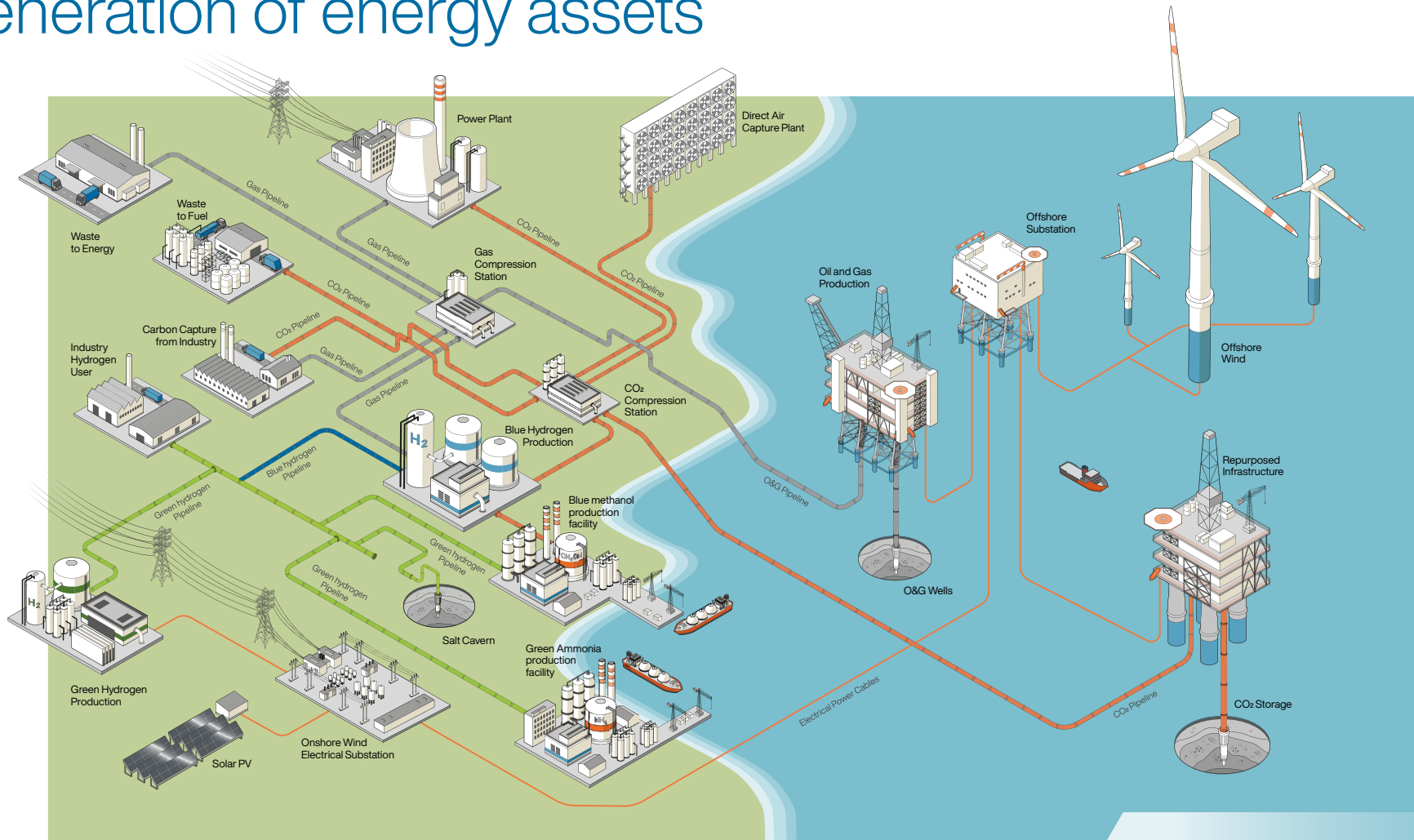

Applying our expertise
to meet the world's
evolving energy
needs
Petrofac
BORWIN GAMMA
Energy Transition Projects

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 more than 40-year track record to develop, design, and de-risk energy producing facilities and infrastructure.

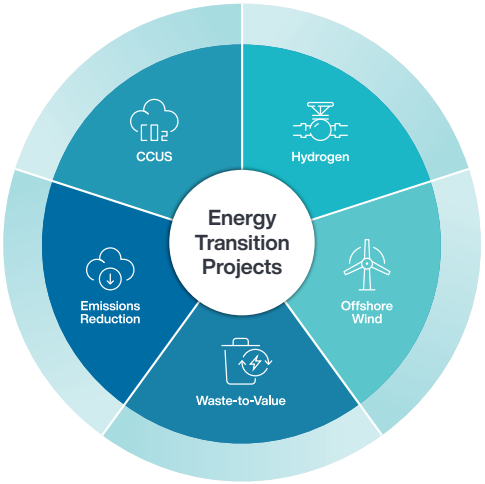
Alongside our work in renewable and energy transition projects, we help you to decarbonise your existing assets too.

Through our diverse international team, and a network of 30 offices, we partner with clients across the world, to support their evolving energy needs.



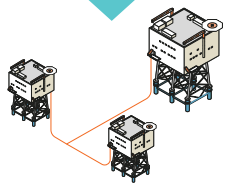
Established skills,
deployed for the energy transition

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.



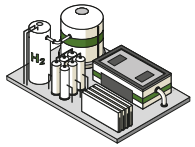
Drawing on our existing experience, we are successfully extending this approach to a new generation of energy assets:

OFFSHORE WIND



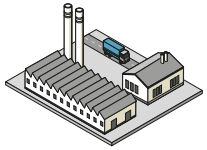
Building on more than a decade's experience in designing and building HVAC and HVDC electrical substations, we are also harnessing our operations experience to extend our support to the sector.

HYDROGEN



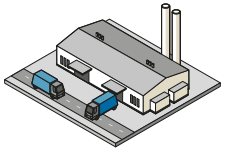
Leveraging our wind, solar and gas capabilities to design and build green hydrogen projects, and our hydrocarbons experience to deliver other low-carbon products, such as e-fuels.

CARBON CAPTURE, UTILISATION AND STORAGE



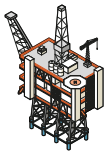
Using our expertise in gas processing, transport and storage to safely and economically capture, transport and store carbon.

WASTE-TO-VALUE



Deploying 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 41-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, safety, 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 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.

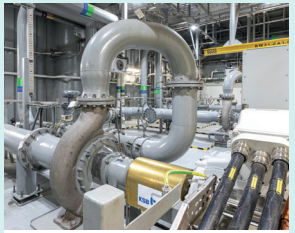
Concept/ Pre-FEED

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 requirements.

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

Across our energy transition projects, 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 more than 1,000 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.

15+ years of delivery in **offshore wind**

EPCI and O&M

HVDC BorWin 1
TenneT

O&M consultancy services & personnel supply

2009

HVDC DolWin 1
TenneT

Engineering support & construction supervision

2011

HVDC HelWin 1 and BorWin 2
Siemens Energy

Commissioning support

2013

HVAC Galloper
RWE Renewables

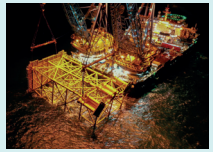
EPCIC OSS

2016

HVDC BorWin 3
TenneT

EPCIC OSS

2018



HVAC Seagreen
SSE

EPCIC OSS & LSS

2022

HVAC HKZ
TenneT

EPCIC (2) OSS

2023

HVDC 2GW program
TenneT

EPCIC (6) OSS & (1) LSS

2023+

Engineering and Consultancy

2012

HVAC Race Bank
Centrica

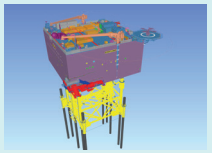
Concept study OSS

2013

HVAC Dudgeon
Equinor

Concept study OSS & LSS

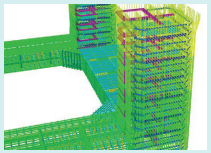
2015



HVAC Triton Knoll
RWE, J-Power, Kansai

Concept study MFP

2018



Floating wind

Concept study floating foundation

2019

HVAC Seagreen
SSE

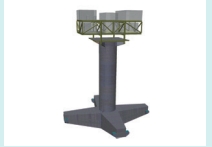
FEED study OSS

2019

HVAC Sofia
RWE

FEED study LSS

2022



Floating wind
Seawind Ocean Technology

Design verification of floating foundation

Offshore wind EPCI

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. Seagreen became fully operational in 2023 and was awarded Renewable UK's 'Project of the Year' the same year.

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

Through our oil and gas projects we have extensive experience in delivering complex scopes. This includes various hydrogen solutions. By combining this capability with our growing track record in delivering complex CO_2 removal scopes, we are actively supporting large-scale low-carbon hydrogen opportunities in the green and blue sectors, where hydrogen demand is growing year on year.

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

Develop

Concept identification and selection

Flow assurance

Licensor 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.

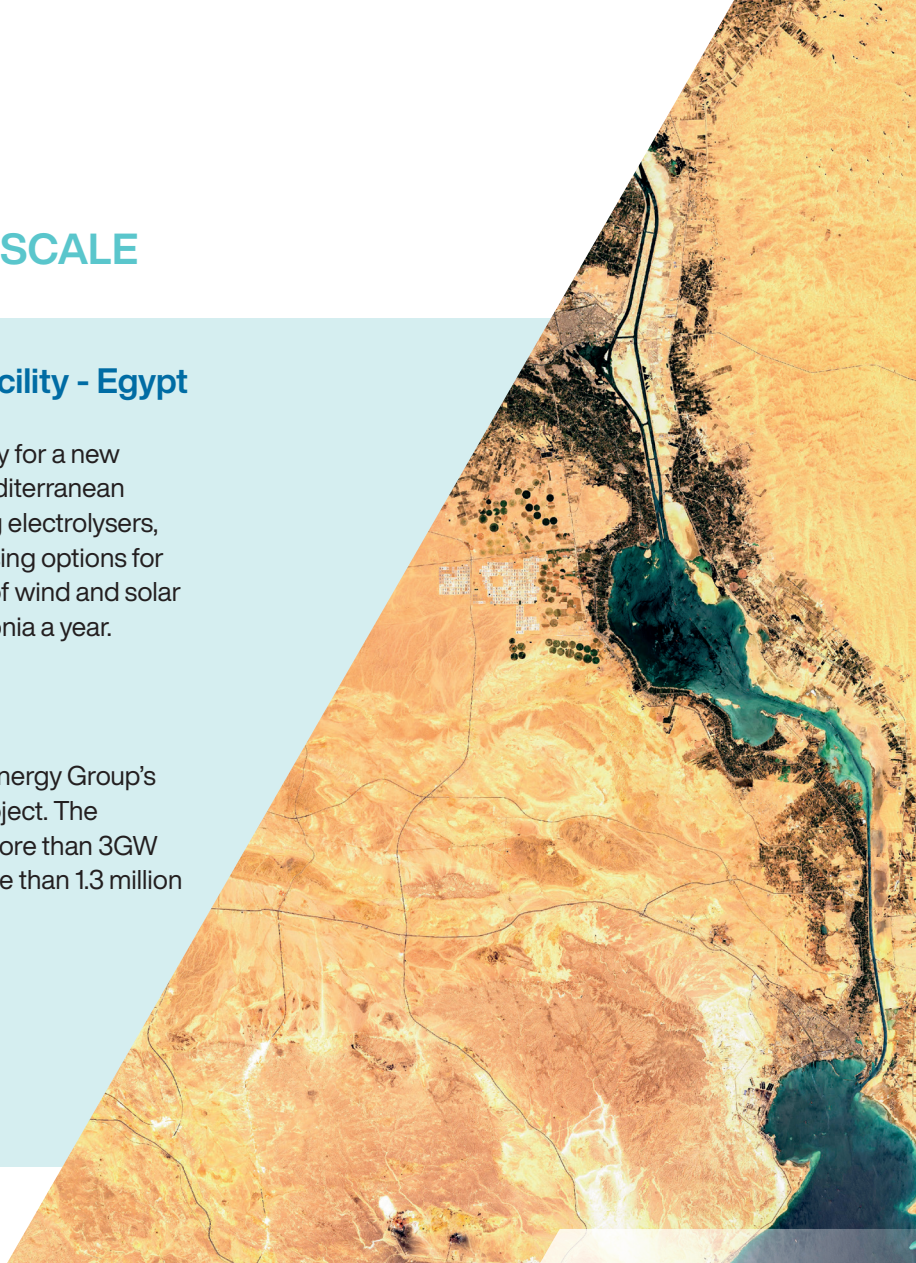
Harnessing Australia's abundant resources, the Arrowsmith project is targeting a production capacity of 25 tonnes of green hydrogen per day, derived from renewable sources. To produce these volumes, the plant includes around 100 MW of solar power, supplemented by 114MW of wind generation capacity, both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

Green hydrogen to ammonia facility - Egypt

We delivered an early-stage feasibility study for a new green hydrogen to ammonia facility for Mediterranean Energy Partners. Our scope included sizing electrolysers, 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, 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, giving 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 large-scale CCS projects

DELIVERING ACROSS THE VALUE CHAIN

Providing early-stage project support to Stockholm Exergi

We supported Stockholm Exergi on the FEED for a planned CO_2 capture facility at a combined heat and power plant at Värtaverket, Sweden. We integrated Stockholm Exergi's chosen process design package into the deliverables, including Capsol Technologies' end-of-pipe capture technology. Our work also included a cost estimate and technical documentation for the subsequent engineering, procurement, and construction phase.

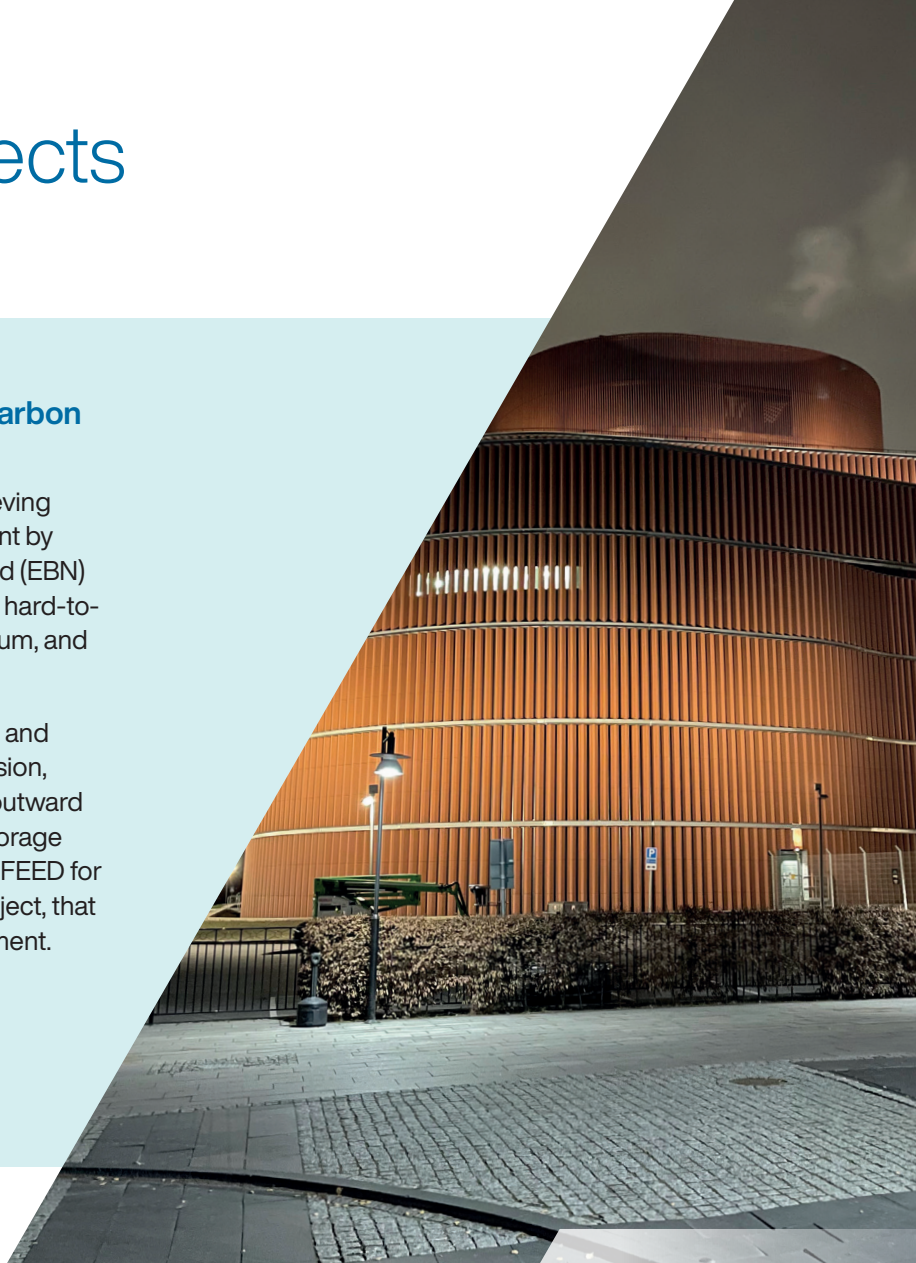
Accelerating and de-risking Storegga's low carbon initiatives

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

FEED for the Netherlands' flagship carbon transport and storage project

Aramis marks a significant step in the EU achieving its decarbonisation targets. A joint development by TotalEnergies, Shell, Energie Beheer Nederland (EBN) and Gasunie, it offers a route to decarbonising hard-to-abate industries across the Netherlands, Belgium, and France.

Our scope spans the process design package and FEED for the CO_2 capture plant, CO_2 compression, dehydration, liquefaction, onsite storage, and outward shipment terminal (prior to transport to final storage site). Simultaneously, Petrofac is executing the FEED for Neptune Energy's L10CCS carbon storage project, that will eventually connect to the Aramis development.



The expertise to deliver **value from waste**

Our EPC 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

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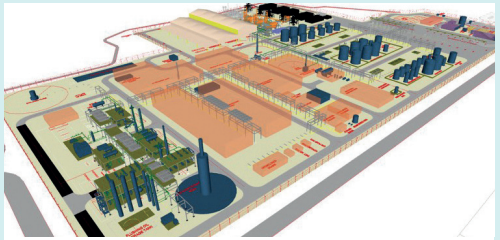
Technology assessment / studies to ascertain commercial viability and future positioning

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

As part of a wider engagement with Green Fuels, we delivered FEED for a UK Department for Transport (DfT) funded SAF competition. Project Firefly is a novel route to producing SAF from sewage sludge. The aim of the FEED was to demonstrate an integrated technology route to SAF using sewage sludge as feedstock. This was a joint project between Green Fuels, Petrofac and Cranfield University.

Feed for biohydrogen and biomethane plant

We delivered 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 of 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_2 savings a year, saved 55 MMSm3 fuel gas a year and delivered a saving of $3M 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 are promoting and supporting decarbonisation across our supply chain.

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

44+
We have 44+ years of energy experience

>US$1.75 billion
Average procurement spend per year

>200 million
average annual direct construction work hours

15+
We have 15+ years of offshore wind expertise

>4.5 million
annual engineering work hours

Talk to us

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