# CHARGING ELECTRIC AND HYBRID VESSELS AT SEA

Equinor is a leading broad energy partner to the UK, supplying natural gas from Norway, developing domestic energy resources and generating low-carbon electricity. Equinor has been operating in the UK for nearly 40 years and aims to reach net zero emissions globally by 2050. Headquartered in Norway, the company employs 22,000 people globally, and over 650 in the UK. Equinor supports the UK economy by investing billions in crucial energy infrastructure, working with over 700 suppliers across the country.

Equinor currently powers around 750,000 UK homes through its three operational wind farms; Sheringham Shoal, Dudgeon, and the world's first floating wind farm, Hywind Scotland. In partnership with SSE Renewables and Eni Plenitude, Equinor is building the largest offshore wind farm in the world, Dogger Bank, off the Northeast coast of England, and is maturing its plans to extend both the Dudgeon and Sheringham Shoal wind farms.

| Challenge Background |
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| To achieve UN Sustainable Development goals and combat climate change, reducing emissions from vessels and ships is an action being taken by many agencies. According to IMO's website, " *IMO has adopted mandatory measures to reduce emissions of greenhouse gases from international shipping, under IMO's pollution prevention treaty (MARPOL) - the Energy Efficiency Design Index (EEDI) mandatory for new ships, and the Ship Energy Efficiency Management Plan (SEEMP).*<br><br>*In 2018, IMO adopted an initial strategy on the reduction of GHG emissions from ships, setting out a vision which confirms IMO's commitment to reducing GHG emissions from international shipping and to phasing them out as soon as possible."*<br><br>Based on the next steps to implement the strategy to decarbonize international vessels, it is expected that many vessels would become electrically driven or hybrid.<br>In both cases, the long distances to attend offshore stations and wind turbines can be challenging for the vessels' batteries autonomy.<br><br>This challenge is seeking solutions to allow vessels to recharge at sea, using the power available from the offshore substation. With that, service vessels (Crew Transfer Vessels (CTVs) and Service Operation Vessels (SOVs)) can recharge while offshore, ensuring their presence offshore is longer without returning for charging at a port. |

| Solution Requirements | |
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| **Functional Requirements** | Proposed solutions should consider current vessel technologies and proposed and potential developments in the offshore wind industry.<br><br>Proposed technologies should make considerations for:<br>• How the charging station is engineered including any mooring/anchoring requirements for floating solutions<br>• Power cabling requirements to source power from the offshore substation platform |

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| | • Any buoyancy requirements to enable the operations.<br>• How safe access can be maintained<br>• Ensuring that the charging station can be utilised safely in a range of common operating conditions in which vessels operate |
| **Technical Characteristics** | Proposed technologies should enable/consider:<br>• Technology shall consider electric availability provided from the Offshore Station Platform<br>• Remote communication related to the charging activities with the onshore control room. Communication with control room shall be performed using SCADA<br>• That the Offshore Station Platform and charging station are unmanned<br>• Maintenance requirements to be observed. Maintenance should not be required more often than annually.<br>• Due to safety, vessels are not allowed to be close to the platform (minimum 10m distance). There is a risk that if the vessel loses its positioning control, there will be a collision to the platform.<br>• Safety requirements for a safe electric charging offshore on a moving vessel (subject to current, waves, wind etc) |
| **Operating Conditions** | • Water depth (m): 80 to 105<br>• Seabed: Sand, Mud/muddy sand<br>• Mean wave heights (m Hs): 1.5 to 2.2<br>• Distance to shore (km): 135 |
| **Cost Requirements** | • No immediate cost requirements foreseen. However, the solution needs to consider the cost benefit of charging the vessel offshore versus the time consumed for the vessel to return to shore for re-charging. |

| **Market Opportunity** |
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| This solution can benefit all wind farms around the Globe. As more and more vessels shift to more sustainable and greener sources of fuel, this solution can be implemented in all wind farms. |

| **Eligibility and Further Information** | |
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| **Eligibility** | Entrants to this competition must be:<br><br>• Established businesses, start-ups, SMEs (Small-Medium Enterprises) or individual entrepreneurs<br>• UK based or have the intention to set up a UK base<br>• Minimum of TRL (Technology Readiness Level) Four. See link for further detail on the TRL scale https://enspire.science/trl-scale-horizon-2020-erc-explained/ |

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| **Assessment** | Applications will be assessed on:<br><br>• Applicability to the challenge<br>• Innovativeness of the solution<br>• Coherence of proposed business model and company vision<br>• Feasibility and economic viability, including ability of the team to progress the solution<br>• Development potential<br>• Maturity of the solution<br>• Ability to launch product and ease of implementation |
| **IP & Commercial Route** | • Existing background IP associated with a potential solution will remain with Launch Academy Applicant(s)/Participant(s). Where any new IP generation is envisaged during the Launch Academy programme, it will be subject to the mutual IP agreement of the Launch Academy Participant(s) and Launch Academy Sponsors if it is jointly developed. If new IP is developed solely by the Participant then it will remain with the Participant.<br>• Where necessary, a non-disclosure agreement (NDA) may be signed to uphold confidentiality in the engagement between the Launch Academy Participant(s) and Launch Academy Sponsors.<br>• ORE Catapult do not take any share of IP ownership or enter commercial ventures through the Launch Academy programme. |