REFLOW MARINE®

Innovative solution: Reflow Marine

October 2024

Introduction

The study is part of a larger project by Water Revolution Foundation focused on assessing suppliers' solutions for improved sustainability in the yachting industry. The study compares two methods for managing damaged pipes on a 500GT superyacht: the traditional “Business as Usual” (BAU) approach of replacing pipes with new stainless-steel ones (Scenario 1) and Reflow Marine technology, which restores pipes by cleaning and coating them with an epoxy resin (Scenario 2). The goal is to assess whether Reflow Marine’s method offers a better environmental performance than the BAU approach

Approach & Data

The study adhered to ISO 14040 and 14044 standards and was conducted by ALEA Design at the University of Modena and Reggio Emilia, with review by TETIS Institute SRL, a University of Genoa spin-off. Data collection encompassed all processes, including material sourcing, production, transport, and end-of-life stages. Data quality was assured through a mix of primary data, estimates, and proxy data, supplemented by information from the Ecoinvent 3.9 database using SimaPro 9.5 software.

Functional Unit

The functional unit (F.U) for the study is the repair or replacement of 100 linear meter of 80mm diameter stainless-steel pipe on a superyacht.

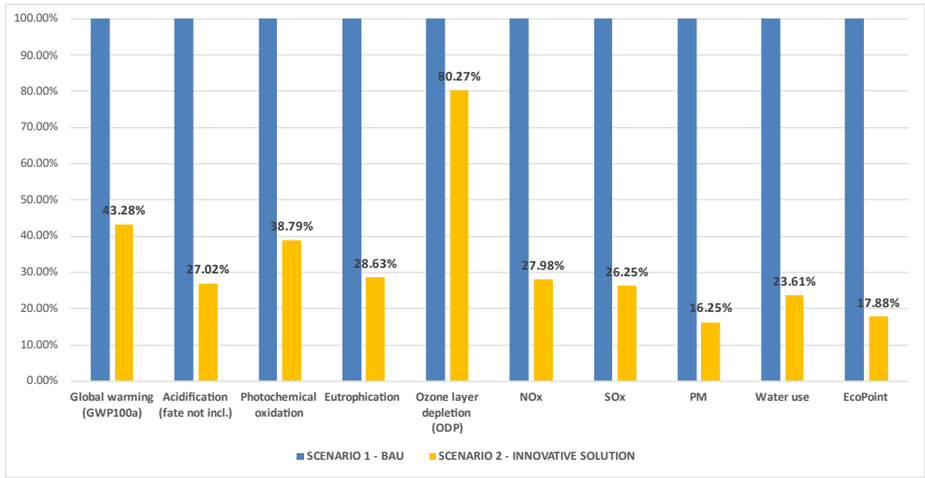
System Boundary

System boundaries include upstream (material extraction and transport), core(manufacturing and repair process), and downstream(end-of-life). Both scenarios occur at the MB92 shipyard, ensuring uniformity in transportation and installation phase. Scenario 1 replaces pipes entirely, while Scenario 2 repairs them using Reflow Marine’s technology.

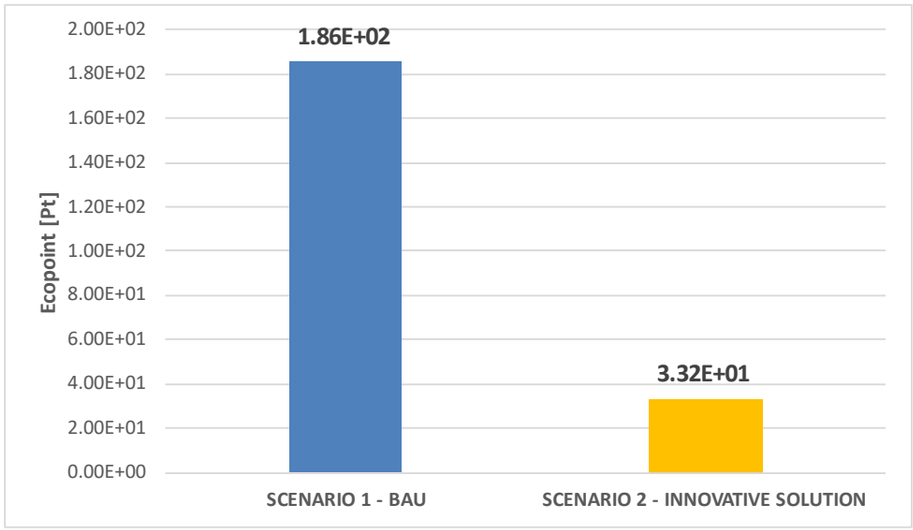
Conclusions

The results indicate that Scenario 2 (Reflow Marine’s solution) is a better alternative, with reduction in all environmental impact categories ranging from 19.3% up to 83.75%. Additionally, the Ecopoint method (reduction across human, ecosystem and resource depletion impact) shows an 82.10% overall reduction. Sensitivity analysis confirm the robustness of these results, even with increase in energy consumption and raw material impacts. Reflow Marine’s technology provides a clear environmental advantage, aligning with environmental performance goals for the yachting industry.

LCA Impact Category Results (Business-As-Usual vs Reflow Marine Innovation)



Comparison between the results of Scenario 1- damaged pipes complete substitution (BAU) and Scenario 2- damaged pipes restored using Reflow Marines process (Innovative solution)



The single score (Ecopoint) compares Scenario 1 (pipe replacement) with Scenario 2 (pipe repair) a higher Ecopint indicates a greater environmental impact. Scenario 2 shows significantly lower impact

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