Summary of 2023 Survey of Onshore Wind Impacts on Aviation and Defence

In 2023, RenewableUK conducted a survey on behalf of the Department of Energy Security and Net Zero (DESNZ) to assess planning objections to onshore wind farms in Great Britain related to interference with aviation and defence infrastructure. The aim was to quantify how much of the pipeline is affected by objections from aviation and defence organisations, reasons for objections being raised, and identify the locations affected. The survey report was written by RenewableUK and BVG Associates, in collaboration with DESNZ, the Department for Transport (DfT) and Scottish Government.

Background to Onshore Wind Turbine Interference with Aviation and Defence Systems

Wind turbines can interfere with the operation of civil aviation and air defence communications, navigation and surveillance (CNS) infrastructure. This includes:

- Wind turbines can show up as false positives on radar systems, causing desensitisation that can make it difficult to accurately detect or track aircraft.
- When a turbine is 150 meters and above it requires lighting schemes for safety purposes.
- Wind turbines can pose an obstruction hazard to low flying aircrafts, including within Ministry of Defence (MOD) training areas or through interruption of established instrument flight procedures (take-off and landing).
- Wind turbines can cause ground vibrations that can interfere with seismological monitoring, stations.

To manage the safeguarding implications of wind turbine interference with CNS systems, aviation and defence stakeholders can register objections to planning applications for onshore wind projects. When cases arise, the project developer works with the relevant operator to deliver mitigation solutions that minimise or eliminate risk. Doing so allows for the onshore wind developer to progress to construction and operation. This process can be costly and time-consuming and, if a solution is not available or is too expensive, it can ultimately halt projects altogether.

Information on the nature and extent of aviation and defence impacts are held locally, and there is no national data set that quantifies and qualifies the capacity of onshore wind that is affected by aviation and defence requirements. DESNZ therefore requested RenewableUK to survey its members and solicit feedback on the nature of aviation and defence impacts.

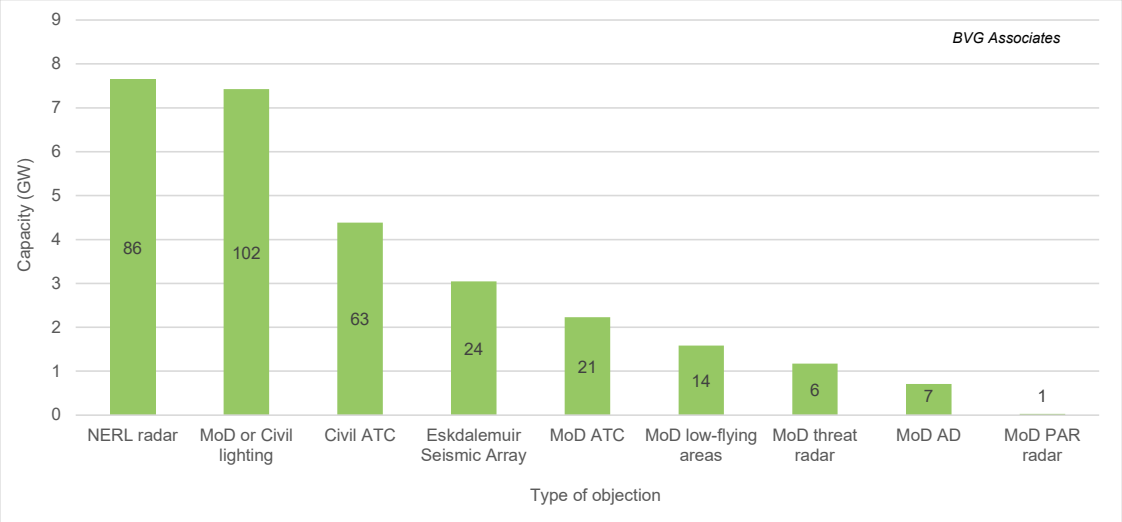
Survey Overview

The survey was conducted between 8 March to 23 May 2023, with information collected from wind farm developers and triangulated with aviation and defence stakeholders. RenewableUK used the EnergyPulse database to identify projects and developers. Data were received from 182 of the 305 projects that were contacted, covering a cumulative capacity of 13.56GW - a response rate of 60% representing 67% of total pipeline capacity.

Key Findings

- **Objections to onshore wind projects on the grounds of interference with aviation and defence systems affect a substantial proportion of the future onshore wind pipeline.** Of the 13.56GW of pre-construction capacity, 79.3% or 10.75GW faced at least one objection related to either aviation or defence. [1]
- **A significant number of projects faced multiple objections**. 112 projects totalling 9.3GW encountered at least two objections, and 6.2 GW faced more than three.
- **Lighting-related objections were the most commonly reported**, affecting 102 projects (7.39GW of the pipeline). While these objections are generally resolvable through appropriate lighting arrangements, they often trigger additional concerns related to environmental or visual impacts
- **Objections from National Air Traffic Services En Route plc Licence (known as NATs or NERL) on grounds of radar interference were the most common non-lighting objections reported**, affecting 86 projects (7.6GW of the pipeline).
- **A significant proportion of the pipeline is estimated to interfere with MoD and civil Air Traffic Control (ATC) operations.** Objections from civil airports on grounds of ATC radar interference affected 63 projects (4.4GW), and MOD ATC objections affected 21 projects (2.2 GW).
- **3GW of capacity is subject to objections on the grounds of interference with Eskdalemuir Seismic Array**.

Distribution of reported objections by capacity from the Survey of developers by system operator (with number of projects within bars)



Conclusion

The 2023 survey was able to indicate the potential impact of aviation and defence objections on the onshore wind pipeline. Addressing the challenges associated requires enhanced coordination and clear mitigation strategies at the national and local level. However, the survey was unable to quantify and qualify the time and cost associated with delivering mitigations. Improving data accuracy and understanding the full scope of objections and their mitigation will be crucial for supporting the continued development of onshore wind energy in the UK.[2]

[1] Preconstruction projects are assumed to be those that were in either consent, in planning or in scoping. (This includes Eskdalemuir projects)

[2] The Survey results were compiled and analysed by BVG Associates.