MEDITERRANEAN ACTION PLAN (MAP)
REGIONAL MARINE POLLUTION EMERGENCY RESPONSE CENTRE FOR THE MEDITERRANEAN SEA (REMPEC)

Sixteenth Meeting of the Focal Points of the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC)

Sliema, Malta, 13-15 May 2025

REMPEC/WG.61/8
25 March 2025
Original: English

Agenda Item 8: Reduction of GHG emissions from ships

A Roadmap for transitioning to low carbon shipping in the Mediterranean Sea

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Note by the Secretariat

This document, prepared by the Secretariat, presents a draft Roadmap for transitioning to low carbon shipping in the Mediterranean Sea.

Background and Content

1 According to the International Maritime Organisation's (IMO) Fourth Greenhouse Gas (GHG) Study, emissions - including carbon dioxide (CO_2), methane (CH4) and nitrous oxide (N_2O), expressed in CO_2 - of total shipping (international, domestic and fishing) have increased from 977 million tonnes in 2012 to 1,076 million tonnes in 2018 (9.6% increase). In 2012, 962 million tonnes were CO_2 emissions, while in 2018 this amount grew 9.3% to 1,056 million tonnes of CO_2 emissions – the share of shipping emissions in global anthropogenic emissions has increased from 2.76% in 2012 to 2.89% in 2018.

2 In April 2018, the IMO adopted the Initial IMO Strategy on reduction of greenhouse gas (GHG) emissions from ships (hereinafter referred to as the Initial IMO GHG Strategy), which defined the objectives, tools, pace of work and guiding principles and as such was the framework for IMO Member States to decarbonise shipping.

3. In July 2023, IMO adopted the 2023 IMO Strategy on Reduction of GHG Emissions from Ships (hereinafter referred to as the 2023 IMO GHG Strategy) in accordance with the agreed programme of follow-up actions, which now replaces the Initial IMO GHG Strategy. The 2023 IMO GHG Strategy represents a framework for IMO Member States, setting out the future vision for international shipping, the levels of ambition to reduce GHG emissions and guiding principles; and includes candidate mid- and long-term further measures with possible timelines and their impacts on States. It also identifies barriers and supportive measures including capacity building, technical cooperation as well as research and development (R&D).

4. In 2021, the European Union (EU) introduced its "Fit for 55" package, aiming for a 55% reduction in greenhouse gas (GHG) emissions by 2030 across all industrial sectors. The shipping sector was subsequently subjected to four new regulations:

.1 Emissions Trading System (ETS) Directive which took effect in 2023;

.2 Fuelled Maritime Regulation which took effect in 2025;

.3 Alternative Fuels Infrastructure Regulation: to ramp-up of alternative fuel availability in core ports in EU Member States by 2025; and

.4 Energy Taxation Directive: to remove the tax exemption for conventional fuels used between EU ports and a new tax imposed which took effect in 2023.

5 The Mediterranean Sea is one of the world's busiest maritime regions acting as a critical crossroad for global trade, energy transport and tourism. It is of strategic importance as a global trade hub with key chokepoints at the Straits of Gibraltar and the Dardanelles with major ports both on the northern and southern shores. The uniqueness of the region will surely influence any international or regional goal set to reduce GHG emissions from ships.

6. Any goals set will be influenced by the economic and policy disparities between the Mediterranean coastal States that are EU Member States and those that are not EU Member States which may create challenges for adopting a unified strategy to decarbonise shipping in the Mediterranean region. Furthermore, geopolitical instability in the Mediterranean region or adjacent regions, can obstruct efforts to establish a coordinated approach to the transition.

7. To overcome these challenges collaboration and collective efforts become crucial. Furthermore, to address uncertainties regarding future policies, proactive engagement from Governments, industry stakeholders, and international organisations is crucial. This engagement will help establish clear and stable regulatory frameworks, fostering confidence and enabling long-term planning and investment. Lastly, fostering collaboration among stakeholders is vital. This includes creating platforms for dialogue, sharing best practices, and promoting partnerships between Governments, shipping companies, port authorities, and environmental organisations to collectively achieve the goals of the

2023 IMO GHG Strategy in the Mediterranean region. By acting collectively, Contracting Parties can amplify their input, reduce costs through shared resources and position the region as a leader in sustainable maritime transport.

Initiatives taken to date

8. With a view to contributing to addressing the challenge of decarbonizing the maritime industry, the Contracting Parties to the Barcelona Convention at their 22nd Meeting (COP 22, Antalya, Türkiye , 2021) committed, through the 2022-2031 - Mediterranean Strategy for the Prevention, Preparedness and Response to Marine Pollution from Ships (Decision 25/16) *to promote and support the development and implementation of innovative global solutions to mitigate and respond to climate change*.

9. Furthermore, COP 23[1] agreed to include the following activity in the UNEP/MAP Programme of Work and Budget for 2024-2025†:

> - *3.2.2. Mobilise and implement innovative solutions to reduce GHG emissions from ships in selected ports, including through energy efficiency and decarbonisation.*

10. With a view to assisting Contracting Parties, to mobilise and implement innovative solutions to reduce GHG emissions from ships in selected ports, including through energy efficiency and decarbonisation, during 2024, REMPEC has commissioned multiple Studies to support evidence-based decision-making to address GHG emissions from ships in the Mediterranean region. With finance available from the Governments of France and Italy, the following Studies were finalised by REMPEC:

.1 Study on the effective implementation of the 2023 IMO Strategy on Reduction of GHG Emissions from Ships in the Mediterranean region, as presented in REMPEC/WG.61/INF.13;
.2 Study to assess the legal and technical implications of the European Union Emission Trading Scheme (EU ETS) for shipping in the Mediterranean region, as presented in REMPEC/WG.61/INF.14;
.3 Study on the implementation of emission control and energy efficiency measures for ships in port areas in the Mediterranean region, as presented in REMPEC/WG.61/INF.15;
.4 Study analysing the impact of biofouling on the energy efficiency of ships and the GHG abatement potential of biofouling management measures in the Mediterranean region, as presented in REMPEC/WG.61/INF.16; and
.5 Study on the implementation of possible Green Shipping Routes (Corridors) Maritime Hubs (Green Hubs) to reduce GHG emissions from shipping in the Mediterranean region, as presented in REMPEC/WG.61/INF.17.

11. Furthermore, following on IMO's MEPC Resolution 367 (79) adopted on 16 December 2022 to encourage Member States to develop and submit voluntary national action plans to address GHG emissions from ships, REMPEC has also developed a Draft Guidance Document on the Preparation of National Action Plan (NAPs) to address GHG from Ships in the Mediterranean, as contained in REMPEC/WG.61/8/6.

12. The above-mentioned Studies, conducted by globally reputable research organizations, have overlapping information and proposed potential actions and measures in each respective area, which in instances are similar in nature. In light of this work, the progress made thus far at IMO following the adoption of the 2023 IMO Strategy and the initiatives by the EU which will inevitably have a bearing on the region, REMPEC sought to prepare a draft Roadmap with expected outputs which is set out at Annex to the present document, to address GHG emissions reductions from ships in the Mediterranean region for consideration by Contracting Parties. This draft Roadmap provides a comprehensive

[1] 23rd Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal region of the Mediterranean (Barcelona Convention) and its Protocols was held from 5-8 December 2023 in Portorož, Slovenia

framework for future work by Contracting Parties to reduce GHG emissions from ships and at the ship-shore interface through: 1) regulatory and policy arrangements; 2) low carbon shipping 3) capacity building; 4) green ports; 5) green corridors; and 6) green financing.

13. Actions requested by the Meeting

The Meeting is invited to:

.1 **take note** of the information provided in the present document and Annex; and

.2 **comment** as deemed appropriate.

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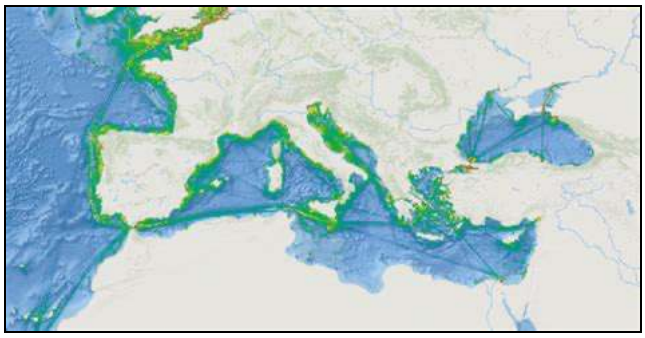
Annex

A DRAFT ROADMAP FOR TRANSIONING TO LOW CARBON SHIPPING IN THE MEDITERRANEAN SEA

1 INTRODUCTION AND CONTEXT

1.1 The 2013 report[2] from the International Panel on Climate Change (IPCC) highlights the Mediterranean as one of the most vulnerable regions in the world to the impacts of global warming. The 2019 Report on the State of the Environment and Development in the Mediterranean (SoED)[3] concludes that the Mediterranean basin is affected by climate change at a pace well above global average, in particular, by more rapid warming of ambient air and sea surface in all seasons. Through the application of the Coastal Risk Index[4] (CRI-MED) for the Mediterranean (on 21 Mediterranean countries), coastal hot-spots are found to be predominantly located in the south-eastern Mediterranean region. The Mediterranean Sea is one of the busiest seas in the world, with 24% of the global fleet of ships calling ports or passing through the Mediterranean in 2019, including container ships, gas tankers and oil and chemical tankers representing 36.5%, 32.6%, and 27% of the word fleet, respectively.

1.2 Moreover, the Mediterranean is the second largest market globally (after the Caribbean) for cruising, accounting for 17.3% of worldwide cruises in 2019. Container port traffic development also shows a clear trend of rapid growth of the sector, which undoubtedly increases the environmental pressure and strengthens the need for a transition to a sustainable maritime sector. Furthermore, maritime traffic is steadily increasing adding environmental pressures, including rising CO_2 emissions.



Density map of ship traffic in the Mediterranean Sea, 2017 (source: www.researchgate.net)

1.3 Shipping contributes to 2.89% of global GHG emissions (IMO, 2020)[5]. As the regulatory body for international shipping, the International Maritime Organisation (IMO) is committed to reducing air emissions from the industry. The 2023 IMO GHG Strategy marks a significant milestone in the industry's transition towards zero-emission shipping by approximately 2050. Achieving this target requires a holistic, systematic, and transdisciplinary approach, incorporating a mix of strategies and active collaboration among stakeholders.

1.4 Adopting and enforcing appropriate regulations are crucial for the decarbonisation of the maritime industry. The IMO is working on adopting regulations for implementing the 2023 IMO GHG Strategy including GHG pricing to incentivise the transition to carbon-neutral energy and zero-emission technologies. Against this background, the EU has already introduced the ambitious "Fit for 55" package aiming for a 55% reduction in GHG emission by 2030 across all industrial sectors including a cap and trade system extended to shipping.

1.5 The unique characteristics and specificities of the Mediterranean region influence the shift to net-zero emission shipping. Economic and policy disparities between the Mediterranean coastal States that are EU Member States and those that are not EU Member States create challenges for adopting a unified strategy for net zero-emission shipping in the Mediterranean region. Furthermore, geopolitical instability in the Mediterranean region or adjacent regions, obstructs efforts to establish a coordinated

[2] https://www.ipcc.ch/site/assets/uploads/2018/03/WG1AR5_SummaryVolume_FINAL.pdf
[3] https://planbleu.org/wp-content/uploads/2021/04/SoED_full-report.pdf
[4] https://coastalriskindex.com/
[5] IMO. (2020). Fourth IMO GHG Study. Retrieved from: https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Fourth%20IMO%20GHG%20Study%202020%20-%20Full%20report%20and%20annexes.pdf

approach to the transition. While the region's renewable energy resources hold significant potential to transform it into a green energy hub, working towards resolving geopolitical issues is essential to attract investors and drive economic growth through job creation. The Mediterranean's strategic importance as a global trade and energy corridor enhances its potential to become a leading energy hub and a pivotal player in the energy transition. However, trying to overcome geopolitical instability and adopting a cohesive approach to maritime industry decarbonization are crucial for realizing this potential.

2 GEOGRAPHICAL COVERAGE

2.1 The area to which the Roadmap applies is the area defined in Article 2 of the Protocol concerning Cooperation in preventing pollution from ships and, in cases of emergency, combatting pollution of the Mediterranean Sea.

3 PRESERVATION OF RIGHTS

3.1 The provisions of the Roadmap shall be without prejudice to stricter provisions regulating the management of GHG emissions from ships contained in other existing or future national, regional or international instruments or programmes, when considering existing best practices for addressing GHG emissions from ships in the Mediterranean region.

4 GUIDING PRINCIPLES

4.1 The Roadmap will be guided by:

.1 the work of the Contracting Parties to the Barcelona Convention, wherever possible towards achieving the UN 2030 Agenda for sustainable development and delivering on the SDGs (especially SDG 5 - Gender Equality, SDG 13 - Climate Action, and SDG 14 – Life Below Water) and the Good Environmental Status (GES) of the Mediterranean Sea and Coast, particularly the ecological objectives related to non-indigenous species (EO2), contaminants (EO9), and marine litter (EO10);

.2 the initiatives taken by the Contracting Parties to the Barcelona Convention towards achieving Objective 4 – addressing climate change as a priority within the context of the Mediterranean Strategy for Sustainable Development (MSSD)[6], in its updated version;

.3 the collaboration with all stakeholders of the Mediterranean region, with a specific focus on IMO and, as appropriate on EU, related regulatory instruments and institutions, with a view to encouraging more cohesive working, maximizing synergies and benefits for the Contracting Parties and effectiveness and enhancing impacts on the ground;

.4 the knowledge gained from the studies conducted and the guidelines developed on GHG emissions from ships by REMPEC as well as the achievements and lessons learnt through the implementation of the regional Mediterranean Strategy for Prevention, Preparedness and Response to Marine Pollution from Ships 2022-2031[7];

.5 the prevention and precautionary principles approach when planning and undertaking activities to deliver the objectives of the Roadmap;

.6 the Ecosystem Approach (EcAp) to the management of human activities in the Mediterranean marine and coastal environment;

.7 the regional and sub-regional initiatives between countries to tackle GHG emissions from ships in the Mediterranean region where possible;

[6] https://www.unep.org/unepmap/what-we-do/mediterranean-strategy-sustainable-development-mssd
[7] Decision IG.25/16.

.8 the cooperation among relevant organisations and stakeholders operating within the Mediterranean to maximise synergies,wherever possible, and impacts on the ground, and encourage more cohesive and effective working;

.9 the work to promote gender equality and the empowerment of women within the maritime sector; and

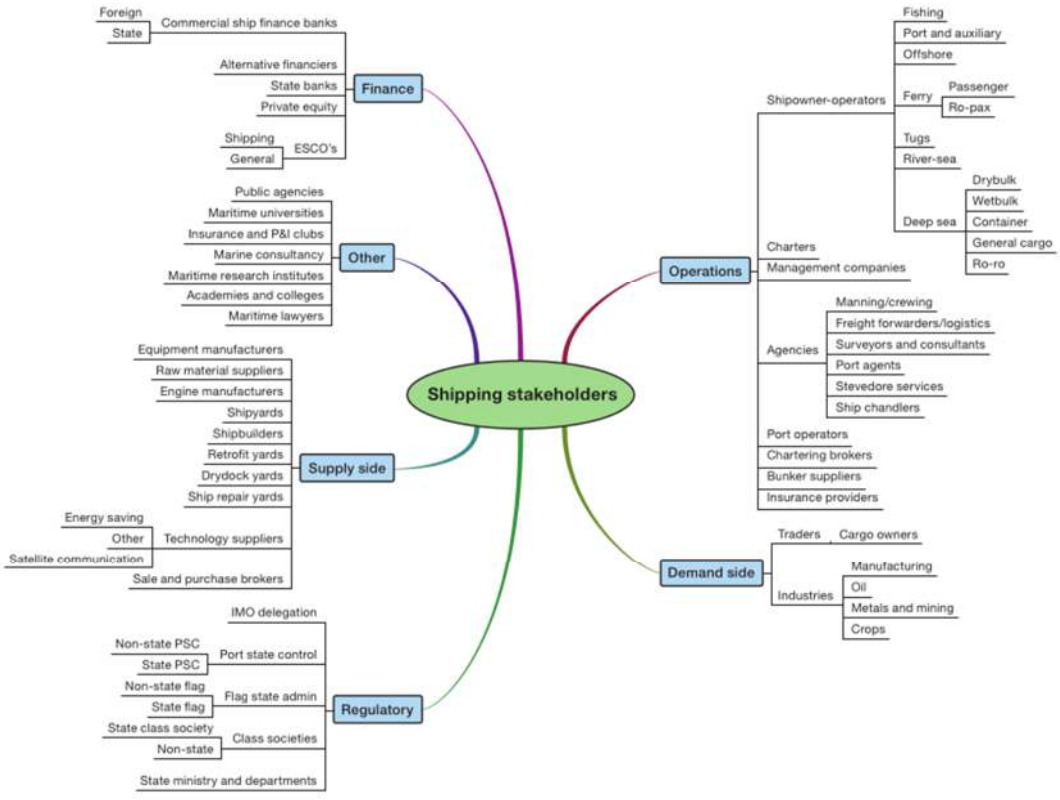
.10 the innovative solutions, wherever possible, to address the objectives of the Roadmap within the framework of any initiatives taken by IMO and UNEP/MAP.

5 APPLICATION

5.1 This Roadmap will address GHG emissions from ships and from the ship-shore interface, as appropriate in compliance with legal regulations aimed at contributing to net-zero greenhouse gas emissions from ships and controlling greenhouse gas emissions from ships, in conformity with international law, under the aegis of United Nations specialized agencies, and in particular of the IMO, including but not limited to the international conventions dealing with maritime safety, notably the International Convention for the Safety of life at Sea, 1974 (SOLAS) and the prevention of pollution from ships, notably the International Convention for the Prevention of Pollution from Ships (MARPOL) and specifically its Annex VI, and the International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention).

6 STAKEHOLDERS

6.1 It is well recognized that addressing the reduction of GHG emissions from ships at national level is linked to various Ministries, Government agencies or other institutions can be responsible for, or impacted by, national legislation to reduce GHG emissions from ships.



6.2 At national level, it is important to identify which maritime sectors and stakeholders are expected to play a role in the reduction of GHG emissions from ships That said, the 2023 IMO GHG Strategy identifies a level of ambition whereby the "*uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5%, striving for 10%, of the energy used by international shipping by 2030*". This and climate action by the European Union (EU), of which some Contracting Parties are also members, will increasingly impact maritime transport in the Mediterranean region as a whole and so there is an urgent need for Contracting Parties to the Barcelona Convention to consider the challenges and opportunities from a regional perspective

6.3 The primary responsibility for achieving the objective of the Roadmap remains, in the main, with Contracting Parties to the Barcelona Convention. Thus, the primary stakeholders for the implementation of the Roadmap, are Contracting Parties to the Barcelona Convention who can act both individually and as a group.

6.4 However to support their individual and collective efforts there must be collaboration coordination and collective efforts by all relevant stakeholders in the region. Considering the technical expertise required for the implementation of Roadmap in the framework of the Prevention and Emergency Protocol, REMPEC, supported by the Secretariat of the Barcelona Convention other MAP Components and other stakeholders will assist Contracting Parties to build consensus on various matters through the provision and coordination of technical support and providing a platform for regional or sub-regional cooperation.

7 OBJECTIVE OF THE MEDITERRANEAN ROADMAP AND ACTION PLAN

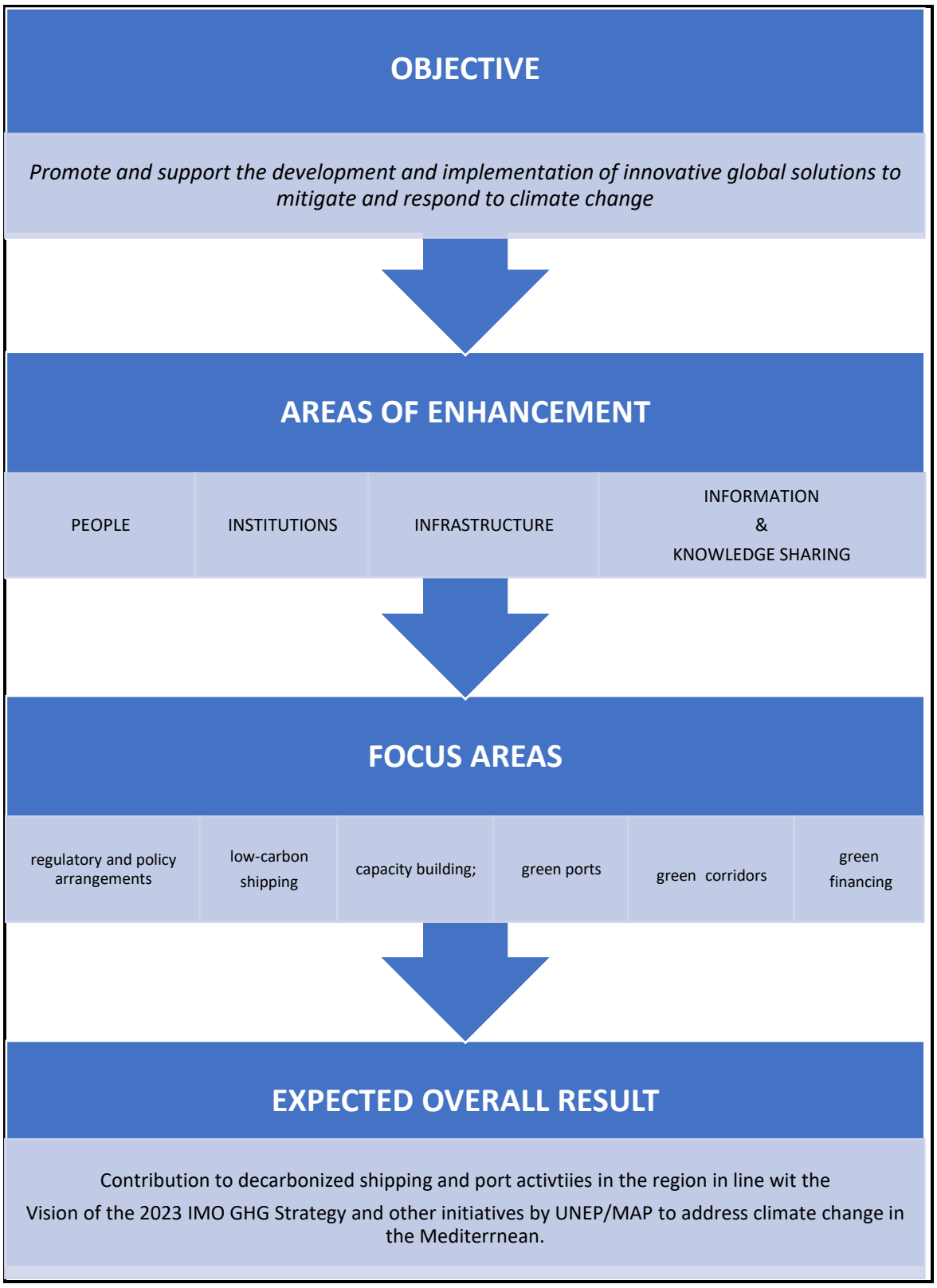
7.1 The Contracting Parties to the Barcelona Convention and its Protocols at their 22nd Meeting (COP 22, Antalya, Türkiye) adopted Decision 25/16 on the Mediterranean Strategy for the Prevention, Preparedness, and Response to Marine Pollution from Ships (2022-2031).

7.2 The Mediterranean Strategy (2022-2031) identifies seven key Common Strategic Objectives (CSOs) representing the central focus areas to guide action over the 10 year period. In particular CSO 2 is aimed to:

> *"Promote and support the development and implementation of innovative global solutions to mitigate and respond to climate change"*

7.3 The purpose of this Roadmap is to build on the experiences gain from the initiatives taken by Contracting Parties thus far to address GHG emissions from ships at the regional level and most importantly to reinforce, in a coordinated manner, the already established collaborative and collective efforts of Contracting Parties, who will build on what has already been achieved to address this CSO with a view that GHG emissions from ships and the ship-shore interface in the region are reduced and ultimately contribute to the level of ambition in the 2023 IMO GHG Strategy.

Figure 1: Roadmap flow chart



8 FOCUS AREAS OF THE ROADMAP

8.1 The Roadmap focuses on the following key areas:

Key Area 1: Regulatory and Policy arrangements

Background - MARPOL Annex VI, which regulates air pollution and GHG emissions from ships, is a critical instrument for mitigating maritime environmental impacts representing 97.3% of world merchant shipping tonnage. For Mediterranean coastal states, the region's 2022 designation as Sulphur Emission Control Areas (SO_x ECA) by IMO, effective from 1 May 2025, marks a transformative step. At the time of designation, 16 out of the 21 coastal States had acceded to MARPOL Annex VI. The Mediterranean SO_x ECA under MARPOL Annex VI targets SO_x but indirectly also supports GHG reduction.

Furthermore, biofouling on ship's hull significantly contributes to increase fuel consumption and GHG emissions from ships. Research suggests that a global approach to effective biofouling management through for example the International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention) could reduce shipping-related GHG emissions by up to 19% equivalent to 198 millions tons of CO_2. Effective biofouling management can lead to significant energy savings and fuel demand of significant benefit to a busy shipping region like the Mediterranean Sea.

Thus, Mediterranean coastal States, ratifying and effectively implementing MARPOL Annex VI and the AFS Convention become essential in aligning with global and regional climate objectives and contributing to a cleaner Mediterranean.

While some Mediterranean coastal States have ratified MARPOL Annex VI and the AFS Convention and integrated the provisions into their national legal frameworks, other coastal states are in the process of doing so. Universal adoption followed by enforcement across the region is vital to ensuring a harmonized regulatory framework, ensuring a level playing field that does not discriminate against any flag or port state and promoting regional cooperation in emission reductions.

In addition to the IMO regulations on GHG reduction, in 2021, the European Union (EU) introduced the ambitious "Fit for 55: package aiming for a 55% reduction in greenhouse gas (GHG) emissions by 2030 across all industrial sectors, that will have a direct impact on the Mediterranean region. The shipping sector was subjected to four new regulations; 1) Emission Trading System (ETS) Directive which took effect in 2023 and was extended to maritime transport emission since 2024 2) FuelEU Maritime Regulation which took effect in 2025; 3) Alternative Fuels Infrastructure which is an update of an existing directive to ramp up the availability of LNG by 2025 and onshore electrical power supply in core EU ports by 2030; and 4) Energy Taxation Directive to remove the tax exemption for conventional fuels used between EU ports which took effect in 2023.

Recommendations:

1 accede to IMO instruments addressing the reduction of GHG emissions from ships including aspects of biofouling management, if not as yet done so;

2 transpose into national law the relevant regulations from IMO instruments concerning the reduction of GHG emissions from ships, including aspects of biofouling management;

3 harmonize as appropriate, national regulations with the relevant IMO regulations addressing the reduction of GHG emissions from ships including aspects of biofouling management;

4 align national and regional policies, as appropriate, with emerging EU measures to drive cleaner fuels and low emission shipping;

5 ensure full compliance with the relevant IMO regulations addressing the reduction of GHG emissions from ships including aspects of biofouling management through adequate enforcement mechanisms.

Key Area 2: Low-carbon shipping

Background - The maritime industry has developed various zero/low-emission solutions, which are in different stages of development, tailored to vessel type, size and operational needs to meet the decarbonization goals set by the IMO. .Options include battery-electric systems, hybrids, use of hydrogen, ammonia, LNG, biodiesel and biogas to replace the traditional fossil fuels, wind-assisted propulsion. Energy efficiency improvements – such as optimized ship design, operational (speed) management, proactive hull cleaning together with carbon capture onboard and upgraded logistic s– are also critical for cutting emissions. Additionally digital tools, automation and AI can improve weather-based route planning and streamline port operations, reducing ship-port stays and port emissions. Solutions would vary between existing ships and new builds.

Recommendations:

1 ensure that there is sufficient capacity and expertise in new solutions for green shipping including the development of legislation to facilitate a conducive environment for the take-up of zero and low-emission solutions for domestic ships;

2 comply with the IMO mandatory technical and operational energy efficiency requirements for ships (e.g EEDI, EEOI, EEXI, CII and SEEMP);

3 encourage technical and operational strategies to minimize emissions while maintaining operational efficiency such as expanding the SO_x ECA to include NOx and introducing voluntary slow steaming in specially protected areas with the framework of the SPA/BD Protocol;

4 offer tax incentives and subsidies for shipowners transitioning to zero-emission fuels;

5 support R&D for sustainable energy efficiency solutions by pooling resources from public and private stakeholders, support research on shipping energy efficiency and develop data-driven tools for better management. Encourage scientific institutions and industry to identify key research areas, participate in R&D programmes, and share findings with coastal States;

6 engage with manufacturers and suppliers in coastal states to facilitate the import, installation and maintenances of low-emission ship technologies;

7 promote the use of smooth coating and alternative technologies for reducing hull friction;

8 conduct digitilisation projects for voyage optimization, fuel consumption tracking and predictive maintenance.

Key Area 3: Capacity building

Background - Transitioning to the use of low carbon fuel and net zero-emission shipping to achieve the goals of the 2023 IMO GHG Strategy requires transdisciplinary capacity building supplemented by raising awareness for collective action. Effective capacity building programmes for maritime personnel, port authorities and government officials aligned with IMO instruments addressing the reduction of GHG emissions from ships, including IMO guidelines on zero emission shipping are key. Training must be systematic, addressing technical compliance with emission reduction technologies, operational best practices as well as legal and policy frameworks governing maritime decarbonization. Raising awareness to ensure all stakeholders understand the applicable regulatory frameworks in the region

including the EU decarbonization initiatives and the urgency of transition to net zero-emissions from ships will indirectly reinforce the long-term risks on inaction.

Recommendations:

1 equip personnel with opportunities for knowledge on low-carbon shipping (green) technologies and on the relevant IMO instruments concerning the reduction of GHG emissions from ships;

2 build expertise in enforcing emissions regulations and implementing Port State Control (PSC) control measures;

3 establish regional centres of excellence on green shipping which can promote technologies and operations to improve energy efficiency and foster innovation through support to universities and research institutions building on the experience of IMO's MTCCs;

4 launch regional awareness campaigns, engaging industry leaders in the process to inform maritime professionals, shipowners and other stakeholders on the environmental impact of shipping emissions;

5 work with organizations such as IMO, EU, EBRD and other funding mechanisms to leverage funds and expertise for capacity building programmes and promote regional awareness.

Key Area 4: Green Ports

Background – Ports play an important role in reducing overall GHG emissions from ships. Various ports are in a phase of developing strategies to reduce emissions at the ship-port interface such as:

.1 reducing emission from tugboats;
.2 onshore power availability at berth;
.3 cargo-operations-related emission reduction;
.4 LED lighting; JIT arrival systems;
.5 carbon capture, utilization and storage (CCUS); and
.6 other measures to increase efficiency such as dynamic under-keel clearance, auto mooring, green fuel in trucks.

The use of low-emission fuels including the use of electrification to power vessel and hybrid vessels for short-sea shipping on ferries and onshore power supply (OPS) also known as "cold Ironing" are most likely the most common strategies to reduce GHG emissions from ships to date. Effective biofouling management can also lead to significant energy savings and emission reductions particularly beneficial to busy shipping lanes in the Mediterranean. These strategies do come with their own challenges for ports such as the availability of effective biofouling management and bunkering infrastructure for low-emission fuels as well as high energy demand for OPS from existing energy supply facilities in a country.

Recommendations:

1 promote the formal adoption of the IMO biofouling Guidance by Contracting Parties for intra-short captive shipping in the Mediterranean Sea;

2 promote In-Water Cleaning (IWC) facilities in targeted ports;

3 consider upgrading energy grid connections to support expanded electrification of port activities;

4 promote shore power (cold ironing) at major ports;

5 offer economic incentives across Mediterranean ports to reward low-carbon operations by shipowners in the form of "green rebates";

6 create a unified Mediterranean Green Port programme that grants fee reductions or priority berthing to vessels using alternative fuels or achieving high environmental ratings;

7 establish and once established, expand alternative fuel infrastructure to develop a network of alternative fuel bunkering hubs in key Mediterranean ports at the same ensuring compatibility of refuelling facilities across the region.

Key Area 5: Green Corridors

Background – Upgrading the infrastructure of ports to reduce GHG emission at the ship-shore interface facilitates the designation of specific low-emissions shipping routes or green corridors where only zero or low emission ships can operate. Since green shipping corridors will require the supply of green energy at one or both ends or nearby ports, it can motivate the coordination of infrastructure development so that it is complementary and interoperable.

This has the potential to promote fuel hub ports each specializing (initially) in certain alternative fuels and connecting these hubs along shipping corridors. Since the launch of the Clydebank Declaration in 2021[8], over 60 green shipping corridor initiatives have been announced, reflecting a significant increase from 21 in 2022 to more than 60 as of November 2024, including nearly 32 new corridors announced in 2023. Most remain in the feasibility study stage or are formulating implementation plans, none have yet been fully operationalized in the Mediterranean region although multiple green corridors around the Mediterranean are in an advanced stage of being realized.

Initiating the implementation of green shipping corridors requires:

.1 establishing the baselines for the three pillars i.e. ships, fuels used by ships and infrastructure supplying ships and identifying first movers opportunities;

.2 engaging relevant key stakeholders i.e. cargo owners, shipowners, operators, regulators, port authorities and fuel producers; and

.3 developing a holistic plan with timeline for all stakeholders. Subsequently, implementation would require securing investment in required infrastructure along the corridors.

Recommendations:

1 explore the possible establishment of port to port or sub-regional green corridors e.g. Western Mediterranean corridor connecting major ports.

Key Area 6: Green Financing

Background - The 2018 Initial IMO Strategy introduced "candidate mid- and long term measures" to further incentivise the reduction of GHG emissions form ships. Among these, market-based measures (MBMs) were identified as potential mid-term solutions. MBMs place a price on GHG emissions, creating an economic incentive for the maritime industry to reduce its fuel consumption by investing in more fuel-efficient ships, adopting advanced technologies and improving operational efficiency. Building on this, the 2023 IMO GHG Strategy reaffirmed the necessity of incorporating an economic element specifically through a maritime GHG emission pricing mechanism as part of a broader set of

[8] https://www.gov.uk/government/publications/cop-26-clydebank-declaration-for-green-shipping-corridors/cop-26-clydebank-declaration-for-green-shipping-corridors

candidate measures to achieve its reduction targets. The significance of such an economic element could be four-fold:

.1 supporting the reduction of shipping's GHG emissions in alignment with the 2023 IMO GHG Strategy

.2 encouraging the transition to low and net zero-carbon solutions;

.3 potentially contributing to an international R & D fund for scalable low-and zero-carbon technologies; and

.4 supporting developing countries in their climate action including both adaptation and mitigation efforts.

Against this backdrop, in 2005, the European Union Emissions Trading System (EU ETS) Directive established Emissions Trading System (EU ETS) Directive. It covers approximately 45% of the EU's GHG emissions. As of 1 January 2024, the EU ETS Directive has been extended to maritime transport emissions. This will have significant impact on the shipping sector of Mediterranean countries engaged in trading in the EU.

Meanwhile, Mediterranean EU Member states are actively implementing the EU ETS Directive whilst some non-EU Mediterranean countries are taking steps to develop their own carbon pricing scheme designed to align with the EU ETS. (e.g Türkiye).

Economic and policy disparities between Mediterranean coastal States that are EU member States and those that are not EU Member states can create challenges for adopting a unified position at regional level on a maritime GHG emission pricing mechanism.

Recommendations:

1 participate actively in regional and international meetings and negotiations, fostering regional partnerships where possible to contribute to the development of a global maritime GHG emission pricing mechanism;

2 ensure that any existing regional or national economic measure complements and is in line with a global maritime GHG emission pricing mechanism to avoid any variances between the two which could lead to potential revenue and carbon leakage;

3 evaluate the administrative burden involved in managing a maritime global GHG pricing mechanism and ensure sufficient resources are in place to manage the mechanism once in place;

4 ensure that the lower income States in the region will have access to any revenues collected from a maritime global GHG pricing mechanism to primarily support the modernisation of energy systems and improvement of energy efficiency of their maritime industry as well as their overall climate action.

9 OUTPUTS AND TIMELINES OF THE ROADMAP

9.1 The expected outputs of the Roadmap are set out as at Appendix. These expected outputs have been derived from the various recommendations put forward under each of the focus areas of the Roadmap. The implementation of the Roadmap and consequently the expected outputs require effective partnerships, financial support and for the most part will be project driven.

9.2 The timeline for the expected outputs listed in the Appendix are presented as approximations, offering flexibility to accommodate periodic reviews of the Roadmap's effectiveness and relevance.

These reviews will take into account the implementation requirements, as well as evolving technological advancements and regulatory developments. This will allow continuous alignment with the goals of the 2023 IMO GHG Strategy and initiatives by UNEP/MAP to address climate change in the region.

10 REPORTING AND MONITORING

10.1 A monitoring process is established to ensure the effective implementation of the Roadmap, while an effective reporting mechanism is essential to its successful implementation.

10.2 The Roadmap will be reviewed on a biennial basis by the meeting of REMPEC Focal Points. Adjustments will made as necessary, reflecting progress and addressing emerging challenges from GHG emissions from ships. This ensures that the Roadmap remains responsive to the evolving needs of the maritime sector in the region and the broader objectives of regional development and sustainability.

10.3 To this end, every two years REMPEC will prepare a consolidated report on the implementation of the Roadmap based on information provided by Contracting Parties and other sources of information available to it. The report will be submitted to the Meetings of its Focal Points. It will be publicly available and will be submitted to other fora, as appropriate.

11 RISK MITIGATION

11.1 The successful implementation of the Roadmap is subject to certain risks including, but not limited to appropriate and adequate funding being available within Contracting Parties, and regional institutions. Furthermore, the complexities of the Mediterranean Sea Region's socio-politics could present potential political instabilities within the region, which could hinder its successful implementation.

11.2 In order to mitigate the risks identified for the implementation of the Roadmap making use of digital technologies, as feasibly possible, to improve networking, capacity building and visibility should be considered. To mitigate risks associated with ensuring appropriate and adequate funding, Contracting Parties will ensure that the funds available are used in an efficient and appropriate manner, avoiding duplication of efforts wherever possible, in order to fully implement the Roadmap. Contracting Parties will also coordinate with all stakeholders (including the private sector, NGOs, regional and international non-governmental organisations, etc), looking for opportunities to collaborate and join efforts whenever possible and as appropriate.

11.3 REMPEC will assist Contracting Parties, with the limits of its capabilities to develop partnerships with regional and international organisations and seek funding opportunities where feasibly possible to support the activities necessary to implement the Roadmap. To mitigate risks associated with potential political instabilities, Contracting Parties will continue the efforts within the framework of the Barcelona Convention to address jointly, and individually, common challenges through regional consensus for the benefit of the entire region, and its individual Contracting Parties.

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Appendix

Expected Outputs of the Roadmap

	Expected Outputs	Timeline		
		Short term	Medium term	Long term
i.	Establishment of a Mediterranean Decarbonization Taskforce to oversee the implementation of the Roadmap	●	●	●
ii.	Accession to and transposition into national law the relevant international instruments addressing the reduction of GHG emissions from ships including aspects of biofouling management, harmonization of national regulations with these instruments	●	●	●
iii.	Compliance and operational efficiency starting with a focus on the current SO_x ECA, possibly expanding it to NO_x ECA in line with IMO's MARPOL Annex VI	●	●	●
iv.	Capacity building programme to equip personnel with knowledge on green shipping technologies and IMO GHG reduction instruments, EU maritime legislation while also developing expertise in emissions regulation enforcement and PSC measures	●	●	●
v.	Comprehensive raising awareness campaign among different maritime stakeholders to inform on shipping emission impacts, highlighting the advantages of the 2023 IMO GHG Strategy	●	●	
vi.	R&D on sustainable energy efficiency solutions through public-private collaboration. Research institutions and industry to identify key areas for innovation and share findings of pilot efforts among coastal states through a common platform	●	●	●
vii.	Voluntary slow steaming, and other routing measures introduced to minimize emissions while maintaining operational efficiency in specially protected areas within the framework of the SPA/BD Protocol		●	●
viii.	Tools designed for data collection for fuel tracking, voyage optimization and predictive maintenance		●	●
ix.	Adequate infrastructure provided to establish In-Water Cleaning facilities and to support ships using alternative fuels or land side energy sources in targeted ports		●	●
x.	An incentive programme which offers economic "green rebates" across Mediterranean ports to reward low-carbon operations to ship owners which will the form the basis of a unified Mediterranean Green Port programme granting fee reduction or priority berthing to environmentally superior v		●	●
xi.	Green Corridors created linking Mediterranean ports within the region and beyond			●
xii.	100% net zero emission shipping in the Mediterranean by 2050			●