Developing Environmentally Acceptable Wind Farms
Environmental Framework

The 2009 Renewable Energy Directive sets a target for the UK to achieve 15% of its energy consumption from renewable sources by 2020.

The benefits wind energy brings can be grouped into three main areas:

- Environmental
- Security of supply and greater diversity in energy mix
- Economic development and financial benefits

The National Renewable Energy Action Plan for the UK (2009) recognises the need for “good Practise in reconciling wind energy with environmental objectives and community engagement”
Renewable Energy Projects

Site search and feasibility
Initial search to find areas that are theoretically suitable for wind farm developments
Detailed feasibility to assess viability, value and risks

Optimisation
Iterative project designs that is informed by consultation and survey
Monitoring and managing change to minimise risk, and maximise value

Assessment
Detailed robust, transparent and repeatable analysis of environmental data and presentation within an EIA as part of planning submission
Requirements of the Solution

A system that facilitates data storage, tracking, management, validation and integrity
Ease of use and access to information for a variety of staff
Sharing data without replication, and while maintaining security, particularly between companies within Group
A decision support tool to facilitate all the stages of a project
Robust, repeatable and transparent analyses
Clear and concise presentation of results in the different companies house styles
SPatial Information Delivery and Analysis - SPIDA

Database - ArcSDE and SQLServer
Project Explorer - C# using ArcObjects is add-in to ArcDesktop 10
Information on the project and drawings
Catalogue to access and manage all drawings for a project
Create new drawings with base template layout in company house style
Ensures consistency of quality and efficiency of map making
SPIDA-web

SPIDA-web - ArcGIS Server and JavaScript API
Easy to use web front end that links to SPIDA database
Accessible anywhere with network access
Available to project managers, technical staff and ecologists

Variety of tools available
Navigation including find
Show/hide layers
Interrogative tools
Measure/buffer
Draw/save graphics
Output reports
Access Project Explorer maps

General users can access information, interrogate data and/or print out quick rough map without the need to use specialised GIS team
Site Search and Feasibility

Model looks for potential area for wind farm given constraints and ascertains the viability of project.

Risk - data layers display the % chance of success
- Geographical
- Buildings
- Infrastructure
- Planning

ROI - financial value
- Wind speeds
- Operating costs
- Capital costs

Return on investment and risk combined

Output passed to Site Search Team for ground-truthing
Optimisation - minimising impact to habitats

Calculates habitat lost to infrastructure features, both permanent and temporary.

Repeatable models help answer the what-if quickly so can feed into consultation with client and assist in mitigation.
Optimisation - minimising impact to bird species

Effort corrected activity model shows hot-spots of bird usage (and cold spots) on a site

Any surveyor effort bias removed

Used for identifying risks/opportunities

Iterative layout design

Post-consent monitoring
Assessment - calculating risk to birds

Statutory agency requirement to assess collision risk to specific avian species

Guidance is a standard methodology (Band et al) that assesses bird activity within the risk window and the probability of bird collision

Tabular output feeds into probability model outside of GIS
.....in review

GIS is used at all stages of wind farm development, from initial search for potential sites through to final planning submission and beyond.

Centralised data storage ensures data integrity, security and ease of management and access.

Two-tier approach providing expert GIS staff with the tools required for complex analysis and general users easy access to all data holdings.

The models streamline procedures and improve efficiency; facilitating robust, repeatable and transparent analyses.

SPIDA is constantly evolving to meet the business needs.
Thank you - any questions?