# UNLOCKING OFFSHORE CHARGING TO ENABLE DECARBONISATION

## A JOINT INDUSTRY POSITION PAPER

The offshore wind sector has pledged to deploy "low carbon Crew Transfer Vessels and Service Operation Vessels" to decarbonise the industry and increase the UK's competitive standing [1].

Utilising energy generated by the offshore wind farm in its most efficient form, offshore charging in combination with battery-powered service vessels presents one of the most promising and cost-efficient technologies to deliver low carbon vessel operations. Through Government and industry funded research and development, offshore charging concepts have progressed to a high technology readiness level with prototypes being used for in-field demonstrations. The challenge now, is to move from demonstrations to long term trials and commercialisation [2]

Many of the remaining barriers to commercialisation are no longer technical; they are regulatory, commercial, operational and procedural. Unlike traditional vessels operated on fossil fuels (that have had decades to embed supply chains, procedures, and regulations) battery-electric powered vessels will need to operate in an environment that was not set-up with offshore charging in mind. **This paper makes a set of recommendations that will remove barriers to offshore charging, with low to negative costs involved for the enabling parties.**

Although suppliers delivering this technology believe that there is a compelling case that offshore charging presents the optimum means of decarbonising the offshore wind fleet, this paper does not seek to pick winning technologies for vessel decarbonisation. Instead, this cross-value-chain industry coalition representing offshore wind developers, vessel owners, vessel designers, technology suppliers, and industry organisations sets out a series of recommendations that will level the playing field for offshore charging and correct unintentional market failure.

There are various potential mechanisms that could be used to incentivise emissions reductions for offshore wind vessels. Although these would be welcomed as a powerful enabler of offshore charging, they are part of wider discussions around maritime and offshore wind decarbonisation, and so are out of scope for this position paper.

# Background

The UK is a global leader in offshore wind energy (OSW) deployment, generating clean electricity that reduces dependence on fossil fuels and plays a vital role in achieving net-zero. Every stage of an offshore wind farm's life—installation, operations and maintenance, and decommissioning—relies on a diverse fleet of vessels that currently run on marine gas oil (MGO), contributing to both local air pollution and global emissions. Although OSW remains far cleaner than fossil-fuel generation, there are still significant emissions, and vessel operations contribute around 33% to an OSW farms LCA emissions [3]. The sector is committed to further reducing its carbon footprint, and decarbonising the supporting maritime fleet is an essential part of that effort.

Crew Transfer Vessels (CTVs) and Service Operation Vessels (SOVs) are key targets for emissions reduction in offshore wind. CTVs are smaller vessels (15-30m) that transport technicians daily between port and the wind farm, while larger SOVs (60-120m) remain on site for two to three week periods with technicians sleeping aboard.

Offshore charging is emerging as a leading solution to replace marine gas oil in CTVs and SOVs. By using the existing offshore electrical infrastructure, vessels can plug directly into the offshore wind farm to access zero-emission power. As battery costs fall and vessel electrification advances, fully electric operations, where vessels complete their entire voyage after offshore charging, are increasingly achievable. While potentially transformational for decarbonising the OSW fleet, across a normal day's operation, offshore charging is forecast to use only around 0.1% of a large wind farms electrical output.

The Clean Maritime Demonstration Competition (CMDC) programme (funded by UKSHORE part of the Department for Transport) has been instrumental in supporting UK based organisations in developing offshore charging technology, with projects supported in every round of the competition including the high TRL ZEVI competition. As a result, UK plc is heavily embedded in the offshore charging industry and progression of the technology stands to benefit the UK both from an economic and decarbonisation standpoint.

**Key Elements of an Offshore Charging System**

Integration into wind farm infrastructure: Electrical supply capability and installation space on turbines, substations, or dedicated foundations, or cable interface for buoy systems.

Charging Equipment: Connectors, reelers, power management and control systems.

Vessels: Electric or hybrid vessels with receptacle for connector and electrical integration into battery system.

Power Access: The contractual, pricing, and regulatory framework that governs whether a vessel can charge from the windfarm.

Of these elements the access to power currently has the most uncertainty.

For an in-depth review of key players and technology maturity see [2]. For white papers and feed studies please see [4] [5] [6]

# RECOMMENDATIONS

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**1. Integrate offshore charging into early project development**

**Barrier**

Offshore charging is often not considered in early project phases. Retrofitting charging capacity later may be infeasible or prohibitively expensive.

**Actions**

- Requirement or incentives for offshore charging feasibility assessments during site selection, early studies, or FEED.
- Set expectations that spatial, structural, and electrical capacity for charging should be designed into windfarms from the outset by issuing guidance to make offshore charging part of standard development practice.

**Outcomes**

Including design considerations for offshore charging in the initial planning phase of OSW farms ensures vessel procurement teams have the option of procuring battery electric vessels without the comparatively higher costs of specifying offshore charge points later in the wind farm design phase.

**Action Holders**

- The Crown Estate, Crown Estate Scotland
- Wind Farm developers

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**2. Clarify and enable commercial access to offshore electricity**

**Barrier**

Contract for Difference rules do not explicitly cover offshore electricity use and there is a lack of metering and contractual arrangements to permit energy use for O&M related marine operations without legal ambiguity. Offshore electricity has the potential to provide vessels with low-cost energy without subsidy, however in the current situation power prices and access are uncertain.

**Action**

- Establish clear commercial frameworks allowing wind-farm electricity to charge operational vessels. Create clear metering, billing, and contractual provisions for offshore electricity use.
- Set a clear and fair financial structure for using electricity, either by removing consumed electricity from CfD, or allowing wind farm operators to be wholesale customers for electricity they generate.

**Outcomes**

Although power used by charging vessels will be small compared to overall wind farm production (~0.1% for a GW scale wind farm), access to this power is essential to operating electric vessels. Allowing operators use this small portion of production will have a negligible effect on power output whilst delivering significant carbon reduction.

**Action Holders**

- DESNZ
- LCCC
- OFTOs
- Offshore Wind Farm Owners

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**3. Enable a first full scale offshore charging demonstrator**

**Barrier**

Successive rounds of commercial investment and private funding have brought the individual components of this technology (vessels, charging infrastructure) to a high TRL. Early deployment however is high-risk for developers and vessel owners and there is no established reference case for safety, operability, or commercial arrangements. Full scale trials to fully derisk the technology before wind farm developers will commit to multi million pound procurements.

**Action**

- Bring together funders with commercial parties to develop a structured demonstration programme to generate lessons learned, standards, and commercial models.

**Outcomes**

Full-scale offshore charging demonstrations will present the final step in derisking this technology, giving wind farm developers the commercial confidence to specify offshore charging as a tender option.

**Action Holders**

- Funding bodies
- Wind Farm developers
- Vessel Operators
- Offshore charging technology developers
- Research and Technology Organisations

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# Signatories

**Operation Zero** There is broad support for an accelerated transition to clean maritime operations in the UK and neighbouring North Sea offshore wind nations. However, although much of the technology exists to deliver this vision, many barriers remain. 'Operation Zero aims to facilitate the collaboration needed to overcome these barriers, with a view to making zero emission operations and maintenance vessels a reality

**Bibby Marine** has over 200 years of maritime heritage and is proud to be leading the development of the world's first electric Commissioning Service Operation Vessel (eCSOV). We strongly support this proposition paper because we believe electrification of offshore wind support vessels, powered by clean renewable energy at source, is the clearest path to decarbonising operations

**Carbon Trust.** We work at the forefront of the global offshore wind industry, collaborating with governments, developers and innovators to make fixed and floating offshore wind a viable commercial energy generation solution.

**Equinor** is an international energy company committed to long-term value creation in a low-carbon future. We deliver energy today, while developing energy solutions for tomorrow.

**Maritime CleanTech** represents one of the world's most complete maritime commercial hubs. We develop energy-efficient and sustainable technologies in collaboration with partners. Being part of the industry-wide group assembled in Newcastle to unlock offshore-charging in UK, we strongly support this position paper.

**MJR** UK Northeast based MJR Power & Automation has been at the forefront of O&M fleets electrification for the last 10 years, supplying turnkey and field proven solutions to wind farm developers and vessel owners. Formalisation of offshore energy offtake regulatory framework is recognised key to generalisation of MJR's offshore charging technology

**North Star** is the largest owner operator of SOV's in the long-term Offshore Wind infrastructure support sector, providing a fully integrated ship management and operational excellence across European projects.

**ORE Catapult** As the UK's leading technology innovation and research centre for offshore renewable energy, we play a key role in delivering the UK's Net Zero targets by accelerating the creation and growth of UK companies in the offshore renewable energy sector.

**Siemens Gamesa** is an industry leader in the wind power sector, supplying advanced onshore and offshore wind turbines. Commitment to renewable energy is essential for achieving a carbon-neutral future, to support the global shift towards clean energy solutions. By collaborating with industry partners, we aim to overcome challenges in the offshore charging landscape, driving innovation and sustainable practices.

**Stillstrom** We are committed to transforming the maritime sector by delivering reliable and safe offshore power and charging solutions that support decarbonisation through electrification and reduce GHG emissions. Our mission is to minimise carbon emissions and environmental impact by ensuring vessels have access to uninterrupted power supply while offshore. Leading the way in offshore power and charging, for an emissions-free maritime future.

**Tidal Transit** operates 10 Crew Transfer Vessels servicing windfarms around the UK and Europe. The company is currently completing the world's first CTV retrofit to 100% electric and is building out a fleet of electrified CTVs due to launch in 2027. Infrastructure both onshore and offshore is key to the successful deployment of these vessels that have the potential to eliminate or significantly reduce CO2 emissions from offshore wind logistics.

**VARD** and our subsidiary **Seaonics** regard offshore charging as the single most promising technology to enable zero-emission ship operations in wind farms. We therefore give our absolute support to the content of this document

## Further Reading

Marine Cleantech's Whitepaper [7]

Bibby Marine's cost analysis [8]

## References


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