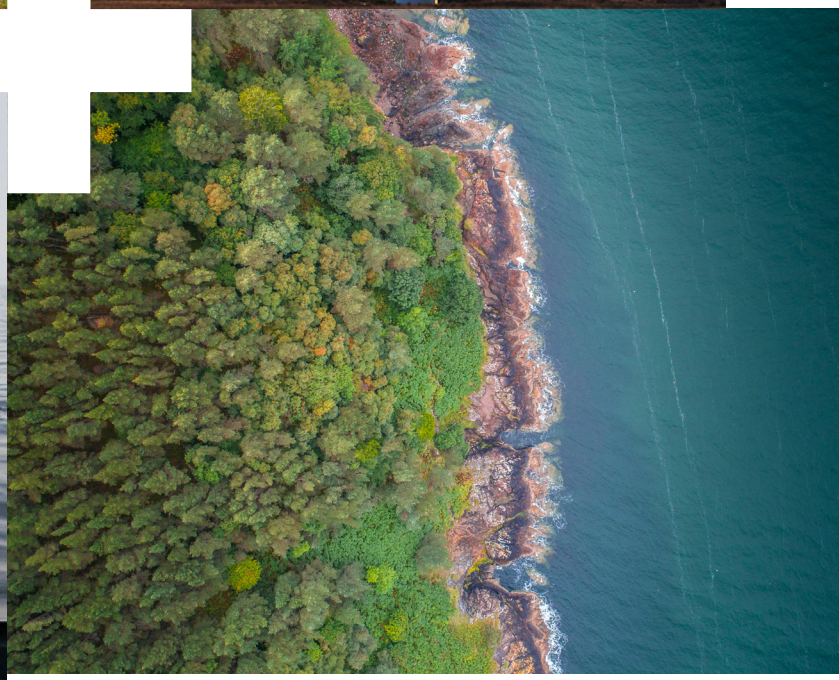
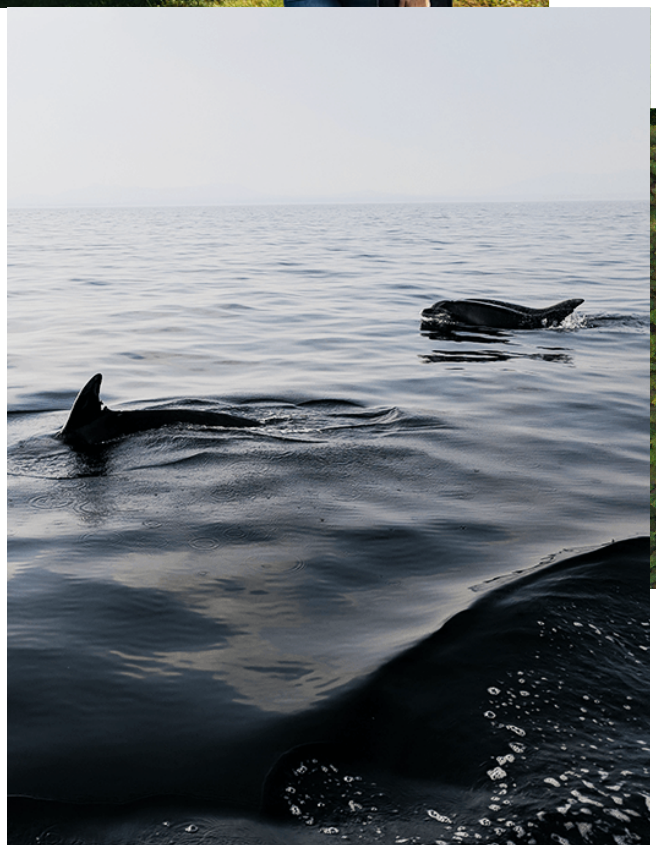
UHI | Energy Innovation





Energy Innovation Strategy

Contents

Mission Statement

The University of the Highlands and Islands (UHI) Energy Innovation Team is focussed on delivering local, regional and national benefit to partners across Scotland and internationally. Our researchers and facilities are on the doorstep of Scotland's most impressive energy resources and recent industry developments, complementing our expertise with a commitment to support the energy sector as it delivers for Scotland and the Highlands and Islands region.

The University has world-class facilities and multi-disciplinary research teams particularly relating to environmental, marine, rural and socio-economic aspects, who are focusing on providing solutions to ongoing energy challenges.

Vision Statement

'Leading and supporting energy innovation where the resource is'

UHI Energy Specialisms

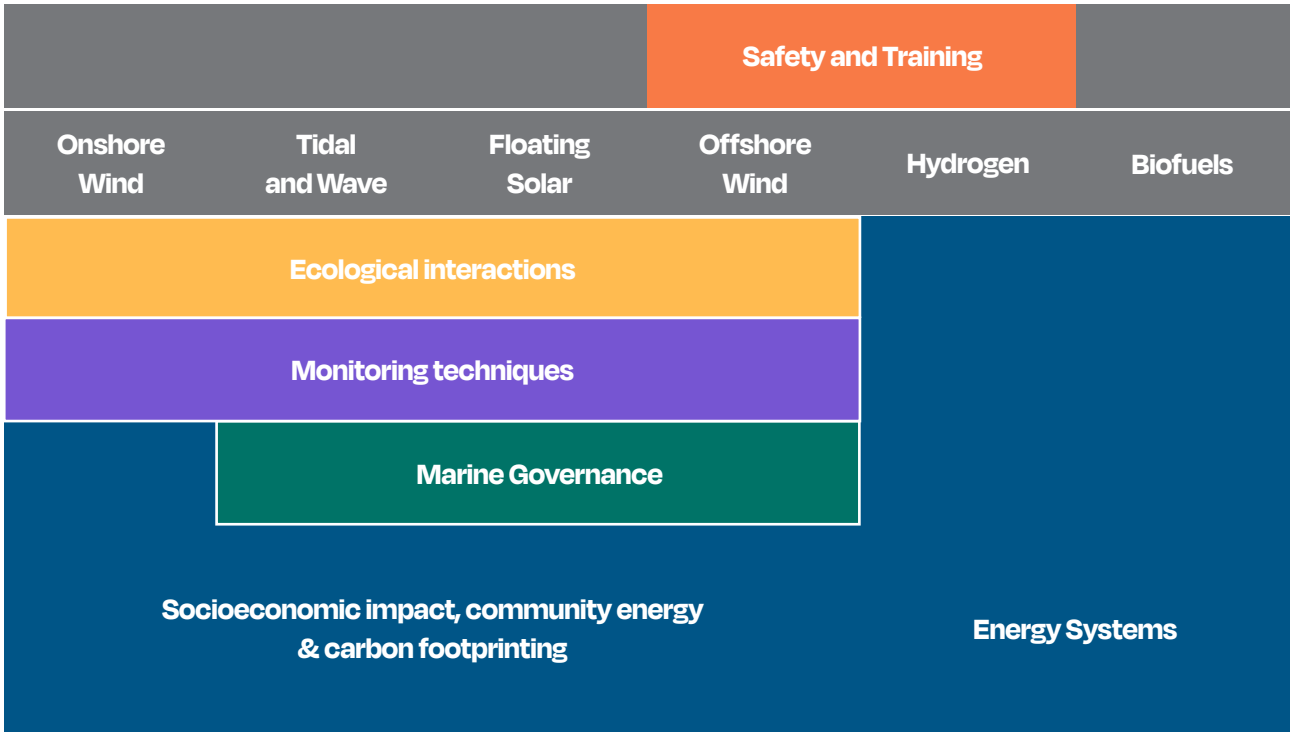
Energy is a key UHI research theme, and we are building a reputation for excellence in research across a range of energy topics critical to the future economic development of the Highlands and Islands region and to the long-term sustainability of Scotland's economy. Energy research at the University addresses the issues surrounding the development and management of energy sources for the future. Our energy focus areas indicate capabilities and areas of growth in the coming years.

Energy Sources

+ Offshore wind (fixed and floating)
+ Onshore wind
+ Tidal stream
+ Wave
+ Floating solar
+ Hydrogen
+ Biofuels

Energy Focus Areas

+ Marine mammal, fish/fisheries and bird interactions
+ Socioeconomic impact, community energy & carbon foot-printing
+ Environmental survey/monitoring
+ Resource assessment/ characterisation
+ Marine governance, planning & decision-support tools
+ Historic environment management & mitigation
+ Energy systems
+ Safety and training



Strategic Themes

- Net-Zero/Sustainability
  - Developing greener/renewable solutions for a more sustainable net-zero world
- Renewable Energy Resource and the Environment
  - Investigating renewable energy resource and environmental interactions to inform consent, monitoring, impacts and environmental assessments
- Marine Systems and Governance
  - Integration of marine systems, policy and governance expertise with cutting-edge research on key ecological and environmental interactions
- Socioeconomic Impacts and Carbon Management
  - Assessments of socioeconomic impacts and carbon footprints into renewable energy development projects

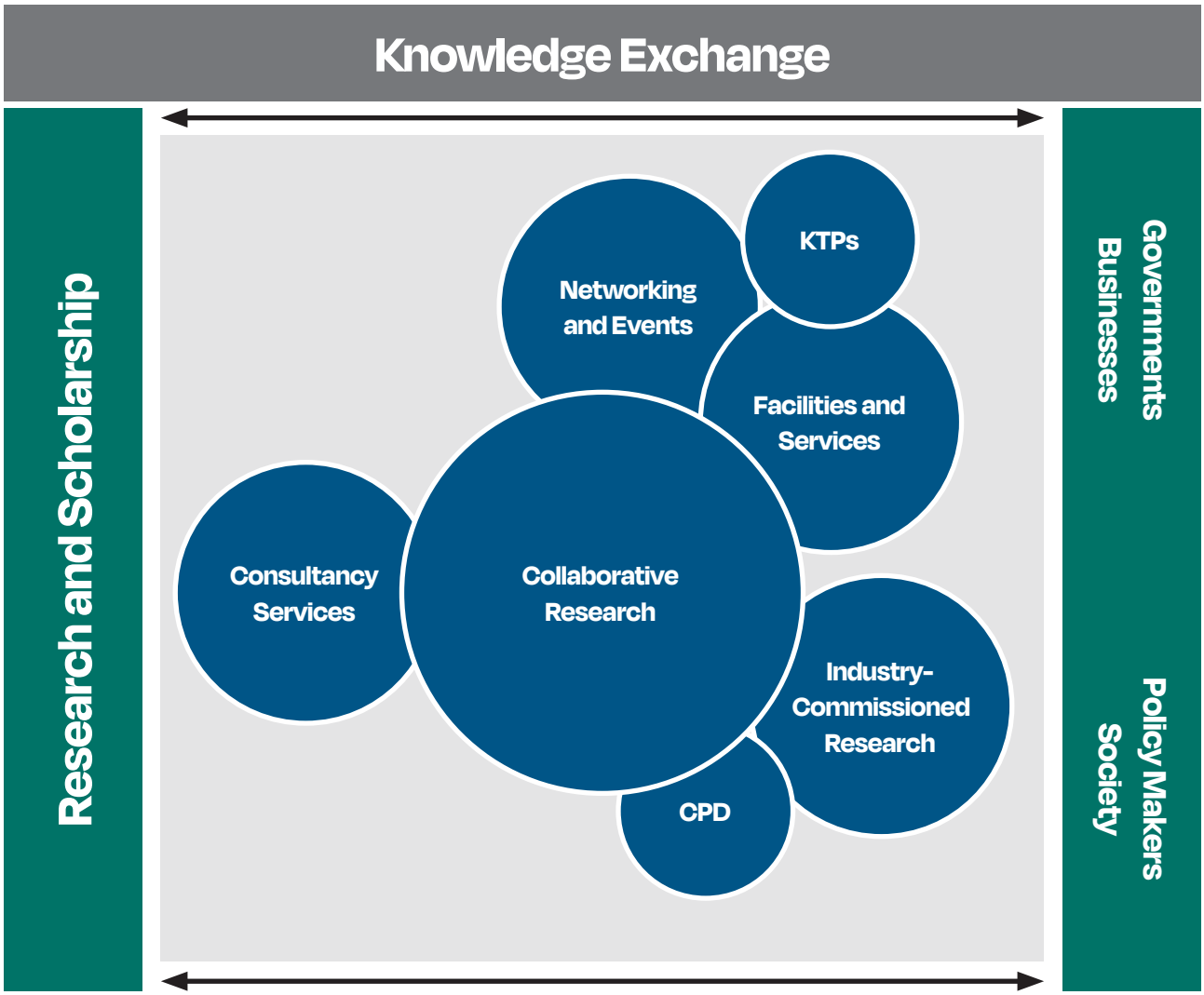
Priorities 2023-2025

- Build UHI capacity within Strategic Themes to allow UHI staff to engage with knowledge exchange (KE) and innovation activities, including increasing impact from academic research.
- Promote engagement of UHI Energy staff with key industry sectors through virtual and in-person events. This will enable opportunities for challenge-led research, KE activities, skills development and innovation.
- Engage with industry forums / supply chain organisations to ensure UHI expertise is highlighted.
- Expand KE activity with businesses through a diversity of funding sources (e.g., Innovate UK, Knowledge Transfer Partnerships, Innovation Vouchers).
- Build upon existing relationships with industry partners and collaborators; seek to establish and sustain larger strategic international and regional partnerships and opportunities for growth.
- Ensure KE activity is cross-cutting among various UHI strategic workstreams through widening engagement, awareness and impact from various programmes and networks.
- Increase income and embed benefits from KE activities within the Energy sector for UHI.

Knowledge Exchange

'Knowledge exchange encompasses the multiple interactions between higher education institutions and businesses, public services, charities and communities, to create societal and economic benefit'.

Knowledge exchange incorporates a two-way exchange between researchers and research users, bringing external perspectives and experiences into both academia and non-academic environments. Knowledge exchange activity leads to **mutually beneficial** impacts including job creation, curriculum and skills development, products, processes, services, public policy and the environment.



The UHI Energy Innovation Team is actively pursuing engagement in the future pipeline of renewable energy projects located throughout the Highlands and Islands region. This includes areas such as ScotWind and the North of Scotland Hydrogen Programme. Our UHI partner institutions are uniquely located in environments where the energy resources are. The university has world-class facilities and multi-disciplinary research teams who are focusing on, and providing solutions to, the big energy challenges of our time. Our research teams specialise in the key issues surrounding the interface between energy generation and environments, be they marine, coastal, terrestrial or socioeconomic.

Whether you are a company looking for technical assistance to help develop new products or processes, or a research institute, policy maker or other organisation wanting to tap into specialist expertise and facilities, the UHI is your ideal partner for knowledge exchange activities, collaborative and contract research, or consultancy services.

Policy Drivers

The Energy Innovation Strategy is informed by key international, UK and Scottish policy drivers to prioritise research and innovation challenges in the energy sector. In summary, renewable energy technologies, sustainable management and practices to support the net-zero transition, green skills development and job creation are the main priorities.

The international, UK and Scottish need for a transformational and accelerated energy transition is critical. This includes the **REPower EU** plan presented by the European Commission to significantly increase the green transition and stimulate major investment in renewable energy technologies. The United States is also prioritising investment with the **Department of Energy** announcing $420 Million into clean energy technologies and low-carbon manufacturing research.

Scotland's National Strategy for Economic Transformation strategy identified relevant industries for Scotland to maximise the opportunities of the next decade to achieve our vision of a 'wellbeing economy'. These key industries for Scotland include renewable energy (wind and tidal energy), hydrogen economy and the blue economy.

The Ten Point Plan for a Green Industrial Revolution aims to support up to 250,000 jobs for the Green Industrial Revolution by 2030. **Skills Development Scotland and the Scottish Government's Climate Emergency Skills Action Plan** indicates significant opportunities for quality green jobs, greater access to global green markets for Scottish businesses and embedding green skills. This is supported by the **Green Scotland Strategy** with areas of focus on the £100m Green Jobs fund, investment in 'green' apprenticeships and green skills, and £60m in manufacturing, energy transformation and low carbon infrastructure.

Scotland's Offshore Wind Policy Statement indicates the current focus for Scotland's renewable energy priorities including both wind energy and marine renewables. **The UK's Offshore Wind Sector Deal** outlines a target of at least 30 GW operational by 2030 providing over 30% of UK electricity.

The UK's Hydrogen Strategy and Scottish Government's Hydrogen Policy statement has an ambition of 5 GW low carbon hydrogen production by 2030 to help the UK meet its net zero ambitions. Scotland's goals for emission reduction targets aims for at least 75% lower than the baseline by 2030 and net zero emissions by 2045.

This Strategy aligns with the **University of the Highlands and Islands Strategic Vision and Plan,** and Energy research is embedded into various partner institution strategies: the Environmental Research Institute, UHI Shetland and the Scottish Association for Marine Science.

Case Studies

The Bryden Centre

This was a €9.4 million, cross-border, renewable energy research centre funded by the EU under the Interreg VA programme. The Bryden Centre covered Northern Ireland, Western Scotland and the Irish border regions. Bryden Centre research was aimed at harnessing the potential for Scotland, Northern Ireland and Ireland to become leaders in marine renewable energy and included a cohort of industry-led PhD studentships.

Hydrogen Utilization & Green Energy (HUGE)

This project provided communities in the Northern Periphery and Arctic (NPA) area energy and self-sufficiency, especially infrastructure providers, through hydrogen utilisation from excess green energy production. This includes designs of a techno-economic assessment tool and hydrogen utilisation business model. HUGE delivered several workshops for hydrogen knowledge transfer focusing on the opportunities and challenges for the deployment of hydrogen technologies in rural and peripheral regions, reaching over 5000 stakeholders.

Sustainable Aviation Test Environment (SATE) (Phase 1)

UHI was a key partner in the SATE project, based in Kirkwall, Orkney helping to directly input to the testing of hydrogen and other low carbon fuels. The Aeronautics and Aircraft Engineering departments also supported the design, certification and flight-testing of the alternatively fuelled aircraft. UHI's Environmental Research Institute was involved in the socio-economic impacts study, to better understand the implications of green aviation developments.

HM Government of Gibraltar

A collaboration between the Department of the Environment, Sustainability, Heritage and Climate Change (DESHCC) and UHI to investigate the potential for marine renewable energy solutions in Gibraltar. Oceanographic monitoring equipment was deployed for data collection on waves and tidal currents to inform marine renewable energy resource assessment and modelling.

Investigation of the novel challenges of integrated offshore Multi-Purpose Platform (INNO-MPP)

This project investigated the idea of a Multi-Purpose Platform (MPP), integrating renewable energy devices and aquaculture facilities, to find synergies to share in costs surrounding manufacturing, installation, operation and decommissioning. This project focused on 2 case studies in China and Scotland and resulted in several studies to determine MPP's response to metocean conditions, the importance of integrated control and power management strategies, and socio-economic and environmental impacts.

Validating Surface Currents at Offshore Renewable Energy Sites (V-SCORES)

This project aimed to develop a comprehensive validation of unmanned aerial vehicle (UAV) techniques for surface current spatial mapping, demonstrated at tidal stream sites. Field campaigns were conducted at commercial sites in the Pentland Firth, Scotland and Ramsey Sound, Wales under varying environmental conditions.

Abbey Ecosse, Industrial Biotechnology Innovation Centre (IBioIC)

A feasibility study involving flexible energy systems (anaerobic digestion of distillery co-products) investigating environmental metrics. The anaerobic digestion plant will be built at Forss Business Park in Northern Scotland. This involved collaborations between Abbey Ecosse, UHI and the University of Hull.

UHI | Energy Innovation

E-mail: energy@uhi.ac.uk | **Website:** www.uhi.ac.uk/energy