

UHI and Onshore Wind

Engineers, environmental and social scientists at UHI are working with multiple stakeholders to facilitate the next stages of deployment of onshore wind technology in Scotland, UK and internationally. These research activities ensure that project developers, regulators and other stakeholders have access to the

necessary technologies, baseline data, predictive models, and evaluation methods to understand the significance and potential impacts of onshore wind developments on the surrounding terrestrial system. Our goals include early identification of data gaps or potential conflicts to reduce risks and resource

requirements, as well as engaging with novel technology development for environmental characterisation, impact prediction and long-term environmental monitoring across large scales.



Environmental monitoring & ornithology

UHI expertise in multi-sensor environmental monitoring of onshore windfarm sites includes the use of radar, drone, animal borne telemetry devices, observer, and other specialised monitoring platforms. Applications include baseline studies of animal distribution and post-consent monitoring to establish changes related to disturbance, displacement, or collision.

UHI ornithologists have been actively involved in improving cumulative impact assessments and revising collision risk models for key species. Research priorities range from investigating individual effects to population-level impacts of wind energy developments, develop new technologies, methods, and models to streamline baseline characterisation of populations and post-consent monitoring.

Historical environmental assessments

There is a wide-ranging portfolio of large-scale projects in northern Scotland, and UHI capabilities include the provision of onshore historic environment scoping documents, environmental impact assessments (EIAs), Environmental Appraisals (EAs) and Environmental Statements. Recent projects include onshore EAs, archaeological management plans for the rollout of fibre optic telecoms cables around Orkney, Shetland and the Inner Hebrides, and EIA chapters (onshore and offshore) for the West of Orkney Windfarm.

UHI can also offer comprehensive commercial historic environment services for terrestrial developments. UHI staff have years of experience in all types of archaeological work particularly in and around Orkney, Shetland, and the Highlands and Islands.

Public perception, socio-economic impact, social licence & carbon footprint

Integrating assessment of socio-economic impacts into planning and decision-making for onshore wind is required at all stages of planning, leasing, and consenting for all project developments. In addition, predicting and managing potential conflicts with other terrestrial space users and benefits of co-location of onshore wind are required.

UHI have the capacity to carry out lifecycle sustainability assessments and carbon footprinting, including social aspects – LCA and techno-economic assessments (TEA), to allow for a complete understanding of the socio-economic consequences of new and existing projects.

Teaching & Training

Supporting the regional economy is at the core of UHI's strategy through the breadth of curriculum provision available across the UHI partnership relating to the development of key growth sectors including onshore wind. UHI works with industry stakeholders and employers to create tailored sectoral provision from supporting supply chain development through emerging onshore wind technologies to lifecycle engineering and industry.

UHI is currently leading the development of Wind Turbine Technician vocational training and more generally offers wind energy teaching modules up to SCQF level 10. UHI is continually looking to expand its onshore wind teaching & training capabilities to allow for innovative work-based learning that meets the needs of industry and the Highlands and Islands.

RENEWABLE ENERGY - ONSHORE WIND



Current Projects

ROBINSON

ROBINSON aims to help decarbonise islands through developing an intelligent, flexible, and modular Energy Management System (EMS), better integration of renewable energy sources, biomass and wastewater valorisation, industrial symbiosis, and the optimisation and validation of innovative technologies.

To support islands' decarbonisation, ROBINSON's EMS will integrate across different energy vectors (electricity, heat and gas) existing and newly developed energy and storage technologies, such as a small gas turbine based Combined Heat and Power unit (CHP), Anaerobic Digester assisted by Bio-Electrochemical Systems (AD+BES) to enable the conversion of liquid waste into biomethane, a mobile innovative wind turbine, a gasifier to convert bio-waste, and hydrogen-related technologies (electrolyser and storage system).

STEM Engagement Programme

Over the last six years, UHI has delivered a STEM outreach programme to early years settings and primary schools across the Highland Council area, providing materials and training to teachers to build their confidence and knowledge in subjects they may not be familiar with. This included the creation of 'Lend a Lab' boxes, which contain themed, age-specific content and lesson plans to support teachers in delivering STEM topics in an engaging way.

UHI has extended its outreach programme thanks to £900,000 of funding led by the West of Orkney Windfarm, a joint venture comprising Corio Generation, TotalEnergies and RIDG, alongside Floating Energy Alliance and their Buchan Offshore Wind project, Thistle Wind Partners and Ossian, a joint venture project led by SSER, Marubeni and Copenhagen Infrastructure Partners.

Case Studies

World Heritage Site avian modelling

Researchers at the Environmental Research Institute (ERI) recently completed a report commissioned by the Flow Country World Heritage Site working group considering the proposed designation bid. There are several onshore windfarms located around the boundary of the proposed World Heritage Site, and concerns were raised about the cumulative collision risk and displacement impact of these on key avian species.

ERI researchers used available data on species presence and distribution as well as specific modelling techniques. Knowledge gaps such as numbers of individuals of each species present in the area were identified, as well as focal species for pre- and post-construction monitoring. The results can be used to help better direct species monitoring, as well as planning policy, and to better focus long-term data collection.

Akla Windfarm

Orkney Research Centre for Archaeology (ORCA) were commissioned to undertake the historic environment scoping for the proposed Akla windfarm development in Orphir, Mainland, Orkney in April 2023.

ORCA specialists undertook a desk-based assessment and prepared an historic environment baseline study to inform the subsequent approach to further assessment relating to the historic environment within the EIA process.

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