



DECARBONISING MARINE ARCHAEOLOGY

MSDS Marine

MSDS Marine are a specialist marine and coastal contractor based in Derbyshire, UK with extensive experience in offering bespoke archaeological solutions. MSDS Marine offer archaeological services including diving services for historic shipwrecks. Operations are diverse in nature and location, with projects undertaken across the world.

This graphic illustrates the **key carbon emissions** associated with various aspects of a typical project such as **fuel** use for marine and road transport to site and material use including **plastic cable ties**.

Key Statistics [1]



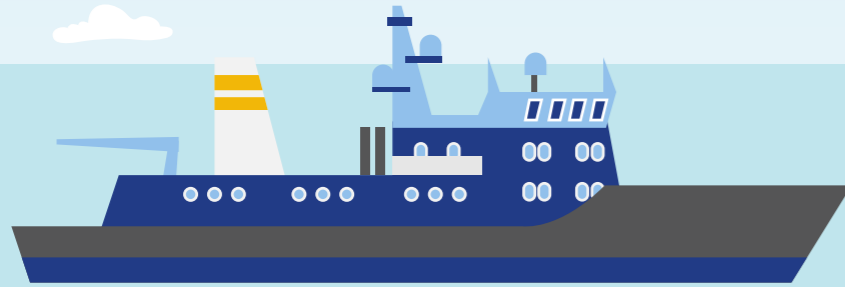
5 days average per operation



1,000 litres of diesel per operation



8 operations average per year



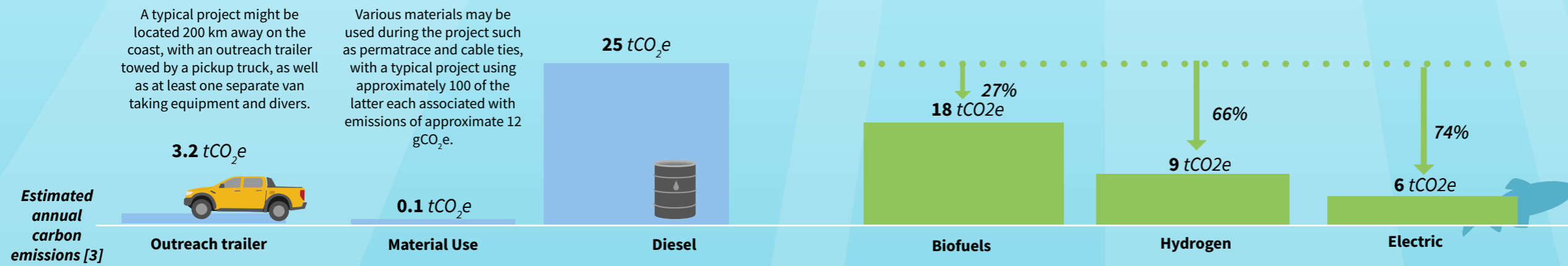
A typical shipwreck diving project may last for up to 5 days, consuming approximately 1,000 litres of diesel. However larger scale projects can last up to 3 months.

Typical project carbon emissions

Shipping currently accounts for **2.3% of global CO₂ emissions** [2]. Despite marine archaeology only accounting for a small fraction of this, **diesel fuel** use remains by far the **biggest contributor** to carbon emissions on historic marine archaeological projects. The diagram below shows how the annual emissions associated with marine fuel use might be **reduced with alternative fuels**.

How marine fuel use can be decarbonised?

There are a range of potential alternative fuels with **lower or net zero emissions** that can substitute diesel or petrol within marine engines, including **lower carbon conventional fuels, synthetic fuels and biofuels**.



	Biofuels	Hydrogen	Electric
+	<ul style="list-style-type: none"> Can be produced from food waste High efficiency 	<ul style="list-style-type: none"> High technology readiness Cheaper energy cost 	<ul style="list-style-type: none"> High energy density Zero emission at point of use
-	<ul style="list-style-type: none"> High cost of fuel and retrofit High land area required for production 	<ul style="list-style-type: none"> High upfront cost Lower range 	<ul style="list-style-type: none"> Large storage volume required Low temperatures or high pressure

Deep Dive

As historic marine archaeological projects extend into deeper waters, the use of mixed breathing gases like Trimix, which includes helium, becomes necessary. While enabling safe deep-water diving, helium extraction has a significant carbon footprint due to its status as a non-renewable resource. Although currently minimal, the environmental impact could grow as projects explore deeper sites.

References

1. James, A. Microsoft Teams Conversation with 3ADAPT, 30 January 2024
2. The Carbon Trust. (2021) Roadmap for the Decarbonisation of the European Recreational Marine Craft Sector. UK. Available at: https://www.europeanboatingindustry.eu/images/EU%20affairs/Roadmap-for-decarbonisation-vessels_Final.pdf (Accessed: 1-15 March 2024).
3. Department for Energy Security & Net Zero (DESNZ), Department for Environment Food & Rural Affairs (DEFRA). (2023) 'UK Government GHG Conversion Factors for Company Reporting'. Available at <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023> (Accessed: 1-15 March 2024).