

From
CO₂

to
CCUS

to
H₂

Energy and
industry carbon
emissions in a
net-zero UK



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Meeting the 2050 net-zero goal

1.5°C
limit to global warming



To limit warming to the 1.5°C scenario outlined in the Paris Agreement, net global CO₂ emissions need to fall by 45% from 2010 levels by 2030 and reach 'net-zero' by the middle of the century.

Net-zero refers to achieving an overall balance between emissions produced and emissions taken out of the atmosphere. It's a legally binding commitment in the UK and, if met, would effectively mean ending the country's contribution to global emissions by 2050.

The government's 10-point plan for a Green Industrial Revolution, published in November 2020, aims to mobilise £12bn of government investment and stimulate up to three times as much private investment by 2030 across energy, buildings, transport, innovation and the natural environment.

The plan includes support for carbon capture, usage and storage (CCUS) and hydrogen (H₂). This includes establishing two CCUS industrial clusters by the mid-2020s, with commercial scale H₂ and ammonia production and greenhouse gas removal plants operational by 2030.

Carbon capture and storage is key to decarbonising many industrial processes – often the hardest to abate. Industrial clusters can provide an anchor load for H₂ production and shared capture and storage infrastructure for direct industrial emissions.

Investment in CCUS clusters is also an opportunity to utilise waste heat and low-quality heat from industry for potential use in heat networks. Meanwhile, H₂ can also be stored and transported via modified gas networks to provide back-up to renewables, overcoming the seasonal and weather-related intermittency of wind and solar power that is the chief obstacle to renewables' total dominance of electrical energy. >

Deploying CCUS and H₂ at scale is seen by the government as vital to preserving and creating jobs in the UK's industrial heartlands – helping to deliver its 'levelling-up' agenda – as well as securing the 2050 net-zero goal.

The 10-point plan concludes that by 2030 CCUS will support up to 50,000 jobs in the UK, with a sizeable export potential. About 8000 jobs would be created in the production of H₂.

Large-scale H₂ demonstration projects – both blue (H₂ production with CCUS) and green (H₂ production using electrolyzers powered by renewables) – need to be completed by 2025 to ensure a credible upscaling pathway for 2030-2040.

To stimulate investment, the government has established a £1bn CCUS infrastructure fund and £240M net-zero hydrogen fund.

We bring in-depth technical expertise and capabilities across the carbon capture and storage chain, from source to end-user, and provide market, financial, economic and environmental services.

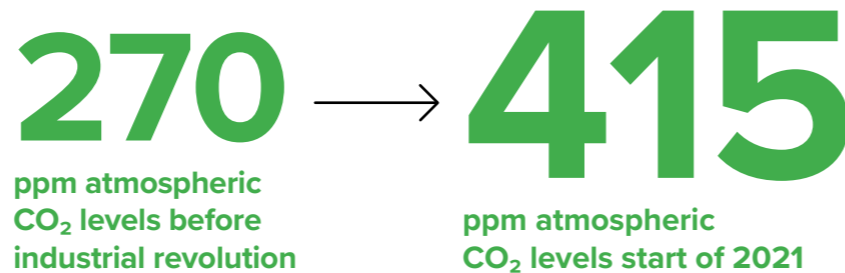
We have designed, delivered and supported projects across power generation and H₂ production, industrial processes and CO₂ transport and storage, including first-of-its-kind and full chain carbon capture and storage projects in the UK and across the world (see [case studies](#)).

We bring insights and routes into the UK and international CCUS and H₂ sectors, including industrial clusters, business models and public policy.

Underpinned by more than 100 years of experience, our consultants, engineers and project managers understand the operational, technical and commercial objectives of emitters, transporters and storage providers, as well as delivering effective carbon management and helping investors and developers achieve their objectives.

When coupled with our experience in auditing and evaluating the success of programmes, we bring a deep pool of insight and expertise to add value to CCUS and H₂ projects.”

Adina Popa
Global business lead for CCUS
Mott MacDonald



Getting to...

The scale of transformation required

Government commits to developing the first industrial CCUS clusters

Regulatory, market and risk-sharing arrangements in place to scale up H₂ production with CCUS

Two CCUS industrial clusters operational

H₂ ready boilers, turbines and other technologies available

CCGT gas-power plants start converting to H₂

Strategies for H₂ and the decarbonisation of heat agreed

First CCUS plants with SMR/ATR

Decisions taken on safely converting natural gas network to H₂

Electrolyser plants using renewable power start producing green H₂

Demonstrate and deploy bioenergy with CCUS (BECCS)

Major upgrade to transmission and distribution grids, with more local grids

2020s

At least two more industrial clusters with CCUS, with one producing H₂ – more planned

Large-scale production of H₂ with CCUS begins

Widespread electrification and roll out of H₂/CCUS in industry

2030s

By 2035, annual H₂/CCUS production is 2GW, with the goal of quickly reaching 5GW a year

BECCS competitive by end of decade

Roll out of large-scale, end-to-end CCUS

Direct air capture demonstrated

Annual H₂ production from steam methane reforming with CCUS is 30GW

Gas distribution networks have been either decommissioned or repurposed for H₂

15M+ homes with connection to H₂ network

Annual H₂ production (from SMR/ATR/CCUS and electrolyser) during 2040s is between 20-100GW

Industrial CCUS clusters capture and store 33MtCO₂ a year

20-65MtCO₂e sequestered a year through BECCS

Across the economy 75-175MtCO₂ removed from the atmosphere and stored each year

Annual electricity supply is two-four times higher than in 2019 – all from low-carbon sources

Direct air capture rolled out to manufacture synthetic jet fuels

2040s

net-zero



Use the coloured circles to change the time period.



See how our energy system will change between now and 2050.



Hand in hand

33Mt

annual CO₂ emissions from six proposed UK industrial clusters

The CCUS and H₂ connection

Decarbonising long-haul transport, industries and processes that require high-grade heat, and domestic heating through electrification is a big challenge.

H₂ is an alternative solution. It is clean and versatile, and already common in sectors such as refineries, ammonia production and bulk chemicals. Proven technology enables hydrogen to be safely stored, and it can be transported as a gas through pipelines – including the existing network – or in liquid form by ships and road tankers, providing feedstock for industry almost anywhere. Incrementally blending H₂ with natural gas to heat homes and buildings, and using it as a fuel for cars, lorries, trains and airplanes is on the horizon.

CCUS and H₂ go hand in hand. Production of H₂ is currently from fossil fuels, mostly gas, but the carbon emissions from the steam methane reforming (SMR) process contributes to global warming. H₂ from natural gas is known as grey hydrogen.

Capturing the CO₂ from the SMR process and utilising it to produce sustainable fuels or chemicals, or storing it in depleted gas fields offshore is called blue hydrogen.

Green hydrogen is produced using renewable sources or nuclear power in an electrolysis plant to split clean water into hydrogen and oxygen.

Scaling up production of blue H₂ using CCUS is the best short-term route to decarbonising industries and processes that require high-grade heat.

Blue H₂ could also directly replace natural gas in the built environment by converting existing storage, transmission and distribution networks. And, in the UK, National Grid is currently testing the conversion of the gas network to H₂, possibly completing the transition by 2035.

Over time, as generation capacity from solar, wind, hydropower and wave/tidal increases, and costs come down, green H₂ can be produced at scale. Storing and transporting the H₂ produced from renewables would also help balance electricity supply with demand.

Projects involving H₂ require a holistic approach to energy systems with input needed from energy, transport and buildings sectors. We have the expertise to cover entire project lifecycles in all three sectors.

We're providing technical integration and optimisation services for NorthH2, Europe's largest wind-to-hydrogen project, and we developed the masterplan for the UK's first multi-modal hydrogen transport hub for the Department for Transport. The hub, on Teesside, will comprise green H₂ production, storage, distribution, and refuelling stations.

Our CCUS experience is vast, and we've been involved directly in carbon capture projects since 2002, including working on the pioneering UK commercialisation programme. This includes in-depth technical understanding of carbon capture, transportation and storage, extensive knowledge of thermal power plant construction and retrofitting, and innovative technical solutions for the industrial and power sector.



H₂ can act as a storage medium and as an energy carrier – taking surplus renewable energy generated during the summer and storing it for winter.

Chris de Beer
Energy storage engineer, Mott MacDonald

**We enable
projects that
maintain and
grow high-value
industries
and jobs**

From vision to delivery

Working together to realise your ambitions

It can take between five and eight years from detailed design to operation to develop a CCUS facility – though combining new and existing infrastructure, such as pipelines, energy-from-waste plants, and identifying innovative, cost-effective technical solutions through value engineering and digitalisation, can significantly reduce the timeframe.

We can help deliver your vision. We bring in-depth technical expertise and capabilities across the full CCUS chain, from source to end-user, as well as in H₂ production and use in power generation. We have been involved directly in carbon capture projects since 2002, including working on the pioneering UK carbon capture and storage commercialisation programme as well as Peterhead, White Rose and Longannet demonstration projects ([page 13](#)).

We were also the technical advisor for the CCS European Energy Programme for Recovery (EEPR) and helped deliver carbon capture and storage projects in Norway.

Current work includes managing the £505M Energy Innovation Programme for the UK Department for Business, Energy & Industrial Strategy. This involves overseeing all CCUS and H₂ projects receiving grants to further develop the technologies and reduce costs. We're also assisting BP to develop a combined cycle gas turbine facility to power the Net-Zero Teesside project, which will use CCUS to decarbonise local industry and support more than 5000 jobs.

During the environmental and social impact assessment process, our environment and social specialists work together with our technical teams to help clients identify optimal solutions that maximise innovation with minimum impact on natural and human environments.

CCS captures and stores emissions

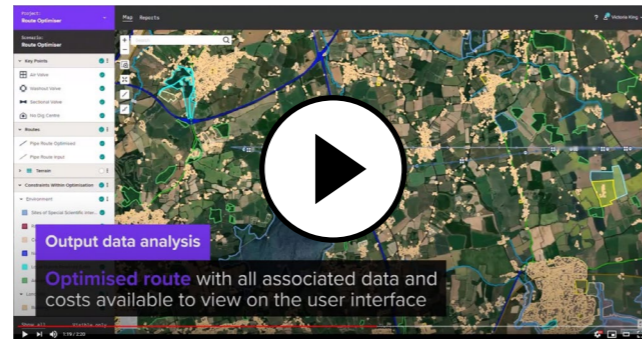
CCUS creates value

Always innovating

We're continually searching for new and better ways of doing things, adding social value and making connections to the UN Sustainable Development Goals – helping you to maximise the social, environmental and economic opportunities on every project.

Moata is our digital solutions platform and it uses the power of data to solve today's most pressing infrastructure problems across the lifecycle. It can help you deliver your CCUS and H₂ projects more quickly, more safely and of higher quality.

Moata Route Optimiser



Moata Route Optimiser is a revolutionary pipeline design process that combines data from base constraints, topographical data, engineering rules, real construction and operational costs and carbon to plot the optimal route.



Click the play buttons on the image thumbnails to see the Moata Route Optimiser and Carbon Portal in action.

Moata Carbon Portal



Moata Carbon Portal allows detailed embodied carbon accounting and planning at all stages of a project. It delivers rapid calculations and insights to highlight major opportunities for innovation, efficiency and competitive advantage for clients and aligns these with the end goal of reducing a project's carbon emissions.

Our market leading solutions to support decision making

Investment Sifting and Evaluation Toolkit (INSET) helps clients to manage information on investment options and evaluate them across multiple criteria.

Transparent Economic Assessment Model (TEAM) is a versatile modelling tool designed to calculate the economic benefits – from employment to welfare – of proposed infrastructure intervention and policy measures.

Total Impact (TI) model captures the social and economic impact of a business on the local economy to demonstrate their active contributions and causal impacts on local jobs and enterprise.

Equality, Diversity and Inclusion Tool (EDIT) enables project managers, designers and lead engineers to make evidence-based and informed decisions about their plans.

We design and deliver our projects to maximise their contribution to the **UN SDGs**. The 17 goals are highly interdependent, so considering the possible breadth and gains at a project's outset enables us to multiply the environmental, social and economic difference it can make.

Our full cycle of CCUS and H₂ services

Inception

Pre-feasibility and feasibility studies

- Project viability
- Economic, environmental and social impacts
- Technical issues
- Procurement strategy
- Project schedule

Business case

- Demand forecasting
- Revenue modelling
- Financial analysis
- Procurement strategy advice
- Business case development/production
- Cost development/analysis

Regulatory and policy advice

- Risks posed by changes in policy, regulation, law or government
- What must be done now/in the future?
- Programme design
- Develop regulatory structures

Identify and analyse risk

- Assess revenue risk and return on investment based on long-term demand
- Assess condition of existing assets, service provision and residual life

Development and delivery

Procurement

- Specification, technical, service, performance
- Tender preparation
- Invitation to tender
- Bidder evaluation and selection
- Contract negotiation and supervision
- Construction supervision and monitoring

Risk management and mitigation

- Minimise technical and commercial risk
- Apportion residual risks to those best able to manage them
- Review long-term mitigation with delivery consortium
- Technical support reaching financial investment decision

Project management

- Contractor support
- System design studies
- Fair, transparent and robust procurement
- Logistics
- Payment control

Concept and detailed design

- Civil
- Structural
- Mechanical, electrical and public health
- Environmental
- Construction and operational health and safety
- Design review

Operation and decommissioning

Ongoing review

- Technical, inspection and maintenance audits
- Technical, social and financial advice
- Operation monitoring
- Legal and regulatory compliance
- Renegotiation of performance measure
- Decommissioning support

Due diligence reviews

- Project economics
- Technical, environmental and social issues
- Policy and regulatory advice
- Commercial performance
- Residual life

With you... every step of the way



Click on the steps to read
short case studies of
highlighted projects

From source to usage and storage, we understand the operational, technical, environmental and commercial challenges of delivering the complete CCUS chain and producing H₂. Discover some of our projects.

Full-chain carbon capture and storage

Generation

Industrial processes

Hydrogen

Carbon capture

Transport

Gas storage

Full-chain carbon capture and storage

Back

Designing the future

Project Peterhead CCGT with CCS project, Scotland
Client Shell UK
Expertise Owner's engineer

Capturing and storing CO₂ emissions from Peterhead gas-fired power station in Aberdeenshire was to be the UK's first full-chain carbon capture and storage project as part of the UK government's £1bn commercialisation competition. Under the proposal, 1Mt of CO₂ would be transported each year to the Goldeneye gas field in the North Sea for permanent storage using existing pipeline infrastructure and an offshore platform. We provided services to Shell UK for the onshore front-end engineering design (FEED) – 385MW combined cycle gas turbine post-combustion – as well as technical interface and project management support across the entire end-to-end carbon capture and storage chain. The FEED was complete in 2015 and, although the government withdrew its backing, the learnings provided confidence that construction and operation of post-combustion carbon capture and storage was feasible, and lessons have been used on subsequent projects.

A demonstration of power

Project Longannet power station, Scotland
Client ScottishPower Generation
Expertise Owner's engineer, technical advisor

Longannet was part of the first UK post-combustion carbon capture and storage demonstration competition and the project involved retrofitting one generating unit at the 2.4GW coal-fired power station for post combustion carbon capture and compression. We acted as owner's engineer for ScottishPower – part of a consortium with National Grid and Shell – on the project and our work included conceptual design, plant integration and performance, cost analysis, and integration of the end-to-end carbon capture and storage chain to ensure it would operate as one system. We also provided technical support and project management office services to the FEED study, as well as commercial, environmental, health and safety, project delivery and planning, risk assessment and contracting strategy services.

Testing oxyfuel technology

Project White Rose CCS, England
Client Capture Power Ltd
Expertise Owner's engineer, technical advisor

White Rose in North Yorkshire was planned as the world's first full-scale oxyfuel power carbon capture and storage demonstration project. The 426MW gross nominal capacity plant was designed to interface with CO₂ transport pipelines in Yorkshire and Humberside. About 2MtCO₂/year would have been transported by pipeline and sequestered in a North Sea aquifer. We provided Capture Power Ltd – a special purpose vehicle formed by Alstom, Drax, BOC Linde and National Grid Carbon – with technical advisory services to deliver the FEED phase of the project, and helped to develop the full chain of deliverables from monitoring, commissioning and testing to operations, maintenance and control. We also supported the commercial work stream, including project contract and bespoke contracts for difference (CfD) negotiations, contract review, cost estimation and risk management.

Generation

Back

Engineering a deal

Project Drax Damhead Creek 2 CCGT plant, England
Client Drax Group
Expertise Owner's engineer

Drax was planning to build a 1.8GW combined cycle gas turbine (CCGT) power plant on the Hoo Peninsula in Kent next to the existing Damhead Creek power plant. Planning permission had been granted and we acted as owner's engineer for the project, providing engineering, procurement and construction support. Our role covered geotechnical investigations, advice on soil and groundwater contamination, utility crossing protection designs (temporary and permanent), earthworks specification and site management, including reuse of demolition material, and grid connection support. Drax sold the existing plant in 2020.

Electricity from waste

Project Local authority energy-from-waste plant, UK
Client Energos
Expertise Detailed design

The plant features three different technologies – mechanical treatment, a biogas plant and a waste gasification facility. It can handle up to 132,000t of waste a year, with the biogas plant and the gasifier treating 32,000t and 93,600t, respectively. Combustion of the gas generates steam to create electricity in a turbine, and the complex has an electrical capacity of 7.7MW, exporting about 5.7MW to the grid. We provided detailed design for the energy-from-waste plant. Our services covered mechanical, electrical, process, control and instrumentation, piping using a 3D model, planning and engineering management.

Heat and power

Project Pengerang cogeneration plant, Malaysia
Client Pentonas Power Sdn.Bhd
Expertise Owner's engineer

The Pengerang CCGT power plant generates electricity and steam for the Pengerang Integrated Petroleum Complex in the state of Johor, Malaysia. As owner's engineer, our role included a design review, factory inspection and construction and commissioning supervision. The cogeneration plant has an installed capacity of 1900MW of power and can produce up to 1250t of steam per hour, making it one of the largest and most efficient gas-fired power plants in Malaysia. Operations began in December 2018.

Industrial processes

Back

Adding H₂ to a refinery

Project Oleo chemicals and soap plant, Mundra, India
Client Adani Wilmar
Expertise Engineering, procurement

Expansion of the edible oil refinery in Mundra, Gujarat, included construction of facilities for fat splitting, fatty acid hydrogenation, continuous saponification and drying, soap production as well as storage tanks for 30,000t of raw materials and a hydrogen generation plant with a gas flow of 1500nm³/hr. The plant has the capacity to refine 2200t/d of edible oil and 350t/d of hydrogenated vegetable fat. We provided detailed engineering and procurement services.

Innovation as standard

Project Don Valley IGCC CCS, England
Client 2CO Energy
Expertise Technical advisory services, due diligence, conceptual design

The aim of this innovative project was to reduce CO₂ emissions from the 900MW Hatfield IGCC plant in the Don Valley, North Yorkshire. It was anticipated that the plant would capture at least 90% of the carbon in the coal as CO₂ – up to 5Mt/year. The captured gas was to be transported through a 400km National Grid pipeline to permanent storage locations 3km under the North Sea for use in enhanced oil recovery projects. To improve the economics of the carbon capture and storage elements of the project, we carried out a technical acquisition due diligence assessment. We also provided technical advisory services for the IGCC pre-combustion plant concept design. This covered fuel selection, plant layout and performance, cost analysis and health, safety and environment issues.

Reducing emissions

Project CDM Polar, China
Client Confidential
Expertise Due diligence, EPC tendering, award and construction monitoring

A chemicals facility in Jinan province was venting 360t of HFC-23, a greenhouse gas that has a warming effect 11,700 times that of carbon dioxide. The replacement incineration plant effectively converts 360t of HFC-23 each year to carbon dioxide, reducing the potency of emissions by the equivalent of 4Mt of carbon dioxide each year. This development was the target clean development mechanism (CDM) project in China at the time, and careful management saw this project completed in 10 months, six months ahead of schedule.

Hydrogen

Back

Decarbonising heat

Project Hydrogen infrastructure development programme, UK
Client UK Government – Department for Business, Energy and Industrial Strategy (BEIS)
Expertise Technical advisor

Rolling out hydrogen at scale to homes and businesses to decarbonise heat using much of the existing natural gas pipework and infrastructure is possible, similar to the way that the entire UK transitioned from town to natural gas between 1967 and 1977. We are supporting the government with its H₂ infrastructure development programme. This includes collaborating with stakeholders, such as National Grid, to trial and test the effects of hydrogen on existing systems, practices and procedures. We are also supporting BEIS to develop the technical specifications and scoring criteria for its hydrogen supply and industrial fuel switching competitions, including monitoring the performance and assessing the commercial viability of the projects that have been granted funding.

Green H₂ production

Project NorthH2 project, Europe
Client NorthH2 Consortium
Expertise Technical integration and optimisation

The NorthH2 project is a global flagship project for large-scale green hydrogen production and the largest H₂ project in Europe. New offshore wind farms – 1GW in 2027 rising to potentially 10GW in 2040 – will link directly to the hydrogen plant and be used to produce green H₂ using electrolysis. We're technical and optimisation contractor, and we'll develop conceptual designs that will be carried forward to a final investment decision. NorthH2 aims to help achieve European, Dutch and German climate goals and accelerate the development of an international H₂ market. The NorthH2 consortium consists of Equinor, Gasunie, Groningen Seaports, RWE and Shell Nederland.

Support for innovators

Project Energy innovation programme, UK
Client UK Government – Department for Business, Energy and Industrial Strategy (BEIS)
Expertise Technical advisor

The UK's Energy innovation programme aims to accelerate the commercialisation of innovative clean energy technologies and processes over the next two decades. We are leading a consortium providing technical advisory services for the £500M+ programme. We are providing design, technical and project management expertise for industrial fuel switching, hydrogen supply (including H₂ into the gas grid), carbon capture and storage (eight innovation projects across heavy industry), grid scale storage, demand-side response (domestic and industrial applications) and the electrification of heating (residential and commercial) among other technologies.

Carbon capture

Back

Cement industry emissions

Project CO₂ capture in the cement industry, UK
Client International Energy Agency GHG Research and Development programme
Expertise Technical advisor

Cement production is responsible for about 5% of global greenhouse gas emissions, with about half of that from the chemical process and 40% from burning fuel. Our study compared oxy-combustion with post-combustion CO₂ capture technologies for a new build cement plant. The project included preparing conceptual designs and process models for both options as well as an evaluation of how carbon capture technologies would affect the operation and performance of the plant. Our work also assessed capital and operating costs, techno-economic modelling of plant performance, and how to retrofit the technologies to existing plants, particularly making them capture-ready,

Examining BECCS technology

Project Biomass to power with CCS, technology assessment, UK
Client Energy Technologies Institute (ETI)
Expertise Technology and commercial readiness

Between 2007 and 2019, the ETI brought together academia, industry and the UK government with the aim of accelerating the development of low carbon technologies. Our experts provided ETI with an independent assessment of the technical aspects of bioenergy with carbon capture and storage (BECCS). We assessed the viability of different BECCS technologies, including chemical looping on biomass to power with carbon capture and storage. The review covered costs, risks, and the technical limitations and benefits of the technologies. Our work enabled ETI to update its assumptions for evaluating carbon mitigation strategies in its energy systems modelling environment or ESME model.

The bigger picture

Project Global technology roadmap for CCS in industry
Client United Nations Development Organization (UNIDO)
Expertise Technical advisor

Our global assessment of carbon capture and storage in the cement sector helped to inform a roadmap for industrial processes, particularly in developing countries, which account for most industrial energy use and CO₂ emissions. It identified the steps required to deliver carbon capture and storage up to 2050 to achieve global greenhouse gas targets. The roadmap provides insights to assist policymakers to evaluate the benefits of carbon capture and storage technology, so they are better placed to make informed decisions. It also provides investors with a crucial assessment of the potential for carbon capture and storage in industry.

A pipeline to recovery

Project Bab CO₂ injection pilot project, UAE
Client Abu Dhabi Company for Onshore Petroleum Operations (ADCO)
Expertise FEED services

We demonstrated the effectiveness of using CO₂ injection to increase oil recovery from the Bab TH 'B' North oil reservoir – the country's first oil field. This pilot project helped to demonstrate the feasibility of full-scale enhanced oil recovery in the Bab Far North Field as part of the UAE's efforts to reduce carbon emissions to the atmosphere. The country is aiming to increase clean energy generation as a proportion of its total energy mix to 24% by 2021 – from just 0.2% in 2014. The UAE is also developing a network for CCUS facilities.

Taking CO₂ further

Project Methanex CO₂ pipeline, Louisiana, USA
Client Methanex Corporation
Expertise Engineering and design services, construction supervision, project management, environmental

The DN150 high-pressure pipeline and meter station in Louisiana is 5.1km long and designed to transport CO₂ to an existing chemical plant to produce methanol for use in windshield washer fluid, recyclable plastic bottles, plywood floors, paint silicone sealants among other goods. We provided project management, survey, engineering, design, mapping, drafting, right-of-way, environmental, procurement, construction management and inspection services for the project. We also designed four horizontal directional drills to mitigate landowner concerns and to expedite permitting along the route.

Transporting gas

Project PennEast pipeline, USA
Client PennEast Pipeline Company
Expertise Engineering, procurement and construction management (EPCM)

The PennEast natural gas pipeline traverses Pennsylvania and New Jersey, and includes 190km of pipeline 0.9m in diameter, a new grassroots compressor station and 12 meter stations. We have provided a full programme of EPCM services, including integration with project stakeholders and comprehensive construction bid process services. Construction of PennEast supports more than 12,000 jobs and the total economic impact of the project has been estimated at US\$1.62bn. The first 109km section of the pipeline is due to become operational in 2021.

Gas storage

Back

Underground gas storage

Project Cornegliano gas storage, Italy
Client Ital Gas Storage
Expertise Concept studies, FEED

The Cornegliano Laudense gas storage facility is being developed about 50km south of Milan in a depleted gas producing reservoir. We first carried out in-depth concept studies to optimise the plant configuration, before delivering a FEED for selected options and an invitation to tender. Cost estimates were prepared at all stages to assist the client's financial analysis for both the seasonal storage/production and gas grid peak shaving/trading models. Cornegliano will store up to 1.3bnm³ of gas.

Gas buffer store

Project Zuidwending Aardgasbuffer underground gas storage, the Netherlands
Client Gasunie/NUON
Expertise Engineering, procurement, construction support

The Zuidwending natural gas buffer is the first gas storage facility in salt caverns – cavities in salt layers – in the Netherlands. The buffer is designed to be flexible, releasing gas when demand suddenly increases. The facilities include six 10MW compression trains providing gas injection at 160bar, production systems for gas dewatering, dehydration and metering as well as associated offsites and utilities. We provided engineering services for the surface facilities and the interface with the storage caverns and were responsible for the procurement of all equipment and materials.

Storage innovation

Project Smart systems and storage innovation programme, UK
Client UK Government – Department for Business, Energy and Industrial Strategy (BEIS)
Expertise Technical advisory, assessment and verification services

The storage innovation programme provides funding to projects involving large-scale energy storage systems across thermal, power to gas (H₂), renewables, demand-side response technologies (to help organisations reduce energy use in peak times) and other emerging requirements from electric vehicle to grid systems to market trading for flexible response in the energy system. We are providing ongoing technical support and project management services for the programme, including the development of a tool to assess energy storage costs and support for bid appraisal, detailed project contract negotiations and project delivery.

Compliance | Design | Modelling | Transport | Pipelines
Gas treatment | Gas injection | Geotechnical engineering
Maritime infrastructure | Environment | Health and safety
Monitoring and verification | Cost minimisation
Risk management | Project management

Opening opportunities with connected thinking.

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