



D4.1 Report on MSSO community building and engagement outlook

Programme: EMFAF-2023-PIA-FLAGSHIP

Grant agreement number: 101124925

Project acronym: GreenMED

Project title: Green Shipping Pathways Towards a Clean Energy Transition in the Mediterranean

Prepared by: CMMI

Date: 30/09/2024

Deliverable version: v4.0



Co-funded by the
European Union

Funding acknowledgement

The project has received funding from the European Maritime, Fisheries and Aquaculture Fund (EMFAF) under grant agreement No. 101124925

DELIVERABLE DETAILS

Grant Agreement No.	101124925
Project acronym	GreenMED
Project full title	Green Shipping Pathways Towards a Clean Energy Transition in the Mediterranean
Dissemination level	Public
Due date of deliverable	M12
Actual submission date	M12
Deliverable name	Report on MSSO community building and engagement outlook
Type	Document, report
Document status	Draft
WP contributing to the deliverable	WP4
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Keywords	Community Building, Engagement Outlook, Decarbonisation, Green Corridors, Alternative Fuels, Green Shipping, Network, Stakeholders, Mediterranean

VERSION HISTORY

VERSION	COMMENTS	DATE
1.0	Structure of report	25/06/2024
1.1	First draft	10/07/2024
2.0	Internal submission to GreenMED partners for feedback	23/09/2024
3.0	Updated document	30/09/2024
4.0	Final refinement	30/09/2024

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1. EXECUTIVE SUMMARY

This report concerns Task 4.1 and documents the Mediterranean Sustainable Shipping Observatory (MSSO) stakeholder network (WP4), which supports early knowledge building (WP2) and assessment framework development (WP3). It also contains information regarding the establishment of the GreenMED and MSSO stakeholder community to enhance knowledge capacity and provide pathways and recommendations towards decarbonisation.

Submitted under deliverable WP4, and more specifically under T4.1, this report outlines the strategic planning and activities undertaken to attract and engage relevant stakeholders for the development of the MSSO as a decarbonisation hub. The MSSO will promote green shipping prospects in the Mediterranean Sea while enhancing its network and knowledge capacity. The consortium consists of five organisations from three EU countries and one North African country: two educational/training organisations (National Technical University of Athens (NTUA), Arab Academy for Science, Technology & Maritime Transport (AASTMT)), a centre of excellence in marine and maritime research, technology and development (Cyprus Marine and Maritime Institute (CMMI)), one technology organisation (Marine Traffic (MT)), and one port operator (Fundación Valencia port (VPF)). This multidisciplinary-skilled consortium, their versatile background in the context of the project along with the technical equipment that will be used during the implementation of the project facilitate the engagement of stakeholders with diverse backgrounds/areas of expertise.

This report has been primarily prepared by the Cyprus Marine and Maritime Institute (CMMI) within the framework of WP4 “Achieving Zero-Emission Mediterranean Shipping” under Task 4.1 “MSSO stakeholder network establishment and activities”.

It is noted that as part of the activities of D5.1 under WP5, the project aims to maximise its impact by effectively disseminating its results and the knowledge generated. This dissemination is carried out through various activities designed to ensure the sustainability and continuation of the MSSO. The objectives covered by WP4 also target the relevant scientific and industrial communities, as well as the general public. Efforts include ensuring synergies and cooperation with other ongoing actions and initiatives and establishing a continuation plan for the project's main outputs.

2. INTRODUCTION

This document is Deliverable 4.1 “Report on MSSO community building and engagement outlook” of WP4. This work package is dedicated to fostering cooperation and information sharing among industry stakeholders to create a comprehensive roadmap towards achieving decarbonisation in the Mediterranean Sea. Its objectives include fostering regional cooperation, both physically and virtually; promoting decarbonisation in the Mediterranean; sharing knowledge among stakeholders to support green shipping solutions in the region; enhancing training capacity and skills in sustainable maritime transport and energy efficiency across the Mediterranean, both in the north and south; developing decarbonisation pathways as part of a broader regional roadmap to achieve carbon neutrality; elaborating on best practices and opportunities for strategic development to advance green shipping at policy-making and industrial levels; and providing the industry with tools to assess user-specific scenarios and cases, thereby boosting investment opportunities.

This report concerns Task 4.1, which focuses on the establishment and activities of the MSSO stakeholder network. This task primarily involves building the MSSO network of stakeholders and supporting the development of the MSSO knowledge base. The stakeholder community will be formulated through a comprehensive analysis to identify specific stakeholders relevant to the project's needs, rendering them as potential members of the MSSO community.

Industry stakeholders, including port operators, shipping companies, energy and technology providers, international associations, and policymakers, will be approached to align with the decarbonisation goals of shipping, particularly in the Mediterranean Sea. Additionally, academic stakeholders will be considered for inclusion in the MSSO community. The methods for approaching industrial and academic stakeholders are outlined in Section 5 of this document as well as in the deliverable "D5.1 Dissemination and Communication Plan and Terms of Reference for the Advisory Board".

The document begins with an executive summary in Section 1 of the document. Section 2 outlines the deliverable's purpose and scope, providing background on shipping's contribution to global GHG emissions and the need for decarbonisation. Section 3 identifies the target stakeholders for the MSSO, assessing their engagement and potential contributions through an online questionnaire. Section 4 presents the engagement strategy and communication plan to foster collaboration among MSSO members. In Section 5, the methods for monitoring and evaluating the effectiveness of the engagement strategy are explained, along with mechanisms for gathering stakeholder feedback and addressing engagement challenges. Section 6 offers case studies of successful engagement in similar projects, highlighting best practices that can inform the MSSO's stakeholder engagement strategy and community building. Section 7 concludes the deliverable with a summary of key findings, while the final section lists references, followed by Appendix A, which details the approach and provides a list of targeted stakeholders.

2.1 Purpose and Scope of the Document

In this context, D4.1 will document the comprehensive establishment of the MSSO stakeholders' community, detailing ongoing activities and outlining plans for the project's final phase. Task 4.1 within WP4 is led by CMMI, while NTUA serves as the project coordinator, with participation from MT, VPF, and AASTMT in related task activities.

2.2 General Background

Reducing CO₂ emissions is vital for decarbonising the shipping industry, especially in the Mediterranean region, where heavy maritime traffic significantly contributes to greenhouse gas (GHG) emissions. Transitioning to alternative technologies such as hydrogen fuel cells, electric propulsion, and wind-assisted ships can reduce emissions by over 80% by 2030 [1]. These innovations not only enhance fuel efficiency and reduce operational costs but also create new job opportunities in the green technology sector across Mediterranean countries. Furthermore, lowering emissions improves air quality and public health in coastal cities, while supporting sustainable growth in key industries like tourism and fishing. Embracing these advanced technologies in Mediterranean shipping is essential for achieving both regional and global decarbonisation goals, ensuring a sustainable future for the Mediterranean basin.

The decarbonisation of the transportation sector, encompassing shipping, aviation, and road transportation, is a multidisciplinary challenge that necessitates interdisciplinary collaboration among various stakeholders, alongside innovation and regulatory and legislative changes [2]. This sector is responsible for approximately one-fifth of global CO₂ emissions and about 30% within the European Union, with shipping alone contributing around 3% of total GHG emissions [3, 4]. The breakdown of the global CO₂ emissions for the transport sector can be seen in Figure 1. Since shipping accounts for 11% of the global CO₂ emissions of the transport sector [5], technological advancements are anticipated to significantly reduce shipping emissions in both emerging markets and advanced economies by 2030 [1]. This illustrates the critical need for coordinated efforts in addressing the environmental footprint of transportation, as well as integrated approaches and technologies to achieve significant reductions in GHG emissions.

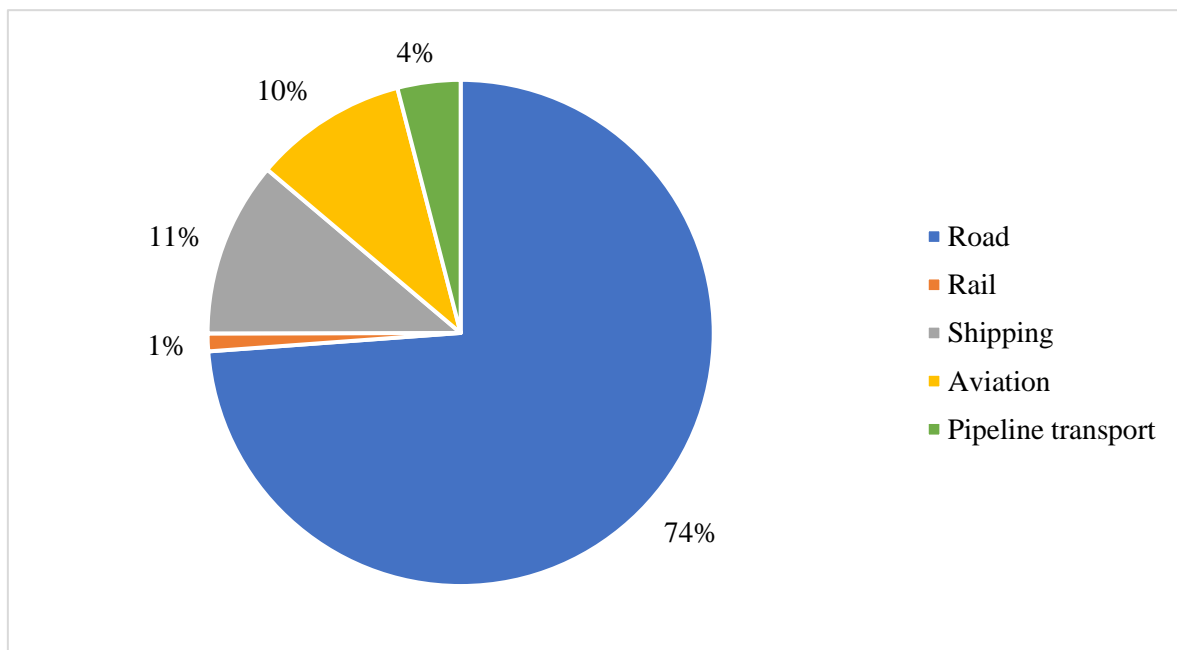


Figure 1: Global CO₂ (Gt) emissions from transport. Image reproduced from the International Energy Agency. [5]

Figure 2 shows National, EU, and global policies and regulations being enforced to address the environmental impacts of shipping activities. This implies that emerging knowledge to develop practical and validated solutions should comply with the rules and regulations promoting sustainable practices. In this regard, GreenMED aims to effectively support green shipping efforts in the Mediterranean Sea basin by promoting feasible decarbonisation pathways (green corridors to ports). Its ambition is to facilitate the clean energy transition in the Mediterranean region and contribute to achieving the EU's established targets [6], which include:

- Reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990.
- Decreasing the greenhouse gas intensity of the energy used on-board ships by up to 80% by 2050.

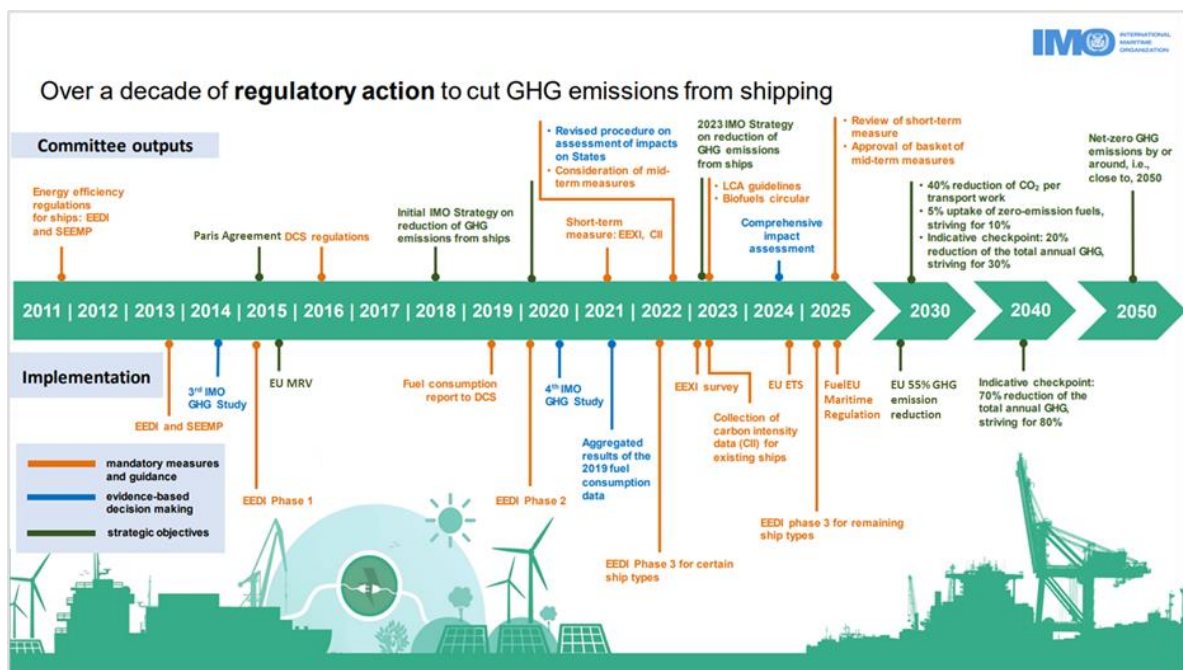


Figure 2: Regulatory action to reduce GHG emissions from shipping. Image reproduced from IMO. [7]

GreenMED is the bridge to decarbonisation in the Mediterranean Sea through collaborative frameworks for integrated data sharing and analysis. By establishing an interoperable platform, diverse datasets from alternative fuels, marine economics, comprehensive marine data, and technologies can be cohesively accessed and utilised. Joint research across sectors will deepen understanding and innovation while harmonising policies based on insights from observatories will ensure cohesive strategies for sustainable development. Strengthening partnerships among academia, industry, government, and civil society will drive collective action towards sustainability goals. Enhancing public awareness and engagement will build support for integrated approaches to climate change and sustainable growth in Europe.

3. STAKEHOLDERS INVOLVED IN THE MSSO

The MSSO will bring together a diverse range of stakeholders from the industrial and academic sectors within the maritime ecosystem. By fostering cooperation among these stakeholders, the MSSO as a decarbonisation hub aims to promote green shipping efforts and support the clean energy transition in the Mediterranean region. The following sections identify the different categories of stakeholders to be approached for joining the MSSO, their level of influence, as well as their potential contribution to the project. Stakeholder engagement, as outlined in D5.2 ‘Dissemination and Communication midterm summary report’, has been initiated through a range of dissemination activities. Knowledge gained from various events, workshops, and activities such as the European Maritime Day (EMD), Our Ocean Conference (OOC), and WestMED Technical Group (TEG) on Green Shipping (GS) meetings, has provided valuable insights. These engagements mark the beginning of an ongoing process, with more comprehensive outcomes and results to be presented in the final version of the deliverable. Appendix A, Table 2 and Table 3 list the stakeholders identified and to be contacted for the MSSO network building.

3.1 Identify the different Categories of Stakeholders

This section focuses on building the MSSO stakeholder network to support the MSSO knowledge base. For the successful establishment and operation of the MSSO, it is required to engage a diverse array of stakeholders from both the public and private sectors, as well as the academic community. Figure 3, which summarises the methodology of the project, shows that feedback from the MSSO stakeholder network (T4.1) will guide data requirements and specifications (T2.1), as has already been done to a certain extent, to support the framework for estimating energy demand for the fleet, for mapping the supply chain in the region, and to perform market analysis (T2.4), which is under way.

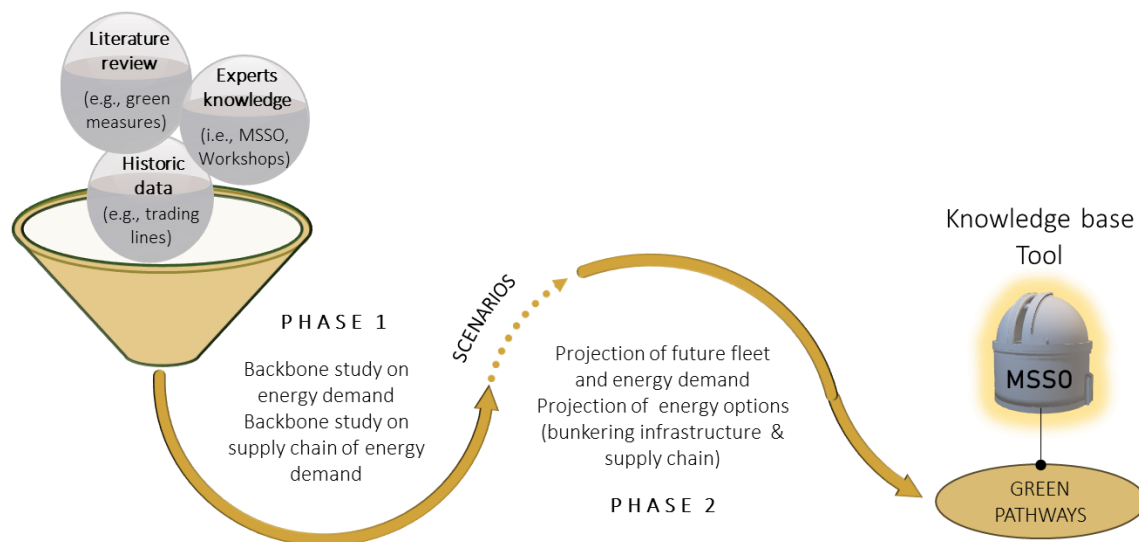


Figure 3: The Mediterranean Sustainable Shipping Observatory (MSSO) development.

In this regard, in the public and private sectors, the selected stakeholders include shipyards, ship management companies, fuel industry companies, engineering and technology service providers, port operators and authorities, relevant ministries, trade associations, classification

societies, non-governmental organizations (NGOs), and regulatory bodies. These entities are crucial as they play integral roles in the shipping industry's infrastructure, operations, and regulatory environment. Shipyards and ship management companies are at the forefront of building and maintaining the maritime fleet, making their involvement essential for implementing decarbonisation technologies and practices. Fuel industry companies are key to transitioning towards sustainable fuel options, while engineering and technology service providers are pivotal in developing innovative solutions for emission reductions. And also, to support the introduction of alternative fuels in the maritime industry. Port operators and authorities, along with relevant ministries, are central to facilitating policy implementation and ensuring compliance. In addition, ports are highlighted as a key stakeholder to the energy transition for the maritime industry, since they should work as energy hubs to support the relevant supply chains for alternative fuels. Trade associations, classification societies, NGOs, and regulatory bodies provide the necessary frameworks, standards, and advocacy needed to drive the sector towards sustainability.

In the academic sector, the stakeholders encompass institutions and universities, academics, researchers and PhD students, specialising in the fields of naval architecture and/or marine engineering, maritime academies, marine and/or maritime sciences, offshore and/or ocean sciences, mechanical engineering, electrical engineering, shipping economics and administration, chemical engineering, and data science. These academic institutions are vital for advancing research and innovation in sustainable shipping technologies and practices. By involving experts and researchers from these fields, the MSSO can leverage cutting-edge knowledge and technical expertise to address the multifaceted challenges of decarbonisation. For instance, naval architects and marine engineers can contribute to the design of more efficient vessels, while data scientists can enhance operational efficiencies through advanced analytics. The inclusion of maritime academies ensures that the next generation of maritime professionals is well-versed in sustainability principles, fostering a culture of environmental responsibility within the industry.

Engaging stakeholders from Greece, Cyprus, Spain, Egypt, and potentially other neighbouring Mediterranean countries ensures a comprehensive regional approach to sustainable shipping. These countries, each with significant maritime activities and interests, represent a strategic geographical focus for the MSSO. Their collaboration can lead to harmonised policies, shared best practices, and coordinated efforts in tackling emissions from shipping, thereby enhancing the overall impact and reach of the observatory's initiatives. Through this diverse and inclusive stakeholder engagement strategy, the MSSO aims to foster a collaborative environment that drives meaningful progress towards decarbonising the Mediterranean shipping sector. Supporting the trading ecosystem regarding the regional decarbonisation goals is significant since ports and passages with high traffic are located along the Mediterranean Sea, such as the Port of Piraeus, Port of Valencia, Port of Alexandria, Suez Canal, Gibraltar Strait, etc. Main ports, vessels in Mediterranean waters (ship traffic) and bunkering sites were identified through the EMODnet platform [8].

3.2 Assessing Stakeholders' Potential Contribution to the Project

The diverse stakeholder groups involved in the MSSO have distinct interests, concerns, and potential contributions, all of which impact the project's vision.

Regulatory bodies, such as the International Maritime Organisation (IMO) and the European

Maritime Safety Agency (EMSA), have the strongest influence and impact on the shipping community at an international and European level respectively, hence their involvement in a hub as the MSSO would be critical for its successful launching. Their involvement ensures **compliance with environmental standards**, employing their strong influence **and industrial collaborations** to shape the MSSO's framework. Their expertise and enforcement capabilities will drive the industry toward reducing emissions and improving sustainability. Additionally, the MSSO hub can inform regulatory bodies of the industry's current efforts, influencing future regulations and setting realistic targets. In summary, collaboration between the MSSO and maritime regulators creates a mutually beneficial pathway for the entire industry.

National authorities, such as ministries, also play a critical role in supporting decarbonisation goals by developing national policy frameworks that align with global environmental targets provided by the regulatory bodies. Ministries can significantly contribute to the MSSO hub by **providing strategic direction, robust policy frameworks, and financial support** to promote “green” research and development in maritime practices. Notably, the Shipping Deputy Ministry of Cyprus can have a substantial impact on a large fleet by enforcing regulations, as the Cypriot flag is the third most popular among European countries and eleventh globally [9]. Greek Ministry of Maritime Affairs has also a great effect in the maritime policies, both regionally and worldwide. Especially in the eastern Mediterranean region, both authorities, as well as Egypt's, can have a large influence, thereby driving considerable progress toward decarbonisation.

Furthermore, **port authorities** enforce national and international regulatory frameworks at a localised level, ensuring compliance across ports and shipping activities. They focus on implementing environmental standards and accelerating the adoption of green technologies and cleaner fuels within their jurisdictions. Additionally, port authorities **offer strategic guidance and policy support** to align the MSSO decarbonisation hub's initiatives with broader EU environmental goals. Their hands-on enforcement and operational support complement the high-level strategic direction provided by ministries, creating a comprehensive approach to achieving decarbonisation in the maritime industry. Integrating regulatory oversight with MSSO's strategic vision will help shape a cohesive and sustainable maritime industry framework, advancing decarbonisation goals and **strengthening the industry's commitment to global environmental stewardship**.

Port operators can serve dual roles within the MSSO framework, including **data providers** essential for managing infrastructure supporting green fuel supply chains and shore power, and as **direct beneficiaries** using the tool to implement efficient logistics and operational strategies. They are deeply invested in aligning with environmental standards to ensure compliance and avoid financial penalties, though they are mindful of the costs and logistical challenges associated with transitioning to sustainable practices. Therefore, this collaboration will ensure alignment with environmental regulations, ultimately reducing vessel emissions and advancing sustainability goals within maritime operations.

Classification societies play a critical role in contributing to a decarbonisation hub by ensuring that ships and maritime operations comply with international standards and regulations. They provide essential services such as the certification and inspection of vessels, ensuring they meet rigorous safety, environmental, and efficiency standards. By promoting and implementing the best practices of the MSSO, classification societies can **facilitate the adoption** of innovative **technologies and sustainable solutions** within the maritime industry. Their collaboration with

various stakeholders, including shipbuilders, owners, and operators, in developing guidelines and frameworks can significantly aid MSSO. By providing technical expertise and regulatory oversight, classification societies help create a standardised and transparent pathway for the maritime industry to achieve its decarbonisation goals.

Shipyards, ship management companies, and fuel industry players are primarily concerned with the operational and financial implications of adopting decarbonisation technologies. While their high influence and interest are crucial for implementing these technologies, bringing them on board can be challenging due to competitive dynamics and the reluctance to share proprietary knowledge. However, their contributions to the MSSO are indispensable for practical **advancements in emissions reduction** and sustainable practices, as well as for identifying the gaps and limitations of proposed decarbonisation solutions.

Trade associations play a central role in facilitating standard-setting and promoting best practices, contributing to a unified approach toward decarbonisation while balancing diverse member interests. They act as crucial intermediaries between the industry, regulatory bodies, and other stakeholders, helping to establish industry standards, promote best practices, and facilitate the adoption of sustainable technologies. This positions them to effectively **promote the MSSO platform to a wider audience**. Additionally, trade associations advocate for policy changes that support decarbonisation efforts and have the capacity to mobilise industry-wide initiatives to reduce emissions. Their influence and coordination capabilities are instrumental in driving the maritime sector towards more sustainable and environmentally friendly practices.

Engineering and technology service providers, known for their innovation, play a crucial role in advancing decarbonisation efforts within the maritime sector, despite potential challenges related to intellectual property and competition. These providers can **offer expertise** to MSSO regarding the **design and retrofit of vessels** to meet environmental standards while optimising performance. Collaborating on best practices, they provide valuable data-driven insights from deploying advanced technologies such as hybrid propulsion systems, energy-efficient designs, and alternative fuels. Furthermore, technology providers with expertise in data science, digitalisation of port and shipping operations, and system automation can efficiently enhance the efforts of MSSO, since they are representing a rapidly developing industry. In essence, engineering and technology service providers are indispensable partners in the MSSO ecosystem, driving innovation and **practical solutions** that propel the maritime industry towards cleaner and more sustainable practices.

Academic and research institutes are essential in advancing green shipping technologies through their research and innovation. They study and develop new methodologies and technologies for decarbonising the shipping industry, with researchers and students contributing their perspectives and pioneering findings. Academics, researchers, and PhD students can promote the MSSO by publishing in journals and conferences, enhancing **knowledge transfer between academia and industry**. Their work deepens the understanding of environmental impacts and technological advancements in maritime operations. Additionally, these institutions can utilise the MSSO to offer education and training programs, fostering expertise in sustainable maritime practices and accelerating the adoption of green technologies. Collaborating closely with the MSSO will enable the translation of research into practical applications, accelerating the adoption of green technologies and promoting industry-wide sustainability initiatives.

NGOs driven by environmental advocacy are highly motivated to support the MSSO but may

have limited influence unless they effectively collaborate with industry players. Therefore, their role is focused on disseminating and **promoting the MSSO** and its features **to their networks** and the general public. By participating in the MSSO's online forum, NGOs can amplify their impact on global maritime policy and promote accountability among stakeholders. Overall, their proactive engagement helps accelerate the transition to cleaner and more sustainable practices in the maritime sector.

Media and journalists significantly contribute to a decarbonisation hub by raising public awareness, shaping opinions, and driving discourse on sustainable practices within the maritime industry. They **disseminate crucial information** about environmental issues, technological advancements, and policy changes related to MSSO decarbonisation efforts. By reporting on these topics, media and journalists inform stakeholders, including the public, industry professionals, and policymakers, about the latest developments and best practices in green shipping. Through investigative journalism and in-depth reporting, they highlight MSSO updates, expose environmental concerns, and emphasise the need for action towards decarbonisation, promoting transparency and accountability. Their coverage encourages public and political support for regulatory measures and investment in sustainable technologies. Additionally, media outlets and journalists facilitate dialogue and collaboration using the MSSO among various stakeholders by providing a platform for diverse voices and perspectives on maritime decarbonisation.

The **general public** can contribute to the MSSO by raising awareness about the environmental impacts of shipping and advocating for sustainable practices. By **educating** themselves and others, **supporting policies that promote green shipping**, and choosing products and services that prioritise eco-friendly shipping methods, individuals can drive demand for sustainable maritime operations. Additionally, public engagement in community initiatives, such as coastal clean-ups and educational programs, along with supporting NGOs and environmental groups through volunteering and donations, can amplify efforts to promote decarbonisation within the Mediterranean. Ultimately, the collective actions and voices of the public can influence industry and policymakers, thus fostering a collaborative push towards achieving the objectives of MSSO.

The Mediterranean region presents a unique set of challenges and opportunities for the MSSO. Regulations in this area are governed by three different continents -Europe, Asia, and Africa- leading to a complex regulatory environment that can impede the formation of a cohesive community. Geopolitical tensions further complicate collaboration, yet they underscore the need for a unified approach that the MSSO can facilitate, offering significant benefits to all involved countries. The region's dominance in short-sea shipping intensifies the urgency for decarbonisation, as these frequent, shorter routes contribute substantially to emissions with almost 52 grams of CO₂ per ton-km in comparison to the 15 grams of CO₂ per ton-km emitted by large bulk carriers and container vessels that transport goods in larger distances [10].

The strict regulations and short deadlines set by international bodies for reducing maritime emissions make decarbonisation a pressing issue. Despite potential resistance from large organisations wary of sharing expertise, the imperative nature of these regulations can serve as a driving force for collaboration. The MSSO's role in fostering collaboration between the aforementioned stakeholders can be proven beneficial, providing a platform for sharing knowledge and aligning efforts towards a common goal of sustainability, thereby turning regulatory challenges into opportunities for innovation and leadership in the shipping sector.

In addition to the above, MSSO can provide an opportunity for shipping companies to implement and benefit from sustainable practices more quickly and visibly.

3.3 Knowledge and experiences from dissemination activities

As shipping decarbonisation constitutes quite a challenge for all involved stakeholders, it is crucial, before formally engaging with stakeholders in the form of an invitation to the project's activities and to the MSSO, to elaborate on the actual questions and individual challenges that are presented towards a clean energy transition in the industry. Thus, project partners took advantage of dissemination events, communication activities, and discussion opportunities, to acknowledge the above. These most significant events, as described in detail in 'D5.2 Dissemination and Communication midterm summary report', are the following:

- Our Ocean Conference, in April 2024; there, after the invitation from WestMED representatives, the project coordinator presented the scope and progress of the GreenMED project, followed by a crucial discussion that provided significant insight regarding shipping decarbonisation, the options ahead and the challenges.
- European Maritime Day 2024, in May 2024; there, together with the other EMFAF projects focusing on the Mediterranean Sea basin, GREEN MARINE MED and Power4Med, in the workshop that was co-organised, useful information was extracted, by also understanding the views of the industry.
- 4th and 5th meetings of the WestMED Technical Group on Green Shipping; these meetings are rather crucial, as a more focused view regarding the shipping decarbonisation in the region. The meetings provide a solid ground for accessing stakeholders across the Mediterranean Sea basin, either from northern African countries, European or other.

These opportunities offer, on the one hand, a wide basis of stakeholders for later engaging with them formally, both for the project updates and the MSSO potential, and on the other hand, the understanding of the individual challenges that maritime decarbonisation presents and ways to overcome them through specific approaches. The latter are summarised in the following, which should be further explored in the stakeholder engagement process and MSSO building:

- Green shipping technologies cannot provide solid solutions for decarbonising the industry, while the focus should be on alternative fuels; however, limiting the energy demand to a certain extent can indeed facilitate a clean energy transition.
- The ideal alternative fuel option is not easily defined, nor the criteria for such a selection; the type of the vessel, the service it performs, the diversified access conditions to the availability of different fuels, by each country or territory, are only some of the parameters that should be considered.
- There are two aspects – also explored in the GreenMED project – that should be considered in the above multiparameter challenge; the ship side, namely the demand of the ship, based on its type of service and sailing patterns, and the shore side, namely the availability of infrastructure with respect to alternative fuels. The latter is rather crucial, as it greatly affects the respective adaptation of the fleet.
- Ship owners are rather reluctant towards decarbonisation options, as the latter may be characterised yet by a low readiness or a high uncertainty regarding the performance,

either environmental, or – more importantly – financially. Thus, it is important to prove technical feasibility of such options, as well as a potential in a positive economic performance for the ship owner, or other stakeholders depending on the case study.

- Optimal development of the alternative fuel supply chains is identified as a need for the industry’s decarbonisation; however, it is yet considered of increased difficulty, because of the low readiness of options, as well as the limited and unstructured data that are necessary for such an exercise. Though, it remains the most promising way of reaching a clean energy transition. Ports play the most crucial role in this exercise, as they need to operate as energy hubs to support such a transition.
- A promising approach for the above challenge is the Green Corridors approach¹. The term green refers to sustainable fuel options that could be provided for ships, while the term corridor may refer to the area of service and the sailing patterns (route-centric), the ports of service (port-centric), the specific fleet or ship (project-centric) or other. This approach allows for a more tailored-made set of options for decarbonisation, considering the differences throughout the industry.

The above realisations are formulating the backbone of the challenges regarding a clean energy transition in the Mediterranean Sea basin, and beyond, throughout the entire industry. They will drive the stakeholder engagement activities as the thematic core for discussions, workshops and surveys (see below), while also driving the scientific and technical work of the project, for delivering answers to these crucial questions for the industry.

3.4 Preliminary Questionnaire and results

A preliminary questionnaire was shared via GreenMED’s LinkedIn page, reaching relevant stakeholders from the targeted fields outlined in Section 4.2 of the 'D5.2 Dissemination and Communication midterm summary report.' It was created using Google Forms, and shared through various channels, including LinkedIn, as well as actively promoted at social events and conferences where GreenMED participated. The questionnaire had 17 responses until September 30th, 2024. The survey serves as an early identification of interest from a selected list of stakeholders, aiming for feedback that will allow the amendment and adaptation of the stakeholders approach strategy. In this respect, the questionnaire will be updated and will be considered as the primary tool for capturing and generating stakeholder interest. The results will support the interest and engagement of the target audience in the proposed initiatives, confirming alignment with the project's objectives, which can also be noticed in the results of the preliminary survey. A well-designed questionnaire helps gauge the target audience's understanding of decarbonisation and tailor the messaging to their specific needs or concerns. Additionally, it allows for direct feedback on whether the audience is interested in adopting the proposed project tools, providing valuable insights into their priorities, challenges, and readiness to embrace such solutions. This feedback can guide further the MSSO tool development and marketing strategies, ensuring greater relevance and engagement. The responses and results from this preliminary initiative are presented below, providing key insights into stakeholder perspectives and the overall reception of the MSSO tool.

Figure 4 presents a demographic breakdown of stakeholders. The most prominent group, accounting for 82.4%, is made up of researchers, indicating a strong presence of individuals

¹ Green Corridors. Global Maritime Forum. <https://globalmaritimeforum.org/green-corridors/>

dedicated to generating scientific knowledge and innovations related to decarbonisation. This high concentration of researchers reflects the hub’s focus on research-driven strategies for reducing carbon emissions. Other stakeholders, such as those from the private sector, public sector, and academia, make up smaller proportions, highlighting the need for greater participation from these groups to ensure a collaborative, multi-sectoral approach. It is evident that in its next phase of reaching out to a larger extend of stakeholders for MSSO network building, the Consortium will focus more on balancing the below distribution, in order to incorporate a strong industry perspective.

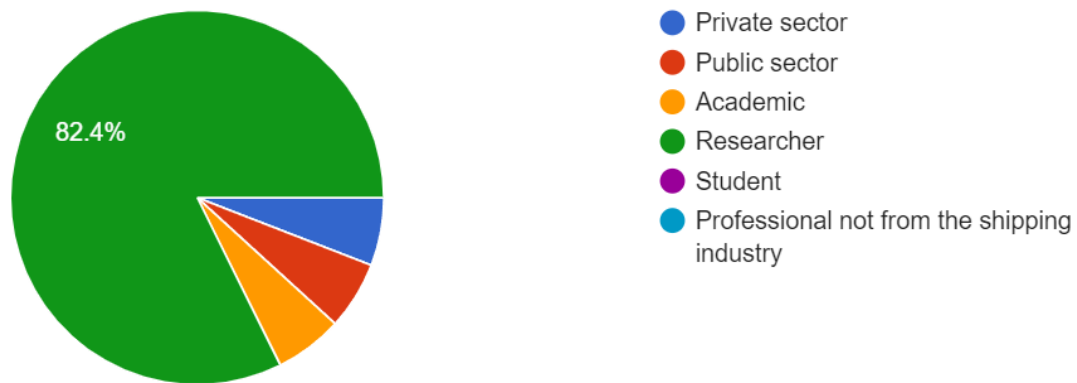


Figure 4. Demographic breakdown of stakeholders according to the sector they are employed in.

Figure 5 displays the distribution of academic fields potentially interested in using the MSSO tool. The largest portion, representing 50%, comes from the field of Naval Architecture and/or Marine Engineering, suggesting a significant interest from this group. Other fields, including Software Engineering, Mechanical Engineering, and Artificial Intelligence, each make up 12.5% of the respondents. This indicates a diverse interest from various engineering and technological disciplines, with data science, electrical engineering, and other maritime-related fields also showing potential engagement. The chart highlights that while the tool primarily attracts those in marine-focused disciplines, there is considerable interest from broader fields like data science and artificial intelligence, which are increasingly relevant in the context of decarbonisation strategies. Similarly, the Consortium will focus more on balancing this distribution as well, by engaging to the appropriate stakeholders.

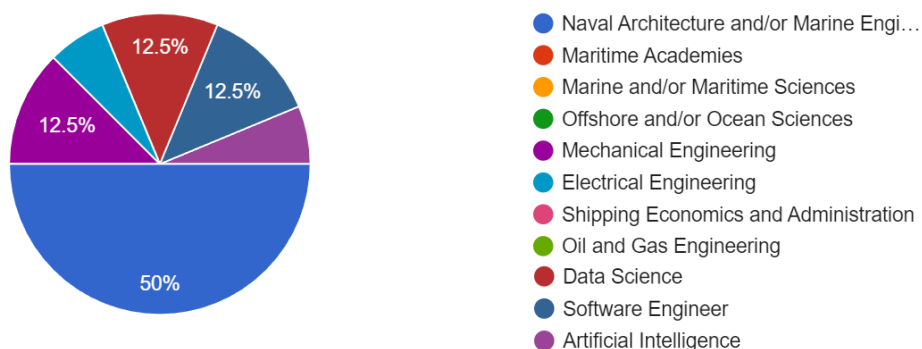


Figure 5. Stakeholders’ distribution of academic and research fields.

Figure 6 shows the industry stakeholders involved in a decarbonisation initiative, with key sectors like Engineering and Technology Services accounting 44.4%, followed by Non-Governmental Organisations (NGOs), and Shipbuilding, Maintenance, and Repairs each representing 22.2%. This share highlights the critical role of technical services and infrastructure in driving decarbonisation within the maritime sector. Additionally, the representation of Ministries (11.1%) suggests government involvement, essential for regulatory support and policy development. The diversity of industries, including engineering and technology services, shipbuilding, regulatory bodies, and NGOs, reflects a collaborative effort across multiple sectors. Each plays a vital role in addressing different facets of decarbonisation—from technological innovations to policy and regulatory frameworks—ensuring a comprehensive approach to reducing emissions within the shipping industry.

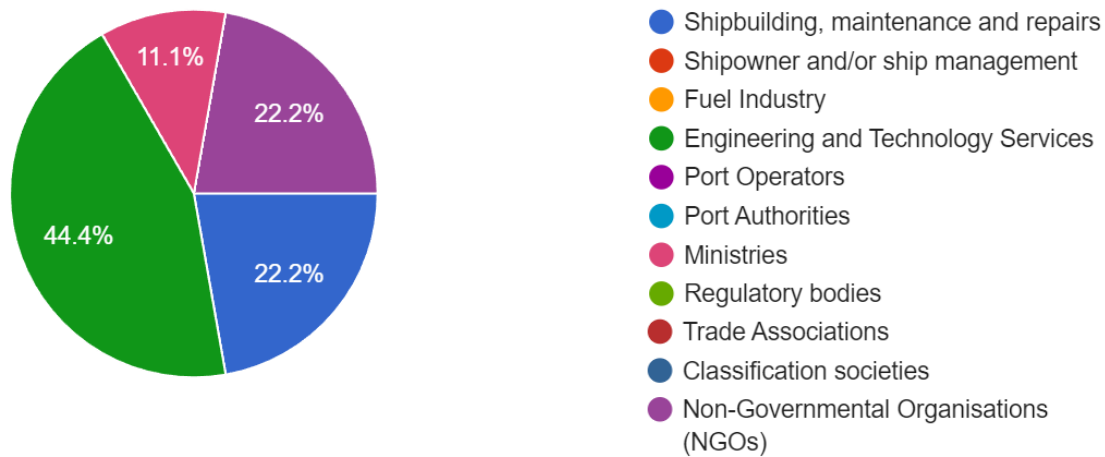


Figure 6. Stakeholders’ distribution within the industry sector.

Figure 7 highlights industry interest in a range of maritime decarbonisation technologies. Alternative fuels and vessel electrification emerge as the most favoured options, with both receiving 52.9% interest, followed by wind-assisted propulsion, vessel design optimisation, and solar energy utilisation, each with 47.1% interest. Waste heat recovery technology also attracts moderate attention at 23.5%, along with shore-side electricity. Operational measures see 29.4% interest, while retrofits, carbon capture technologies, and hull air lubrication are each considered by 11.8% of respondents. Fuel cells and after-treatment systems have the lowest interest, with only 5.9%. This distribution shows a strong preference for innovative and renewable energy solutions, with stakeholders leaning toward fuel alternatives, electrification, and renewable propulsion methods as part of the maritime industry's decarbonisation efforts. In contrast, less interest in carbon capture, retrofits, and after-treatment systems suggests these are viewed as either less feasible or impactful in the immediate future. This early insight provides a basis for further exploring these options with a larger audience. An update on the list, and the consideration of an additional question focusing on the alternative fuels exclusively, will support a more comprehensive mapping of the below interest.

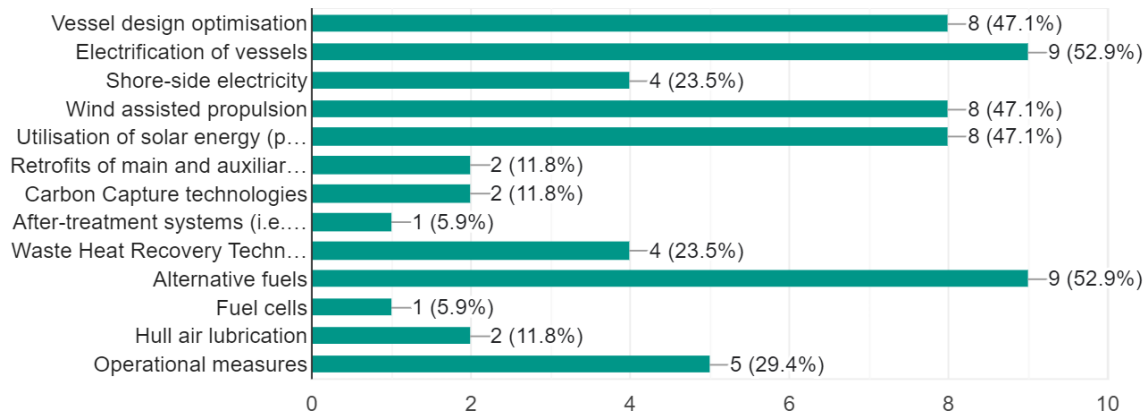


Figure 7. Stakeholders' interest in various maritime decarbonisation technologies.

Figure 8 highlights the features that target stakeholders consider most valuable for the MSSO tool. The "Assessment of green technologies through the processing of data" is the highest-rated feature, with 76.5% of respondents indicating its importance. This is closely followed by the "Interactive map illustrating existing green corridors" (70.6%) and the "Listing of recent updates of the regulations set by the EU Commission and the IMO" (64.7%). "Insights from significant events of the maritime industry and scientific papers" is seen as valuable by 47.1% of participants. The least prioritised feature is the "Hosting of an online forum for exchanging ideas with other stakeholders about strategies towards greener shipping" (29.4%), suggesting that while data-driven and regulatory features are critical, opportunities for interactive stakeholder exchanges are less central to the user base. These results are providing a solid proof for the scope of MSSO and its tools; they will also drive the formulation of more specific and targeted questions in the updated survey.

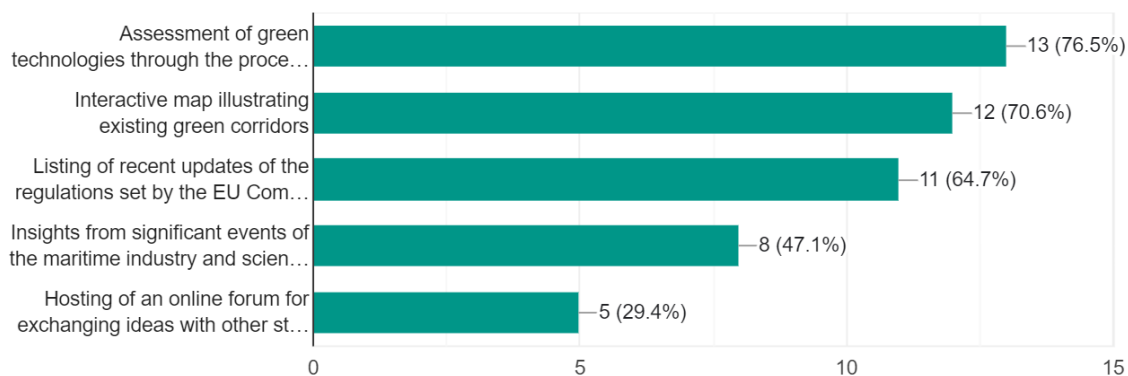


Figure 8. Ranking of MSSO features based on stakeholder preferences.

Finally, Figure 9 illustrates the level of interest in utilising the MSSO as an assessment tool for organisational needs and strategies. A significant majority, 88.2% of respondents, expressed a clear interest in using the tool, while only 11.8% indicated a lack of interest. These results highlight strong support for the MSSO, suggesting that it is seen as a valuable resource for advancing sustainable shipping strategies across the industry.

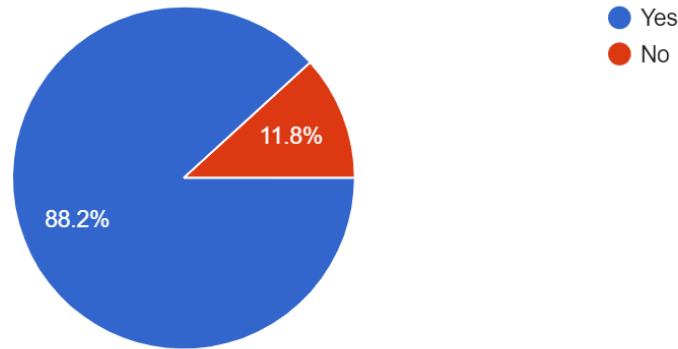


Figure 9. Stakeholders' level of interest in utilising the MSSO as an assessment tool for organisational needs.

The results of this preliminary survey, as explained above, are indicating key aspects to consider in the stakeholder engagement strategy, including the audience composition and where to focus the Consortium's efforts, the various decarbonisation options and their attractiveness, as well as the interest in the MSSO and its tools. Based on these results, an updated survey is constructed and will be circulated as the primary tool for engaging stakeholders and collecting the interest for MSSO, its activities, its tools and goals, around the Mediterranean Sea basin and beyond. This interest will be translated into MSSO memberships and will also drive the observatory's further development.

4. ENGAGEMENT STRATEGY AND COMMUNITY BUILDING

By implementing a comprehensive engagement strategy, the MSSO aims to build a strong, collaborative community dedicated to the decarbonisation of the shipping sector in the Mediterranean region, overcoming regional challenges and leveraging the unique opportunities presented by short-sea shipping.

4.1 Objectives of the Stakeholder Engagement Strategy

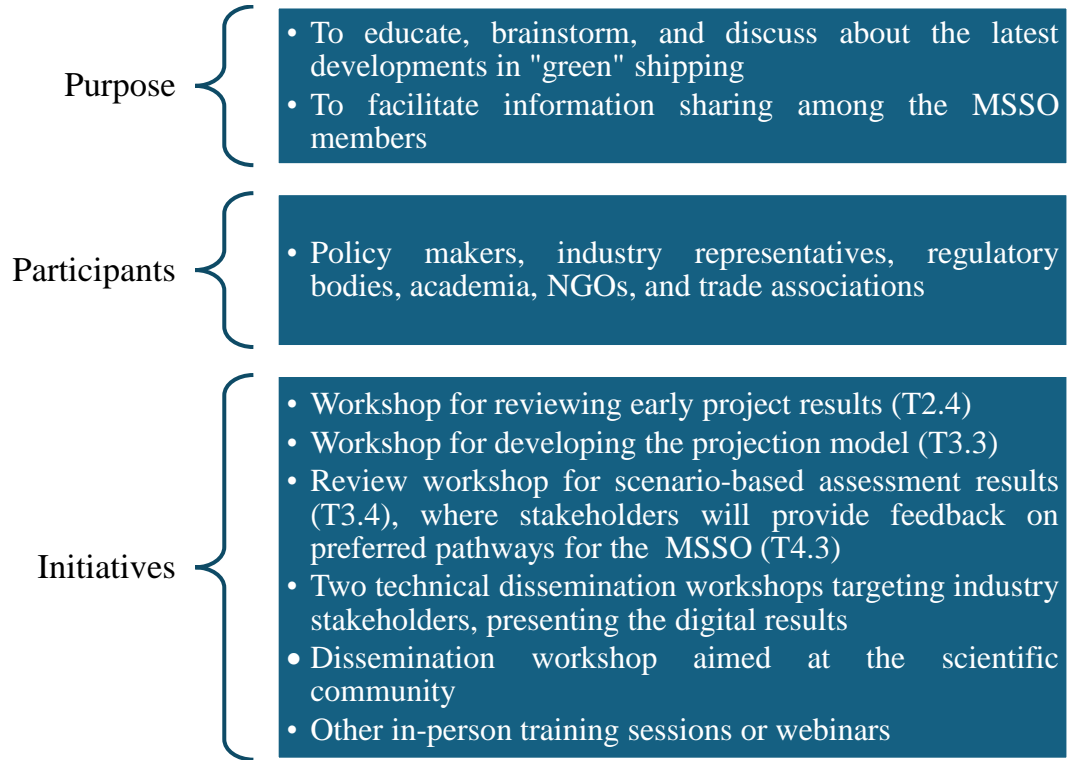
The primary goals of the engagement strategy for the MSSO are to foster collaboration, promote knowledge sharing, and facilitate the adoption of sustainable practices across the maritime sector in the Mediterranean region. The specific objectives include:

- **Establishing a Collaborative Network:** Create a robust network of stakeholders from the public and private sectors, as well as academic institutions, to work collectively towards the decarbonisation of the shipping industry.
- **Enhancing Communication and Transparency:** Ensure open and transparent communication channels among stakeholders to build trust and encourage the sharing of knowledge and best practices.
- **Promoting Stakeholder Involvement:** Actively involve stakeholders in decision-making processes to ensure that their interests and concerns are adequately addressed.
- **Facilitating Capacity Building and Training:** Provide opportunities for stakeholders to enhance their skills and knowledge related to sustainable shipping technologies and practices.
- **Monitoring and Evaluation:** Establish mechanisms to regularly monitor and evaluate the effectiveness of the engagement strategy, making adjustments as necessary to ensure continuous improvement.

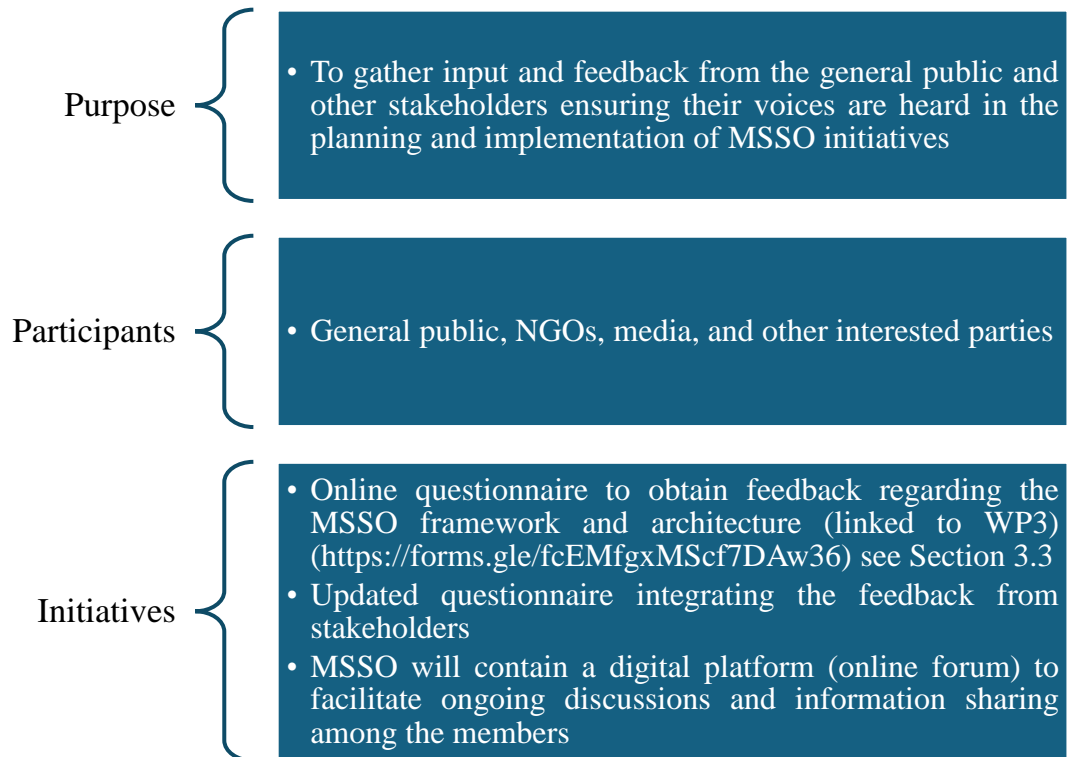
4.2 Methods and Tools for Engaging with Stakeholders

Each partner in the consortium will take responsibility for contacting stakeholders within their respective countries, prioritising organisations or entities with which they have had productive collaborations, built healthy relationships, or signed Memorandums of Understanding (MoUs) or similar agreements. This approach leverages existing trust and familiarity to facilitate engagement. Partners will also reach out to entities in other Mediterranean countries. The following engagement methods are to be used (note that some of the below initiatives are thoroughly presented in deliverable “D5.1 Dissemination and Communication Plan and Terms of Reference for the Advisory Board”), in addition to the email that is prepared to be sent out more specifically to the targeted stakeholders (see Appendix A) and the feedback gained through the preliminary questionnaire (see Section 3.3):

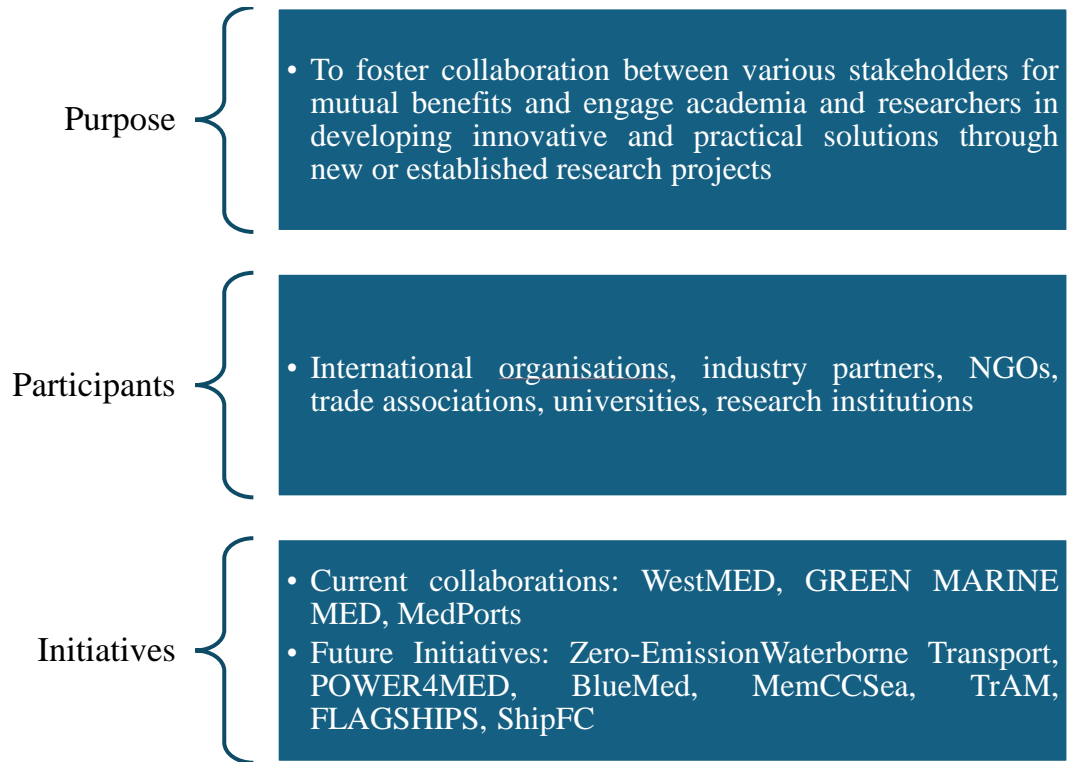
Workshops, Educational Programs and Training



Strategies for gathering public input



Partnerships and Alliances (see “D5.1 Dissemination and Communication Plan and Terms of Reference for the Advisory Board” – Table 4)



Dissemination Initiatives



4.3 Communication Plan

A well-defined communication plan is essential for maintaining engagement and fostering a sense of community among stakeholders. The development of a dedicated online platform for the MSSO will ensure effective communication and knowledge sharing between the MSSO members and will contribute to achieving the set communication targets.

Table 1 categorises MSSO stakeholder communication channels into three types: Informative, Interactive, and Feedback. Informative Channels (MSSO website, journals, publications, conferences, newsletters) disseminate information. Interactive Channels (online forums, social media, workshops, training, webinars, emails, online meetings) facilitate two-way communication. Feedback Channels (online questionnaire) gather stakeholder input. This comprehensive approach ensures effective and varied interactions.

Figure 10 presents a comprehensive overview of the communication channels employed to connect MSSO stakeholders. Radiating from the centre are multiple communication pathways: the MSSO website serves as a central hub; training and webinars provide educational opportunities; journals, publications, and conferences offer in-depth knowledge and updates; an online forum facilitates interactive discussions; workshops enable hands-on learning; emails and online meetings support direct communication; newsletters distribute regular updates; social media engages a broad audience; and online surveys collect feedback and data. Each channel is depicted with a unique icon and connected through lines, highlighting the interconnected nature of these communication methods.

Table 1: Communication channels to maintain engagement among the MSSO stakeholders.

Regular Updates: Newsletters, emails, the MSSO website, and relevant social media channels will keep stakeholders regularly informed about EU Commission and IMO regulations. Additionally, they will provide news and updates on the maritime industry, insights from significant events and scientific research, and information on upcoming industry-relevant events such as conferences, gatherings, and seminars

Key Messages: Develop clear and consistent key messages that emphasise the importance of shipping decarbonisation and the benefits of the collaboration amongst the MSSO stakeholders. Promote the adoption of green shipping technologies through the MSSO website, engaging social media content, and informative newsletter emails. Additionally, a presentation introducing GreenMED and the MSSO will be distributed via email to target stakeholders. For further details, refer to Appendix A

Communication Channels: Utilise a variety of communication channels, including organisation of webinars and virtual events, face-to-face meetings to train interested stakeholders in maritime decarbonisation. The distribution of email newsletters, social media content sharing (LinkedIn and YouTube) will reach different stakeholder groups. In addition, an interactive forum hosted within the MSSO digital platform, where stakeholders will be able to exchange information and knowledge (more details on the stakeholder forum are provided in section 4.4)

Feedback Mechanisms: Implement feedback mechanisms, such as online surveys, polling tools and feedback forms to gather stakeholder input and adjust the MSSO strategies. Surveys will be shared with target stakeholders through emails and the project’s social media LinkedIn page. See Appendix A

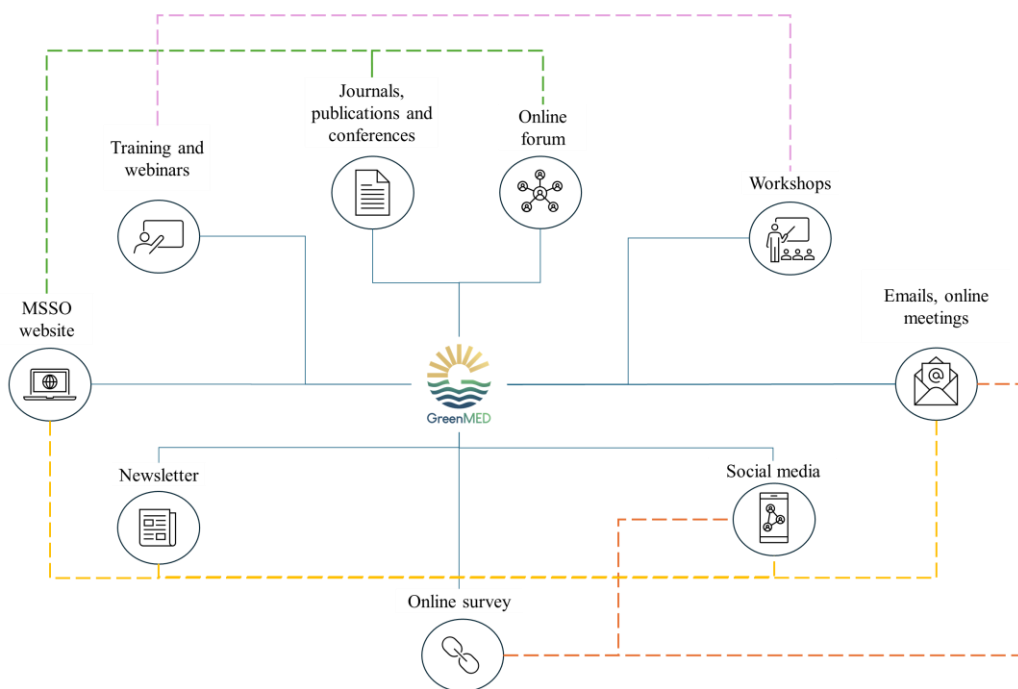


Figure 10: Roadmap of the different communication channels for connecting the MSSO Stakeholder Network.

4.4 Forum for Stakeholder Collaboration

As already mentioned, the MSSO will feature a dynamic and interactive Stakeholder Forum within its digital platform. This forum will serve as a crucial hub for stakeholders to exchange information, share knowledge, and discuss research directions aimed at promoting greener shipping practices in the Mediterranean Sea.

The primary objectives of the Stakeholder Forum are to facilitate information exchange, promote collaborative research, enhance communication, and support decision-making. By providing a platform for stakeholders to share the latest developments, insights, and best practices in sustainable shipping, the forum aims to encourage collaboration among academic institutions, industry experts, and regulatory bodies. This will drive innovative research and development, fostering open and transparent communication among diverse stakeholders to align efforts and create synergies. Additionally, the forum will support informed decision-making and policy development by providing stakeholders with access to a wealth of information and collective expertise.

Key features of the Stakeholder Forum include discussion boards organised on topics such as decarbonisation technologies, regulatory updates, and sustainable fuel options. These boards will allow stakeholders to participate in focused discussions. A knowledge repository will serve as a central archive of documents, research papers, case studies, and presentations, accessible to all forum members. Expert panels will be a regular feature, with industry experts and researchers sharing their insights and answering questions from the community. Collaboration spaces will be available for stakeholders to propose and develop joint projects or research initiatives. Additionally, feedback mechanisms will enable stakeholders to provide input on

MSSO activities and suggest improvements or new areas of focus.

The benefits for stakeholders participating in the forum are significant. Networking opportunities will allow them to build relationships with other stakeholders across the Mediterranean region, fostering a sense of community and shared purpose. They will have access to the collective knowledge of a diverse group of professionals, enhancing their understanding and implementation of sustainable practices. Real-time updates will keep them informed about the latest regulatory changes, technological advancements, and industry trends. Moreover, the forum will enhance innovation by enabling collaboration on cutting-edge research and pilot projects that can accelerate the transition to greener shipping.

By offering this wide-ranging Stakeholder Forum, the MSSO aims to create a vibrant, collaborative environment that empowers stakeholders to collectively address the challenges of decarbonising the shipping sector and achieve a more sustainable future for the Mediterranean Sea.

5. MONITORING AND EVALUATION

To ensure the effectiveness of the engagement strategy, the MSSO will implement a robust monitoring and evaluation framework. This will involve defining Key Performance Indicators (KPIs) to measure the success of engagement activities. Additionally, regular reviews of engagement activities will be conducted to assess their impact and identify areas for improvement. Continuously gathering and incorporating feedback from stakeholders will be essential to refine and enhance the engagement strategy.

By implementing this comprehensive engagement strategy, the MSSO aims to build a strong, collaborative community dedicated to the decarbonisation of the shipping sector in the Mediterranean region.

5.1 Key Performance Indicators (KPIs) for measuring the Effectiveness of the Engagement Strategy

The effectiveness of the stakeholder engagement strategy for the MSSO will be measured through several KPIs that reflect key project results and activities. One of the primary KPIs is establishing the MSSO stakeholder network, with a baseline of 30 stakeholders and a target of 50. As this represents a key milestone of the project, scheduled for completion in M12 (September), it is important to clarify that the milestone will be achieved in the coming days through the execution of the continuous engagement strategy efforts. This indicator will track the growth and inclusivity of the network, ensuring that a diverse range of stakeholders is actively participating. Additionally, the number of workshops involving MSSO members will be monitored, with a baseline of five workshops and a target of seven. These workshops will include two technical and one scientific dissemination workshop, providing forums for knowledge exchange, technical discussions, and dissemination of scientific findings. Furthermore, the MSSO's sustainability and continuation plan (Deliverable D5.4 'Strategy for Sustainability and Continuation') will be prepared and evaluated at the end of the project to ensure stakeholders' ongoing engagement and collaboration beyond the initial project phase.

5.2 Mechanisms for collecting and incorporating Stakeholder Feedback

To collect and incorporate stakeholders' feedback effectively, the MSSO will employ a multi-faceted approach leveraging various mechanisms. One key method will be through responses to the published questionnaire on LinkedIn (for the results of the questionnaire see Section 3.3) and emails sent to selected entities, introducing them to the GreenMED consortium and project and inviting them to participate as members of the MSSO (the template email used for contacting selected entities is provided in Appendix A, along with the presentation sent to encourage participation in the MSSO initiative. The list of target stakeholders to be contacted by email is also provided in Appendix A). This approach ensures broad and targeted outreach, gathering insights from a wide range of stakeholders. Additionally, virtual/physical meetings will be conducted with key personalities from the maritime industry within the consortium's network, providing in-depth qualitative feedback and expert opinions.

Engagement statistics from the project's social media platforms, including LinkedIn, YouTube, and the MSSO website, will also be analysed to gauge the level of interest and interaction among stakeholders. This data will help identify trends and areas requiring further attention. Finally, responses to emails will be monitored to track direct communication and feedback

from stakeholders. By utilising these diverse feedback mechanisms, the MSSO will improve its engagement strategy, ensuring it remains responsive to stakeholder needs.

5.3 Challenges in engaging the Stakeholders and Strategies to mitigate these Challenges

Engaging stakeholders in the MSSO involves navigating several significant challenges. One notable challenge is the presence of established decarbonisation hubs, such as the Lloyd's Register Decarbonisation Hub [11], which already offers similar services. These existing hubs may lead stakeholders to question the added value of joining the MSSO, given the familiarity and established trust with current providers. To mitigate this challenge, the MSSO can clearly articulate its unique value proposition, emphasising the regional focus, tailored support for Mediterranean-specific issues, and the collaborative benefits of a diverse network spanning public and private sectors, academia, and various countries. Especially the focus on the scientific aspect of the observatory, enriched by the support of national and regional authorities and initiatives, is what makes MSSO a pioneering effort for the shipping decarbonisation puzzle.

Another potential challenge arises from conflicts of interest among stakeholders providing similar services. Competitors may be reluctant to collaborate or share information within the MSSO, fearing a potential loss of competitive advantage. To address this, the MSSO can establish clear guidelines and confidentiality agreements that protect proprietary information while fostering a cooperative environment. Highlighting the mutual benefits of collaboration, such as collective problem-solving, shared research opportunities, and combined efforts to meet regulatory requirements, can also help mitigate this concern.

The reluctance to exchange expertise and technologies is another significant barrier. Entities may prefer to keep their innovations proprietary, limiting the flow of knowledge within the network. The MSSO can counter this by promoting the idea of pre-competitive collaboration, where stakeholders work together on fundamental research and standards that benefit the entire industry without compromising individual competitive edges. Offering incentives such as recognition, funding opportunities, or access to exclusive research results can also encourage more open sharing of information.

Political tensions between countries in the Mediterranean region present an additional challenge. Entities from countries with ongoing political conflicts may be hesitant to participate in a project that includes nations they are at odds with. The MSSO can navigate this by maintaining a neutral stance and emphasising the apolitical nature of its mission. Focusing on common goals such as environmental sustainability and economic benefits for the region can help bridge political divides. Building trust through transparent governance, equitable representation of all participating countries, and highlighting successful examples of international collaboration in other sectors can also alleviate political concerns.

Overall, by recognising and proactively addressing these challenges through strategic communication, protective measures, incentives for collaboration, and a strong emphasis on neutrality and common goals, the MSSO can effectively engage a broad range of stakeholders and build a robust, cooperative network dedicated to the decarbonisation of the shipping sector in the Mediterranean region.

6. CASE STUDIES AND BEST PRACTICES

Several case studies of successful engagement in similar projects provide valuable lessons and best practices that can be applied to the MSSO stakeholder engagement strategy and community building.

The **Getting to Zero Coalition** [12] is a partnership between the Global Maritime Forum, the World Economic Forum, and Friends of Ocean Action, bringing together a diverse range of stakeholders from the maritime, energy, infrastructure, and finance sectors. The coalition's ambitious goal of achieving commercially viable zero-emission vessels by 2030 has been a key factor in aligning stakeholders. The success of this initiative can be attributed to a clear vision and goals, a collaborative framework with regular meetings, workshops, and working groups, and high-level engagement involving influential industry leaders and organisations. The coalition has successfully raised awareness, influenced policy discussions, and initiated collaborative projects aimed at decarbonising maritime shipping.

The following can be used as lessons for MSSO's community-building strategy:

- Establish a clear and ambitious vision to align and motivate stakeholders.
- Create a collaborative framework with regular interaction and dialogue.
- Engage high-level industry leaders to drive commitment and visibility.

Launched by the European Commission, the **European Clean Hydrogen Alliance** [13] aims to promote hydrogen as a key energy carrier for achieving climate neutrality by 2050. This alliance's inclusive approach involves a broad range of stakeholders, including industry, government, academia, and civil society, ensuring diverse perspectives and buy-in. Developing clear roadmaps and strategic plans guides activities and measures progress, while access to funding and support from the European Union encourages stakeholder participation and investment. The alliance has facilitated numerous public-private partnerships, accelerated technology development, and fostered policy alignment across member states.

Lessons for the MSSO:

- Engage a wide range of stakeholders to ensure diverse perspectives.
- Develop clear strategic plans and roadmaps to guide activities.
- Provide access to funding and support to encourage participation.

The **Sustainable Shipping Initiative (SSI)** [14] is a global, multi-stakeholder initiative focused on creating a sustainable future for the shipping industry. Its success stems from a collaborative governance structure that includes representation from all key stakeholder groups, transparency and accountability through regular progress reports and open communication, and capacity building by providing training and resources to stakeholders. SSI has driven significant progress in responsible ship recycling, improved energy efficiency, and the development of sustainable shipping standards.

Lessons for the MSSO:

- Establish a governance structure with representation from all key stakeholder groups.
- Maintain transparency and accountability through regular communication and reporting.
- Focus on capacity building by providing training and resources to stakeholders.

The **World Port Climate Action Program** [15] is a collaborative effort by the Port of Rotterdam and other major global ports to reduce carbon emissions and improve sustainability. Key to its success are joint initiatives and pilot projects that test and implement sustainable technologies, public-private partnerships that share risks and benefits, and engagement with local communities to ensure they are involved and benefit from sustainability initiatives. The program has led to the adoption of green technologies, improved port operations, and enhanced stakeholder collaboration.

Lessons for the MSSO:

- Launch joint initiatives and pilot projects to test and implement new technologies.
- Leverage public-private partnerships to share risks and benefits.
- Engage local communities to ensure they are involved and benefit from initiatives.

Other initiatives similar to the concept of the GreenMED project and its outcomes, from which valuable insights for the MSSO can be derived, are presented below:

Fuelink [16] is a digital platform designed to simplify vessel fueling decisions, supporting various departments such as chartering, operations, technical, and finance. The platform helps users develop fueling strategies, optimise fuel procurement, and ensure compliance with environmental regulations, including the EU's Emissions Trading System. Fuelink also centralises bunkering documents, facilitates price competitiveness analysis, and provides 24/7 support for seamless after-sales operations. The platform focuses on transparency, data security, and empowering the maritime industry to meet sustainability goals.

Lessons for the MSSO:

- Centralised platform for managing bunkering documents highlights the importance of streamlined data management.
- Ability to forecast and simulate fuel strategies provides valuable insights.
- Incorporation of EU ETS compliance shows the value of integrating regulatory frameworks.
- Use of digital platforms for information exchange can inspire MSSO to leverage online forums and social media for continuous stakeholder engagement.

Emission Link – Intelligent Emission Insights [17] is an advanced digital platform tailored for the maritime industry to effectively manage and reduce GHG emissions. Utilising real-time monitoring and sophisticated data analytics, it provides actionable insights into emissions of CO₂, SO_x, NO_x, and other pollutants, enabling ship operators to enhance sustainability. The

platform aids in regulatory compliance with international standards, such as IMO's MARPOL Annex VI and EU MRV, through automated reporting tools. Additionally, it offers optimisation recommendations for fuel consumption and operational efficiency, delivering both environmental and cost-saving benefits. By integrating seamlessly with existing ship management systems and supporting data-driven decision-making, this tool empowers maritime stakeholders to achieve substantial emission reductions and strengthen their commitment to sustainability.

Lessons for the MSSO:

- One-stop solution for managing emissions and compliance emphasises the importance of a centralised system.
- A team of experts in legal, environmental, and financial fields provides continuous support.
- Investment in advanced technology and robust data security highlights the importance of digital tools in managing complex processes.
- Focus on managing compliance with EU ETS and other regulations can inform MSSO's approach to integrating compliance tools.
- Proactive stakeholder support and use of digital communication channels underscore the importance of active engagement.

The **WestMED Initiative** [18], supported by the European Commission, is a cooperative framework involving 10 countries from the western Mediterranean, aiming to promote sustainable development and a blue economy in the region. It supports collaborative projects in areas such as maritime safety, environmental protection, sustainable tourism, and job creation. The initiative emphasises cross-border cooperation, innovation, and the sharing of best practices to address regional challenges like pollution and resource management.

Lessons for the MSSO:

- Effective decarbonisation necessitates robust cooperation across national borders to achieve policy alignment and foster shared technology development. The collaboration between WestMED and the MSSO will enhance joint efforts among Mediterranean countries, creating a cohesive strategy for reducing maritime emissions.
- Engaging both public institutions and private companies fosters innovation and enhances resource sharing.
- Strengthening local and regional institutions can accelerate the adoption of green technologies.
- Leveraging data and digital tools helps monitor and optimise decarbonisation efforts.
- Exploring diverse funding sources ensures long-term viability of decarbonisation projects.

The **Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping** [19] focuses on decarbonising the global maritime industry, aiming for substantial emissions reductions by 2050. The center emphasises collaboration, applied research, and regulatory reform to tackle the challenges of reducing the carbon footprint of shipping, which accounts for approximately

3% of global greenhouse gas emissions. By sharing knowledge and fostering partnerships, the center aims to facilitate the development and implementation of sustainable maritime solutions.

Lessons for the MSSO:

- Foster partnerships across stakeholders to drive the development of sustainable shipping technologies and prioritise research initiatives that address practical challenges in maritime decarbonisation.
- Actively participate in shaping policies and regulations that support the transition to zero-carbon shipping.
- Create platforms for sharing best practices and insights among maritime industry players which in turn MSSO aims to establish such a platform.
- Commit to ambitious, long-term goals for emissions reduction to guide strategic planning.

7. CONCLUSIONS AND DISCUSSION

This report outlines the purpose and scope of the Mediterranean Sustainable Shipping Observatory (MSSO), emphasising the critical role of stakeholder identification and engagement in achieving decarbonisation in the shipping sector. The document identifies key stakeholders from the public and private sectors, including shipyards, fuel companies, port authorities, regulatory bodies, and academic institutions. An online questionnaire has been prepared and shared, and will be updated accordingly, as mentioned above, to engage the target audience and introduce them to the MSSO tool and features. Although the response rate to the questionnaire was low, it still provided valuable insights into stakeholder interests and their potential engagement with tools like the MSSO and its associated activities.

The engagement strategy aims to foster collaboration, promote knowledge sharing, and facilitate sustainable practices. The strategy includes regular workshops, stakeholder meetings, and online forums, with each consortium partner taking responsibility for engaging stakeholders within their respective countries. The plan emphasises leveraging existing relationships and building new ones, ensuring comprehensive and inclusive participation. A robust monitoring and evaluation framework is essential for assessing the effectiveness of engagement activities. Key performance indicators (KPIs), regular reviews, and continuous stakeholder feedback will help refine the strategy and ensure its success.

Lessons from successful case studies, such as the Global Maritime Forum and the Poseidon Principles, demonstrate the importance of high-level commitment, clear visions, regular communication, and collaborative research. These best practices will guide MSSO in building a strong, collaborative community dedicated to decarbonising the shipping sector in the Mediterranean.

By integrating these strategies and lessons, the MSSO aims to overcome regional challenges and leverage opportunities, ultimately contributing to a more sustainable and environmentally friendly maritime industry in the Mediterranean region.

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APPENDIX A

The template email for contacting selected entities, introducing them to the GreenMED consortium and project and inviting them to participate as members of the MSSO, is presented below. Note that in the first part of the template, an example of an introductory paragraph for each partner that is going to send the email is provided.



Introduction to the GreenMED project

Dear,

The **Cyprus Marine and Maritime Institute (CMMI)**, a not-for-profit research organization based in Larnaca, Cyprus, is actively participating in the EU-funded **GreenMED project**. This regionally focused initiative aims to support green shipping efforts in the **Mediterranean Sea** basin by promoting plausible, scenario-based decarbonisation pathways. Through GreenMED, the consortium is committed to contributing to the broader goals of environmental sustainability and climate change mitigation in the maritime sector.

[Alternatively,

For NTUA: The **National Technical University of Athens (NTUA)**, among the oldest higher education institutions of Greece and the most prestigious among engineering schools based in Athens, Greece, is actively participating in the EU-funded **GreenMED project**. This regionally focused initiative aims to support green shipping efforts in the **Mediterranean Sea** basin by promoting plausible, scenario-based decarbonisation pathways. Through GreenMED, the consortium is committed to contributing to the broader goals of environmental sustainability and climate change mitigation in the maritime sector.

For Marine Traffic: **Marine Traffic**, the world's leading provider of ship tracking and maritime intelligence services, is actively participating in the EU-funded **GreenMED project**. This regionally focused initiative aims to support green shipping efforts in the **Mediterranean Sea** basin by promoting plausible, scenario-based decarbonisation pathways. Through GreenMED, the consortium is committed to contributing to the broader goals of environmental sustainability and climate change mitigation in the maritime sector.

For Valenciaport Foundation: The **Valenciaport Foundation**, is a centre for Applied Research, Innovation and Training, serving the port logistics cluster based in the Port of Valencia, Spain, is actively participating in the EU-funded **GreenMED project**. This regionally focused initiative aims to support green shipping efforts in the **Mediterranean Sea** basin by promoting plausible, scenario-based decarbonisation pathways. Through GreenMED, the consortium is committed to contributing to the broader goals of environmental sustainability and climate change mitigation in the maritime sector.

For AASTMT: The **Arab Academy for Science, Technology & Maritime Transport (AASTM)**, is a regional university which runs programs in marine transportation, business, and engineering, based in Egypt, is actively participating in the EU-funded **GreenMED project**. This regionally focused initiative aims to support green shipping efforts in the **Mediterranean Sea** basin by promoting plausible, scenario-based decarbonisation pathways. Through GreenMED, the consortium is committed to contributing to the broader goals of environmental sustainability and climate change mitigation in the maritime sector.]

Goal of the project

GreenMED's ambition is to contribute directly and actively to achieving the EU's emission reduction targets set for the 2030 and 2050 milestones. The project's main outcome is the establishment of a decarbonisation hub, the **Mediterranean Sustainable Shipping Observatory (MSSO)**, that will consist of various stakeholders from the maritime sector, including international organizations and regulatory bodies, researchers and academia, shipping and shipping-related companies, technology and energy providers.

We are reaching out to introduce you to this innovative project and to invite your collaboration. Attached, you will find a **presentation** outlining the project's overall scope, mission and goals, along with essential information about our partners, and details on the architecture and features of the MSSO.

Questionnaire

This new green shipping tool - an interactive tool within MSSO - will assess promising decarbonisation technologies, generate green pathways for existing fleets and provide optimum supply chain infrastructure development for alternative fuel options.

We kindly invite you to complete the below questionnaire, to discover more about the features of the MSSO and its interactive tool, and to forward it to other relevant stakeholders who you think may be interested. The questionnaire takes no longer than 5 minutes.

For the questionnaire ► <https://forms.gle/CT9tXe2te77hPkqZA>. Your input will be extremely valuable to us!

If you face any difficulties or if you need additional information, you can contact mostec.group@cmmi.blue

Join our [Newsletter](#) to stay connected with the latest project achievements, research updates, industry insights, and project activities in the journey towards a sustainable maritime future.

To find out more:



[GreenMED - CMMI](#)



[GreenMED project: Overview | LinkedIn](#)



[GreenMED - YouTube](#)

We wish to have you onboard and are open in discussing possible ways of collaboration. Thank you in advance for your feedback and engagement!

Best Regards,

The GreenMED Consortium

The presentation, sent via email to target stakeholders to encourage participation in the MSSO initiative, is provided below. It outlines the project's overall scope, mission, and goals, offering a clear vision of its purpose and intended impact. In addition, the presentation highlights key information about GreenMED's partners, demonstrating the collaborative effort behind the project, and provides an overview of the MSSO tool's architecture and features. When creating such a presentation for stakeholders, it's crucial to ensure clarity, relevance, and alignment with the audience's interests. A well-structured presentation not only conveys the technical aspects but also builds trust by showcasing the expertise of the team and the tangible benefits of the tool. Visual aids and concise messaging further enhance understanding, while the inclusion of real-world applications and case studies can help foster greater engagement and commitment from stakeholders.



GreenMED

Green Shipping Pathways Towards a Clean Energy Transition In
the Mediterranean



Co-funded by the
European Union

1



Introduction to GreenMED

The Consortium and a Project Overview



Co-funded by the
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The Consortium



Coordinator



Partners




Key Information


- Total project cost: € 926,085.00
- Total project funding: € 740,868.00
- Duration: 01/10/2023 – 30/09/2025



The project has received funding from the European Maritime, Fisheries and Aquaculture Fund (EMFAF) under grant agreement No. 101124925.




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Projects related to decarbonisation







<p>National Technical University of Athens</p> 	<p>Website: NATIONAL TECHNICAL UNIVERSITY OF ATHENS (ntua.gr)</p> <p>Relevant projects to decarbonisation:</p> <ul style="list-style-type: none"> • Sea Of Experience – Establishment of Eastern Mediterranean Regional Network • Sector Adaptive Virtual Early Warning System for marine pollution – SEAVIEWS (adrioninterreg.eu)
<p>Cyprus Marine and Maritime Institute</p> 	<p>Website: CMMI Cyprus Marine and Maritime Institute cmml.blue</p> <p>Relevant projects to decarbonisation:</p> <ul style="list-style-type: none"> • ZEST – CMMI • Green Marine (greenmarine-project.eu) • bioCNG-to-Cold Ironing - CMMI • BioCH4-to-Market - CMMI




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Projects related to decarbonisation



<p>Marine Traffic</p> 	<p>Website: https://www.kpler.com/product/maritime</p> <p>Relevant projects to decarbonisation:</p> <ul style="list-style-type: none"> • Vessel AI Maritime Digitalisation (vessel-ai.eu) • GreenVoyage2050 (imo.org) • Mobispaces
<p>Fundación Valenciaport</p> 	<p>Website: https://www.fundacion.valenciaport.com/</p> <p>Relevant projects to decarbonisation:</p> <ul style="list-style-type: none"> • Seanergy Project – Greener Fuels and Energy on Ports • Home Hypobatt • H2PORTS - CLEAN HYDROGEN PARTNERSHIP • GREEN C PORTS (greencportsproject.eu)
<p>Arab Academy for Science, Technology and Maritime Transport</p> 	<p>Website: https://aast.edu/en/</p> <p>Relevant projects to decarbonisation:</p> <ul style="list-style-type: none"> • SEM- SEM Smart Control Systems for Energy Management (aast.edu) • About – FishAqu.eu



5



Scope

Project Information and Outcomes



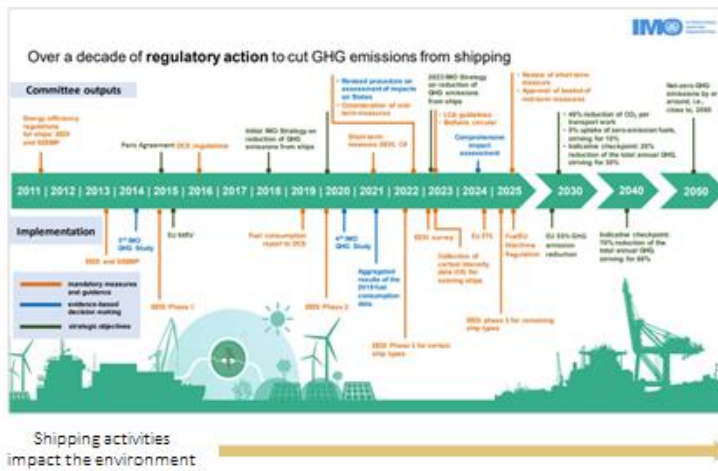
6

Our Motivation



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Regulatory framework of the maritime ecosystem



National, EU and global policies and regulations are being enforced

Need for decarbonisation

Interdisciplinarity leads to applicable, and validated solutions through emerging know-how

8

GreenMED efforts towards decarbonisation



GreenMED aims to effectively support green shipping efforts in the Mediterranean Sea basin by promoting plausible decarbonisation pathways.

The ambition is to facilitate the clean energy transition in the Mediterranean region and contribute to the achievement of the targets established by the EU, which are:

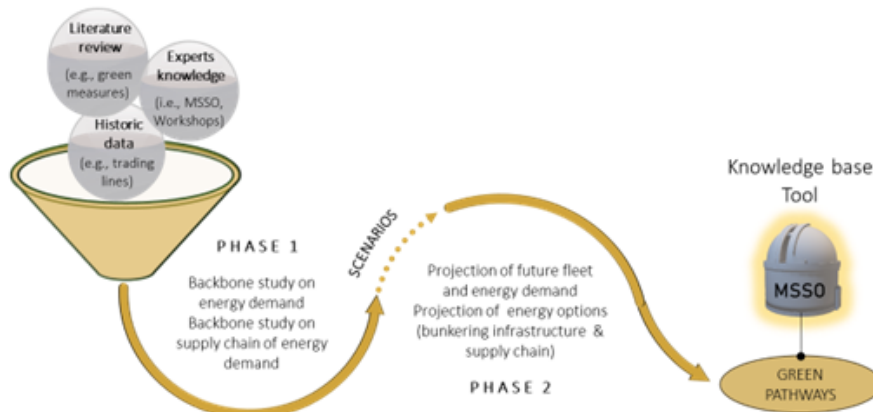
- To reduce net greenhouse gas emissions by at least 55% by 2030
- To reduce the greenhouse gas intensity of the energy used on-board of ships by up to 80% by 2050

Studies are focusing on both the Mediterranean shipping energy demand and the supply chain capacities.




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The main outcome of GreenMED is MSSO



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MSSO Vision

Considering...

- The shipping decarbonisation targets
- The need for a regional approach
- The weak efforts in the eastern Mediterranean
- The efforts for policy-making and various initiatives

We aim for the Mediterranean Sustainable Shipping Observatory (MSSO) establishment, to operate as a decarbonisation hub focusing on eastern and wider Mediterranean region.



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Mediterranean Sustainable Shipping Observatory (MSSO)

Knowledge base Tool



The establishment of the Mediterranean Sustainable Shipping Observatory (MSSO) as a decarbonisation hub will provide:

- >> Recommendations and tools for policy-making and informed-investment decisions
- >> Continuous stakeholder support through MSSO community building



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MSSO Architecture


Contents of the MSSO tool



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MSSO network and GreenMED Advisory Board



MSSO network will be built based on:

- Advisory Board members
- Core partners/members for the MSSO
- Wider network

Advisory Board members so far:

Leonardo Manzari (IT), representing WestMED

Apostolos Georgiadis (GR), representing Angelicoussis Group


Manuel Rodriguez (FR), representing MEDports Association

Beatriz Nieto Calderon (SP), representing Centro Hidrogeno (CNH2)

Lisa Simon De Grunt (SP), representing World Ocean Council & GREEN MARINE MED

Martin Bergström (DE), representing the German Aerospace Center (DLR)

Chara Georgopoulou (GR), representing DNV Greece



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MSSO Stakeholders




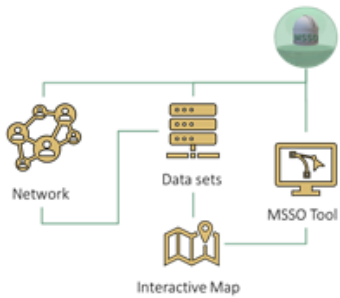

Members of MSSO will be divided into:

- Academics, Researchers and Scientists
- Shipping and Technology providers (Ship Management Companies, Fuel Industry)
- International Organisations and Regulatory Bodies (Classification Societies, Port Authorities)



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MSSO Tool

One of the tool's main gears will be an interactive map illustrating existing green corridors.

In addition, using the ship/fleet characteristics will enable the assessment of green technologies to illustrate the most efficient and sustainable technology to use for the given route.

The tool will host an online forum to host an interactive environment to allow the members exchange their insights on the decarbonisation strategies and technologies.



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MSSO News and Insights

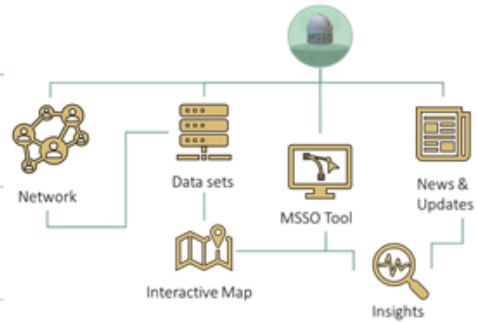


An advantageous characteristic of the tool will be that the users will be informed about the most recent updates of the regulations set by the EU Commission and the IMO.

Conclusions from significant events of the maritime industry, such as conferences, symposia and other events will be shared among the members.

Scientific investigations, including papers and reports, will be uploaded with exclusive access to the members of the tool.

The history of the applied technologies will be tracked, to assess their impact and evaluate the industry's strategic approach towards decarbonisation.



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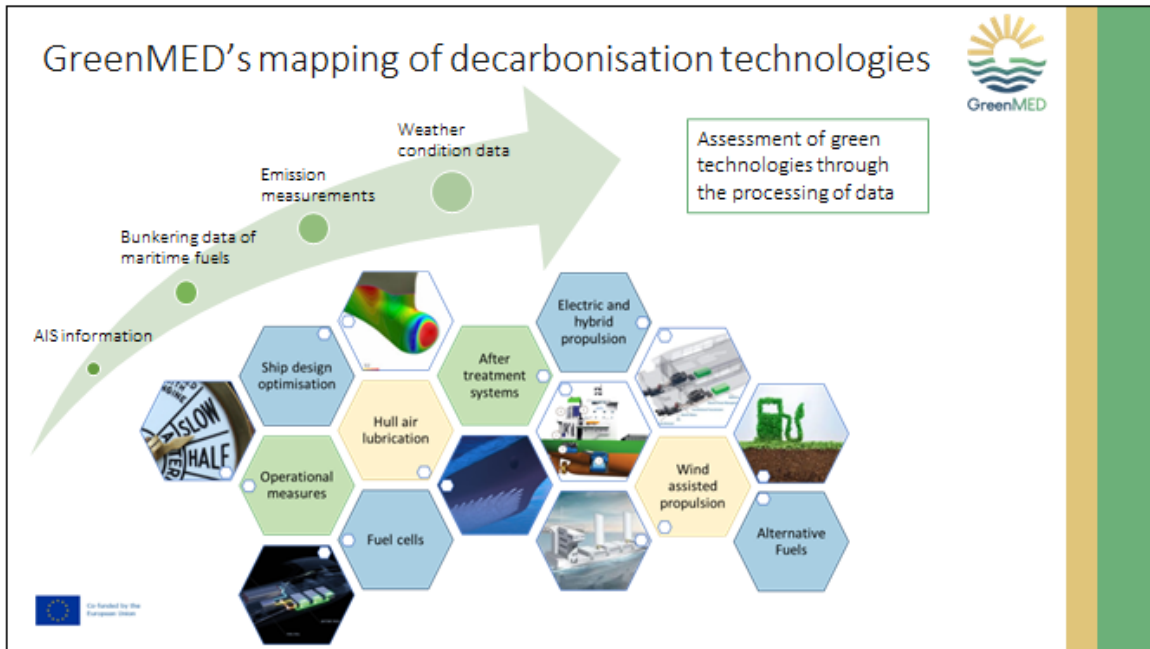
Motives for collaboration

Next Steps



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GreenMED is a bridge towards achieving decarbonisation in the Mediterranean Sea



GreenMED-MSSO will include stakeholders from academia and industry interested in the utilisation of green shipping technologies for the decarbonisation of the maritime transport sector. In the context of the project, MSSO outcomes will be achieved by:

- >> Acting as a **decarbonisation hub**, MSSO will gather information and evaluations from consultants on proposed green shipping solutions. Additionally, convening a reliable group of stakeholders will facilitate the exchange of valuable insights, help outline future research directions for the sector, publish articles, and provide access to papers on topics like regulations and technologies.
- >> Supporting the trading ecosystem regarding the regional decarbonisation goals since **significant ports** with high traffic are located along the Mediterranean Sea, such as the Port of Piraeus, the Port of Valencia, the Port of Alexandria, the Suez Canal, Gibraltar Strait, etc.
- >> The promotion and implementation of decarbonisation strategies in the **Mediterranean region**. Additionally, this hub provides stakeholders with an opportunity to demonstrate their commitment to supporting the Mediterranean region, a key actor in the shipping transport sector, particularly for short-sea routes. Despite its critical role, there is a **lack of clear guidance** and user-specific means to support clean energy transition in shipping.

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Your Contribution



The MSSO will bring together a diverse range of stakeholders from the industrial and academic sectors within the maritime ecosystem or even maritime enthusiasts. By fostering cooperation among these stakeholders, the MSSO as a decarbonisation hub anticipates the stakeholders to actively

- Participate in the Advisory Board and /or as a member of the MSSO
- Participate in project events and workshops
- Communicate MSSO to relevant network



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Sustainability and Continuation



- Establish MSSO as an individual entity (non-profit) in Cyprus, and site offices in other countries
- All GreenMED partners and Advisory Board members will be invited to join MSSO partnership and coordination
- Establish a Board of Directors or Steering Committee as the primary governing body of MSSO, a Scientific Committee to ensure the MSSO remains scientifically driven, and a Secretariat to manage day-to-day operations

Beyond the GreenMED partnership, MSSO will seek research funding, leverage potential in-kind contributions, explore opportunities for advertising, and consider instituting membership fees.



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The following tables outline the key target stakeholders for the GreenMED project, categorised into the private and public sectors (Table 2) and academia (Table 3) of the shipping ecosystem. These stakeholders have been identified as crucial contacts for introducing the MSSO initiative, fostering collaboration, and encouraging participation. Engaging these diverse groups will ensure a comprehensive approach to decarbonisation efforts and promote the effective utilisation of the MSSO tool. The primary target for MSSO membership consists of 30 stakeholders. Please note that in the tables below some organisations, and universities may appear more than once, as they represent different individuals from various countries or fields; their names are omitted to maintain anonymity.

Table 2. Stakeholders to be contacted for the MSSO in the private and public sectors of the industry.

Private/Public	Stakeholder Name	Country
Shipbuilding, maintenance and repairs		
Private	Multimarine Ltd	Cyprus
Private	FP Marine Ltd	Cyprus
Private	NAP ENGINEERING P.C.	Greece
Private	Palmarine (Hellas)	Greece
Private	Glosten	Malta
Private	M.L.E. Co. Ltd	Greece
Private	Zamakona Yards	Spain
Private	Compagnie Tunisienne de Navigation (CTN)	Tunisia
Shipowner and/or ship management		

Private	Petronav Shipmanagement	Cyprus
Private	Columbia Shipmanagement	Cyprus
Private	Conbulk Shipmanagement Corp.	Greece
Private	Capital Ship Management Corp.	Greece
Private	GAC	Spain
Private	DANAOS (Research Centre)	Greece
Private	Levante Ferries	Greece
Private	Lemissoler	Cyprus
Private	FML Shipmanagement	Cyprus
Private	Silver Bulk S.A.	Greece
Private	Baleària	Spain
Private	Angelicoussis Group	Greece
Private	Antipollution	Greece
Private	COSCO Shipping Spain	Spain
Fuel Industry		
Private	Petrolina	Cyprus
Private	ENI	Cyprus
Private	Baseblue	Cyprus
Private	Fuelink	Cyprus
Private	REPSOL	Spain
Private	Helbio Clean Hydrogen Partnership	Greece
Private	HELLENiQ ENERGY	Greece
Private	Motor Oil	Greece
Private	DEPA Commercial S.A.	Greece
Engineering and Technology Services		
Private	Signal Generix	Cyprus
Private	Damianou Marine Electronics Ltd	Cyprus
Private	Prisma Electronics	Greece
Private	Glafcos Marine	Greece
Private	Lomarlabs	Greece
Private	Oceanic	Cyprus
Private	AquaBioTech Group	Malta
Private	euromarine p.c.	Greece
Private	Emission Link	Cyprus

Private	Georghiou&Zembylas Partners	Cyprus
Private	Cleos	Greece
Private	inlecom	Greece
Private	SeaGuardian	Greece/Cyprus
Private	Fameline Energy	Cyprus
Private	Propulsion Analytics	Greece
Private	Seaplace	Spain
Private	Génova	Spain
Private	Immerseave	Cyprus
Private	Prevention at Sea	Cyprus
Private	Rhoe	Greece
Private	Ocean Safe Consulting LTD	Cyprus
Port Operators		
Private	Eurogate	Cyprus
Private	DP world	Cyprus
Private	TEPSA	Spain
Port Authorities		
Public	Cyprus Port Authority	Cyprus
Public	Police Border Marine	Cyprus
Public	Heraklion Port Authority	Greece
Public	Autoridad Portuaria de Huelva	Spain
Public	Port Authority of Piraeus	Greece
Private	Magellan Circle	Italy
Public	Port of Genoa	Italy
Public	Port of Trieste	Italy
Public	Port Authority of Alicante	Spain
Ministries		
Public	Shipping Deputy Ministry	Cyprus
Public	Department of Environment (Ministry of the Agriculture, Rural Development and Environment)	Cyprus
Public	Department of Fisheries and Marine Research (Ministry of the Agriculture, Rural Development and Environment)	Cyprus
Public	Ministry of Maritime Affairs and Insular Policy (Aegean and Island Policy)	Greece
Public	Ministerio de Industria comercio y Turismo	Spain

Trade Associations		
Private	Cyprus Shipping Association	Cyprus
Private	Hellenic Shortsea Shipowners Association	Greece
Private	European Community Shipowner's Associations (ECSA)	EU
Private	European Sea Ports Organisation (ESPO)	EU
Private	MEDPorts Association	Mediterranean
Classification societies		
Private	DNV	Cyprus
Private	Dromon Bureau of Shipping (DBS)	Cyprus
Private	Lloyd's Register	Italy
Private	Lloyd's Register	Greece
Private	RINA	Greece
Private	RINA	Cyprus
Private	American Bureau of Shipping (ABS)	Greece
Private	Bureau Veritas	Cyprus
Private	Bureau Veritas	Greece
Private	Bureau Veritas Marine & Offshore	Spain
Non-Governmental Organisations (NGOs)		
Private	Cymepa	Cyprus
Private	AKTI	Cyprus
Private	HELMEPA	Greece
Private	MIO-ECSDE	Greece
Private	Waterborne TP	Brussels
Private	Alianza Net Zero Mar	Spain
Private	Strategis Maritime Center of Excellence	Greece
Private	New Idea Sas	Italy
Private	SDG4MED	Italy
Private	World Ocean Council	Spain
Regulatory bodies		
-	IMO	International
-	EMSA	EU
Public	Generalitat Valenciana	Spain

The academic sector will be typically represented by individuals rather than organisations/universities. Some of the stakeholders listed below may not be employed in Mediterranean countries, however their nationality and professional ties to the Mediterranean region are relevant, and they might be interested in joining the MSSO's efforts.

Table 3. Stakeholders to be contacted for the MSSO in the academic sector of shipping.

Stakeholder Name	Country
Naval Architecture and/or Marine Engineering	
University of Strathclyde	UK
Hellenic Naval Academy - HNA	Greece
Hellenic Institute of Marine Technology	Greece
National Technical University of Athens	Greece
University of Zagreb	Croatia
CETENA S.p.A. - Centro per gli Studi di Tecnica Navale	Italy
Maritime Academies	
Arab Academy for Science, Technology & Maritime Transport	Egypt
Marine and/or Maritime Sciences	
Cyprus Marine and Maritime Institute	Cyprus
Oceanographic Center - University of Cyprus	Cyprus
Researcher in Maritime, New Technologies & Energy	Greece
Istanbul Technical University	Turkey
Faculty of Maritime Studies of the University of Rijeka	Croatia
Offshore and/or Ocean Sciences	
University of Cyprus	Cyprus
Mechanical Engineering	
University of Nicosia	Cyprus
Aristotle University	Greece
National Technical University of Athens	Greece
University of Southampton	UK
Universitat Politècnica de València	Spain
Universitat Castilla La Mancha	Spain
Electrical Engineering	
National Technical University of Athens	Greece
Universidad Politècnica de Valencia	Spain
Shipping Economics and Administration	

University of Piraeus Centre for Research & Technology	Greece
Chemical Engineering	
InoMob	Cyprus
Centro Nacional del Hidrógeno (CNH2)	Spain
Data Science	
The Cyprus Institute	Cyprus
University of the Aegean	Greece
Associations	
WEGEMT (European Association of Universities in Marine Technology and Related Sciences)	UK
EMSEA (European Marine Science Educators Association)	EU
ECMAR (European Council for Maritime Applied R&D)	Belgium