

OceanLED Explore Weld-In E8 and E9 underwater lights

Comparative LCA against the Lumishore Supra SY310 light (BAU) on a 500 GT superyacht, with steel or aluminium cofferdams

1 INTRODUCTION

Explore Weld-In E8 and E9 are OceanLED underwater LED lights for yachts. OceanLED states that custom optics give the in-water effect with less energy and a much smaller design. Cofferdam: stainless steel or aluminium; body: aluminium (E8) or aluminium bronze (E9).

It compares a 500 GT superyacht with these lights (Scenario 2) and with Lumishore's Supra SY310, the traditional light named by OceanLED (Scenario 1, BAU), per cofferdam material. Goal: verify their performance for Water Revolution Foundation's Hub of Verified Solution.

2 METHODOLOGY

Functional unit. 1 hour of use of one light. Basis: 1,500 h/yr, 5-year light life, 4 replacements over 20 years. E8/E9 (13,000 lm) are assumed to equal the SY310 (20,000 lm) in visual effect; not measured.

System boundaries. Cradle to grave, same for both. *Upstream:* metals, glass, rubber, plastic, copper, cardboard. *Core:* transport, cutting and forming (UK), distribution (800 km by truck). *Downstream:* installation (welding, 2 kWh), use, replacement every 5 years, disassembly, end of life (100% WEEE recycling).

Standards. ISO 14040; ISO 14044; PCR Yachts, small crafts (under consultation); stages per International EPD System GPI v4.0.

Impact methods: : CML 2001 (GWP100, AP, POCP, EP, ODP, NOx, SOx, PM10); AWARE (water); ReCiPe 2016 (H) endpoint single score, Ecopoint (Pt).

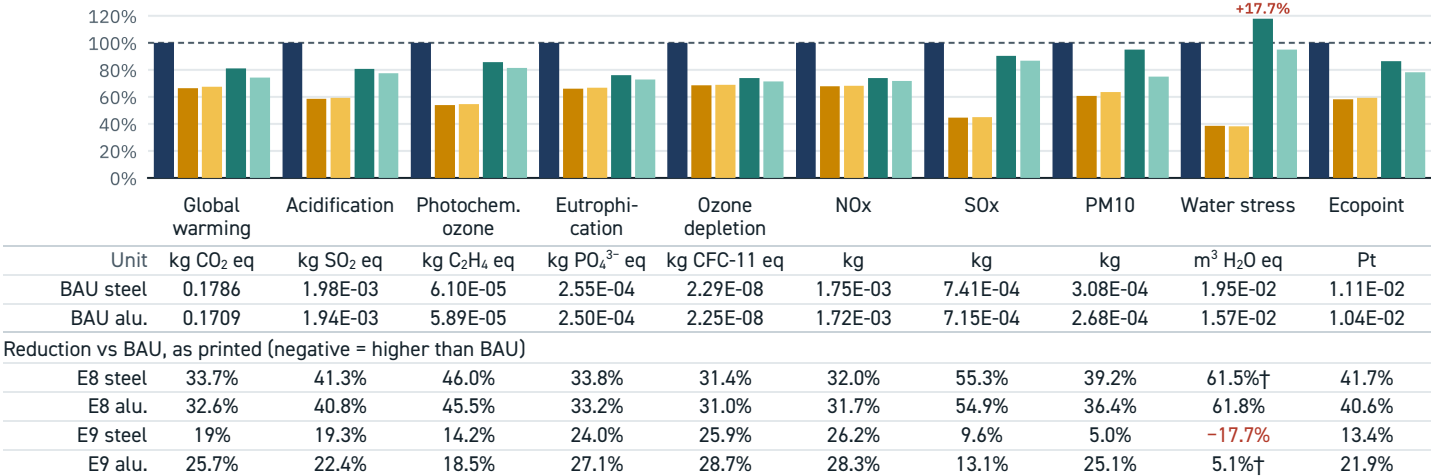
Data sources. Mainly primary data from OceanLED (bills of materials, invoices, measurements, counters). Ecoinvent v3.8; SimaPro 9.3. No allocation. Glass, rubber, plastic and copper split by assumed shares (40/30/20/10%).

Use phase. Power 0.14 kW (E8, E9) vs 0.20 kW (SY310, value given by OceanLED). 56% of the time on shore power (Mediterranean and Caribbean mix), 44% from a diesel generator (30% efficiency): per hour 0.078 vs 0.112 kWh plus 0.0192 vs 0.0274 l diesel.

BAU reference. SY310 weighs 6.80 kg (steel) or 4.10 kg (aluminium); E8 3.2 or 1.75 kg; E9 8.4 or 4.2 kg. No specific SY310 data: its inventory was scaled by mass from OceanLED's data, with the same 5-year life.

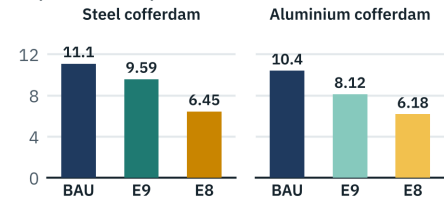
3 RESULTS per functional unit (1 hour of use)

Scenario 2 as % of BAU (BAU = 100%), as in report Figures 4–5



Bar height = 100% minus the reduction printed in Tables 20–23. † The printed water values for E8 steel (7.50E-02) and E9 alu. (1.49E-03) .

Ecopoint (mPt per hour of use)



Layout of report Figure 1, values from Tables 21 and 23; the printed figure does not match them.

Ecopoint by damage category

Reduction	E8 st.	E8 al.	E9 st.	E9 al.
Human health	41.9%	40.8%	13.1%	21.8%
Ecosystems	38.3%	37.4%	18.1%	23.7%
Resources	33.1%	32.1%	21.8%	27.8%
Total	41.7%	40.6%	13.4%	21.9%

Reductions vs BAU as printed in Tables 21 and 23 of the report.

GWP by life-cycle stage (report §4, Figure 6)

Share of GWP	E8 st.	E8 al.	E9 st.	E9 al.
Upstream	4.5%	2.1%	20.3%	10.7%
Core	<1%	<1%	negl.	negl.
Downstream	95%	97.7%	77.9%	88.7%

Use-phase electricity and diesel are at least 99.7% of downstream impacts. For E9, upstream (raw materials) leads in water stress and SOx.

4 KEY FINDINGS

E8 is lower in all 10 indicators, by 31.0% to 61.8% for both cofferdams. Ecopoint is 41.7% (steel) and 40.6% (aluminium) lower. GWP falls from 0.1786 to 0.1185 kg CO₂ eq per hour (steel).

E9 gives smaller gains. Aluminium: 5.1–28.7% lower in all 10 indicators. Steel: 5.0–26.2% lower in 9, but water stress is 17.7% higher. Ecopoint is 13.4% (steel) and 21.9% (aluminium) lower.

Use phase drives the result. The lights draw 0.14 vs 0.20 kW; downstream is 77.9–97.7% of GWP. The heavier E9 (8.4 kg with steel vs 6.80 kg) raises raw-material impacts, which the report links to the water result.

Sensitivity: half the power from onboard PV. E8 stays lower in all indicators. E9 stays lower in all except water stress (+29.5% steel, +3.1% aluminium).

Keep in mind: : SY310 data were scaled by weight from OceanLED's data, and OceanLED gave its power (0.20 kW). Equal light output is assumed, based on OceanLED's claim; not measured.