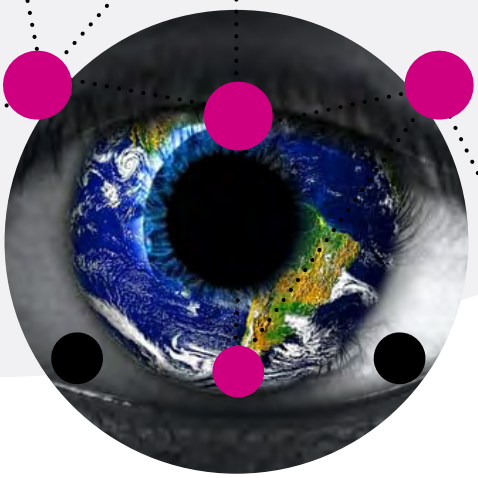

NICER PROGRAMME & INNOVATE UK

CIRCULAR ECONOMY FOR SMEs

ECOMAR Propulsion

UKRI Interdisciplinary Centre for Technology Metals

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CIRCULAR ECONOMY FOR SMEs

The Challenge: What We Were Trying to Achieve

Ecomar Propulsion Limited is a UK-based SME producing two main clean electric marine products: 1) A new to market, robust and powerful electric outboard and 2) an internal motor driven system for larger vessels. They are designed to run on batteries and hydrogen and as a unique selling point (USP), it is part of the company strategy to ensure that as much of the product as possible can be made from recycled or repurposed material and, at the end of use, as much of the product can be recycled or repurposed. It was also an opportunity to establish a credible system of measuring embedded carbon in material choice to ensure that we were able to provide the company with **Eco**logical **Mar**ine products.

The Approach: How We Tackled the Challenge

We conducted an initial review of our current Bill of Materials, with a focus on identifying further opportunities to utilise recycled materials in source products. The review resulted in 12 main recommendations for incorporating already recycled materials, which are expected to generate significant impact.

In addition to these recommendations, the company also identified future recycling opportunities for materials that require limited processing at the end of their useful life. By implementing these opportunities, we hope to continue reducing waste and promoting the principles of circularity in our activities.

During the review process, the team also discovered that there are various ways of measuring Embedded Carbon materials, but there is no clear leader in the field. To address this, we used a Birmingham University approach but found that overall, the accuracy of the findings was uncertain.

As a result of the knowledge gained during this review, Ecomar Propulsion has prioritized Responsible Sourcing in our future supply chains. By taking a proactive approach to circularity, the company aims to become a leader in the industry and set an example for others to follow.

Unexpected Outcomes: What We Learned Along the Way

The main observation and unexpected result were when measuring the embedded carbon in an electric outboard compared with a petrol outboard. The electric outboard has fewer parts than a conventional petrol engine, but its embedded carbon is higher due to the large amounts of copper used in electric propulsion systems. However, measuring the use of each with a Greenpeace study boat found that the electric outboard saves 266 tonnes of polluting emissions over its whole life cycle, despite its higher embedded carbon.

The second major observation from the project highlights the inadequate engagement offered in the supply chain, particularly towards SMEs. This refers to the absence of explanations regarding the source material supply chain to ensure Responsible Stewardship and compliance with 'Good Practice' organisations.

Key Learning: What We Would Do Differently Next Time

From a commercial perspective, having access to respected specialists in the field of material choice and the issues involved in Responsible Stewardship were the most important results from this feasibility study.

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The team conducting the research proposed 12 initial recommendations for material choices, which are currently being analysed. However, it was the conversations concerning exploitation in sourcing materials that brought to light the challenges surrounding the extraction of rare earth and technology metals and had a profound impact on the team. If these matters had not been addressed during the project, the approach to material selection would have been much more sterile and not aligned with our values.

Making a difference has a cost and commercial discussions alone cannot be the only factor!

The Outcome: What We Achieved and How It Has Impacted the Business, Society and Key Stakeholders

As a company, we achieved a full review of our Bill of Materials to discover expert advice on future material choices, not only on recyclability but also to do with the impact certain materials would have using electric power in water.

The impact allows the teams to make different choices in the future in terms of obtaining parts already made from recycled material and using materials that can be more easily recycled at the end of the product's useful life (a core principle of the circular economy, where reuse or remanufacture is not possible). The team also now have more awareness of the societal issues faced by those in countries where source materials are extracted and the potential for exploitation of those labourers. More enquiries will be made to ensure suppliers will be registered with recognized and respected industry bodies such as the Global Battery Alliance who monitor good practice.

Looking Forward: Next Steps and Future Directions

Our work will continue to assess current material choices against the recommendations from the feasibility study based on suitability for the extremes of the marine environment and cost to implement against our aspiration to 'do the right thing'.

We have already committed to the following opportunities to communicate our findings:

- Project discussed with Solent LEP during workshop visit and now guest speaker at event in April at National Oceanographic Centre Southampton University
- Met4Tech been selected to submit academic papers to a project hosted by the University of Cambridge

The main impact from a commercial perspective is that we can, with credibility, discuss our material choices and publicly showcase our commitment to sustainable practices.

By implementing the recommended changes, we not only differentiate ourselves in the emerging technology market but also establish a unique selling point that sets us apart from our competitors. This presents us with a valuable opportunity to lead the charge in driving positive change towards a more circular future.

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This project was funded by the UKRI National Interdisciplinary Circular Economy Research Programme and Innovate UK. Development of the case studies has been supported by the UKRI Circular Economy Hub. More information about the CE-Hub can be found here.

Research was carried out by ECOMAR Propulsion with support from the UKRI Interdisciplinary Circular Economy Centre for Technology Metals.