

Climate change

How Mott MacDonald is developing solutions to this challenge



Mott MacDonald's £1 billion business spans 140 countries with over 14,000 staff working in transport, energy, buildings, water, the environment, health, education, industry and communications. Our breadth of skills, sectors and services and our global reach makes us one of the world's top players in delivering management, engineering and development solutions for public and private sector customers.

The consensus that climate change is happening, and will continue to happen even with immediate action to curb greenhouse gas emissions, demands innovative and practical planning and engineering solutions to mitigate emissions and help communities adapt to the changes. Mott MacDonald's long experience, advanced expertise and international reach mean we can create successful multidisciplinary teams to develop solutions to these challenges.

Adaptation

- Agriculture and rural development
- Biodiversity and conservation
- Coastal zone management
- Flood and land drainage
- Human health and social development
- Infrastructure engineering
- Landscape planning
- Natural disaster planning and recovery
- Policy, strategy and planning
- Water resource management

Mitigation

- Carbon finance and markets
- Carbon footprinting
- CO₂ sequestration
- Energy efficiency
- Renewable energy

Water Resources Demand Management Assistance Project, China. We are examining climate change impacts and developing adaptation responses for water resources, agricultural production, water demand and socio-economic conditions in two river basins in north China.



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Steppe Ecosystem Restoration Project in Moldova, Ukraine and Russia, funded by EuropeAid. Our project includes assessment of the potential for carbon sequestration in humus-rich steppe soils, and for sustainable agriculture under climate change pressures.



Riverside habitats in Tadjikistan, dependent on seasonal flooding from glacier meltwater, are potentially at risk from climate change impacts on glaciers.



Coastal erosion can be countered by engineering measures but in the long run, and faced with sea level rise, managed retreat may be the only option.

From the strategic planning for water resources in the United Kingdom to integrated social, institutional and infrastructure planning in Bangladesh's coastal region and delivering project finance from carbon credits for a biomass power plant in Romania, we deliver complex projects that need full understanding of the long-term drivers and impacts of climate change, as well as expertise in engineering and project management.

Adaptation to climate change

• **Agriculture and rural development** Local climate change impacts are uncertain but may include desertification, changes in rainfall pattern and reduced soil moisture affecting crop yields, and competition between food, fodder and biofuel crops. Such uncertainty has always been present in many communities, but the speed and extent of change may defeat natural resilience resulting in rural poverty and population migration to urban areas or richer countries. In addition to a wide range of livelihood programmes Mott MacDonald undertakes:

- Studies of specific impacts of climate change on agriculture
- Linking regional climate models with hydrological models
- Water demand studies
- Strategies and programmes for adaptation

• **Biodiversity and conservation** While habitats are always affected by short-term seasonal uncertainties, climate change may occur faster than they can respond. Such pressures are aggravated by humans seeking, for example, to develop biofuels such as palm oil, which create areas of monoculture, or prioritising potable and irrigation water use to the detriment of water-dependent ecosystems. Our staff have hands-on experience in:

- Biodiversity mapping
- Plantation management for conservation
- Conservation and mitigation action plans
- Protected species management

• **Coastal zone management** Man's response to sea level rise ranges from defence of urban areas and high-value assets to managed retreat from ill-defended rural coastlines. In less-developed highly populated countries, coastal zones vulnerable to sea level rise are also in demand for land settlement. Mott MacDonald is frequently called on to:

- Design integrated coastal zone management plans
- Integrate conservation into coastal defence schemes
- Assess the impacts of rapid shoreline development
- Survey endangered reefs and other scarce habitats

• **Infrastructure engineering** Future buildings and infrastructure will have to be designed to cope with, for example, higher temperatures, more intensive rainfall and greater flooding risks. In many countries, guidelines for construction are not yet available but must be prepared from a holistic understanding for likely local climate change. Our services include:

- Guidelines for building and infrastructure design
- Stormwater and sewerage systems
- Energy-efficient building design
- Soil erosion protection



In the coastal zone of Bangladesh, we are managing an integrated programme of works to help local communities adapt to climate change, such as enhanced involvement of local organisations in the maintenance of flood embankments.



Flood risk model and GIS for the UK's River Exe allowing for increased risks as the climate changes.



Stormwater Management and Road Tunnel (SMART), Kuala Lumpur. We designed the tunnel to solve problems of dense traffic and increased storm run-off. This kind of dual-use solution is needed to adapt infrastructure to climate change in densely developed areas.

- **Flood risks and land drainage** In many regions, climate change will result in more intense rainfall events. Some developed areas may be expensive to render flood-proof, especially where the underlying cause is a permanently higher groundwater table. We offer:
 - Flood risk mapping and long-term forecasting
 - River engineering and flood defence systems
 - Use of river habitat enhancements for run-off retention
 - Urban stormwater drainage systems

- **Human health and social development** Climate change will present challenges to communities all over the world. In the worst cases, people will be affected by stresses related to access and control of land, water and food resources. Disease patterns, such as the distribution of malarial mosquitoes, may change, and pressures for migration or emigration may grow. Our health and social specialists are experts in:
 - Social impact assessment
 - Climate change education and awareness-raising
 - Integrated health, education and water programme management
 - Management of NGO/community support programmes

- **Landscape planning** All landscapes are essentially dynamic systems and, in highly populated areas, strongly influenced by man and particularly by agriculture. Climate change will affect the landscape directly as a result of changes in land use and cultivation. Mott MacDonald has been commissioned for assignments to:
 - Plan and manage future landscapes around new infrastructure
 - Exploit flood defence systems to improve riverine landscapes
 - Place landscapes in the context of history and climate
 - Restore and manage rivers suffering from low flows

- **Natural disaster planning and recovery** All communities are vulnerable to natural disasters, whether from extreme flood or tidal events, intense droughts or wildfires. We have worldwide experience in:
 - Flood refuge and shelter design
 - Emergency water supplies and infrastructure
 - Post-conflict reconstruction, including water and health systems
 - Management of NGO/community support programmes

- **Water resource planning** The expectation of climate change has grown in parallel with greater demand for scarce water supplies and concern at the impact on the natural environment of water supply and wastewater infrastructure, such as dams, river abstractions and wastewater treatment plant. However, there is also recognition that much can be done to use existing supplies more efficiently and to reuse wastewater. Mott MacDonald staff are acknowledged experts in:
 - Strategic planning of water resources under climate change
 - Prediction of future rainfall, run-off and infiltration patterns
 - Community schemes for efficient storage and use of water
 - Water conservation and re-use of grey water
 - Long distance inter-basin water transfer
 - Transnational water resource management



The multi-award winning Manchester Civil Justice Centre sets new standards for the efficient use of energy in buildings.



Hare Hill wind farm extension, Scotland. We were appointed by ScottishPower as the lead consultant for the conceptual design and environmental impact assessment.

Contact us

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Mitigation services

- **Carbon finance** The Kyoto Protocol framework, the UN's Clean Development Mechanism and the European Emissions Trading Scheme have created opportunities for using financial incentives for global reduction of greenhouse gases. Mott MacDonald has practical experience of using carbon credits to improve the financial viability of major projects, particularly in the energy and waste sectors.
- **Carbon footprinting and management** There is increasing demand for tools to allow the impacts of an organisation or a project on the global climate to be quantified over the whole life cycle. Our experience – gained from such major projects as the new Crossrail tunnel and railway beneath London, water company assets management programmes and power projects in a number of countries – has placed us at the forefront of this rapidly emerging market.
- **CO₂ capture and sequestration** Climate change is accepted as a consequence of massive emissions of CO₂ from industrialised areas. Where there are large, localised emissions, particularly fossil fuel energy plants, there are opportunities for the capture of CO₂ and its removal from the carbon cycle. We have carried out projects to develop capture and sequestration strategies and technologies for gas and coal-fired power stations, as well as for offshore oilfield generators, where oil and gas reservoirs are potential sinks for CO₂.
- **Carbon management in industry and buildings** National building standards worldwide are being redrafted (in some countries by Mott MacDonald) to minimise the greenhouse gases released during construction and operation. We have dedicated teams that plan and design buildings to maximise the use of natural light, heat and ventilation, exploit renewable sources of energy such as ground heating and cooling, and minimise greenhouse gas release during construction and decommissioning.
- **Renewable energy** The recent explosive growth in demand for renewable sources of energy has focused particularly on wind, biomass and solar power. Mott MacDonald is one of the leading specialist engineering and planning consultants for a range of biomass technologies and both onshore and offshore wind power schemes. Our broad expertise and reputation for innovation has also resulted in our appointment for studies of wave and hydrogen power schemes.

Project Polar, Jinan, China. We designed an incinerator to destroy 360 tonnes per year of the chemical HFC-23, a potent greenhouse gas, thereby eliminating the release to the atmosphere of 4 million tonnes of CO₂ – equivalent per year. The scheme received financial credits under the Kyoto Protocol's Clean Development Mechanism.



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