

Caledonian MacBrayne
Clyde & Hebridean Ferries

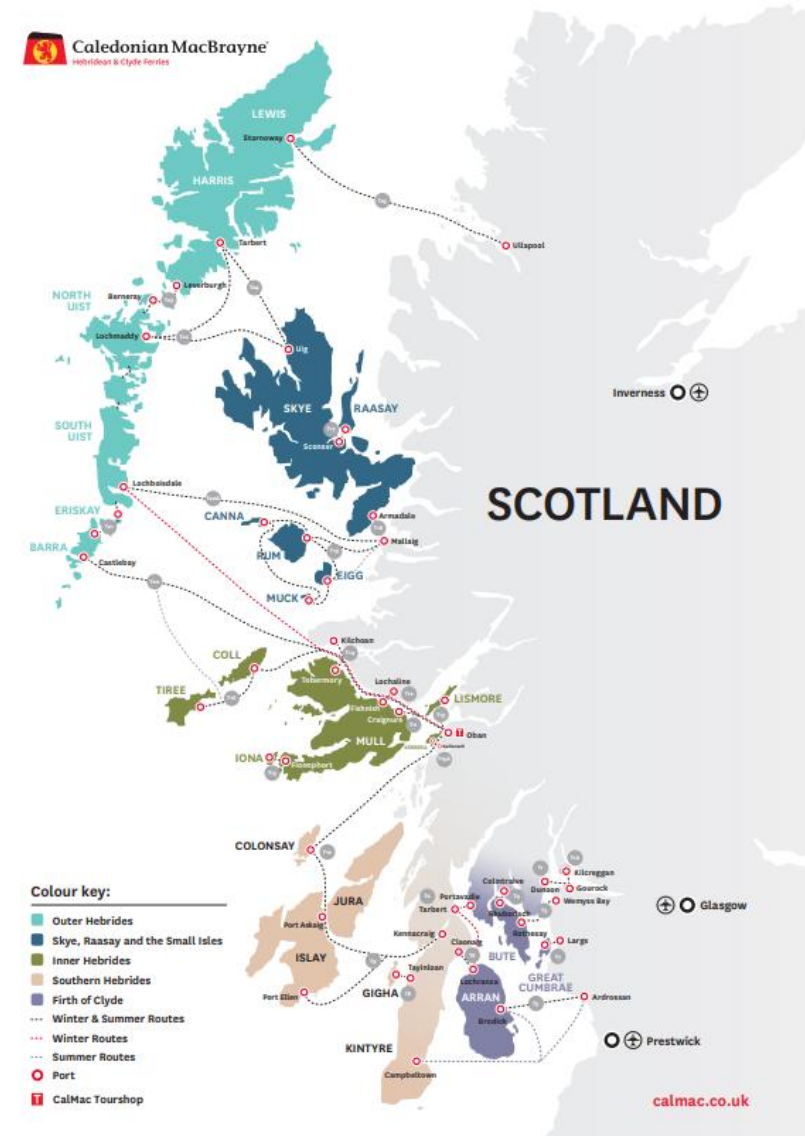
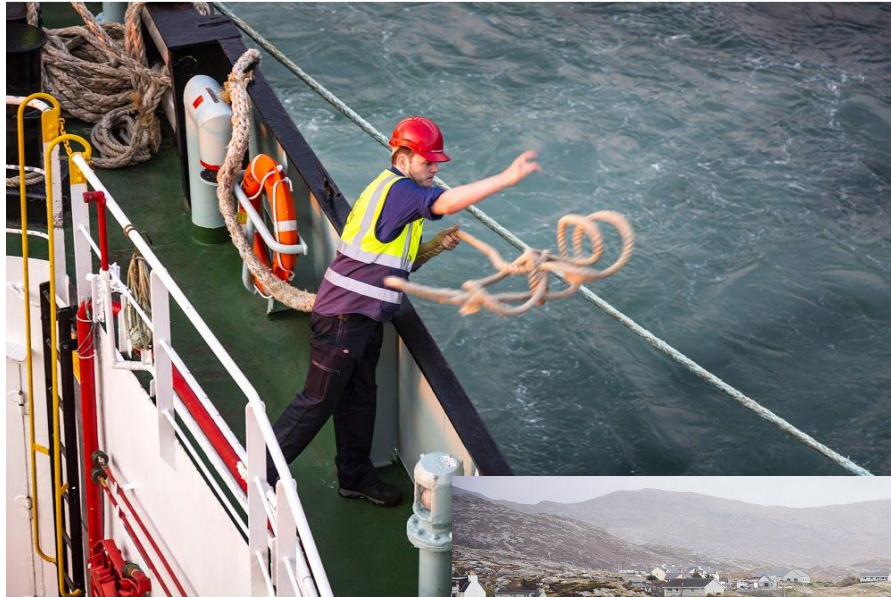
Maritime Industry Decarbonisation Symposium

30 October 2025

Alex Cross
Director Standards and
Performance



Introduction to CalMac



Introduction to CalMac



1/3

< 20 yrs old

1/3

20 – 30 yrs old

1/3

> 30 yrs old

Small Vessels



Passenger Vessels



Hybrids



Major Vessels



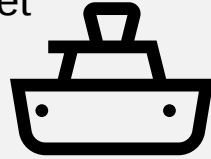
Workboat



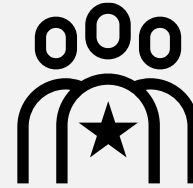
A lifeline service for our communities



UK's largest ferry company
with **35** vessels in the fleet



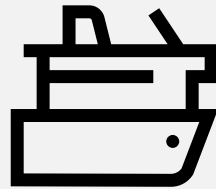
Employees:
2,000



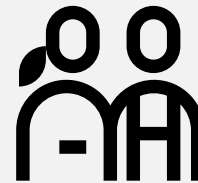
Iconic Scottish brand serving
28 island and remote mainland
communities



Scheduled Sailings:
172,370 (500+ per day)



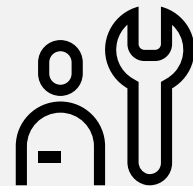
Shipped
Passengers (2019):
5.7 million



Weather Cancellations:
2.4% (2/100 sailings)



Technical Cancellations:
1.2% (1/100 sailings)



Customer Satisfaction (Oct 2023):
90%



Challenges

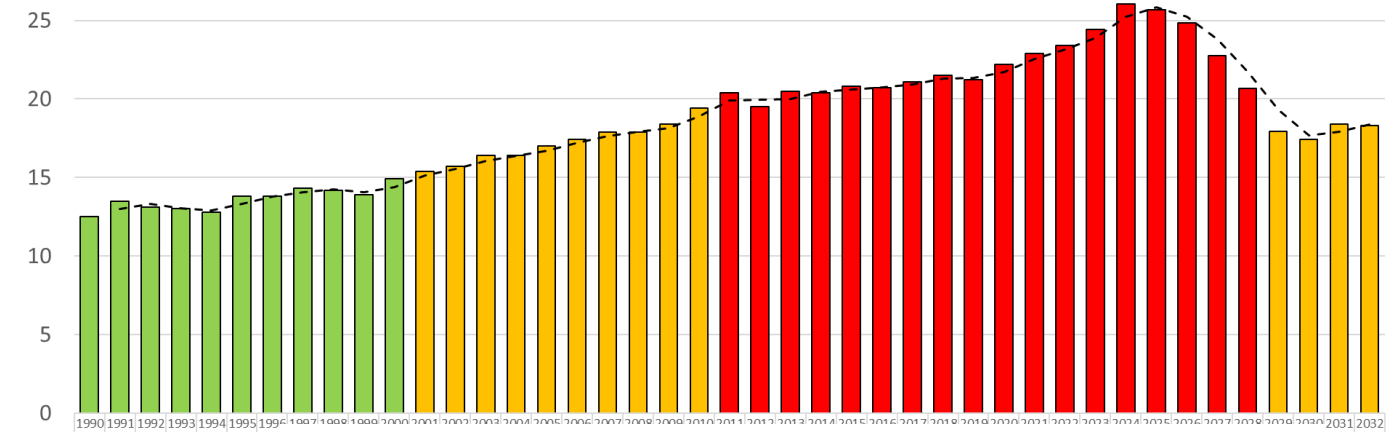
- Increasing demand driven by success of RET creating capacity constraints
- Full deployment of all our vessels with no spare vessels to supplement capacity
- Average age of fleet 25 years (reducing)
- Changing weather patterns
- Lack of standardisation leading to complicated supply chain - 467 suppliers used in FY22/23
- Record levels of investment to improve vessel resilience and reliability - 117% increase to £45m in FY23/24

On the horizon

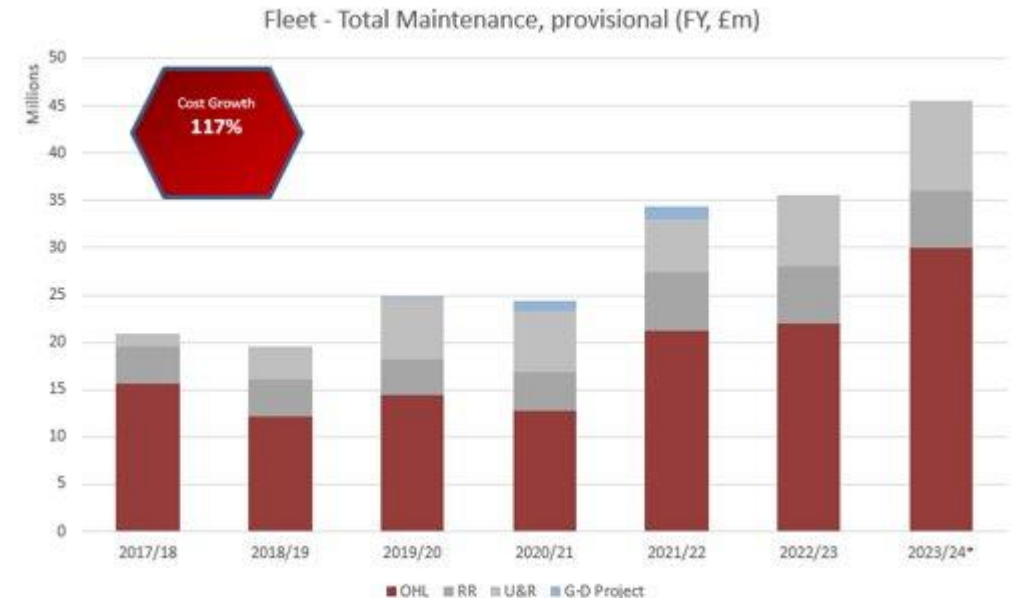
- 6 major vessels and 10 smaller vessels will improve capacity and resilience



Fleet average age 1990 - 2032



Investment 2017 - 2023



Net Zero: Legislation and policy framework



National UK

Target: Net-zero by 2050

- Transport Decarbonisation Plan
- Maritime 2050: navigating the future and UK Clean Maritime Plan
- Consultations on Shore Power, UK ETS, Low Carbon Ports

Regional Scotland

Target: Net-zero by 2045

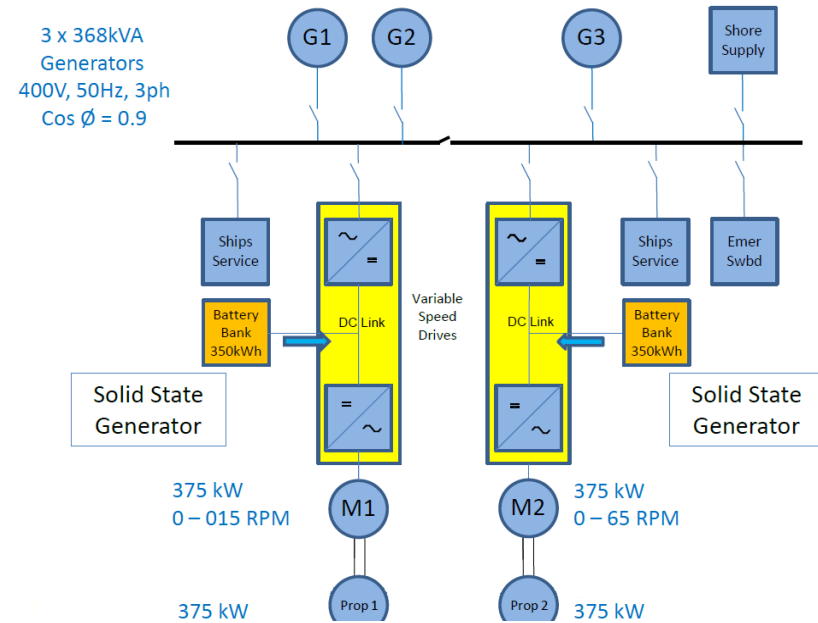
- Scotland's National Transport Strategy
- Islands Connectivity Plan (in draft)



Outlining the capabilities of the Hybrid Ferries and their operational tasks



- MV Hallaig entered service 2013
- MV Lochinvar entered service 2014
- MV Catriona entered service 2016
- Diesel Electric Hybrid powertrain



Outlining the capabilities of the Hybrid Ferries and their operational tasks



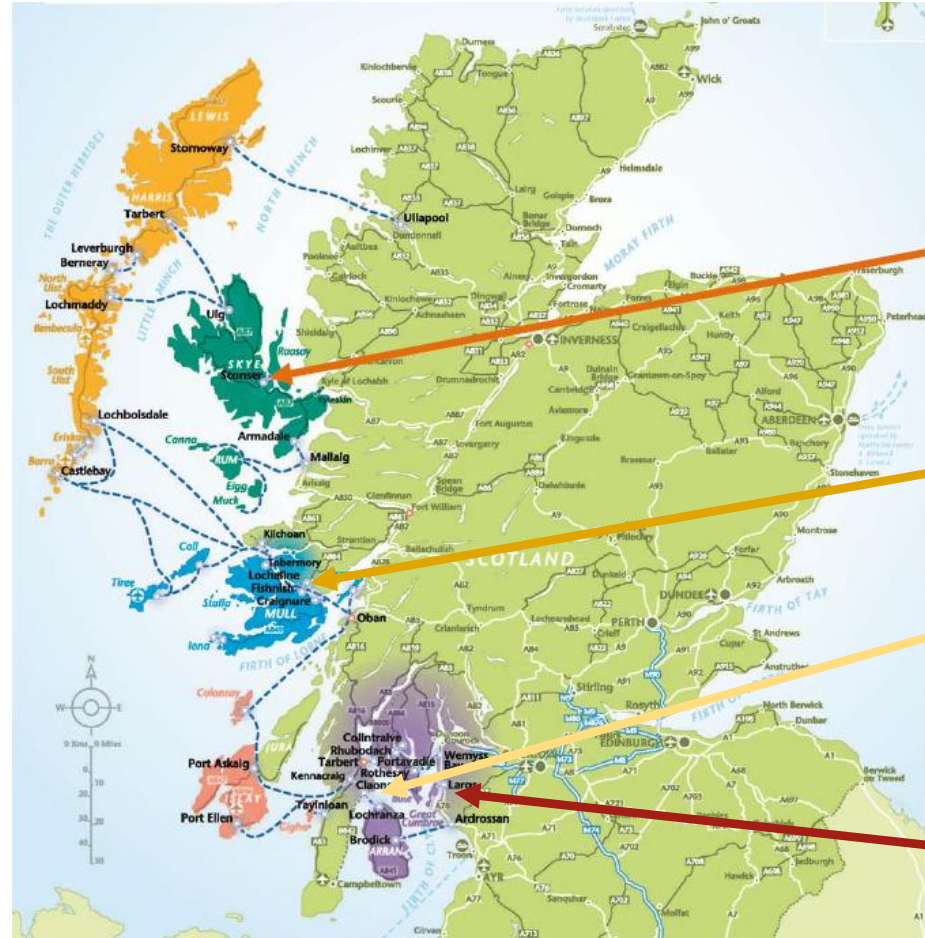
Raasay



Lochranza



Sconser



Hallaig:
Sconser – Raasay

Lochinvar:
Fishnish – Lochaline

Catriona:
Lochranza – Claonaig

Overhaul location:
Clyde

Working with Hybrid Vessels Electrical Storage – Batteries



- Technology
 - › Propulsion control system modes – crew training
 - › Complex computer control vs ‘simple’ diesel mechanical, lack of engineers
 - › Battery discharge and charging cycles
- Management of battery when moving for overhaul
- Management of defects
 - › Battery Cell imbalances
 - › Battery cell failures
 - › Wider defects and implications on hybrid systems
- Firefighting / Safety – fixed STAT-X chemical FF system
- Battery capacity reduction / battery replacement



Fire Risk (Example) Hallaig Venting Incident



Fire Risk (Example)

Hallaig Venting Incident



Fire Risk (Example)

Hallaig Venting Incident



- Incident
 - › Vent not fire – safety in design
 - › Firefighting medium
 - › Remote location / Firefighting capability
 - › What if it had happened at sea?
- Post Incident recovery
 - › Initial safety case review / risk assessment / managing the recovery
 - › Removal and disposal of batteries
- Investigation
 - › Internal investigation with support from external specialists.
- Lessons Learned
 - › Positive - Safety in design
 - › Early design of systems / batteries
 - › Age of batteries
 - › Firefighting medium
 - › Lack of knowledge of how to manage these types of situation
 - › Technology is advancing
 - › Low Carbon / Net Zero generates novel risks

Defining Future Ferry Design - Options



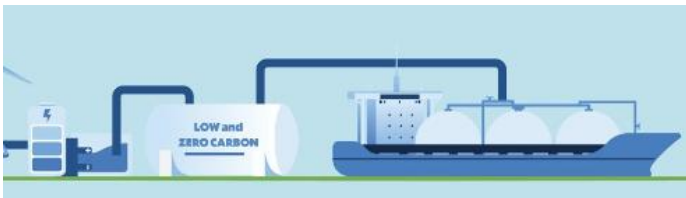
- Industry is at a crossroads and future is uncertain
- Options for zero carbon energy in:
 - › Electricity from grid (how is it generated & stored)
 - › Biofuels (Land space?)
 - › Hydrogen
 - › Renewable liquid fuels (Methanol / Ethanol / Ammonia)
 - › Wind – direct or indirect
 - › Nuclear fuel?!



Defining Future Ferry Design - Challenges



- Energy density (volume and weight)
- Energy losses in production of Green Fuels
- Dodgy' claims / sorting the misunderstandings / "true green"
- Grid capacity and availability of Shore Power
- Lack of market-based incentives
- Third party ports
- Weather
- Storage



Net Zero: Conclusion



- There is a clear and legally binding direction to get to NetZero (in the UK)
- For operators to consider the transition they need:
 - › Regulatory direction
 - › Market based incentives
 - › Significant upgrade of the Grid to support charging in remote areas



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Thank you



High Level Timeline

