



Up2Circ – Boosting the Uptake of Circular Business Model, Product and Process Innovation

Horizon Europe 2021-2027

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Sectorial catalogue **Maritime Industries and Services**



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Short introduction to the sector: Maritime Industries and Services

The European continent is essentially a maritime continent. The EU coastline is 68.000km long. The EU is home to 23 coastal states and 27 flag states. While the economic climate has been challenging, the EU's blue economy is strong with a turnover of some €658 billion and a workforce of more than four million people. The maritime sector's importance spans several key EU policy areas including transport, environment and oceans, energy, internal market, and neighbourhood and enlargement. ([EMSA](#))

'Maritime' is variably defined broadly as 'of or relating to the sea'. With regard to commercial shipping, the maritime sector consists of shipbuilding, shipping, ports, marine and maritime business services industries, each of which comprise a diverse array of activities. This can be extended to the naval defence industry, offshore wind, offshore oil & gas and offshore construction. Considering recreational shipping, the maritime sector covers yacht and boat building, marinas, watersports and related services with significant contributions to coastal tourism. A further segment is related to everything coming off the sea, thus to marine resources and the marine ecosystem. This includes fishing and offshore aquaculture as well as the use of marine resources like algae and seaweed and environmental monitoring.

This sectorial catalogue shall provide companies and business advisors with relevant practical sector-specific information on potential actions for circular transition of the maritime industries and services sector. The main focus is on commercial shipping, but also specific contents related to recreational shipping and marine resources are included.



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A shift towards sustainable impact: Multilateral challenges

“the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade”
[A new Circular Economy Action Plan](#). (EU communication)

Challenges for the sector regarding sustainability are diverse:

- Facing **climate change** maritime industries need to develop measures towards zero-emission shipping and zero-emission ports.
- Considering the **scarcity of materials and the CO₂-emissions related to them**, especially metals and steel, but also the significant **harm to health and environment** maritime industries caused by unsustainable practices of shipwrecking on distant beaches over decades, more sustainable and resilient practices in shipbuilding and handling of end-of-life ships are needed.
- Pollution by ships, the sulphur content of fuels, marine litter, invasive species transported in ballast water, microplastics, toxic antifouling substances, underwater noise and non-sustainable fishing practices destroyed the balance of the ecosystem and caused a **loss of marine biodiversity**. From an economic point of view, this has a significant negative impact on the fishing sector but also on maritime tourism. It would be in the own interest of maritime industries to stop harming and start regenerating maritime ecosystems.
- Oil spills and pollution with hazardous substances following ship incidents can threaten wide coastal areas. Strict safety measures and an effective disaster management should be a key interest of maritime industries.

Because of its global structure, transformation in commercial shipping needs a stable and smart regulatory environment, in line with international standards.

Please find an overview of the most important policies and regulations that have been implemented throughout the last years or are currently in preparation, annexed to this document.



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CE opportunities for the sector, including best practices

The main principles of the circular economy are to

- eliminate waste and pollution
- circulate products and materials at their highest value
- regenerate natural systems

“The shipping industry is still in its early days when it comes to understanding and applying circular economy principles across the ship lifecycle. At the same time, the industry faces a rapidly changing landscape in light of decarbonisation efforts, the growth of the global fleet and need for increased ship recycling capacity, regulatory changes, and the global sustainability transition. When seen together, these circumstances present an opportunity for shipping to demystify and apply circular economy principles throughout the ship lifecycle.”

[*“Exploring shipping’s transition to a circular industry”*](#)

Let’s consider the opportunities arising in this context for the maritime sector:

Opportunities for Shipping

With upcoming regulations, many companies will need to document the carbon footprint for the products they present to their consumers - including manufacturing and full logistic process. Many industries are striving to offer zero-emission products and maritime industries could play an active part as a partner to facilitate zero-emission logistics. Compared to air cargo but also to road freight transport, emissions of waterborne transport are in general lower (though there is still a lot of room for improvement) - this can be a market opportunity for waterborne transport and if consistently implemented could be utilised as a sales argument especially for inland waterborne transport.

Shipping is more and more seen as an end-to-end service of transporting goods and commodities all the way, with shipping companies transforming to become full-service providers for “Green transport and logistics” - either by themselves or by strategic alliances. Ship owners and shipping agencies can benefit by innovating their business models accordingly and being up to date regarding digitalization and traceability demands.

Digitalization is also a key opportunity to reduce emissions in shipping by increasing efficiency, e.g. with route optimization, digitised processes or predictive maintenance.



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Logistics are a value-adding facilitator of a more circular flow of products and materials - with an increase of repair, remanufacturing and recycling there is also an increasing need for reverse logistics cargo flows. This is a huge opportunity for commercial shipping.

Opportunities for Shipbuilding

The circular economy is a huge opportunity to revive the shipbuilding sector in Europe beyond the special purpose and luxury segments. Since fleets increased in size of vessels and numbers significantly during the last decades, global recycling volumes for end-of-life vessels are expected to double by 2028 and nearly quadruple by 2033. The need to circulate parts and materials at their highest value in shipbuilding is not only necessary for ecological reasons, but with scarcity of materials, increasing prices for steel and growing geopolitical uncertainties also economically convincing. With the EU's Ship Recycling Regulation, the revival of ship recycling industries in Europe has become a fact.

This opens a market opportunity for innovations enabling sustainable and highly automated scrap yards as well as reuse and recycling of materials. Looking into the future, circular design in shipbuilding can be a strategic advantage – modularity and standardisation would enhance reuse and remanufacture, records not only on hazardous but on all materials and construction would facilitate reuse and increase end-of-life value beyond steel price, advanced materials can increase performance and extend lifetime.

Best practices:

Maersk has been developing ways to [build recyclable ships that can be dismantled and reused](#). The company has developed a database called Cradle to Cradle Passport:

[Bar Technologies](#) provides a wide range of design and engineering consultancy services with a focus on 5 key sectors: High Performance and Super Yachts, Leisure Marine, Heavy Marine, Data & Electronics and Renewables:

Opportunities for Ports

With proximity to cities and industries and as crossing points of transport modes, ports can play a very active role in a circular economy. To enable zero-emission shipping, production, storage and supply of renewable energy, biofuels and hydrogen is required. During transition period, technology providers for carbon capture and storage/valorization are needed. Ports handle huge volumes of raw materials, intermediates, and finished products. Combined with infrastructures for reverse logistics, remanufacturing and recycling ports can benefit from new material streams in the circular economy. Thanks to the strategic position of ports in logistic chains, port areas have the best conditions to set up repair facilities and to settle recycling industries in order to turn wastes into value. Port facilities, that are responsible for the management of ship wastes, can take advantage of valorization of diverse



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resource-streams, e.g. turning ship-waste into biogas. The circular economy holds many opportunities to increase the economic benefits from ports while mitigating the negative impacts of port activities on urban surrounding areas.

Best practices:

Sustainability is a key focus area for the future development of [Port Esbjerg](#).

In cooperation with Leviathan GmbH, GERMAN NAVAL YARDS welcomes the [first ship that is to be recycled 100% sustainably](#) for the first time.

Opportunities for Offshore Renewable Energy

According to the [EU's Blue Economy Strategy](#) offshore renewable energy could help meet the climate neutrality targets and generate a quarter of the EU's electricity in 2050, mainly through offshore wind energy. A sustainable ocean energy mix should in addition include floating wind, thermal, wave and tidal energy – providing a great opportunity for commercial success of these emerging technologies. Closely connected to offshore renewable energy production is the topic of energy storage, including hydrogen production presenting a business opportunity especially for coastal and port areas. But considering the circular economy, the offshore renewable energy sector itself needs to transform, especially with regard to circular design, remanufacturing and recycling. Now that the first generation of offshore wind turbines reaches end-of-life, a new infrastructure and innovative technologies are needed for sustainable decommissioning and recycling of offshore platforms. Circular design of offshore wind plants, especially of the huge composites parts, will not only put an end to the unsustainable practices of landfill but enable circulation of parts and materials at a high value.

Best practices:

[Siemens Gamesa pioneers wind circularity](#): launch of world's first recyclable wind turbine blade for commercial use offshore.

Opportunities for Leisure Boating

To solve the problems with end-of-life leisure boats rotting away or ending in landfill, besides the need for suitable regulations also opportunities arise for innovative approaches to encourage reuse and upcycling of end-of-life boats, to upscale and commercialise recycling solutions for composite waste and to introduce circular material alternatives to composites and fibreglass to the market. Modular design can increase efficiency in boat building. Repair and refurbishment can extend lifetime. The introduction of 'product-as-a-service' business models instead of sales for yachts and boats could help to keep value, avoid deterioration and increase utilisation rate. For sustainable short distance transports, sailing can come to a revival not only in maritime tourism but also as a 0-emission-transport opportunity.



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Best practices:

[Greenboats](#) is a sailing boat manufacturer that reduces CO2 emissions of composites by up to 80% over the product life cycle, by using natural and recycled materials. The company promises the same or better mechanical properties compared to conventional products.

[Shipped by Sail](#) is an environmentally responsible shipping broker, importing high quality products, which cannot be grown or produced domestically in a sustainable way.

Opportunities for Marine Resources and restoration of Marine Ecosystems

The opportunities of circular economy connected to the use of marine resources and the restoration of marine ecosystems are manifold. Traditional fishing industries have the opportunity to shift to more sustainable fishing practices, develop new business opportunities with valorization of by-products and contributing to publicly refunded restoration activities like collecting litter and lost fishing gears. There is high potential in sustainable aquaculture, not only of fish and seafood but also of algae, which can be used for such diverse applications like vegan fish-alternatives, energy production or ingredients for cosmetics. Creative approaches of valorization of ocean plastics have proven to be economically successful.

Best practices:

[Vetik](#) is developing the production of a marine algae based red colourant which is healthy and has potentially skin rejuvenating properties.



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Striving for Circular Economy: Tech-savvy SMEs that offer solutions to increase circularity in maritime industries and services

SHIPBUILDING

- Greenboats, Germany

[Greenboats](#) is a sailing boat manufacturer that reduces CO₂ emissions of composites by up to 80% over the product life cycle, by using natural and recycled materials. The company promises the same or better mechanical properties compared to conventional products.

- Clean Ocean Coatings, Germany

[Clean Ocean Coatings](#) offers a biocide-free antifouling solution. The innovative coating combines the advantages of ceramics and polymers, leading to a very smooth surface that is easy to clean and lasts at least two years longer than conventional coatings. Shipping companies also benefit from the CO₂ savings made possible by the smooth surface.

SHIPPING AND MAINTENANCE

- Value Maritime, Netherlands

[Value Maritime](#) has developed a filter system for small and medium-sized ships that, in addition to sulphur, also filters ultra-fine particulate matter (ultra fine dust) and CO₂ from the air.

- BIO-UV, France

[BIO-UV Group](#) designs, manufactures and markets ultraviolet (UV-C) disinfection and water treatment systems. BIO-UV Group has developed a range of BIO-SEA chemical-free ballast water treatment solutions (BWTS), certified by the IMO and USCG.

- FoulFighter, Finland

[FoulFighter](#) develops mechanical cleaning solutions to prevent early-stage fouling biofilm from spreading and growing.

- Hasytec, Germany

[Hasytec](#) offers an innovative antifouling technology, based on ultrasonic and controlled with AI.



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MANAGEMENT & SERVICES

- NautilusLog, Germany
[NautilusLog](#) offers smart, digital services for vessel, hazardous materials and emission management.
- Zero44, Germany
[Zero44](#) provides customised digital solutions for shipowners, charterers, and operators to streamline their CII and EU ETS management.
- Arinto, Germany
[Arinto](#) offers an arrival optimization system (AOS) that uses machine learning to help shipping companies get the most accurate information about when their vessels should ideally arrive at their port of destination. This helps to reduce fuel usage, save time and money and increase planning reliability.
- Heyport, Germany
[Heyport](#) is a collaborative approach with real-time insights into port call and berth planning. Its central communication channels ensure a single source of truth for all stakeholders involved.

RECYCLING

- Leviathan, Germany
[Leviathan](#) enables safe, clean, and renewable energy powered Ship Recycling in a controlled environment. The company developed an extreme pressure sand and water mixture, coupled with automated robots, and some inhouse secrets.
- Martens Renewables, Netherlands
[Martens Renewables](#) offers a unique waste treatment and environmental service package to the maritime and petrochemical industry to create a “renewable” ecosystem for a much needed different approach towards waste treatment and recovery of hydrocarbons into a renewable oil stream.
- Renable, Denmark
[Renable](#) develops a certified circular steel platform.
- Sagro, Netherlands
[Sagro](#) is a cluster of companies specialising in (circular) demolition, asbestos remediation, infra, logistics, environment & space, storage & transshipment and recycling (waste) streams.



- 3dPort, Spain
[3D Port](#) is a hub that embraces the transformation process of plastics and contributes to the Blue Economy. The team wants to transform sea-waste into 3D printed solutions to revalue the plastics collected in the seas, oceans and ports.

CIRCULAR MATERIALS

- Holy Technologies, Germany
[Holy Technologies](#) develops recyclable carbon fibre solutions for high-performance applications. Holy's technology unlocks an entirely new category of components, which have the potential to be significantly greener, lighter, and cheaper than the default.
- Plastic@Sea, France
 Plastics of various sizes are ingested at all levels of the food chain, causing physiological disturbances. [Plastic@Sea](#) uses a range of standard tests (ISO, OECD, EPA) to highlight the potential toxicity of plastics on various organisms, and proposes solutions that are more respectful of the environment. Faced with bans on the marketing of certain plastics, alternative solutions are emerging. Plastic@Sea supports companies in their choice of more virtuous products that respect eco-design criteria.

R & D DRIVEN COMPANIES

- Eco Marine Power, Japan
[Eco Marine Power](#) Co. Ltd. (EMP) is an internationally focused technology company based in Fukuoka, Japan, that develops innovative renewable energy focused fuel and emissions reduction technologies for shipping and offshore applications.
- Veracity, Norway
[Veracity](#) developed the Alternative Fuels Insight (AFI) platform to accelerate the shipping companies transformation. They offer comprehensive information about innovative ship propulsion and related topics.
- Water Robotics, France
[Water Robotics](#) is a Clean Tech start-up based in the Cap Oméga incubator in Montpellier. The company develops and markets the "Water Scan" tool, a data acquisition and processing chain for aquatic environments: rivers, lakes, canals, coastal lagoons, harbours and nearby



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coastlines. They find technical solutions to make the most advanced digital technologies accessible in their respective original fields: water and environmental microbiology. Based in a coastal region, the company has already adapted its solutions to the marine environment (coastline/lagoon/port).

- Lineup Ocean, France
[LINEUP OCEAN](#) is based in Montpellier and supports and prepares coastal communities and their populations for Coastal Resilience. To fulfil this mission, LINEUP OCEAN designs and develops innovative bio-inspired solutions, both aesthetic and sustainable, useful for the protection of goods and people, for the rehabilitation of marine ecosystems and for the development of eco-responsible activities depending on marine ecosystems and waves (diving, snorkelling, surfing, paddle, etc.).

Outlook: Further content to explore and sector specific funding opportunities

INITIATIVES AND NETWORKS

Ocean Stewardship Coalition

<https://unglobalcompact.org/take-action/ocean>

The National Ocean Platform for Sustainable Business: Cycle two

<https://globalcompact.no/losningsplattform/the-ocean-action-platform-cycle-two/>

Ship Recycling Transparency Initiative

<https://www.shiprecyclingtransparency.org/about-the-srti/>

Poseidon Principles

<https://www.poseidonprinciples.org/finance/#home>

Getting to Zero Coalition

<https://www.globalmaritimeforum.org/getting-to-zero-coalition>

The Circular Shipping Initiative. How the Circular Economy could introduce new value to the shipping industry

<https://www.shipfinance.dk/media/1980/the-circular-shipping-initiative.pdf>



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GUIDELINES AND HANDBOOKS

MCN Ship Efficiency Guideline

<https://www.maritimes-cluster.de/news/aktuelles/mcn-guideline-ship-efficiency-2022-news/>

A roadmap on the implementation of the circular economy on end-of-life recreational boats

<https://circulareconomy.europa.eu/platform/sites/default/files/2023-07/Roadmap%20on%20the%20implementation%20of%20circular%20economy%20-%20EOL%20recreational%20boats.pdf>

Ship Recycling Guide, First Edition

<https://www.ics-shipping.org/publication/ship-recycling-guide-first-edition/>

Unified Container Inspection and Repair Criteria (UCIRC) for Steel General Purpose Containers, Revision 3

https://www.ics-shipping.org/publication/ucirc_revision_3/

RESEARCH

Circular economy approach in the maritime industry: Barriers and the path to sustainability

https://pure.strath.ac.uk/ws/portalfiles/portal/141871069/Okumus_et_al_TRA2022_Circular_economy_approach_in_the_maritime_industry.pdf

Towards a circular maritime industry: Identifying strategy and technology solutions

<https://www.sciencedirect.com/science/article/pii/S0959652622045085>

Financing a sustainable ocean economy

<https://www.nature.com/articles/s41467-021-23168-y>

The Circular Economy in Ports and Maritime Shipping

<https://porteconomicsmanagement.org/pemp/contents/part2/green-supply-chain-management-ports/circular-economy-ports-maritime-shipping/>

Envisioning the Port of Rotterdam in a 100% Circular Economy

<https://portusonline.org/envisioning-the-port-of-rotterdam-in-a-100-circular-economy/>

Exploring shipping's transition to a circular industry. Findings of an inquiry to understand how circular economy principles can be applied to shipping

<https://www.sustainableshipping.org/wp-content/uploads/2022/02/Ship-lifecycle-report-final.pdf>



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Ensuring circular strategy implementation: The development of circular economy indicators for ports
<https://www.sciencedirect.com/science/article/pii/S2666822X23000060>

Shipping's Role in the Global Energy Transition
<https://www.ics-shipping.org/publication/shippings-role-in-the-global-energy-transition/>

Financial impact of the IMO 2020 regulation on dry bulk shipping
<https://www.sciencedirect.com/science/article/pii/S2666822X22000144>

Vessel Ownership, Trade Finance and Regulatory Compliance
https://cdn.ihsmarkit.com/www/prot/pdf/0423/Vessel-Ownership_Trade-Finance_and_Regulatory-Compliance_Whitepaper_April2023.pdf

SECTOR SPECIFIC FUNDING OPPORTUNITIES

Waterborne / Horizon Europe
<https://www.waterborne.eu/partnership/partnership>

EU Mission: Restore our Ocean and Waters
https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/restore-our-ocean-and-waters_en

BLUE Invest
https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/blueinvest_en

PORTUGAL BLUE launch Growth Blue I, the first blue economy focused private equity fund in Southern Europe
https://www.eif.org/what_we_do/resources/news/2023/portugal-blue-commits-to-growth-blue-i.htm?lang=-en



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Contact

Do you have any feedback, hints or questions? Please get in touch:

contact@up2circ.eu

<https://up2circ.eu/>



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ANNEX: Maritime policies and regulations

LAW OF THE SEA	MAIN GOALS
Legislative Organisation: UN	Establish and ratify a bilateral framework to protect marine biodiversity in international waters.
Status: Adopted in 2023, by 75 signatories	
Scope: Agreement under the United Nations Convention on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction.	
Further Information: https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-10&chapter=21&clang=en https://news.un.org/en/story/2023/06/1137857	

CORPORATE SUSTAINABILITY DUE DILIGENCE	MAIN GOALS
Legislative Organisation: EU	The aim of this Directive is to foster sustainable and responsible corporate behaviour and to anchor human rights and environmental considerations in companies' operations and corporate governance.
Status 2023: The proposal will go to the European Parliament and the Council for approval. Once adopted, Member States will have two years to transpose the Directive into national law and communicate the relevant texts to the Commission Scope: Large EU limited liability companies: <i>Group 1:</i> +/- 9,400 companies - 500+ employees and net EUR 150 million+ turnover worldwide. <i>Group 2:</i> +/- 3,400 companies in high-impact sectors. - 250+ employees and net EUR 40+ million turnover worldwide, and operating in defined high impact sectors, e.g. textiles, agriculture, extraction of minerals. For this group, the rules start to apply two years later than for group 1. <i>Non-EU companies:</i> +/- 2,600 companies in Group 1 and +/-	



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1,400 in Group 2 <i>Third country companies</i> active in the EU with turnover threshold aligned with Group 1 and 2, generated in the EU.	
Micro companies and SMEs are not concerned by the proposed rules. However, the proposal provides supporting measures for SMEs, which could be indirectly affected.	

FUEL EU MARITIME	MAIN GOALS
Legislative Organisation: EU	<p>The regulation aims to support the decarbonization of the shipping industry.</p> <p>FuelEU Maritime sets greenhouse gas (GHG) emission intensity requirements on energy used on board ships trading in the EU from 2025.</p> <p>What's more, it mandates the use of shore power for container and cruise ships in certain EU ports from 2030.</p>
Status: The European Parliament (EP), Council of the European Union, and the European Commission (EC) have reached an agreement on the FuelEU Maritime regulation. The EP and Council are expected to formally adopt the revised regulation later in 2023.	
Scope: The initiative aims to enable the EU to reduce its net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels and to achieve climate neutrality in 2050.	
Further Information: https://www.dnv.com/maritime/insights/topics/fuel-eu-maritime/index.html https://transport.ec.europa.eu/transport-themes/clean-transport/alternative-fuels-sustainable-mobility-europe/renewable-and-low-carbon-fuels-value-chain-industrial-alliance_en https://www.consilium.europa.eu/en/press/press-releases/2023/07/25/fueleu-maritime-initiative-council-adopts-new-law-to-decarbonise-the-maritime-sector/	



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SUSTAINABLE AND SMART MOBILITY STRATEGY	MAIN GOALS
Legislative Organisation: EU	<p>Reducing the current dependency on fossil fuels. Some points of the strategy refer to the maritime industry:</p> <p>39. The European Green Deal calls for a substantial part of the 75% of inland freight carried today by road to shift to rail and inland waterways.</p> <p>44. Similarly, while successive action programmes have helped inland waterways transport to largely maintain its modal share³², actions are necessary to preserve this accomplishment and seize the untapped potential in a sustainable way, both along TEN-T corridors and in those inner cities where inland waterways can green the last mile of city logistics. The Commission will put forward the NAIADES III programme to exploit this potential by tackling the key challenges such as the need to renew barge fleets and to improve access to financing, while ensuring full compliance with environmental policies, in particular with the Water Framework Directive and the Habitats Directive.</p> <p>45. In addition, TEN-T support for the Motorways of the Sea has succeeded, seeing more cargo transported more sustainably, through short-sea shipping. The EU must now also lead by example and make European maritime areas sustainable, smart and resilient.</p>
Status 2023:	
<p>Scope: The goal is a 90% cut in emissions by 2050 in the transport sector, including market readiness of zero emission marine vessels by 2030.</p>	
<p>Further Information:</p> <p>https://transport.ec.europa.eu/transport-themes/mobility-strategy_en</p> <p>https://transport.ec.europa.eu/transport-modes/inland-waterways/promotion-inland-waterway-transport/naiades-iii-action-plan_en</p>	



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REGULATION FOR THE DEPLOYMENT OF ALTERNATIVE FUELS INFRASTRUCTURE (AFIR)	MAIN GOALS
Legislative Organisation: EU	<p>Set mandatory deployment targets for electric recharging and hydrogen refuelling infrastructure for the road sector, for shore-side electricity supply in maritime and inland waterway ports, and for electricity supply to stationary aircraft.</p> <p>Maritime ports that see at least 50 port calls by large passenger vessels, or 100 port calls by container vessels, must provide shore-side electricity for such vessels by 2030. This will not only help reduce the carbon footprint of maritime transport, but also significantly reduce local air pollution in port areas.</p>
Status 2023:	
Scope: The AFIR is part of the EU's "Fit for 55," a package of regulatory actions to make the EU policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.	
Further Information: https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1867 https://www.gsk.de/wp-content/uploads/2023/02/GSK-Update-Landstromanlagen-EN-230223.pdf	

IMO 2020 Rule	MAIN GOALS
Legislative Organisation: IMO	<p>Limit sulphur content in fuel oils.</p> <p>77% reduction in overall sulphur oxide emissions from ships, which leads to reduced health- and environmental risks.</p>
Status: In effect since: 2020	
Scope: IMO Member States	
Further Information: https://www.imo.org/en/MediaCentre/PressBriefings/pages/34-IMO-2020-sulphur-limit-.aspx https://www.imo.org/en/MediaCentre/PressBriefings/pages/03-1-March-carriage-ban-.aspx	

MRV REGULATION	MAIN GOALS
Legislative Organisation: EU	<p>Reduce CO2 emissions, methane (CH4) and nitrous oxide (N2O) emissions.</p>
Status 2023: The amended version has been published for the inclusion of maritime transport activities in the EU Emissions	



<p>Trading System and for the monitoring, reporting and verification of emissions of additional greenhouse gases and emissions from additional ship types.</p>	
<p>Scope: Until 1 January 2024, the MRV Regulation only covers CO2 emissions from large ships.</p> <p>After 1 January 2024, the scope of the MRV Regulation expands to include methane and nitrous oxide emissions from shipping.</p> <p>In addition, from 1 January 2025, general cargo ships between 400 and 5000 gross tonnage and offshore ships of 400 gross tonnage and above fall under the scope of the amended MRV Regulation.</p>	
<p>Further Information:</p> <p>https://emsa.europa.eu/reducing-emissions/mrv-changes.html</p>	

EU EMISSIONS TRADING SYSTEM (EU ETS)	MAIN GOALS
<p>Legislative Organisation: EU</p>	<p>Limiting emissions from around 10,000 installations in the energy sector and manufacturing industry, as well as aircraft operators operating between these countries and departing to Switzerland and the United Kingdom.</p> <p>Covering around 40% of the EU's greenhouse gas emissions.</p> <p>Covering emissions from maritime transport from 2024.</p>
<p>Status: Set up in 2005, the EU ETS is the world's first international emissions trading system. It is now in its fourth phase (2021-2030).</p>	
<p>Scope:</p> <p>All EU countries plus Iceland, Liechtenstein and Norway (EEA-EFTA states)</p>	
<p>Further Information:</p> <p>https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en</p>	



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ENERGY EFFICIENCY DESIGN INDEX (EEDI)	MAIN GOALS
Legislative Organisation: IMO	<p>Continuous improvements in the energy efficiency of shipping.</p> <p>Goal-based and technology-neutral regulations have incentivized the use of energy-efficient technologies such as hull air lubrication, wind assisted propulsion, waste heat recovery, etc.</p> <p>Those measures represent the first global mandatory GHG-reduction regime for an international industry sector and have been driving energy efficiency improvements across the global fleet for more than a decade.</p> <p>IMO Member States have adopted further energy efficiency measures in 2021 to reduce the carbon intensity of international shipping by at least 40% in 2030 compared to 2008.</p>
Status: In effect since 2013.	
Scope: From 1 January 2023, it is mandatory for all ships to calculate their attained Energy Efficiency Existing Ship Index (EEXI) to measure their energy efficiency and to initiate the collection of data for the reporting of their annual operational carbon intensity indicator (CII) and CII rating.	
Further Information: https://www.imo.org/en/OurWork/Environment/Pages/Improving%20the%20energy%20efficiency%20of%20ships.aspx	

ENERGY EFFICIENCY EXISTING SHIP INDEX (EEXI)	MAIN GOALS
Legislative Organisation: IMO	<p>Improving the technical performance of existing ships.</p>
Status: In effect since 2013	
Scope: One-time certification for existing ships, targeting design parameters.	
Further Information: https://www.imo.org/en/OurWork/Environment/Pages/Improving%20the%20energy%20efficiency%20of%20ships.aspx	



CARBON INTENSITY INDICATOR (CII)	MAIN GOALS
Legislative Organisation: IMO	<p>Track and report the operational energy efficiency of ships, building upon fuel oil consumption from the IMO DCS and the SEEMP as a management tool.</p>
Status: The first year of the attained annual operational CII verification will be 2024 for the operation in calendar year 2023.	
<p>Scope: CII is mandatory for ships of 5,000 gross tonnage and above.</p> <p>The annual carbon intensity reduction factor is equivalent to business-as-usual until entry into force; then 2% from 2023 to 2026; and to be further strengthened for the period 2027 to 2030. Vessels, based on their performance, will receive an environmental rating of A (major superior), B (minor superior), C (moderate), D (minor inferior) or E (inferior performance level).</p>	
<p>Further Information:</p> <p>https://www.imo.org/en/OurWork/Environment/Pages/Improving%20the%20energy%20efficiency%20of%20ships.aspx</p> <p>https://www.dnv.com/maritime/insights/topics/CII-carbon-intensity-indicator/index.html</p>	

SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)	MAIN GOALS
Legislative Organisation: IMO	<p>Improve the energy efficiency of a ship in a cost-effective manner.</p> <p>Urge the ship owner and operator at each stage of the plan to consider new technologies and practices when seeking to optimise the operational performance of a ship.</p> <p>Provide an approach for shipping companies to manage ship and fleet efficiency performance over time using recognized monitoring tools.</p>
Status: In effect since 2013	
Scope: Mandatory, ship-specific management plan.	
<p>Further Information:</p> <p>https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Air%20pollution/MEPC.346%2878%29.pdf</p>	



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THE EU REGULATION ON SHIP RECYCLING	MAIN GOALS
Legislative Organisation: EU	<p>Define requirements for ships and recycling facilities to ensure that ship recycling is executed in an environmentally safe manner.</p> <p>Restrict or prohibit the installation and use of hazardous materials on ships, such as asbestos or ozone-depleting substances.</p> <p>Establish a European list of ship recycling facilities.</p>
Status: In effect since 2013	
Scope: Vessels, visiting European ports or anchorages, > 500 GT	
Further Information:	
<p>https://www.dnv.com/maritime/insights/topics/ihm-ship-recycling/index.html</p> <p>https://environment.ec.europa.eu/topics/waste-and-recycling/ships_en</p> <p>https://emsa.europa.eu/about/financial-regulations/items.html?cid=280&id=3003</p>	

HONG KONG INTERNATIONAL CONVENTION FOR THE SAFE AND ENVIRONMENTALLY SOUND RECYCLING OF SHIPS	MAIN GOALS
Legislative Organisation:	<p>Ensure that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risks to human health, safety and to the environment.</p>
Status: Agreed in 2009, the Hong Kong Convention will enter into force in June 2025. As of June 2023, twenty-two countries have ratified.	
Scope:	
Further Information:	
<p>https://www.dnv.com/maritime/insights/topics/ihm-ship-recycling/index.html</p> <p>https://www.imo.org/en/OurWork/Environment/Pages/Ship-Recycling.aspx</p> <p>https://www.imo.org/en/ourwork/partnershipsprojects/pages/se-nsrec-phase-ii.aspx</p>	



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BALLAST WATER MANAGEMENT CONVENTION	MAIN GOALS
Legislative Organisation: IMO	Prevent the spread of potentially harmful aquatic organisms and pathogens in ships' ballast water.
Status: In effect since 2017	
Scope: The convention applies to ships registered under contracting Parties to the BWM Convention, which take up and use ballast water during international voyages.	
Further Information: https://www.imo.org/en/MediaCentre/HotTopics/Pages/Implementing-the-BWM-Convention.aspx	

INTERNATIONAL CONVENTION ON THE CONTROL OF HARMFUL ANTI-FOULING SYSTEMS ON SHIPS	MAIN GOALS
Legislative Organisation: IMO	Prohibit the use of harmful organotins in antifouling paints used on ships and establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.
Status: In effect since 2008	
Scope: The Convention prohibits the use of harmful organotins in anti-fouling paints used on ships and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.	
Further Information: https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the-Control-of-Harmful-Anti-fouling-Systems-on-Ships-(AFS).aspx https://www.transportstyrelsen.se/en/shipping/Environmental-protection/Anti-Fouling-Systems-for-Ships/	



MARITIME AUTONOMOUS SURFACE SHIPS CODE (MASS CODE)	MAIN GOALS
Legislative Organization:	IMO aims to integrate new and advancing technologies in its regulatory framework - balancing the benefits derived from new and advancing technologies against safety and security concerns, the impact on the environment and on international trade facilitation, the potential costs to the industry, and their impact on personnel, both on board and ashore. IMO wants to ensure that the regulatory framework for Maritime Autonomous Surface Ships (MASS) keeps pace with technological developments that are rapidly evolving.
Status: The aim is to adopt a non-mandatory goal-based MASS Code to take effect in 2025, which will form the basis for a mandatory goal-based MASS Code, expected to enter into force on 1 January 2028.	
Scope: Align a necessary regulatory framework with emerging technologies.	
Further Information: https://www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx	

