



Circles
of Life

Whitepaper

Tackling Maritime Decarbonisation Beyond Ship Operations

How CirclesOfLife advances Circularity and Transparency in European shipbuilding and maritime manufacturing sector

The challenge

Current EU maritime decarbonisation policies focus on reducing ships' operational emissions. As these decline toward 2050 targets, emissions from shipyards and material use – driven by resource intensity and lack of circularity – become increasingly significant. This shift demands urgent attention to maintain the long-term competitiveness, resilience, and strategic autonomy of Europe's shipbuilding and maritime manufacturing sector.

The industry spans ship production, maintenance, repair, retrofit, and conversion, alongside a vast supply chain of maritime systems, technologies, and services. It supports¹:

- 25,000+ equipment manufacturers and tech providers
- 300+ shipyards
- 343,000 direct jobs
- €114 billion annual production value

However, growing reliance on third countries threatens Europe's industrial sovereignty. The sector's complexity, high-tech nature, and investment intensity make lost capabilities hard to recover. Strengthening this ecosystem is vital for Europe's green transition, defense, and economic security.

The issue

EU shipyards face mounting pressure to reduce emissions and material footprints while competing with regions operating under weaker environmental and labour standards. Key challenges include:

- Fragmented data and inconsistent reporting
- Lack of transparency on environmental impacts
- Absence of clear, actionable guidance for decision-makers

These gaps hinder the adoption of circular practices and limit the sector's ability to meet sustainability goals.

CirclesOfLife: A strategic response

The Horizon Europe CirclesOfLife project (Grant No. 101138013) delivers practical tools to help the EU maritime sector advance circularity, reduce emissions, and align with evolving policy frameworks. Developed in collaboration with shipyards and stakeholders across Europe, CirclesOfLife's solutions include, on one hand, the Ship Lifecycle Passport and Ship Circular Materials Passport, and on the other hand, the Shipyard Environmental Performance Index (SEPI):

¹ In the EU, the shipbuilding and ship repair sector and the 1st and 2nd tier suppliers represent a €114 billion annual production value. The shipbuilding and ship repair sector and the 1st tier suppliers represent 343,000 direct jobs. The 1st tier suppliers includes nearly 25,000 companies.

1. Ship Lifecycle Passport (SLP) & Ship Circular Materials Passport (SCMP)

These digital passports enable full traceability of materials and environmental impacts across a ship's lifecycle. Benefits include:

- Bridging data gaps on material footprints
- Supporting compliance with EU design and waste legislation
- Aligning with the Digital Product Passport and ESPR
- Promoting circular strategies (reuse, repair, refurbish) under the 9R framework

They empower informed decision-making and embed circularity from design to dismantling.

2. Shipyard Environmental Performance Index (SEPI)

SEPI is a standardized software tool to assess and improve shipyard sustainability across newbuilds, repairs, and end-of-life operations. It enables:

- Benchmarking and hotspot identification
- Adoption of cleaner technologies
- ESG-driven branding and access to green finance
- Integration with SLP and SCMP
- Incentivization of Best Available Techniques (BATs)

SEPI also fosters sustainable employment, upskilling, and economic revitalization in coastal regions. Within the CirclesOfLife project, training modules on SEPI are also developed to share knowledge across the maritime industry and contribute to workforce upskilling.

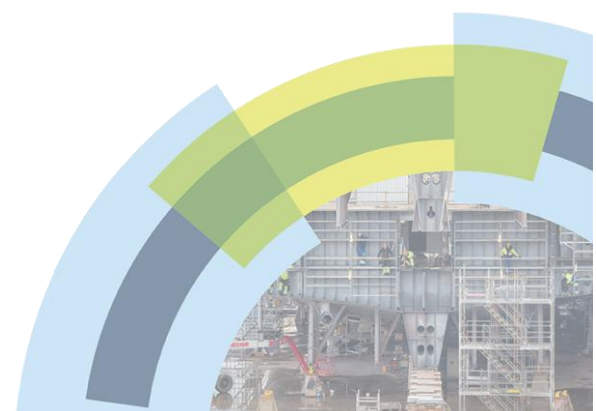
Policy alignment & Strategic impact

CirclesOfLife tools are designed to meet current and emerging EU and international frameworks, and contribute to ensuring compliance within the maritime industry²:

- CSRD, ESPR, DPP, IED, CEAP, EU SRR
- Voluntary standards like IMO Green Passport and Global Reporting Initiative

By embedding KPIs tied to mandatory sustainability requirements, CirclesOfLife enhances traceability, lifecycle transparency, and circularity. This dual alignment helps stakeholders navigate tightening regulations and access green finance.

² Corporate Sustainable Reporting Directive (CSRD), Ecodesign for Sustainable Products Regulation (ESPR), Digital Product Passport (DPP), Industrial Emissions Directive (IED), Circular Economy Action Plan (CEAP), EU Ship Recycling Regulation (SRR).



Recommendations to EU Policymakers

CirclesOfLife urges EU co-legislators to:

- Develop a legal framework for ship lifecycle management under the Circular Economy Act and EU Ship Recycling Regulation
- Create financial instruments to reduce lifecycle costs and support circular practices
- Recognize CirclesOfLife tools within the EU Maritime Industrial Strategy
- Support innovation and scaling via Horizon Europe and related programmes

Conclusion

CirclesOfLife offers actionable, policy-aligned solutions to decarbonise and future-proof Europe's maritime sector. By delivering tools such as SEPI, SLP, and SCMP, the project strengthens transparency across the maritime value chain and offers valuable insights into shipyard processes, enabling improvements in both environmental performance and industrial competitiveness. Continued support is essential to scale these innovations and secure Europe's leadership in sustainable shipbuilding and maritime manufacturing.

Partners



Contact

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