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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

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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 at every stage of the project lifecycle: from feasibility, development, pre-construction, construction and operations through to re-powering, as well as the full suite of due diligence services from acquisition to project finance and vendor’s DD.

By taking a 360° to projects, Natural Power is able to provide genuine added value for its clients particularly where there are complex design requirements or where planning and development services are required. It is also able to provide support for construction and asset management services as the project progresses through its lifecycle.
We take a site specific approach for determining issues and constraints for proposed solar projects. By doing this we can provide indicative proposals for taking a site forward based on assumptions directly attributable to the project and specific client requirements. We develop a phased approach to the project, based on our experience and tested methodologies, while maintaining flexibility to meet the needs of the client. The overall goal for each stage of the proposal is to help minimise risk and provide cost savings and project optimisation to the client wherever possible. The approach is flexible so whilst it may be worthwhile to undertake a site visit for one project, it may prove more useful to meet the local planning officers before submitting a screening/scoping request on another.

**Desk based feasibility assessment**

Natural Power’s experienced team will first carry out a high-level desk based feasibility assessment that could include the following elements as required:

- Ecology (identification of key constraints including designated sites)
- Hydrology (including flood risk)
- Topographical and geotechnical (ground risk)
- Residential amenity (landscape & visual and glint & glare)
- Outline site layout design
- Capacity estimate (based on a MW/ha calculation for potential developable area)
- “Buildability” – access, topography and any headline site constraints (e.g. peat/forestry) from aerial imagery
- Grid connection strategy

"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
Site Visit
A site visit from one of our experienced solar professionals can deliver the following benefits:

→ Project optimisation and reduced risk
→ Prioritised portfolio ranking
→ Further informs a view of whether or not the project is buildable and bankable
→ Reduced risk of a protracted planning process and application refusal

A project that has been reviewed by experts who have been involved in solar projects at all stages of development can pinpoint potential issues at an early stage, reduce risk and identify lifecycle cost savings.

Adding value through a solid knowledge base
Legislation and policy is evolving all the time. Natural Power ensures that its experts are aware and briefed about ongoing changes so that they are fully conversant with the implications and can pre-empt any issues to ensure no project delays.

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
Site Design
During the pre-planning phase our team of engineers are equipped to provide a range of civil, structural, mechanical and electrical engineering support services to provide practical assistance regarding site layout and associated infrastructure, access options and other construction related issues during the preparation of the EIA /ER in order to ensure we secure planning permission for a buildable project.

Our skilled electrical engineers have experience of working at all distribution and transmission voltages within Ireland and the UK. Our capabilities include developing optimised site layouts, managing the tendering of works, reviewing grid connection offers, subsequent equipment selection and associated electrical design. This ensures that the site is redesigned and built to meet current grid code requirements in accordance with relevant electrical legislation and good practice. We have also developed in-house processes to optimise site cabling design and offer this service as part of our front end engineering design (FEED) studies. In order to determine the requirements for any development, our experienced electrical engineers review existing information, assess infrastructure and ensure compliance with current distribution regulations and grid code.

Collocation and Energy Storage
Opportunities exist to take advantage of grid capacity at on-shore wind projects through collocation of solar PV. Natural Power has experience evaluating the feasibility of collocation as well as full lifecycle support through planning, construction and operational phases of collocation projects.

The Natural Power team has working knowledge and experience of working on battery storage and pumped storage projects, as well as the associated grid integration of such projects, which will prove invaluable in undertaking feasibility assessments, preparing planning applications and ultimately building out your energy storage project and integrating it with the grid.

Ground Investigation
Natural Power has a fully equipped geotechnical team consisting of experienced geotechnical engineers with extensive knowledge of undertaking pre-planning, pre-construction and post construction geotechnical projects (note this service is not available in the USA). Our team has specialist knowledge of renewable energy development ranging from site appraisal to full scale ground investigation and detailed peat stability risk assessments. Natural Power is equipped to provide full project life-cycle, geotechnical consultancy services.

By undertaking some ground investigation works at an early stage the developer can reduce both planning risk and the risk of increasing the construction costs.
Ground investigation can:

- Inform a site layout, identifying areas of poor ground to be avoided
- Give indications of appropriate foundation types and depths
- Inform access track design and excavation methods
- Anticipate if any damage to piled steel foundations is possible due to interactions with the local soil type

Energy Yield Assessment

Since 1996 Natural Power has been conducting regular finance grade independent energy yield assessments and operational energy yield analyses. For solar projects we utilise in-house tools as well as industry standard tools for estimating performance and yield. Natural Power is currently investing in solar energy yield capabilities which will yield enhanced capabilities for the global solar sector.

Capabilities include:

- Assessing facility layouts accounting for civil, electrical and solar PV array designs in order to identify and highlight issues that may affect energy yield
- An assessment of the solar resource and energy production of the proposed project will be undertaken. Natural Power will select appropriate dataset regarding representability of the expected solar resource at the project location. If available, on site measurements will also be used to set up the long term site representative dataset
- Developing numeric site models which account for the influence of external and site-specific factors, in particular obstacles, shadings and topography
- Predicting energy output for each year of the life time of the facility
- Calculating secondary loss factors, energy output and performance ratios
- Estimating uncertainty and the expected degradation and impact on the energy yield over the expected lifetime of the facility
Pre-Construction

Natural Power has extensive experience in progressing projects from initial planning and design through to commencement of construction. We have supported a wide range of clients in the provision of required documentation, expert advisory 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:
  - EPC and maintenance contracts
  - Contestable grid connection contracts
  - Review of grid connection agreements
  - Third party services and materials

- Management of planning condition discharge, including:
  - Environmental compliance and surveys
  - Construction environmental management plan (CEMP)
  - Habitat management plan (HMP)
  - Geotechnical site investigation (drilling, trial pitting, testing, topographical survey)
  - Water quality, drainage management and flood protection
  - Traffic and transport planning
  - Contaminated land surveys analysis and mitigation

- Health and safety management and acting as project supervisor design phase (PSDP)

- Managing the interface and acting as single point of contact with ESB Networks in progressing the grid connection works

we take a pragmatic approach to engineering timescales while remaining sensitive to the environment

Chris Pendlebury, Director of Planning and Environment
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, structural and mechanical services
  → H&S advisory services including PSDP
  → Lenders technical advisor / due diligence
  → Resident engineer covering site management

**Environmental Clerk of Works**

Our team of fully qualified Environmental Clerk of Works act as the point of contact for all license condition discharge, construction and 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.

The ECoW takes a leading role in providing the following services:

→ Planning condition discharge and compliance
→ Toolbox talks
→ Mitigation measures
→ Peat management
→ Water monitoring programmes
→ Drainage management
→ Community liaison and local engagement
Operations & asset management

Natural Power is one of the world’s leading independent providers of operational phase services for major utilities and independent power producers. We provide excellence in health and safety management combined with unique software tools and procedures to ensure maximum efficiency in solar farm operations for our clients. Our aim is to manage operating assets safely and efficiently while maximising production. Offering a full range of services designed to meet the needs of our clients’ projects we ensure a consistent approach without compromising on health and safety, including:

- Operational control
- Access / egress and work flow management
- Emergency response
- Lone / remote working
- Site forecasting / outages
- Site supervision
- Control point services
- High-Voltage services
- Asset inspections
- Environmental monitoring

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
Due Diligence

Natural Power has provided project finance standard due diligence services for solar PV projects to major banks, investment funds, developers and IPPs in the UK, across wider Europe and North America and we aim to replicate this range of services in Ireland. With over 320 staff, we cover the widest range of activities that a due diligence project could require, from planning and development to ecology, from construction and energy assessment to operations, including the following:

- Due diligence review
- Energy yield assessment
- Site layout review
- Solar PV technology review
- Electrical review, incl. Grid installation strategy
- Curtailment and Constraint Analysis
- Contracting strategy
- Environmental and HSEQ
- Project and processes management
- License and consents review
- O&M review
- PPA review
- Project and processes management
- License and consents review

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
In order to assist our clients in responding to ever changing markets, we offer LCOE advisory services to support our clients in planning for maximum cost efficiencies across the lifetime of their solar projects. We understand the long game and know that making the right decisions at the right time can have a significant impact on project success. Through in-depth analysis, careful planning and strategic reviews, we can help make the marginal gains across a project that will result in a greater overall return.

Our LCOE tool kit includes:

→ Project and portfolio LCOE audits
→ Facilitated strategy workshops
→ Training
→ Due diligence reviews and cost benchmarking
→ Project specific LCOE modelling and analysis
→ Implementation of specific measures at all project phases

We work closely with our clients to understand their particular business models to find bespoke solutions to drive efficiencies across their projects.

By taking an LCOE driven focus we help our clients:

→ Design and permit cost competitive tender ready projects
→ Deliver DD / investment optimised projects
→ Provide “Real-time” LCOE analysis of operational projects
→ Provide cost visibility & stability
→ Release the value of data & knowledge
→ Maximise portfolio & pipeline value
## Project Experience

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<thead>
<tr>
<th>Client</th>
<th>Project</th>
<th>Scope of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Equity</td>
<td>California USA - 200 MW</td>
<td>Pre-construction Due Diligence</td>
</tr>
<tr>
<td>Confidential</td>
<td>Idaho USA - 100 MW Portfolio</td>
<td>Pre-construction Due Diligence</td>
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<tr>
<td>Confidential</td>
<td>Idaho USA - 100 MW Portfolio</td>
<td>Owner’s Engineer</td>
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<tr>
<td>Confidential</td>
<td>Idaho USA - 100 MW Portfolio</td>
<td>Pre-construction Planning and Environment Services</td>
</tr>
<tr>
<td>Confidential</td>
<td>Idaho USA - 100 MW Portfolio</td>
<td>Construction Phase Environmental Compliance Services</td>
</tr>
<tr>
<td>Confidential</td>
<td>Idaho USA - 100 MW Portfolio</td>
<td>Operational Phase Environmental Monitoring</td>
</tr>
<tr>
<td>Confidential</td>
<td>Massachusetts USA - Portfolio</td>
<td>Feasibility Study</td>
</tr>
<tr>
<td>Juwi</td>
<td>South UK - Portfolio</td>
<td>Strategic Pre-construction Planning Framework</td>
</tr>
<tr>
<td>Sovello</td>
<td>South Wales UK - Portfolio</td>
<td>Site Screening and Feasibility</td>
</tr>
<tr>
<td>Prowind</td>
<td>South UK - Portfolio</td>
<td>Site Screening and Feasibility</td>
</tr>
<tr>
<td>Confidential</td>
<td>South England - 5 MW</td>
<td>Pre-construction Due Diligence</td>
</tr>
<tr>
<td>Fred. Olsen Renewables</td>
<td>UK - Portfolio</td>
<td>Feasibility and Permitting Advisement</td>
</tr>
<tr>
<td>Aura Power</td>
<td>South England UK - 5 MW</td>
<td>Feasibility Study</td>
</tr>
<tr>
<td>Bow Lane Environmental Capital</td>
<td>South Wales UK - Portfolio</td>
<td>Site Screening and Feasibility</td>
</tr>
<tr>
<td>Vattenfall</td>
<td>Confidential - Portfolio</td>
<td>Feasibility Study</td>
</tr>
<tr>
<td>Santander</td>
<td>Suffolk UK - 32 MW</td>
<td>Broxted - Owner’s Engineer</td>
</tr>
<tr>
<td>Natixis Energico/CEPAC</td>
<td>Corsica - 4 MW</td>
<td>Due Diligence</td>
</tr>
<tr>
<td>Confidential</td>
<td>Reunion Island - Portfolio</td>
<td>Due Diligence</td>
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<tr>
<td>Confidential</td>
<td>Suffolk UK - 5.2 MW</td>
<td>Due Diligence</td>
</tr>
<tr>
<td>Confidential</td>
<td>Chile South America - Portfolio</td>
<td>Due Diligence</td>
</tr>
<tr>
<td>BayWa r.e. Solar Projects GmbH</td>
<td>Aylesbury, Buckinghamshire UK - 24 MW</td>
<td>Aston Clinton - Owner’s Engineer</td>
</tr>
<tr>
<td>Confidential</td>
<td>South West Scotland UK - 5 MW</td>
<td>Feasibility, Hydrology and Soil Classification</td>
</tr>
<tr>
<td><strong>Project:</strong></td>
<td>Broxted Solar Farm</td>
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<tr>
<td><strong>Client:</strong></td>
<td>Santander</td>
<td></td>
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<tr>
<td><strong>Project Description:</strong></td>
<td>Supported the client through the pre-construction and construction phases. The site will produce almost 32 MWp.</td>
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<tr>
<td><strong>Services Provided:</strong></td>
<td>Natural Power's role on this project was to manage the contractor interfaces and works onsite. Forthnightly site visits were conducted during the early stages of the project to ensure compliance with:</td>
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<tr>
<td></td>
<td>➔ Design proposal</td>
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<tr>
<td></td>
<td>➔ Site layout</td>
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<tr>
<td></td>
<td>➔ Health and safety legislation</td>
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<tr>
<td></td>
<td>➔ Progression of Distribution Network Operator and Independent Connections Provider connection works</td>
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<tr>
<td></td>
<td>Natural Power undertook meter operator and supplier negotiations along with Ofgem accreditation on behalf of the client.</td>
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<td></td>
<td>In the later stages of the project our role included:</td>
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<td></td>
<td>➔ Inspect and snag the installation – including panel wiring, structures, cable installation and compliance of High-Voltage equipment to UK legislation</td>
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<tr>
<td></td>
<td>➔ Ensure As Built documentation is accurate</td>
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<td></td>
<td>➔ Ensure completion of health and safety file</td>
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<tr>
<td></td>
<td>➔ Facilitate handover from the Engineering Procurement Construction team to the operations and maintenance team</td>
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<tr>
<td><strong>Date of Project:</strong></td>
<td>2013-2014</td>
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<tr>
<td>Project:</td>
<td>California Solar Farm</td>
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<tr>
<td>Client:</td>
<td>Confidential</td>
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<tr>
<td>Project Description:</td>
<td>Conducted a pre-construction energy assessment for this 385 MWp solar project, located in California.</td>
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</tbody>
</table>
| Services Provided: | Natural Power performed a solar resource assessment, energy production estimate and an uncertainty analysis for the project. Annual energy production estimates at the P50, P75, P90, P95 and P99 probability exceedance levels were provided for each year over the life of the power plant. The assessment was conducted using the commercial software PVsyst. Natural Power developed modeling assumptions as well as loss factors for the analysis, which included estimations and derivations of key variables including:  
- Weather file selection  
- Module and inverter component files  
- Shading losses  
- Soiling losses  
- Component mismatch  
- DC wiring  
- AC wiring  
- Auxiliary loads  
- Transformer losses  
- System availability  
- Curtailment losses |
| Added value: | Worked with the client to deliver results on a compressed schedule and provided engineering judgment to fill in gaps in the available information |
| Date of Project: | 2017 |
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.
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