

Policy Brief 2025/3

Photo: IMO UN

Beyond the Breaker's Yard: A Circular Voyage driven by Ship Recycling

SUMMARY

The transition towards a circular economy is urgent and presents opportunities for better aligning sustainability and decarbonization strategies. In the global maritime economy, the adoption of more circular practices could facilitate the provision of high-demand raw material supply through secondary steel, while reducing the carbon footprints of the shipping and steel sectors. Currently, ship recycling is an industry that receives increased attention due to its high potential in both regards, and can furthermore aid in processing hazardous materials of vessels, thereby taking them out of marine and coastal environments effectively.

However, so far, ship breaking and recycling have mostly played out in South Asian countries with relatively lax regulations, and have long been characterized by poor social and environmental conditions, poor occupational health and safety practices, and negative impacts on coastal communities. Now, many breaker yards are leaping towards more standardized and safe practices for the industry, while low standard yards might have to exit from the market. Globally relevant frameworks for ship recycling, such as the Basel Convention on transboundary Movement of Waste, are now complemented by the Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships, which entered into force in June 2025 in an attempt to raise global standards – yet it leaves some key dimensions of protection under addressed. Effective coordination and implementation of both conventions are essential, while these significant gaps and loopholes persist. If these shortcomings are not resolved, the risks of a continued global divide and the perpetuation of poor business-as-usual will remain.

This policy brief is intended to inform actors across maritime shipping, ship recycling, and adjacent industry sectors. It provides recommendations to support a sustainability-oriented practice in vessel recycling and encourages close adherence to global policy frameworks on the matter.

KEY RESULTS

- A circular maritime economy supports global raw material supply with secondary steel
- Global shift in ship recycling offers renewed opportunity to promote safer and more effective practices
- Environmental and social safeguards are considered more thoroughly, but remain a stark concern, especially in the Global South
- Infrastructure and capacity development will be essential to establish socially and environmentally responsible practices

RECOMMENDATIONS

- Strengthen compliance and implementation of regulations to prevent adverse marine and coastal impacts
- Improve national oversight and global standards through competent authorities that check for compliance
- Enable strategic investment and market development to produce suitable infrastructure opportunities
- Leverage blended financing to support transition towards more sustainable practices
- Provide "Green Credit Guarantees" to reduce lender's risk and lower interest rates
- Develop integrated local planning to address place-based infrastructure needs and expand on local capacities
- Design for sustainability through all operational life stages

THE CONTEXT

There is a growing need for rapid decarbonization and advancing towards more circular economies. Along those lines, there is a heightened demand to source raw materials from recycled sources, such as end-of-life ships [1]. South Asian countries such as Bangladesh, India, and Pakistan have emerged as ship breaking hot spots, providing numerous resources that global markets were highly dependent on for infrastructure development.



Figure 1: Ship breaking working conditions in Bangladesh (2024). Photo Credit: NGO Shipbreaking Platform.

Formerly, ship breaking – or wrecking – was for the most part concerned with sourcing salvageable machinery, equipment, outfitting, as well as other raw materials from the decommissioned vessels [2]. Moving forward, the advanced processing of end-of-life ships could be transformed into a more sustainable industry that shapes all life stages, from cradle to cradle, towards greater resource efficiency and circular approaches in maritime shipping. Hence, ship recycling is by now well-positioned to better contribute to the current global efforts towards higher circularity standards and decarbonization strategies.

In addition, the decommissioning of ships has been characterized so far by high environmental and social costs, with many adverse implications and threats to local coastal ecosystems and communities, widening inequality in countries that are already disproportionately affected by climate change impacts. Highly hazardous industry practices, poor occupational health conditions, and insufficiently regulated shipbreaking sites – marked by numerous risk and safety challenges – have raised serious human rights and justice concerns across multiple countries, with the direst conditions reported in India and Bangladesh [3].

Now, however, the maritime shipping and steel recycling industries are uniquely positioned to align forces and leap towards higher standards and decarbonization. Alongside, they could put better operational practices in decommissioning and processing end-of-life fleets forward globally [2].

Thereby, the future provision of much-needed materials, such as recycled steel, will be significantly increased if this window of opportunity is properly taken up.

This industrial expansion is also tied to improvements in global legal frameworks. Previously existing regulations and guidelines, such as the International Maritime Organization (IMO) Guidelines on Ship Recycling (adopted by the IMO Assembly in 2003), as well as International Convention for the Prevention of Pollution from Ships (MARPOL, adopted by the IMO in 1973) and the Basel Convention (1989), are now complemented by the IMO's decarbonization agenda, net zero carbon pledges by steel industries, International Labor Organization (ILO) Guidelines for Asian Countries and Turkey, and the Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships – which entered into force in June 2025 [4]. The Hong Kong Convention has been a joint effort of the Marine Environment Protection Committee (MEPC) of the IMO, the International Labor Organization (ILO), and the Basel Convention Secretariat to address prevalent gaps and loopholes in existing legislation and foster better practices in design, operation, and decommission of vessels, thereby covering the entire lifespan of ships.



Figure 2: Ships beached for disassembly in Bangladesh (2024). Photo Credit: NGO Shipbreaking Platform.

Yet, civil society organizations raise concerns over remaining loopholes such as re-registering ships to avoid strict regulations ("flags of convenience"), beaching ships directly on shores for disassembly, workers' protection, and downstream waste and hazardous material processing [4]. Hence, regulatory changes need to strengthen Extended Producer Responsibility (EPR), and must strive to uphold the aim to protect the Global South from waste dumping.

Moving forward, under sustainable and ethical global standards, ship recycling stakeholders and the maritime community can facilitate the transition of the sector and a shift away from substandard, unsafe, and unregulated ship breaking practices is likely to occur, producing new global opportunities for an emergent circular blue industry.



EMERGING DYNAMICS

Under the new convention and legal framework, renewed opportunities for thorough conversations on ship recycling, circular economy, and industrial development arise – with possibilities to move beyond established and often exploitative hot spots for ship breaking such as Bangladesh, India, Pakistan, and Turkey – which had accounted for over 95% of the global ship recycling market, with around 15 million tons of ships recycled there each year [2].

A global shift towards decisive management of risks and hazards for South Asia is necessary, including a push for proper industrial facilities, robust waste management systems, and strict enforcement of social and environmental legislation, guided by the principles of the Basel Convention that protects the Global South from toxic waste dumping. This transformation of global markets will be vital to generate a positive impact of the industry and make it a viable addition to a future-proof circular economy. Particularly so, since the steel industry is looking to increase its provision of raw material through recycled inputs such as secondary steel, reducing the need for carbon-intensive primary steel production. Now that ship recycling is emerging as a potential key source for high-quality raw materials, they offer growing opportunities for sustainable sourcing, thereby helping to meet the increasing global raw material requirements.

Currently, and increasingly so in the future, almost all parts of vessels are recyclable, with processing ship hulls for metal scrap saving 80-90% of energy compared to processing directly from iron ore [4,5]. In light of shipping being the main mode of global cargo transport and trade volume [6] – with fleet sizes projected to increase both in fleet number and in individual ship size in the upcoming decades – secondary steel provision through recycling is significant. This is why, with responsible processing of end-of-life vessels, two challenges are addressed simultaneously: moving toward circular economy and helping decarbonize steel industries, one of the highest emitting manufacturing sectors that contributes about 7% of global GHG emissions yearly [7], as well as decommissioning fleets in a regulated manner, with particular attention to their hazardous substances and wastes.

Yet, these efforts require close monitoring and inspection, not only at the point of decommissioning, but rather throughout the entire vessel operation. End-of-life ships need to be dismantled and recycled in a sound process and with vessel-specific planning that prevents harm to surrounding environments, thereby ensuring the protection of nature and coastal communities [1].

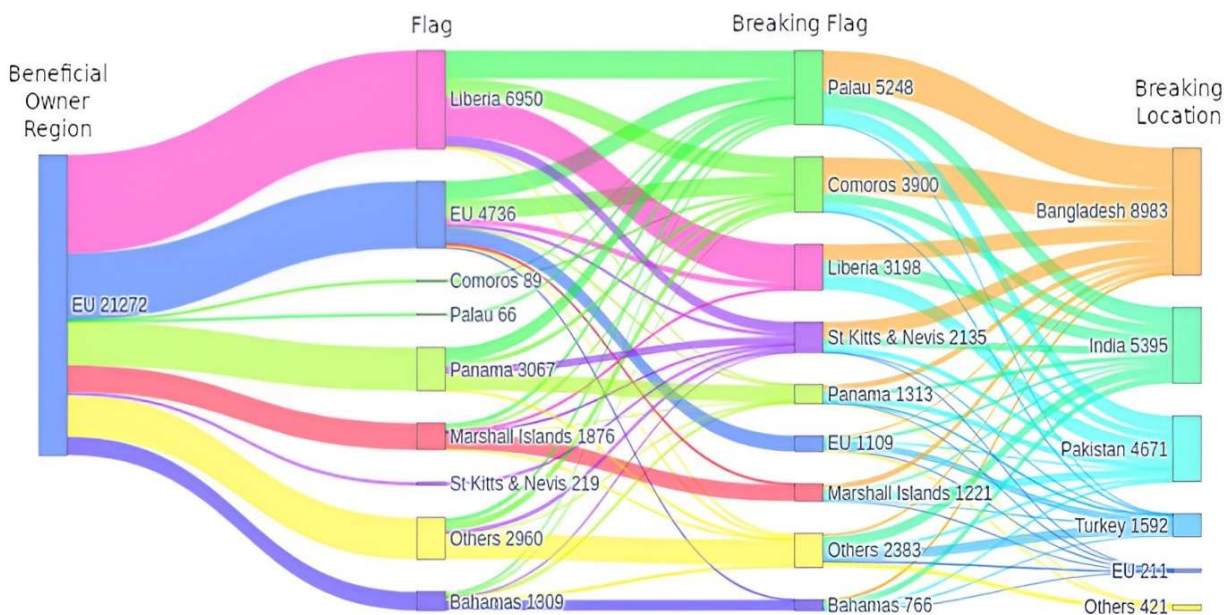


Figure 3: Flags and breaking locations of scrapped vessels with beneficial owners from countries in the European Union for the years 2017–2022. The data is based on EOLSHIPS; limitations regarding traceability, unknown owners and unknown flags are acknowledged. In case a vessel does not change its flag for breaking, its 'Flag' and 'Breaking Flag' countries match. Numbers indicate the GT sum of all vessels in thousands; colors indicate the destination with respect to the next level. The visualization follows the approach of Wan et al (2021) and is taken from Bleischwitz, R., Höller, J., & Kriegl, M. (2023) [1] licensed under CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>.



To date, risks associated with human or environmental health remain high, since toxic materials – such as heavy metals or oily residues, PCBs, asbestos, mercury, arsenic, cadmium, lead, and others [2,4] – had been commonly used in past shipbuilding and easily pollute marine and freshwater sources, soils, and air. Other threats include practices such as the landing of ships directly on shorelines for disassembly ("beaching").

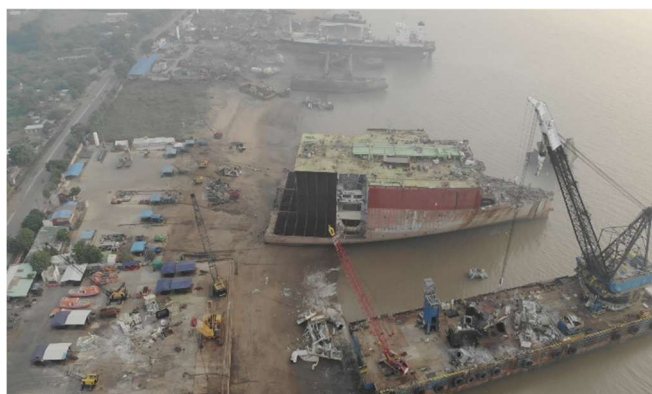


Figure 4: Disassembly in a ship breaking yard in India (2019).
Photo Credit: NGO Shipbreaking Platform.

According to NGOs and environmental advocates, these practices require urgent phase-out, since they directly affect coastal residents, not only through pollution, but also through other forms of environmental degradation, such as mangrove deforestation [3]. This, in turn, threatens local small-scale fisheries and sustenance, while natural protection against climate change impacts is in further decline. Owners of shipbreaking yards argue that investing in dry docks is not always economically feasible, given the impacts of anticipated sea-level rise on such operations. They instead contend that beaching can be done in an environmentally safe manner – a claim that will need to be substantiated.

With the Hong Kong Convention having entered into force in mid-2025, its enforcement has been delegated to the national level. Hence, initial results and positive impacts might be limited due to constraints in political will, oversight bodies [1], and the challenges of implementing the Basel and Hong Kong conventions concurrently. However, NGOs and environmental actors have already raised several concerns about legislative shortcomings, especially with regard to workers' protection and the lack of binding requirements on labor conditions under the convention [3]. In addition, the downstream handling and final disposal of hazardous wastes beyond the ship recycling yard down to final disposal destinations remains a major and largely unaddressed concern [3].

Important frameworks on ship recycling, such as the European Waste Ship Regulation and the EU Ship Recycling Regulation, are inspiring other countries' own ship recycling policies. For example, Brazil, Canada and, most recently, the United Arab Emirates have developed regulations modeled on the EU approach. The UAE Ship Recycling Regulation not only draws from the EU framework, but goes further by

requiring dismantling exclusively in dry docks or equivalent structures – and by banning the use of cash buyers for end-of-life transactions. Yet, opportunities for circumventing existing regulations likewise remain. So far, European-owned vessels have only to a small extent been disassembled or recycled in Europe and are instead mostly re-flagged [1] to be broken down on beaches in South Asia.

This practice is often attributed to cost-saving motives; however, the underlying driver is profit maximization. Shipowners selling their vessels to substandard ship breaking yards could receive prices up to three times higher via cash buyers compared to selling to proper EU recycling facilities. This massive price gap stems from several factors, including extremely low labor costs, minimal investment in facilities and infrastructure, and shady business practices without extended producer responsibility. Furthermore, prevailing discussions revolve around economic considerations and debated capacities to recycle ships of larger sizes in Europe [1]. To make the European market more attractive, long-standing practices – such as reflagging and outsourcing to countries with lax environmental and labor regulations – have to be actively addressed in the new Convention and the revised EU directive to avoid further lock-in of business-as-usual and to result in an upward uptake of better practices.



Figure 5: Employees on site at the launch of a ship recycling project that improves social and environmental safety standards in Dhaka, Bangladesh (2018).
Photo Credit: IMO UN.

Be it in Asia, Europe or beyond – the outlooks for ship recycling and processing can be highly promising if the necessary incentives are provided to develop (or expand on) essential infrastructures, such as ports, secondary steel processing capacities, and waste management facilities. In addition, professional and operational training to enhance industry health and safety standards, as well as risk management, is a necessity to ensure implementation of regulations on an operational day-to-day basis. With environmental and social considerations fully addressed and considered, marine and coastal ecosystems can benefit, while economic opportunities to local communities could likewise be enhanced.



POLICY RECOMMENDATIONS

Strengthening compliance and implementation: While standards for ship waste and hazardous material management must be strengthened further globally [6], prevention of adverse marine and coastal impacts is closely tied to the implementation on the ground – requiring adequate financial and training resources to enable practical and operational compliance with existing legal frameworks through trained and competent personnel, reporting, and track keeping strategies – and appropriate and specific ship recycling plans developed and externally approved for each vessel.

National oversight and improved global standards: Competent national authorities should be mandated with oversight and compliance checks [4], so that international regulation is supported and practically enforced [6], with the aim of advancing the emerging global market to a viable and sustainable industry with authorized and certified actors and facilities. Transparency in such reports will be useful to consider. Moreover, remaining regulatory loopholes and uncertainties must be closed.

Enabling strategic investment and market development: (Early) investments in the industry and suitable development opportunities for infrastructure require a radar for emerging changes in prices and technologies with scenario developments. Such mechanisms could stabilize early markets and create viable destinations for ship recycling and the growing market of secondary steel – thereby breaking established harmful practices of flagging for convenience and subsequent ship breaking in substandard yards in South Asian countries [1]. Simultaneously, such data and scenarios could be aligned towards net-zero steel, which provides the raw material to advance a maritime circular economy in line with ambitious national decarbonization strategies.

Blended financing: Shipyard owners in South Asian countries lack financial incentives to transform their yards in compliance with Hong Kong Convention regulations. To address this, European countries and international financial organizations could establish grant and soft loan

mechanisms to those yards seeking to transition from traditional to environmentally sustainable (“green”). This should include technical assistance, training, and knowledge sharing to obtain green yard certifications.

Provide “Green Credit Guarantees”: Governments in India, Pakistan and Bangladesh should receive extended support to develop government-backed “Green Ship Recycling Guarantee” schemes. Under such schemes, banks and microfinance institutions issue loans to small-size yard owners with partial credit guarantees, covering up to 50% of the loan principal. Such guarantees reduce lenders’ risk and lower interest rates (to around 7–8%), thereby improving access to capital for smaller yards breaking as little as 8,000 tons of ships annually.

Integrated local planning: Planning for ship recycling facilities needs to consider place-based conditions and opportunities for the development of docks that process differently sized vessels, as well as the needs of adjacent industries (steel, waste processing, other infrastructure). Long-lasting permission requirements should be reconsidered and – where possible – accelerated. Local capacities for occupational training, as well as practical compliance and oversight mechanisms, require development and strengthening. Such standard setting will require political will, deliberations and multi-actor alliances.

Design for sustainability: Ship design throughout all operational life stages should be advanced with sustainability and recyclability in mind, with the aim to construct vessels based on alignment with future processing needs and the environmentally friendly decommissioning at end-of-life. Supporting pilot projects with smaller and medium-sized vessels will be essential to trial new business models and technologies, while building confidence among corporate and industrial actors to advance the adoption of more sustainable solutions. Gradual upscaling over time can then move stakeholders towards a fully recoverable value chain and a maritime circular economy.

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ABOUT THIS POLICY BRIEF

This Policy Brief is part of a series aiming to inform policy-makers on the key results of the ZMT research projects and provide recommendations to policy-makers based on research results. The series of ZMT Policy Briefs can be found at www.leibniz-zmt.de/policy_briefs.html. This publication was commissioned, supervised and produced by ZMT. DOI: <https://doi.org/10.21244/zmt.2025.005>

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