

Marinetek ECO marina® floating pontoon

Comparative LCA against a standard concrete pontoon with galvanized steel reinforcement (BAU) over 80 years

1 INTRODUCTION

ECO marina is Marinetek's floating concrete pontoon reinforced with carbon and glass fibre instead of galvanized steel, with built-in EPS floats. Marinetek states it is about 15% lighter and lasts about 80 years, against 30–40 years for a standard pontoon. Both are made in Velim, Croatia.

2 METHODOLOGY

Functional unit. One complete pontoon of 16.68 m³ for its whole life: 80 years. The BAU counts as two pontoons, the second installed after 40 years.

System boundaries. Same for both. *Upstream*: concrete, reinforcement (steel, or carbon and glass fibre), polystyrene, wood, PVC pipes, aluminium cleats. *Core*: raw-material transport, production in Velim (electricity, diesel, water, waste). *Downstream*: crane lifting and transport to site (150 km), installation (lifting into the water, anchoring), disassembly, transport to recycling (transport only, polluter-pays principle).

Standards. ISO 14040; ISO 14044 (incl. Amd 2, 2020); PCR Yachts and small crafts (2015, being updated); stages per EPD System GPI v4.0.

Impact methods. CML 2001 (GWP100, AP, POCP, EP, ODP, NOx, SOx, PM10); AWARE (water); ReCiPe 2016 (H) for Ecopoint.

The study compares this pontoon (Scenario 2) with a standard concrete floating pontoon with galvanized steel reinforcement (Scenario 1, BAU), both 16.68 m³, for a 500 GT superyacht. Goal: verify ECO marina for Water Revolution Foundation's Hub of Verified Solutions.

Data sources. Primary data from Marinetek for both pontoons (data collection sheet, questionnaire). Ecoinvent v3.10; SimaPro 9.6. No allocation. Diesel taken as 0.835 kg/l and 42.8 MJ/kg.

BAU reference. Standard pontoon, 7.12 t (ECO marina 6.33 t). No use or maintenance impacts for either.

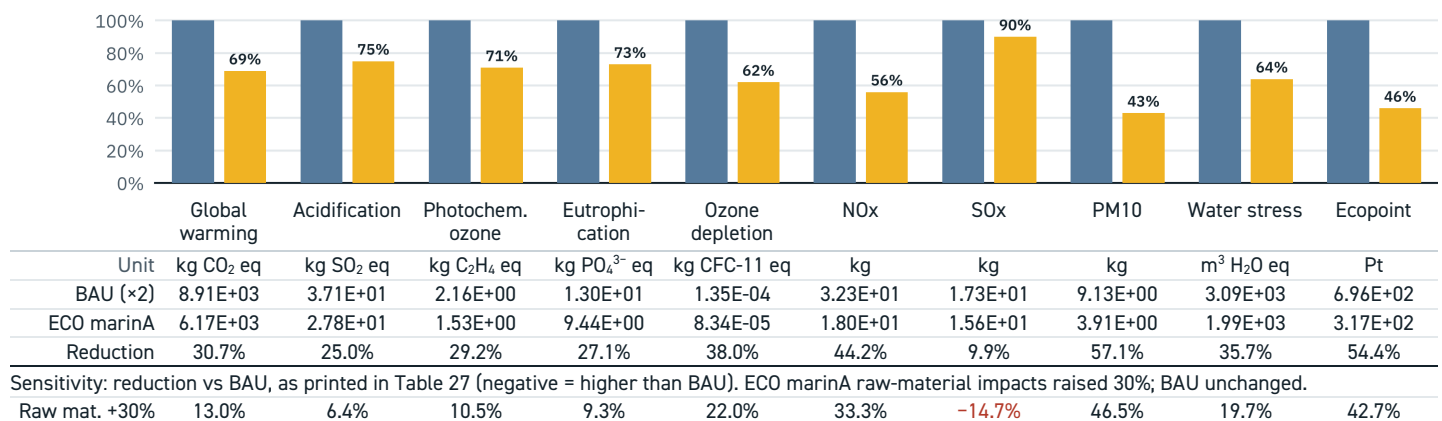
Materials (t). BAU: concrete 6.40, steel 0.31, polystyrene 0.16. ECO marina: concrete 5.82, polystyrene 0.21, carbon fibre 0.03, glass fibre 0.03. Both: wood 0.25, PVC 0.045, aluminium 0.1.

Not reported: author, report date, cut-off criteria, data quality results, uncertainty analysis.

3 RESULTS per functional unit (one pontoon, 80 years)

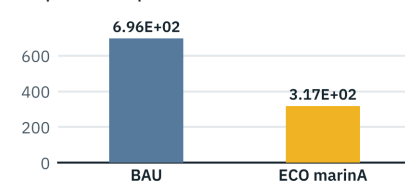
■ Scenario 1 – BAU (steel-reinforced) ■ Scenario 2 – ECO marina

Scenario 2 as % of BAU (BAU = 100%), report Figure 4



Bar labels as shown on report Figure 4 (whole percentages). Base case: Tables 25–26; BAU values cover two pontoons.

Ecopoint (Pt per functional unit)



Layout of report Figure 1, values from Table 26.

Ecopoint by damage category

Pt	BAU (x2)	ECO marina	Reduction
Human health	6.76E+02	3.05E+02	54.9%
Ecosystems	1.44E+01	8.95E+00	37.7%
Resources	5.86E+00	3.72E+00	36.4%
Total	6.96E+02	3.17E+02	54.4%

Values as printed in Table 26.

Where the impacts come from (report §4)

BAU: almost all from upstream, the raw-material supply chain.

ECO marina: mostly upstream and downstream.

Both: concrete and polystyrene contribute most; downstream, diesel for handling the pontoon dominates; core is not relevant.

Figures 5–6 give no values, so they are not plotted.

4 KEY FINDINGS

ECO marina is lower in all indicators, by 9.9% to 57.1% (Table 25); Ecopoint by 54.4% (Table 26). Smallest gain: SOx (9.9%); largest: PM10 (57.1%).

Longer life and no steel. One ECO marina covers 80 years where the BAU needs two pontoons. It is also lighter (6.33 t vs 7.12 t) and replaces the steel with carbon and glass fibre.

Keep in mind: the lifetimes (80 vs 30–40 years) come from Marinetek

Sensitivity: with ECO marina's raw-material impacts 30% higher, it stays 6.4–46.5% lower in all indicators except SOx, which becomes 14.7% higher. Ecopoint stays 42.7% lower.

Not tested: the 80-year life, which sets the two-to-one comparison. It comes from Marinetek.