ONSHORE WIND

CREATING A BETTER ENVIRONMENT
contents

01 / introduction
02 / overview
03 / experience
04 / case studies
05 / worldwide offices
06 / supporting information
Natural Power is an independent renewable energy consultancy and services provider with over twenty years of in-house project experience. We provide expertise at every stage of the project lifecycle: from feasibility, development, pre-construction, construction, operations to re-powering, and through all elements of due diligence.

Natural Power’s 360° lifecycle experience spans more than 800 projects, with a team of over 340 experts. Our approach to consultancy services allows us to focus on reducing interface risk and working smarter from day one of your power project, through:

- The application of pioneering new technologies, methodologies and best practices to tackle the most complex and challenging issues
- The provision of project management experience delivering both practical and innovative consulting
- Building wide and lasting relationships with our clients, who then benefit from our full lifecycle experience at every stage of their project
- Providing trusted, impartial due diligence services to financial investors that equal the breadth of services offered to development clients

“our mission and vision:

to create a better environment by providing market leading advice and services to our clients

Stephen Trotter, Managing Director”
Natural Power provides expertise in every stage of the project lifecycle; from site prospecting, constraints mapping and resource assessment, through consent, design and construction to operational asset management.

We are leaders in bringing new technologies, methodologies and best practice methods to the forefront of the onshore renewable energy industry in order to tackle our clients’ most complex and challenging issues. Our project management experience allows us to offer truly innovative yet practical consultancy.
Feasibility

Natural Power has a proven reputation and track record of working with clients to undertake site finding, screening and feasibility studies for onshore wind. Our in-house experts on wind resource, grid, environmental issues, human use considerations, ground conditions and planning legislation, work seamlessly to identify sites with the lowest associated risk in terms of consent and build conditions.

Our team provides a similar role for grid infrastructure feasibility studies, with our technical experience and capacity being supplemented by wayleaving experience.

We also have a highly trained global team of experienced wind analysts and environmental project engineering personnel who offer a comprehensive range of technical services to wind farm developers and investors alike. This allows us to provide our clients with optimised project designs, finance-grade Energy Yield Analysis (EYA) and site classification studies.

Our full technical services applicable in feasibility studies include:

- Campaign design
- Layout design
- Wind resource assessment and mapping
- Turbine sizing and selection
- Energy Yield Assessment
- Site screening
- Environmental constraint mapping
- Grid Infrastructure feasibility
- Construction surveys

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"we take a considered approach from the outset, therefore we can advise our clients on the best way to achieve their project goals while flagging any potential risks"

Lauren Wheatley, Director of Technical
Natural Power supports its clients through the project design and consenting process by bringing together cutting edge project knowledge and experience with a realistic approach to development and risk mitigation. We are particularly experienced at working with our clients' engineers in the development of robust, consentable, buildable sites.

We have supported a range of projects from full Environmental Impact Assessments (EIA) production and consent management to specialist expert advisory roles, baseline data gathering, analysis and modelling.

Our onshore planning and development team specialises in providing coordinated EIA related to the likely impacts from wind farm developments, transmission and cabling infrastructure.

We take the opportunity to work with our clients to define and address every aspect of a potential project throughout the development phase; identifying risks and opportunities at the earliest possible stage.

Our aim, like our clients', is to efficiently manage costs and risks to help deliver consented projects ready for financing and construction, including, but not limited to:

- Scoping, EIA co-ordination, consent strategy and management
- Integrated, multi disciplinary wind farm design management
- Total in-house ecology and hydrological services including:
  - Baseline survey and analysis
  - Consenting advice
  - Environmental Statement (ES) chapter production
- Industry, Government, stakeholder and developer group representation
- Statutory regulation, site politics - strategy, advice and application
- Wind resource assessment and mapping
  - Design of anemometry campaign and management
  - Finance grade energy yield assessment
  - Optimised turbine selection & layout design
- Turbine advisory, supply package management and options appraisal
- Operations and maintenance strategy development

"We take a considered approach from the outset, therefore we can advise our clients on the best way to achieve their project goals while flagging any potential risks"

*Jim Adams*, President, North America
development & consenting
we take a pragmatic approach to engineering timescales while remaining sensitive to the environment

Chris Pendlebury, Director of Planning and Environment
Pre-construction

Natural Power has extensive experience in progressing projects from gaining consent through to commencement of construction. We have supported a wide range of clients in the provision of required documentation, expert advisery and stakeholder liaison in order to meet with suspensive and ongoing planning conditions. As with all phases of development our approach is to mitigate risk for the client and seamlessly move the project from consent to a buildable asset.

Services include:

- Contract procurement support, including:
  - Turbine Supply Agreements (TSA) and maintenance contracts
  - Civil, electrical, Balance of Plant Contracts (BoP)
  - Grid connection contracts
  - Forestry contracts
  - Third party services and materials

- Management of planning condition discharge, including:
  - Environmental compliance and surveys
  - Noise condition compliance
  - Construction Environmental Management Plans (CEMP)
  - Health & safety management
  - Habitat Management Plans (HMP)
  - Peat Management Plans (PMP)
  - Geotechnical site investigation including drilling
  - Water quality, drainage management and flood protection
  - Traffic and transport planning
  - Contaminated land surveys analysis and mitigation

- Interface and progress with grid connection

- Geotechnical Services
  - Equipped to provide full project lifecycle, geotechnical consultancy services including intrusive works, topographic survey and interpretive reporting
  - Fully compliant with Eurocode 7 and relevant turbine supplier specifications
  - Expertise using a risk based approach to challenging, remote and mountainous sites during site design, consent and construction
  - Own and operate our own fleet of specialist drilling equipment and supply vehicles capable of crossing remote terrain with self-rescue capability
Natural Power provides construction project management with an aim to construct clients’ projects on time, on cost and on specification. On behalf of the client we provide project management and monitoring during the construction phase.

Services include:

- Owners Engineer
  - Administration of contracts
  - Programme management
  - Project interface
  - Construction supervision and on-site management
  - Health & safety
  - Management of specifications

- Construction Project Management
  - Grid and electrical services
  - Civil and structural services
  - Health & safety advisory services including CDM Consultant and Principal Designer services
  - Lenders Technical Advisor / Due Diligence
  - Resident Engineer covering site management
  - Monitoring and witness testing
  - Turbine walk down/snagging inspections

- Health & safety
  - CDM / Health & safety consultancy
  - Health & safety training

We draw upon the expertise of our world class team of analysts, ecologists, construction managers, geologists and engineers to ensure the highest chance of achieving consent for our clients’ projects.

John Woodruff, Principal Consultant
Our team of fully qualified Environmental Clerk of Works act as the point of contact for all license condition discharge, construction & installation teams and statutory and non-statutory stakeholder liaison. This is a key knowledge transfer aspect from pre-construction to construction and post-construction and is a core area of Natural Power’s expertise.

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we aim to get maximum revenue for our clients by optimising performance and reliability during the operational stage

Euan Fenelon, Director of Operations and Asset Management
Operations

Natural Power is one of the world’s leading independent providers of operational phase services for major utilities and independent power producers.

We provide award-winning excellence in health & safety management combined with unique software tools and procedures to ensure maximum efficiency in wind farm operations for our clients. Our aim is to manage, co-ordinate and efficiently control your operating assets safely and efficiently while maximising production.

Offering a full range of services designed to meet the needs of onshore projects, we ensure a consistency of approach without compromising on health & safety, including:

Site Services

- Local site management
- 24/7/365 ControlCentre services
- High-Voltage (HV) management
- Grid code compliance and trading
- Wind turbine resets
- Commercial and financial services
- Ecology and hydrology monitoring services

Advanced Performance Engineering

- Real time independent SCADA monitoring
- Operational downtime analysis and reporting
- Wind turbine, End of Warranty (EoW) and Balance of Plant (BoP) inspections/audits
- Performance and reliability optimisation
- Post-Construction Yield Analysis (PCYA)
- Power output forecasting
- Engineering solutions and implementation
Due Diligence

Natural Power provides technical due diligence services throughout all stages of the transaction cycle, from initial risk assessment and reporting in early transaction stages through to comprehensive reporting for credit-committee at final bid stage or financial close. Our due diligence clients include major international banks, developers, IPPs, utilities, investment funds and other financial institutions.

Our client offering includes:

- Full technical due diligence scope of works
- Advice based on real-life experience
- Long established credibility and trust
- Flexibility and broad resources
- Clear and concise reporting
- Clearly managed project risk
- Depth of skills and resources

Natural Power routinely performs detailed technical due diligence on behalf of clients in a number of different transaction scenarios:

- Project finance debt transactions, where Natural Power fulfills the duties of lender’s or owner’s independent engineers / technical advisors, from pre-finance technical due to project commissioning and handover
- Mergers and acquisitions (M&A) transactions, often containing a mixture of operating, pipeline and preconstruction assets, where Natural Power performs technical due diligence duties on behalf of the acquirer or on behalf of the vendor

"our team of 50 due diligence specialists has worked across over 200 projects worldwide, giving us unparalleled experience of a range of transaction scenarios"

Giles Dearden, Director of Due Diligence
At Natural Power we provide our clients with an integrated approach to data analysis combined with hands-on inspection and advanced performance engineering expertise covering a wide range of turbine technologies.

This experience includes; onsite management, remote site management through our 24/7 ControlCentre, turbine inspections, performance analysis of operational data and full portfolio due diligence.

The Natural Power team has developed a world class knowledge of all major technologies and as such we are ideally positioned to support our clients in the analysis, selection, performance and optimisation of assets at every lifecycle stage.
Our robust approach to project management and close relationship with our clients’ construction teams helps to minimise delays and ensures the safest possible work environment.

Ralph Spernagel, Director of Construction
Camster Wind Farm: 50 MW, 25 turbines, located between Lybster and Watten in Caithness, Scottish Highlands

Client:
E.ON Climate and Renewables

Project Description:
Supporting the client through the development, preconstruction and construction phases as well as ongoing operational site management

Development Phase
Natural Power helped the Camster site to achieve planning consent in January 2009 by providing E.ON with consent management for outstanding objections from:

→ SNH with regards potential hen harrier impact, a key barrier to consent
→ SEPA with regards to impacts upon local water courses
→ The Highland Council with regards to potential impact upon peat
→ The Highland Council road department and local resident concerns with regards to the proposed construction access to the Camster wind farm site by establishing a revised access route to the wind farm site

Camster sits within a commercial forestry plantation and, during the winter, is on the flight path for Hen Harriers on their way to hunting grounds to the north and south of the site. E.ON required to fell some trees in order to carry out wind resource analysis, which raised concerns from SNH that this would create a favourable hunting habitat for the Hen Harriers.

Natural Power’s Planning and Development and Ecological specialists worked with E.ON to develop a Habitat Management Plan (HMP), providing SNH with the confidence to lift their objection (based on potential hen harrier impacts).

The HMP proposed management prescriptions, to be continually monitored through the life of the wind farm, to maintain the habitat of the wind farm site to limit the attractiveness to prey species and so limit the exposure of hunting raptors to collision risk.

Pre-Construction Phase
Pre-construction discharge of planning conditions began in 2009. Natural Power supported E.ON throughout the pre-construction and construction process, attending and playing a key role in public liaison group meetings and stakeholder liaison including landowners and public roads authority.

Through negotiation with the Planning Authority (PA) and statutory bodies, forestry works were allowed to occur ahead of full planning condition discharge. This meant that construction works could commence through the Phase 2 bird breeding season, thus greatly improving the construction programme to meet the grid live date.

Geotechnical site investigation identified a requirement for additional on-site borrow pits. Applications were submitted and consent was obtained at short notice, reducing impact on project timescales.

Natural Power’s Ecology team provided onsite environmental expertise and advice as Ecological Clerk of Works during pre-construction, forestry felling and construction phases.
Parallel to discharging planning conditions and provision of Construction Design and Management (CDM) co-ordination, Natural Power assisted E.ON with the procurement of forestry works and provided expertise regarding technical aspects of the turbine contract and the balance of plant procurement process including scope of works, site visits and tender clarification meetings, in conjunction with E.ON procurement.

Construction Phase
Natural Power engineers managed construction activities on behalf of E.ON including:

- the management of all forestry felling
- regular site visits, review and approval of the Construction Method Statement (CMS) with the Principal Contractor
- co-ordination and interface between the wind turbine manufacturer, BOP, District Network Operator (DNO), Forestry Commission, Forestry Contractor Civil and Electrical Contractor
- CDM co-ordination including review and collation of documents for the Health & safety file and owner’s engineer representative on site

In line with planning consent requirements, Natural Power’s ecologists and hydrologists monitored environmental impacts, water quality and private water supplies throughout the construction period.

Following construction, the Scottish Environmental Protection Agency (SEPA) has recommended that Camster be recognised as an example of good working practice for reinstatement on upland deep peat wind farm sites.

Operational Phase
Through our dedicated team of local site managers, Natural Power has recently taken over operational site management for Camster wind farm on behalf of E.ON. This will include:

- compliance with industry best practice
- application of the wind turbine safety rules and High Voltage rules
- management of the HV network ensuring it is appropriately maintained and that suitable response is in place in the event of any outage
- ensuring effective liaison with a range of stakeholders from turbine maintenance contractors to land owners, local residents and grid companies

Natural Power will continue to monitor environmental impacts, water quality and private water supplies during the operational phase, minimising the impact to the wider environment from the wind farm site and providing E.ON with ongoing support and risk mitigation.

Dates and Duration of contract for Project: 2007 – ongoing (8 years)

Performance delivered, including strategic value to the client:

- Natural Power led Section 42 planning applications to microsite the wind farm track network and raise the consented tip height to ensure the minimising of deep peat excavation across the wind farm site. This led to added value in both the cost savings of earthworks and the environmental benefit of reduced excavated peat volumes
- On behalf of the client, Natural Power led a local planning application to consent the use of a further 2 borrow pits within the site boundary for access track construction. This added value in reducing the cost of imported materials required for track construction and reducing the number of construction vehicles on the public highway during the busiest period of civil works
- Natural Power’s project management ensured the effective co-ordination and communication throughout the construction phase between all contractors, the DNO and landowners involved in the project and ensured client requirements were achieved
- Natural Power construction and ecology teams worked together to ensure that bird breeding restrictions would not lead to the ceasing of all works on-site and gained the necessary approvals from the statutory bodies to allow a phased approach to keep the construction programme in line with DNO and turbine supplier key dates
Natural Power delivers services and operates assets globally for our clients, with eleven offices across Europe and North America and agencies active in South America and Asia Pacific.

- USA
  - Sarasota
  - Seattle

- SCOTLAND
  - Castle Douglas (Global HQ)
  - Stirling
  - Inverness

- ENGLAND
  - Newcastle
  - London

- IRELAND
  - Dublin

- WALES
  - Aberystwyth

- FRANCE
  - Nantes
  - Paris

- TURKEY
  - Ankara [Agency]

- CHILE
  - Valparaiso [Agency]
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Health & Safety

Natural Power operates a Safe System of Work procedure, this procedure outlines the requirements and guidelines required for safety in the workplace and mitigation of risk.

Health & safety is the number one priority for Natural Power both from an operational and management point of view. The safety of our staff, contractors, and the public must come before any technical or commercial considerations.

In accordance with statutory requirements, for all routine and non-routine activities undertaken by employees and others working on behalf of Natural Power, a risk assessment must be undertaken and sufficient controls introduced to manage the risk. Method statements are activity specific and are prepared where their absence would adversely affect the ability to exercise the controls identified by risk assessment.

The ControlCentre is an industry leading innovation providing 24/7 monitoring and communication services through trained operatives in our control room, ensuring our field staff have round the clock access to log on and off of the remote / lone working system. This combined with our hand-held SPOT devices ensures staff members working in the field have a safe environment to operate in.

Quality

Natural Power has established rigorous procedures and work instructions for all aspects of our business. All staff currently work to a list of core procedures for quality control and business management as part of our on-going commitment to our Quality Management System (QMS).

A totally integrated project management system is used throughout all departments, that includes file tracking and back-up along with resource management, document checking and authorisation, providing a full audit trail for all documents and project activities.

All data and reports are subject to a minimum two stage quality assurance process in line with ISO 9001:2008 procedures where documents are produced by a technical specialist then checked by another specialist before being checked and approved by a senior manager, ensuring a consistently high quality output to clients at all times.

Our asset management, construction and ecology management group, technical services and development consultancy services have all achieved the ISO 9001:2008 certification and Achilles Verify Category B2. Full details of our QMS are available on request.
Environment
Natural Power has internal goals with regards to environmental practice relating to energy use, carbon footprint reduction and recycling. We have had an Environmental Management System (EMS) in place since 2001 and have progressed our EMS to an integrated Quality and Environmental Management System and now hold ISO 14001:2004 certification.

All policies and arrangements are reviewed on an annual basis by our Quality and Environmental Manager and the management team.

The processes required for the Quality and Environmental Management System, their sequence and interaction have been identified along with the criteria and methods required to ensure their effective operation and control. All subcontractors would be expected to work to the Natural Power Environmental Policy Statement; evidence of this is required on appointment. Before each project commences an environmental risk assessment is carried out covering all aspects required for the scope of work.

Disaster recovery
Natural Power recognises the need for our clients’ projects to have robust systems and processes in place to ensure that data, documents and key staff continuity are retained in the event of a major incident.

Natural Power’s electronic Document Management System ensures that project documents are stored in a secure and ordered location on a central server which is backed up regularly to off-site storage.

All emails are archived in a cloud based system which allows recovery of deleted mail and also provides email continuity in the event of a failure of Natural Power’s servers or internet connection.

Hard copies of key documents are stored in a fireproof safe.

Multiple office locations assist in provision of continuity in the event of a major incident, such as fire, affecting any particular location.
what we do

- Leading independent renewable energy consultancy
- Analysis, engineering, planning & permitting, environmental, project management and due diligence services
- Onshore wind, offshore renewables, solar, hydro, renewable heat and grid & infrastructure
- Established in 1995, 11 offices globally, 340+ staff

For full details on our ISO and other certifications, please visit: naturalpower.com/company