology has been selected, we then use our deep, developer-friendly expertise to ensure we maximise that solution for your particular project.

We understand how to unlock complex projects – we have delivered close to 1,000 feasibility studies and completed over three million workhours of consultancy and front-end engineering, both for greenfield and brownfield infrastructure projects. We have also been a project developer and asset owner ourselves and we bring this experience to every assignment.

“ As a technology neutral organisation, we consider a range of technologies, selecting the best option for every project. ”



# The experience to deliver offshore wind

We've built a successful record in the engineering, procurement, construction and installation (EPCI) of offshore wind assets - and we support operations and maintenance too.

To date we've enabled the delivery of close to 4GW of offshore wind power, through the completion of both HVDC and HVAC substations in Europe and the UK.





# Offshore wind

## SUPPORTING EUROPE'S ENERGY TRANSITION

### “ONE OF THE WORLD'S LARGEST HVDC PLATFORMS”

One of our most challenging offshore wind projects was the BorWin3 offshore wind grid connection for TenneT, which now supplies more than one million German homes with clean energy. Delivered in partnership with Siemens, this involved the engineering, procurement and construction of one of the world's largest HVDC platforms – and the installation of the finished topside involved the region's first-ever float over, using dynamic positioning technology on a semi-submersible vessel.

“ During construction, we mobilised more than 1,500 workers, who worked more than 13.5 million work-hours. At peak construction the platform occupied almost five square kilometres of Dubai's Drydocks World. ”

### “THE WORLD'S DEEPEST FIXED BOTTOM OFFSHORE WIND FARM”

In 2020, Seagreen Wind Energy recognised our track record for safe and effective project delivery in the renewable energy sector with a major project award. This entailed the engineering, procurement, fabrication, transportation, offshore installation and commissioning of the HVAC offshore substation platform, including the topside, jacket and piles. The massive offshore substation forms the backbone of the offshore wind farm. At 40 metres long, 45 metres wide and 15 metres high, the 4,800 tonne heavyweight topside superstructure accommodates three circuits to generate 1075 MW of electricity to power more than 1.6m UK homes.

“ Contributing to Scotland's largest offshore wind project. ”



# The knowledge to deliver **low-carbon hydrogen**

Through our oil and gas refinery projects, we have extensive experience in delivering 'grey' hydrogen scopes. By combining this with our growing track record in delivering complex CO<sub>2</sub> removal scopes, we are actively supporting large-scale blue hydrogen opportunities.

This, together with our experience in designing and delivering electrical power systems for offshore wind projects, means we also have the experience and expertise to help advance both large and small-scale green hydrogen and green ammonia projects worldwide.



## Develop

- Concept identification and selection
- 
- Flow assurance
- 
- Licenser selection
- 
- Specialist consultancy

## Design

- Plant and infrastructure design
- 
- FEED
- 
- Detailed design

## Build

- PMC (project management consultant) and Owner's Engineer
- 
- Well engineering
- 
- EPCm
- 
- EPC/E&P

## Support

- Operations and maintenance
- 
- CMMS
- 
- Modifications
- 
- Debottlenecking and optimisation



# Hydrogen solutions

## PIONEERING GREEN HYDROGEN AND GREEN AMMONIA AT SCALE

### Supporting Australia's largest commercial-scale green hydrogen project

We combined our expertise across renewable, low-carbon engineering and gas processing to successfully deliver FEED for one for the world's first green hydrogen production facilities for Infinite Green Energy.

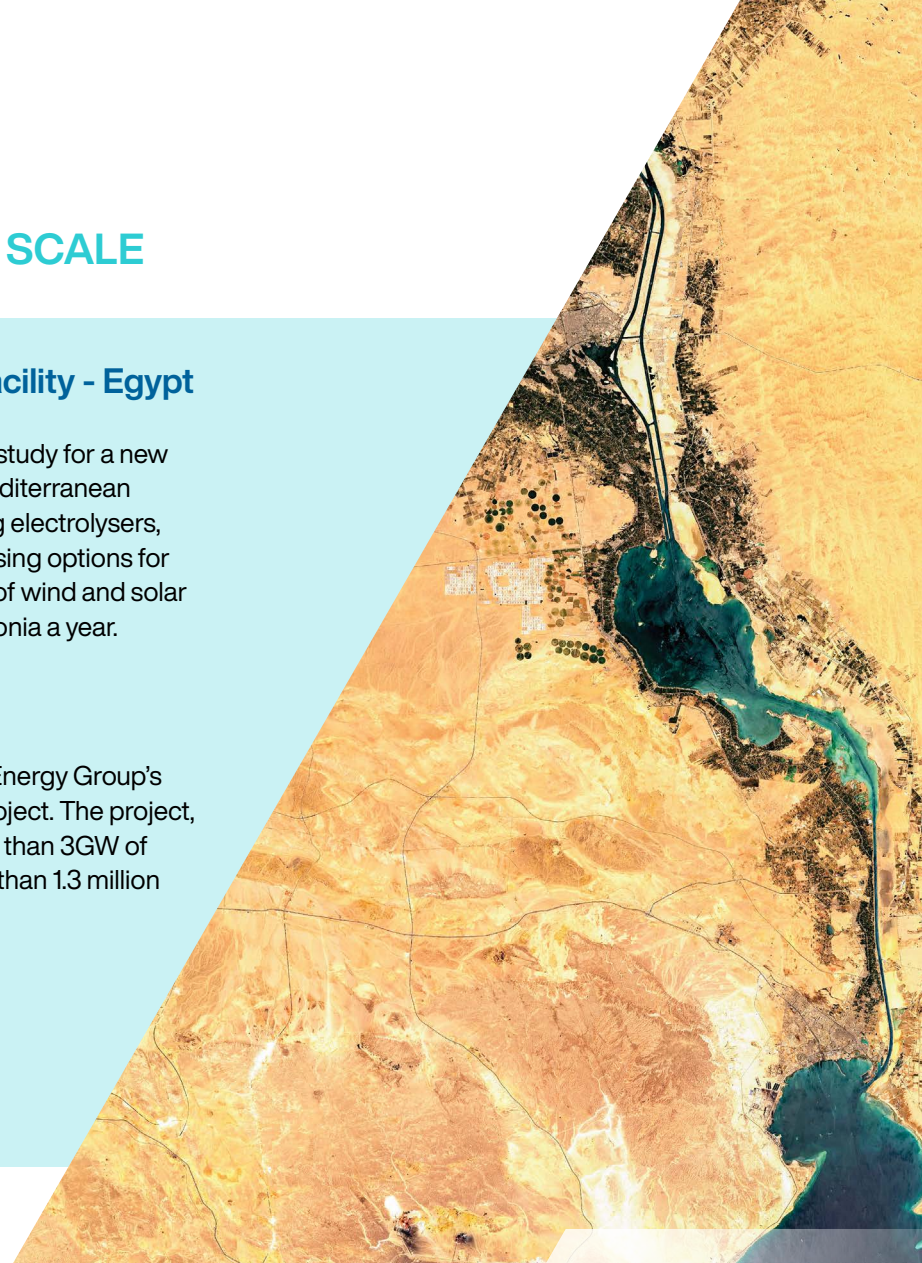
Harnessing Australia's abundant resources, the Arrowsmith project is targeting a production capacity of 25 tonnes of green hydrogen per day, derived from renewable sources. To produce these volumes, the plant includes around 100 MW of solar power, supplemented by 114MW of wind generation capacity, both generated on site.

### Green hydrogen to ammonia facility - Egypt

We are delivering an early-stage feasibility study for a new green hydrogen to ammonia facility for Mediterranean Energy Partners. Our scope includes sizing electrolyzers, selecting the ammonia licensor and assessing options for an export facility. The facility will use a mix of wind and solar and targets 125,000 tonnes of green ammonia a year.

### Green ammonia facility - Chile

We are Owner's Engineer for Transitional Energy Group's (TEG's) Gente Grande Green Ammonia Project. The project, on Tierra del Fuego, will plans to use more than 3GW of renewable power (wind) to produce more than 1.3 million tonnes of green ammonia annually.



# The expertise to deliver **carbon capture and storage**

We are deploying our expertise in gas processing, transport, and storage, and our brownfield EPC capabilities to support the early development and definition of large-scale CCUS projects associated with the UK's CCUS clusters, as well as other carbon capture projects worldwide.

These projects are mainly for concept engineering through to FEED and project management scopes, where we draw on our life-of-asset expertise to enhance our solutions and give surety to future delivery phases. By being technology-neutral, we have experience integrating a variety of technologies into our designs to ensure we deliver the best value and optimised technical solutions.



Concept identification and selection

- Flow assurance
- Licensor selection
- Specialist consultancy

**Develop**



Plant and infrastructure design

- FEED
- Detailed design

**Design**



PMC (project management consultant) and Owner's Engineer

- Well engineering
- EPCm (engineer, procure, construction management)
- EPC/E&P

**Build**



Operations and maintenance

- Computerised maintenance management system (CMMS)
- Modifications
- Debottlenecking and optimisation

**Support**

# Partnering on a large-scale CCS facility

## DELIVERING ACROSS THE CARBON CAPTURE, TRANSPORT AND STORAGE VALUE CHAIN

We can support you on one element of your project, or provide support across the asset lifecycle to develop a deeper relationship and deliver more value.

“ First large-scale facility of its kind in Europe. ”

### PROVIDING EARLY-STAGE PROJECT SUPPORT TO STOCKHOLM EXERGI

We are working with Stockholm Exergi on the FEED for a planned CO<sub>2</sub> capture facility at a combined heat and power plant at Värtaverket, Sweden. We are integrating Stockholm Exergi's chosen process design package into the deliverables, including CO<sub>2</sub> Capsol's end-of-pipe capture technology. Our work also includes a cost estimate and technical documentation for the subsequent engineering, procurement, and construction phase.

### ACCELERATING AND DE-RISKING STOREGGA'S LOW CARBON INITIATIVES

As part of our Technical Delivery Alliance with Storegga, Petrofac is providing capabilities, people, processes and systems to accelerate and de-risk the several of the company's low carbon initiatives – including a proposed Direct Air Capture (DAC) facility, and a major CCUS and Hydrogen facility.





# The expertise to deliver **value from waste**

Our EPC (engineer, procure, construct) experience, process knowledge, and petrochemical design skills equip us well to support waste-to-value projects that transform waste feedstocks into valuable products, including biofuels and sustainable aviation fuels (SAF).



Technology selection

- Technology assessment / studies to ascertain commercial viability and future positioning

**Develop**



Selection of technology licensors

- Integration of designs into an overall engineering package

**Design**



Concept, FEED and engineering execution, through EPC / EPCm solutions.

- Focus on maximising value and minimising life of plant GHG emissions

**Build**



Operations and maintenance

- CMMS
- Modifications
- Debottlenecking and optimisation

**Support**

# Waste-to-value

## LOW-CARBON BIOFUEL AND SAF SOLUTIONS

### NOVEL SOLUTION TO SUSTAINABLE FUEL PRODUCTION

Greenergy selected Petrofac to help deliver a new facility to transform waste tyres into a sustainable source of low-carbon biofuel. Our design team is responsible for overall facility process optimisation, material handling and process engineering. We are also the main interface between key process licensors, delivering the major mechanical packages for steam methane reforming, carbon black handling, fuels storage and export systems.

### SEWAGE TO JET FUEL PROCESS DEMO PLANT

We are delivering the FEED for a UK Department for Transport-funded SAF competition. The aim of the FEED is to demonstrate an integrated technology route to SAF using sewage sludge as feedstock - addressing a market opportunity and un-met need. This is a joint project between Green Fuels, Petrofac and Cranfield University.

### FEED FOR BIOHYDROGEN AND BIOMETHANE PLANT

We're delivering front-end engineering, licensor screening and selection for Advanced Biofuel Solution's first large-scale industrial plant at Protos energy park, near Ellesmere Port, UK.

The facility will produce biohydrogen and biomethane using refuse-derived fuel (RDF) as feedstock. The plant will require a waste processing facility at the front end, producing biohydrogen as a by-product. As part of our scope, we are exploring the production of synthetic crude that can be a feedstock for SAF.



# The energy to deliver **emissions reduction**

For assets across the oil, gas, refining and petrochemicals sectors, we look for opportunities to reduce and monetise flared gas, and to replace the use of onsite gas or diesel generators with grid connections or renewable energy sources.

Where appropriate, we deploy digital technology and value engineering to help reduce the emissions intensity of your assets across their lifecycle.



› **In the design and engineering phase** – we routinely devise concepts that will minimise the carbon intensity of a facility's future operations, focusing on asset electrification, minimising flaring and optimised operating approaches.

› **In the construction phase** – sustainability is an important theme, and we work with you to deploy ingenious environmentally-friendly initiatives. These include the use of renewable energy for power generation and logistics.

› **In our operations and maintenance contracts** – much of our work is about helping you find new efficiencies. Often these are through the use of digital solutions and regional collaboration to reduce fuel use and reduce flaring.



# Emissions reduction

## HELPING OIL AND GAS COMPANIES REDUCE FLARING AND ELECTRIFY ASSETS

### CONNECTED WORKERS DELIVERING ULTRA-EFFICIENT MAINTENANCE FOR bp

Having safely managed planned and corrective maintenance on all bp's offshore UK North Sea assets for more than a decade, we continue to increase efficiencies through digital technology and a campaign approach. Working closely with bp, we combined the use of digital twin and connected worker technologies, to digitalise our execution processes from end-to-end driving a 200% improvement in productivity.

### REDUCING FLARING ACROSS OPERATIONS

We have worked closely with an international oil company's operations and engineering teams to understand emissions issues for an onshore plant. Following detailed studies, modifications were made to the facility to reduce flaring by 85%, increase production by 2% and significantly reduce CO, NOx and BTEX emissions. All modifications were implemented with zero downtime.

### 50MW SOLAR PV SOLUTION FOR GAS FACILITY

Relying on gas turbine generators for power supply at their oil and gas facility, our client wanted to reduce emissions without risking power generation downtime. We designed a full PV system to integrate with the gas turbine generators. Completed in 12 months, the solar PV solution has generated 145,000 MWH a year, delivered 66,000 tCO<sub>2</sub> savings a year, saved 55 MMSm<sup>3</sup> fuel gas a year and delivered a saving of \$3MM of fuel gas cost a year.



# Sustainable, ultra-efficient operations, with a commitment to Net Zero

We place sustainability at the core of our strategy. It is critical to creating long-term value for our clients, stakeholders, and teams.

We are progressively reducing the environmental impact of our own operations through efficiency gains and the application of digital technologies.

**We have committed to reach Net Zero in scope 1 and scope 2 emissions by 2030, and expect our asset support business to reach this goal by 2025. We are also working to influence our supply chain to set their own reduction targets.**

Importantly, we have built Direct Air Capture (DAC) into our Net Zero plan, signing-up as the first customer of Storegga's proposed UK-based, large-scale facility – for which we are also supporting the pre-FEED phase.

This commitment is part of a broader sustainability strategy which includes commitments to diversity and inclusion, impeccable standards of governance, a local delivery model, and an industry-leading safety record.

**We focus on three areas:**

**Enable** – encouraging our people to be Net Zero advocates and support our clients, partners and suppliers in achieving their lower carbon ambitions

**Reduce** – cutting our emissions by implementing energy efficiencies, optimising our operations and methods of construction, and reducing flaring and venting

**Transform** – switching to renewable energy, phasing-in hybrid and electric vehicles on site, and fitting smart building technology in our offices to maximise energy efficiency



# Powered by people

**Our people, their capabilities and skills set us apart.**

From the world's largest offshore wind converter platform, to deploying our capability to support and integrate emerging technologies, our portfolio reflects the ingenuity of our people, their agility, and appetite for problem solving.

Irrespective of whether we are delivering a challenging development project or providing ongoing operational support, our team works with rigour, predictability, and an unfaltering focus on safety.

Alongside our commitment to employing diverse teams, and an exemplary approach to worker welfare, we commit to bringing value to every community in which we operate.



**200+**

We have delivered 200+ major projects



**41+**

We have 41+ years of energy experience



**2008**

We have been deploying our expertise in support of new energy projects since 2008



**100+**

We have provided +100 assets globally with our asset support services



**10+**

We have 10+ years of offshore wind expertise



**2030**

We have committed to be Net Zero by 2030



# Talk to us



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