PAGERPOWER
Urban & Renewables

Pager Power Services Overview

Consultancy Capabilities Report

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PLANNING SOLUTIONS FOR:

- Solar
- Telecoms
- Railways
- Defence
- Buildings
- Wind
- Airports
- Radar
- Mitigation

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1 INTRODUCTION TO PAGER POWER

Pager Power Overview

Pager Power assists developers by helping them resolve aviation, radar and telecommunication interference issues that can halt wind and building developments across the world. In addition, Pager Power offers glint and glare assessments to determine the potential impact of solar reflections from reflective surfaces, such as solar panels and glass façades. These services can save a developer's time and money by identifying and understanding project risks early, with Pager Power being able to assist at any point in the project timeline.

The company offers a flexible approach to overcoming these problems through a successful combination of consultancy and specialist software. Pager Power's services are tailored to the individual client and project needs. In addition, Pager Power has extensive knowledge of developing and progressing bespoke mitigation solutions. When we work in different countries, we will accommodate time zone differences to ensure we deliver the best service possible.

Pager Power has helped developers overcome a large number of planning objections and, as a result, possess a good working relationship with stakeholders. The company regularly works with key stakeholders in the UK including the Ministry of Defence (MOD) and National Air Traffic Services (NATS), however we do have experience with certain stakeholders in countries further afield.

It is estimated that today, Pager Power has worked on one quarter of operational wind developments in the UK and has completed over 1,100 glint and glare assessments for a variety of development types.

Our areas of expertise include:

- Civil and military radar (PSR and SSR)
- Aviation navigation aids including VORs and DMEs
- Marine and meteorological radar
- Aviation safeguarding including obstacle assessments and lighting
- Development within Public Safety Zones (PSZ)
- Terrestrial and satellite television and radio interference
- Telecommuncations including microwave links and telemetry
- Glint and glare for aviation, residents, road users and railway operations
- Shadow flicker from wind turbines
- Stakeholder consultation, appeals, hearings and public inquiries
- Environmental impact assessment chapters and Scoping opinions
- Due Diligence and mitigation solutions

Clients we have worked with include:

- Dublin Airport
- National Grid
- Watkin Jones Group
- Scottish Power
- NPower
- Brockwell Energy Limited
- NPower
- The Hut Group
- Enzygo Limited
- BP Lightsource
- Bristol Airport Ltd
- Infinergy
- Turley Associates
- Dulas Limited
- Pegasus Planning Group Ltd
- SSE
- RSK Environment Limited
- Arcadis Consulting
- BSR Energy Limited
- AECOM
- Axis
- Sirius Planning Ltd
- South Africa Mainstream Renewable
- Bute Energy Ltd
- London & Regional Properties
- TOBIN Consulting Engineers
- Renaker Build Limited
- E.On
- RPS
- Engie
- Deloitte
- Ask Central Limited
- Arcus Consultancy Services Ltd
- Inland Ltd
- EDF Energy Renewables Ltd
- Aardvark EM Limited
- Tide Construction
- Land Use Consultants
- Voltalia UK Ltd
- Patrick Parsons
- DP Energy
- Boralex
- MAG
- Savills
- Bruntwood Ltd

Countries we have completed projects in include:

2 PROJECT INVOLVEMENT

Wind Developments

Pager Power has been involved with many wind developments. A few of the operational developments are listed below:

- Whitelee
- Sheringham Shoal
- Hameldon Hill (Ext.)
- Clyde
- Dorenell
- Greenock
- Blacklaw
- Lisset
- Avonmouth
- Blackstone Edge
- New Albion
- Arecleoch

Below are two of the wind developments that are now operational/consented that Pager Power has been involved in.

Kincardine radar used to mitigate Whitelee

Whitelee, Scotland

Pager Power worked closely with Scottish Power and BAA to identify a site for a new radar from which none of the turbines would be detectable, but aircraft flying into Glasgow Airport would be seen.

Part of the Port Victoria Wind Development

Port Victoria, Republic of Seychelles

Pager Power undertook a Desk Based Communications Link Report in addition to a Communications Link Survey. The wind development gained consent and has been operational from June 2013.

Image: "Ste Annes Island" by David Stanley / CC BY 2.0 / Image resized and shape altered.

Solar Developments

Pager Power has been involved with many solar developments. A few of the operational developments are listed below:

- Cleve Hill
- Hale Farm
- Comet Solar Farm
- Tullamore
- Woodtown Farm
- Netley Solar Farm
- Sowerby Lodge
- Dublin Airport PV
- Redcourt Farm
- Coolroe
- Burnham Wick
- Walland Farm

Below are two of the solar developments that are now operational/consented that Pager Power has been involved in.

Visualisation of Cleve Hill

Cleve Hill, England

At the time of writing, Cleve Hill Solar Park is the largest operational solar development in the UK, and the first to be classed as a Nationally Significant Infrastructure Project (NSIP). Pager Power conducted detailed glint and glare analsyis for sourrounding roads, dwellings and footpaths.

Aerial image of the solar panels in-situ on the airport

Dublin Airport PV

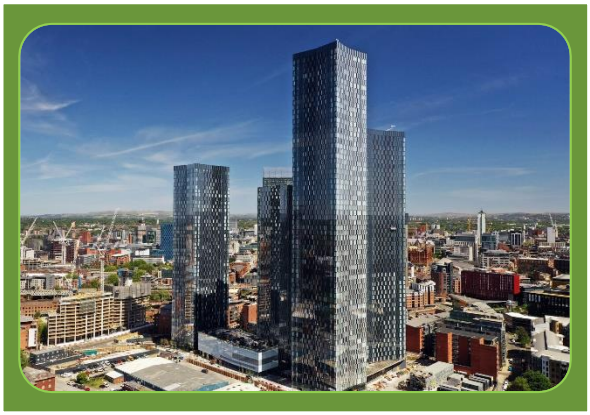
Maintaining aviation safety is paramount at airports. Pager Power completed glare analysis for a relatively small scheme at the airport, with the challenge of removing predicted solar reflections towards the new ATC Tower. The solar development is now in operation.

Building Developments

Pager Power has been involved with many building developments. A list of some of the projects are presented below:

- Deansgate Square
- Albert Island
- Chelsea Creek
- Crown Street Phase 1 and 2
- One Eastside
- Clayton Road, Hayes
- 168 Park VIew Road
- City Labs 2&3
- Ducie Street Warehouse
- No 1 Old Trafford
- Trinity Riverview
- 20-32 Goldworth Road

Below are two building developments that are under construction/built that Pager Power has been involved in.



Deansgate Square, Manchester

Deansgate Square, Manchester

Deansgate Square includes, at the time of writing, the tallest building in Manchester. Pager Power worked with Renaker and completed a variety of assessments for this project including radar, aviation safeguarding (lighting and obstruction) studies, as well as various telecommunications assessments for the four towers.

One Eastside, Birmingham

One Eastside, Birmingham

One Eastside will be the tallest buiding in Birmingham when it is built. Pager Power worked with Court Collaboration and completed a variety of assessments for this project including radar and aviation safeguarding studies, as well as various telecommunications assessments. Of particular note was the potential imact upon Birmingham Airport's operations.

To read more information and see more case studies, please visit our website.

3 CONSULTANCY SERVICES

Pager Power's Expertise

Pager Power can provide an overview of the issues that may affect a site's suitability and which may require further consideration. The key features that may include consideration are as follows:

- Microwave and UHF communications;
- Radio telemetry and control links;
- Television and radio transmissions;
- Glint and glare (solar developments or any structure with a surface capable of producing a solar reflection;
- Shadow flicker;
- Meteorological sites;
- Public Safety Zones (PSZ);
- Aviation operations and infrastructure (discussed on the following page).

Identifying Project Risks

Pager Power offers an extensive range of products to help the developer determine the impact a proposed development may have on aviation activities in the area. Areas of assessment include published safeguarding criteria, radar, navigational aids, flight operations and airspace, amongst others. Pager Power can resolve potential issues through technical analysis and mitigation discussions.

A developer may avoid costly delays and significantly reduce your planning and administrative costs by identifying these risks early. Pager Power can identify the key issues that may affect a prospective development at the earliest stage in the planning timeline. The industries Pager Power predominantly works within are wind, solar or building development. In many cases however, Pager Power works on projects which don't fall within the three categories but may nevertheless affect the systems listed below.

Aviation Studies

Pager Power covers a variety of areas within aviation, these include but are not limited to the following:

- UK AIP listed civil aerodromes and heliports;
- Assessment of Low Flying Areas;
- Civil Airport ATC radars;
- En-Route radio navigation beacons;
- MoD ASACS (Air Defence) radar sites;
- Military aerodromes;
- Military ATC radar sites;
- MoD Tactical Training Areas;
- Meteorological sites;
- NATS en-route radar sites;
- UK AIP listed Civil Aerodromes and Heliports;
- Instrument Flight Procedures (IFPs) – high-level;
- Mitigation, technical support and consultation with stakeholders.

Aviation Analysis Types

Pager Power offers a variety of different types of analysis for assessing the potential impact on aviation operations and infrastructure. The analysis may focus on concerns already raised by stakeholders or identifying the risks a project may face. Areas covered in this assessment include:

- Radar line of sight analysis;
- Radar detectability analysis;
- Desktop shielding study and site survey of a blocking point;
- Analysis of the turbines as physical obstructions;
- Analysis of Air Traffic and Airspace above the proposed development;
- Radar and radio navigation aid interference;
- Assessment of the operational impact on the relevant installations;
- Obstruction lighting;
- High-level assessment of Instrument Flight Procedures (IFPs);
- Study of mitigation options.

An overview of some of the most common analysis types is presented below.

Radar Impact Assessment

With the use of the company's specialist software, Pager Power can help the developer determine the likely impact that the turbines will have upon specific radar. A radar impact assessment can be undertaken which conform to many different guidelines such as UK CAA, Eurocontrol and ICAO.

Radar Detectability Assessment

A radar detectability assessment will provide an insight into potential impacts a wind development may cause on radar stations and a desk-based assessment of obstructions. The assessment uses a method described by the Civil Aviation Authority (CAA) in the first edition of Civil Aviation Publication (CAP) 764, used for determining the impact of wind turbines on Aeronautical Radar Stations.

Blocking Point Survey

The blocking point survey includes a range of analyses to determine potential blocking points between known radar and a proposed wind development. A survey is undertaken to investigate additional shielding features, such as buildings, and analyse the impact this could have on the line of sight from the radar. Once a blocking point survey has been undertaken, this information can be combined with a radar detectability assessment to produce a detailed analysis of the situation.

Physical Safeguarding Assessment

Physical safeguarding is a key aspect of maintaining aviation safety around an aerodrome. Pager Power can assess the level of clearance or infringement of any structure, provide recommendations on aviation lighting and assist you with navigating the path forward.

Radar Mitigation Study

The bespoke analysis of the radar mitigation study will guide the developer in overcoming operator objections. Pager Power can also guide developers through the consultation process.

Telecommunications Studies

Any structure has the potential to impact telecommunication services depending on its proposed location. It is important to assess proposed developments to identify any wireless telecommunication links that cross or constrain a potential site. Pager Power is able to assist with stakeholder consultation and advise developers of any issues using a range of tailored products.

We have also produced a White Paper regarding telecommunications impacts associated with various development types.

Communications Link Report

The report investigates potential communication issues for a proposed structure, including wind farms or building developments. The report includes the following:

- Full consultation with Ofcom and all relevant identified link operators;
- An exclusion zone chart of the proposed site and all relevant links;
- 2D exclusion zone calculations for any identified conflicts between the potential obstruction and link. (Calculated using the published Ofcom method);
- Pager Power's conclusions and recommendations.

Pager Power can create GIS data files for identified link path exclusion zones so that they can be marked as constraints against the site.

Communications Link Survey

Based on link data identified from the Communications Link Report, this service includes:

- A full survey of all communication link ends identified as potential issues;
- Updated report accounting for accurate antenna location data for each surveyed link end.

Communications Link 3D Analysis

A report that details the analysis of any potential link issues in 3D by accounting for terrain, turbine location and dimensions and link location and height. A 3D exclusion zone is then generated and presented in a standalone report or in an update to the initial report.

Communications Link Mitigation and Consultation

Following initial analysis of the potential issues concerning communications links, Pager Power is able to work on behalf of the developer to try to overcome any telecommunication objections through negotiation with concerned parties and the development of practical mitigation solutions.

Television Studies

Pager Power offers a range of services to ensure the developer gains a full understanding of television interference levels.

Television Desk Study Assessment

A Television Signal Interference Desk Study Assessment provides interference charts detailing where issues could arise if a wind or building development was constructed in the area. The analysis takes Earth Curvature and Refraction into account and is superimposed onto a 20 by 20km map of the area to allow for easy interpretation.

Television Baseline Survey (Pre-Construction)

The purpose of a Television Baseline Survey is to identify which television transmitters are being received and then accurately measure the strength at which the channels are being broadcast in the site area. These results can be compared with those of a post-construction survey to accurately monitor the effect the development has had on local television reception.

Television Baseline Survey (Post-Construction)

This survey can be carried out for any existing wind or building development. The measurements are taken using a specialised television analyser, and the report can recommend mitigation solutions to developers where potential issues arise.

Shadow Flicker Studies

Rotating turbine blades can cause brightness levels to vary periodically at locations where they obstruct the Sun's rays. This effect is known as shadow flicker. Pager Power has developed a range of products to help developers assess possible shadow flicker impacts and can work with developers to come up with the most suitable mitigation options.

Shadow Flicker Zone Assessment

A shadow flicker zone assessment gives a basic overview of the proposed development, identifying regions where shadow flicker may be an issue. It consists of a shadow flicker zone contour chart and maps, indicating the areas where shadow flicker is predicted with estimated levels of impact based on the location within the contours.

Shadow Flicker Impact Assessment

This assessment takes into consideration all dwellings within 1km of the proposed turbines.

The assessment would require dwelling data which can be obtained in a number of ways:

- **Option 1:** Provided by the client;
- **Option 2:** Identified via a map search;
- **Option 3:** Undertake a site survey to identify the relevant dwellings and their visibility.

The report includes a list of predicted shadow flicker times and durations at each dwelling.

Shadow Flicker Shut Down Scheme

A shadow flicker shutdown scheme provides the shutdown times that are required to eliminate shadow flicker at particular receptors, such as dwellings. This can ensure that no effects are experienced during the lifetime of the wind development.

Glint and Glare Studies

Pager Power undertakes solar glint and glare assessments for proposed or existing developments where a specular reflection may occur. To date, Pager Power has completed over 1,100 glint and glare assessments and has even produced its own glint and glare guidance, which is now in its fourth edition. The types of development assessed include but are not limited to:

- Solar photovoltaic developments;
- Building developments;
- Structures with large surface areas composed of materials capable of producing a specular solar reflection.

Glint and Glare Assessments

The most common receptors which are covered within a glint and glare assessment are as follows:

- Surrounding roads;
- Surrounding dwellings;
- Aviation infrastructure and operations, including pilots and Air Traffic Controllers;
- Railway infrastructure and operations, including train drivers and railway signals;
- Public Rights of Way (PRoW).

Our modelling is carried out using our own custom software that was developed specifically for solar photovoltaic systems. This includes modelling the path of the Sun, modelling reflections in three dimensions and quantifying the time and duration of any effects.

Glint and Glare Services

Pager Power is able to provide support and solutions at all stages of the project. We have a track record of providing:

- Scoping input;
- Technical reports and modelling;
- Mitigation assessments;
- Site surveys;
- Stakeholder meetings, expert witness and hearings.

We are always on hand to discuss bespoke project needs and tailor our approach accordingly.

Continuing Professional Development (CPD) Sessions

Pager Power provides CPD sessions on a range of topics that may affect your proposed development. We can assist with the understanding of key planning requirements surrounding a proposed development, whilst it also gives us the opportunity to meet more of our clients in person to better understand their needs and expectations.

We can cover the following development types:

- Solar developments;
- Wind developments;
- Building developments.

Our comprehensive CPD sessions provide an overview of the following, as appropriate:

- Pager Power company background and experience;
- Overview of the planning requirements;
- Relevant guidance and studies;
- Assessment process overview;
- Assessed receptors and assessment ranges;
- Methodology overview;
- Impact classification;
- Overview of the mitigation options;
- Our experience consulting with stakeholders;
- Case studies;
- Key recommendations and considerations;
- Additional services we can provide;
- Questions and discussion.

Our CPD sessions can be made bespoke to your requirements and can be provided in person or via video conference.

Other Services

Preparation of Environmental Impact Assessment Scoping Opinions

Pager Power can produce scoping opinions for projects to identify the key risks and provide an opinion on whether a topic should be scoped in or out of the full assessment for submission to a planning authority.

Preparation of Environmental Impact Assessment Report Chapters

EIAR Chapter Work covers all aspects of our technical analysis for wind, solar and building developments, using the client's provided template if requested. The EIAR Chapters are based on work that has already been undertaken.

Meeting Attendance

Pager Power is happy to arrange and attend meetings with relevant stakeholder representatives and provide a full post-meeting discussion along with an informal report explaining any technical matters arising from the meeting. This can be either in person or virtually.

Site Finding

Pager Power will assess a required region for suitable sites with regard to radar and aviation issues, as well as any other developer requests. This is a highly customisable service, and as such, the process and outputs will depend largely on the requirements of the developer.

Due Dilligence and Third-Party Reviews

Pager Power has experience undertaking due diligence analysis and third-party reviews.

Hearing, Appeal and Public Enquiry

Pager Power is happy to assist with hearings, appeals and public enquiries.

Bespoke Solutions

Pager Power will tailor its range of services to fit the needs of every individual site and client.

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