CMAL: Decarbonising Scotland's ferries on the route to Net Zero

Briefing for Net Zero, Energy & Transport Committee

February 2023

The maritime sector is estimated to contribute circa 3% of emissions globally. It is therefore essential that the next generation of vessels and harbours are environmentally friendly and sustainable. CMAL is taking a leading role in driving down emissions from both vessel and port infrastructure assets.

CMAL is the asset owner of both ports and vessels that are a key element in providing lifeline ferry services in Scotland both on the Clyde and Hebrides routes and the Northern Isles routes. Within our portfolio we are the owners of 37 ferries and 26 port facilities which are all critical infrastructure assets supporting the island communities within Scotland.

It is one of CMAL's key priorities to consider innovative solutions to limit the carbon footprint and emissions that are associated with both our vessels and port infrastructure.

As global technological advances in ferry decarbonisation progress, we will adopt new technologies for both vessels and harbours that will further reduce, if not eliminate, harmful emissions. Our future vessels will be designed to support retrofitting as new technologies are introduced.

CMAL are also partners in a pioneering research study, HYSEAS III, on the viability of alternative, renewable maritime fuels. We will endeavour to share this with the Committee when it is published.

We are currently scoping the role of Environmental Manager, an important new role for CMAL, which will strengthen our processes to measure, record and report on our primary and secondary emissions. Our targets are aligned with the Scottish Government targets to achieve Net Zero by 2045 and will identify clear ways to and timescales to deliver these targets.

Vessels

Turning to focus particularly on vessels, one key aspect in reducing carbon footprint and emissions is to continue our work regarding the adoption of alternative fuels to power ferries. Our current investment plan in new vessels ensures greater fuel efficiency across the network as research to develop greener fuels continues.

Within our fleet, we have already taken innovative action by exploring alternatives to low sulphur marine diesel oil.

Our vessel engineers were responsible for introducing the world's first diesel-electric hybrid ferries, MV Hallaig (2012), MV Lochinvar (2014) and MV Catriona (2016). This technology enables these three vessels to operate on the batteries for 30% of each working day. The batteries are charged using shore power connections from the grid.

As part of the Small Vessel Replacement Programme, we are currently finalising the concept designs for an initial seven small ferries (Phase 1) followed by a further three small ferries (Phase 2) that will enable each vessel to work from battery power for 100 per cent of each day. Phase 1 concept designs will be completed in Q1 2023 and then the vessels will be tendered with an ambition to achieve contract signing in Q4 2023. The batteries are charged using shore power connections from the grid.

We have two dual fuel vessels under construction, the MV Glenn Sannox and Hull 802, that will be able to operate on liquefied natural gas (LNG), a cleaner fuel compared to diesel. It is anticipated that these vessels will reduce the carbon footprint of our ferry fleet by 25 per cent overall and almost eliminate emissions such as NOx, SOx and particulates.

We continue to seek new ways to power vessels by adopting further advances in battery technology and electrifying our fleet. We are progressively rolling out the ability of our major ferry fleet to connect to shore power when alongside overnight. This will, in turn, enable the diesel generators to be switched off, reducing carbon emissions and noise pollution.

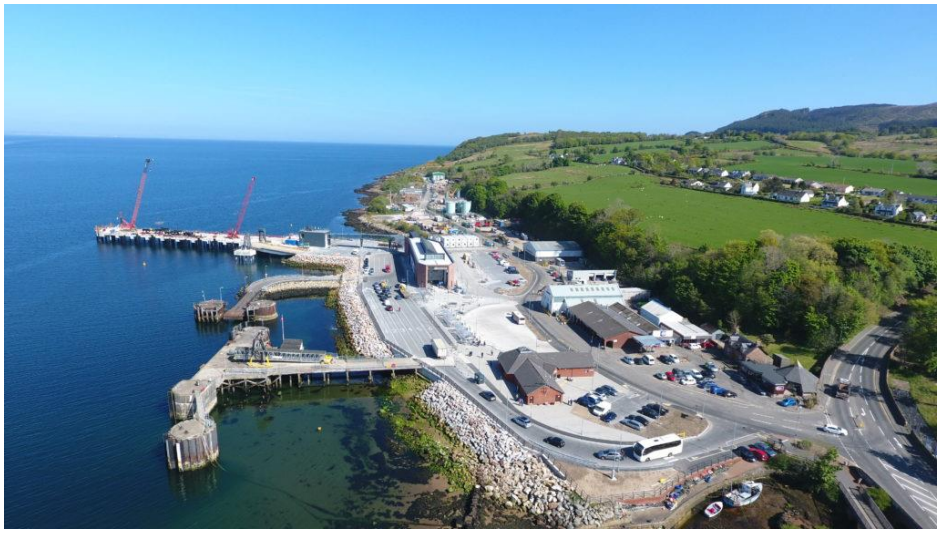
Importantly, our vessels team are involved in ground-breaking projects to use carbon-free fuels. We are a partner in the HYSEAS III project to develop Europe's first sea-going vehicle and passenger ferry powered by hydrogen fuel cells. The HYSEAS III Consortium comprises of an experienced team of commercial and public sector organisations from France, Norway, Sweden and Germany working with partners in Scotland including CMAL, Orkney Ferries and the University of St Andrews. CMAL is part of a European Consortium and within that we have been responsible for vessel design and gaining 'Approval in Principle' from DNV which was awarded in Q4 2022.

We are also working with the University of Strathclyde to conduct a study into the operational and commercial viability of ammonia, hydrogen, and inland electricity as maritime fuels.

Whilst technology is advancing at pace there is currently no true solution to attaining Net Zero within the major ferries fleet. However, through innovative design, hull form, propulsion technologies and adoption of battery solutions our latest orders for two new major ferries within the fleet to serve the Uig Triangle will achieve a reduction in power of 40 per cent that directly correlates to an improved fuel efficiency with a 40 per cent reduction in carbon, NOx, SOx and particulates.

Ports and Harbours

CMAL also owns and maintains 26 harbours, with associated buildings and infrastructure. Our harbours engineers, surveyors and project managers are equally committed to designing and building greener, more sustainable infrastructure. We continually investigate improved solutions for implementation across our network. This will facilitate lifeline services for years to come.



Implementing measures to reduce our carbon output through harbours is not a one-size-fits-all approach.

Examples of innovation combined with carbon reduction:

- Biomass boiler and solar panels at Brodick Ferry Terminal, Arran
- Reed beds at Portavadie provide a low-cost, zero energy wastewater treatment system
- Air source heating system at Tarbert Ferry Terminal

When designing new buildings, CMAL endeavour to implement as many energy saving measures as we are able to within that location. As with our fleet, we will adopt new technologies for ports vessels and harbours that will further reduce, if not eliminate, harmful emissions in order that we play our part in realising our Net Zero ambitions by 2045.

For more information, please contact Brian Fulton