

Carbon capture and storage

Helping you to make fossil fuels carbon friendly



Mott MacDonald is a global multidisciplinary company with a strong engineering base. With annual revenue of £1 billion, we combine the skills of 14,000 staff with a strong presence in 140 countries. In response to a clear need to support the decarbonisation of electricity generation and other energy intensive processes worldwide, we have developed a full technical, commercial and environmental advisory capability in carbon capture and storage (CCS).

CCS technology is increasingly seen as a key element in the global portfolio of advanced energy technologies needed to address climate change. It is the only option that, at present, may bridge the gap between projections of global fossil fuel burning and the need to reduce global emissions, with the potential to bring the cuts in CO₂ emissions needed for meeting targets beyond 2020.

Our experience and services

Mott MacDonald provides comprehensive advisory services for both coal and gas-fired plant with CO₂ capture and capture-ready plant, and a wealth of experience in understanding the context of power generation within the energy sector as a whole. This complements our long-standing expertise in coal, oil and gas-fired power and heat production, oil and gas pipelines, gas storage and enhanced oil recovery. Our CCS knowledge can also be applied to the cement sector.

From the gas reserve or coal mine through the generation plant to geological CO₂ sequestration, our multidisciplinary teams understand the technical, environmental and commercial profile of power generation with CO₂ capture, including the upstream and downstream supply chains. Our expertise includes in-depth knowledge of the design, engineering, operations and construction of pipelines, pumping and compressor systems and associated facilities, as well as the geological storage of gas.

Our capabilities span the whole spectrum of upstream facilities and process engineering relevant to appraisal of gas extraction, reforming and CO₂ injection for a CCS project, both onshore and offshore. We are a world leader in providing services to owners, developers and project financiers, all of whom require independent assurance during implementation of their investment. Our dedicated and proactive teams combine engineers, environmentalists, financial analysts, safety experts, project managers and management consultants. We operate worldwide from centres of excellence in Europe, the Middle East and the USA, and we are supported by local capabilities in many countries.

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Our services include

- Contract review and negotiation
- Economic modelling
- Feasibility studies and design reviews
- Front end and detailed design/specification
- Operation and maintenance strategy
- Power plant CO₂ transport and storage
- Environmental health and safety/social impact assessments
- Planning and permitting applications
- Risk and reliability
- Legislation, guidelines and policies
- Market drivers and barriers/carbon trading
- Project and cost management
- Site selection/evaluation
- Tender preparation/evaluation



To support the decarbonisation of electricity generation and other energy intensive processes, we have developed extensive CCS capabilities.


Mott MacDonald

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Our track record

- **Owner's engineer for ScottishPower, UK** As owner's engineer, Mott MacDonald is assisting ScottishPower's CCS team in the preparation of their submission to the UK government as part of the UK post-combustion CCS demonstration competition. Our work includes conceptual design, plant integration, performance and cost analysis.
- **Pre-feasibility studies for power stations, UK** We carried out high-level pre-feasibility studies on conceptual carbon capture readiness for power stations in the UK in order to meet the requirements of the Department of Energy and Climate Change (DECC) Guidance on Carbon Capture Readiness as part of Section 36 of the Electricity Act 1989.
- **Feasibility study for ultra mega power plants, India** We carried out a feasibility study for developing ultra mega power plants (9 x 4000MW) in India as carbon capture ready. Our services covered the conceptual design, technical and financial modelling, investment appraisal, comparison of options and costs, evaluation of risks and sensitivities.
- **Comparative study for the International Energy Agency (IEA)** We carried out a comparative study that assessed the impact of carbon capture technologies on the cement industry for the IEA Greenhouse Gas Research and Development Programme. This included thermal and process modelling of oxy and post-combustion processes, techno-financial modelling of plant performance, comparison, analysis of options and costs.
- **Comparative technology study, worldwide** Mott MacDonald performed a comparative technology study to assess the effect of CO₂ capture on the leading power generation processes. The project included a comparative techno-economic appraisal of the six leading technologies and surveys of power sector utilities and investors across 29 countries to establish investment preferences for new thermal generation plants.
- **Examining different capture technologies for a new-build coal-fired plant, North Sea** We examined different capture technologies for use with a new-build coal-fired plant focused on applying the CO₂ for enhanced oil recovery (EOR) in the North Sea. Technologies included integrated gasification combined cycle (IGCC) and super-critical with post-combustion CO₂ capture.
- **Feasibility study, Dubai** We developed a feasibility study under the clean development mechanism (CDM) of CCS applied to a Dubai client's generation facilities, with a focus on their potential additional carbon credit revenue. Our analysis included an assessment of the opportunities of selling CO₂ for potential oil and gas customers interested in working on EOR in Dubai.
- **Feasibility study, Australia** We have completed a feasibility study – Greenhouse Gas Emissions Study, Australia – providing a comprehensive evaluation of the technological solutions to CO₂ reduction, including IGCC.
- **Planning and implementation of a combined cycle gas turbine, Norway** Mott MacDonald assisted project developers on the planning and implementation of a combined cycle gas turbine (CCGT) with CCS at Oslo Fjord, Norway. Our work included overall plant layout and an interfaces review.
- **Feasibility study, Kazakhstan** We carried out a pre-feasibility study for the application of CCS to a CCGT generation plant in Kazakhstan. The study explored both pre-combustion and post-combustion capture of CO₂ for the gas-fired onshore plant. Geological sequestration of CO₂ in the offshore oilfield and other onshore formations was also explored.

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