

General Information	
Preliminary title of the European Partnership	Zero-emission waterborne transport
Short description of the partnership	The proposed partnership is expected to radically transform inland and maritime waterborne transport, develop knowledge, technologies and demonstrate solutions that will enable zero-emission shipping for all ship types and services ¹ . It will contribute to maintaining and further reinforcing Europe's global leadership in green shipping technologies. This will create a foundation for shipping to underpin a carbon neutral future with the demonstration of deployable zero-emission solutions suitable for all main ship types and services by 2030.
Services directly involved	DG RTD, DG MOVE, DG CLIMA, DG ENER, DG ENV, DG GROW, DG MARE
Context and problem definition	<p>Shipping is very different to other transport modes due to its huge scale, unique technologies and fuels, endurance, special operating environment and regulation. This sets it apart from other activities. Specific challenges:</p> <ul style="list-style-type: none"> ▪ Challenge to Decarbonise: In 2018, 134 million tons of CO₂ were emitted from ships visiting European ports, these represent around 13% of total EU transport emissions. Globally, shipping accounts for 2-3% of total GHG emissions, to put in perspective, if shipping was a country it would be the 6th biggest GHG emitter in the world. If no action is taken, these emissions are expected to increase by between 50% and 250% by 2050. ▪ Challenge to cut pollution: Ships, both inland and maritime have a negative impact on air quality, particularly in coastal regions. The proportion of air pollution from ships within the EU has increased as other sources have become cleaner. SO_x, NO_x, PM, water pollution and underwater noise are a public concern, which has been reflected in headlines². Effective and affordable technologies are needed to significantly reduce emissions (including retrofits for existing vessels), to meet regulatory requirements and targets, such as zero emissions. ▪ Fragmentation: The sector is fragmented because of its complex international structures, diverse regulatory frameworks (international, national, regional and European laws) and authorities (ports, rivers, waterways, national maritime and inland authorities). Instruments to achieve zero-emission shipping are also fragmented with a diverse mix of European³, international⁴, national⁵, regional⁶ and private⁷ actions. There are also a large number of actors, e.g. some 300 shipyards and 22.000 maritime equipment manufacturers, as well as ports and shipping companies in the EU. ▪ Europe is still a major global player: European-based shipping companies control around 40% of the global fleet. It moves 75% of EU external trade around one third of intra EU trade. European maritime technology suppliers are global leaders in high technology ships (marine and inland cruise ships,

¹ In line with, [IMO Strategy for GHG reduction, Paris Agreement](#) objectives and [“A Clean Planet for All” the EU's long-term decarbonisation Strategy](#).

² E.g. [“Just 15 of the worlds largest ships, produce more pollution \(SO_x\) than all the cars of the world”](#), [“NO_x from shipping set to exceed all EU land-based sources within a decade”](#).

³ E.g. CEF, LIFE, MFF, EIB, Horizon2020, FCH JU

⁴ E.g. IMO, IAEA, UNFCCC, IACS, ISO

⁵ E.g. National strategies for R&I in waterborne transport

⁶ E.g. ERDF, HELCOM, OSPAR, Barcelona Convention and other regional organisations

⁷ E.g. [Maersk, the world's largest container shipping company, has pledged to operate carbon neutral vessels from 2030](#)

	<p>electric ships, offshore support), green shipping technologies (battery electric, cleaner engines, exhaust treatment systems, green equipment and smart technology for improved efficiency). European companies supply almost half of global marine equipment. Strengthening EU expertise in zero-emission technologies will enable it to compete within new market, currently dominated by competitors from the Asian region.</p> <ul style="list-style-type: none"> ▪ Policy: In 2018, with EU support, global agreement was reached to cut total GHG emissions from international shipping by at least 50% by 2050 compared to 2008 levels, with a zero-emission ambition. Inland Waterway Transport has been called upon to enhance its environmental track record, both by the European Council and the European Parliament. Determined to contribute to zero-emission waterborne transport, the Waterborne Technology Platform recently adopted an ambitious strategic research agenda. ▪ Urgency: To meet the 2050 target radical change will be required, which will not be possible through operational changes and incremental improvements alone. New technologies need to be developed and deployed. Considering a typical 30-year life of a ship, the first radically changed vessels need to be deployed within 10 years, with technology developed during the period of Horizon Europe.
Objectives and expected impact	<p>Whilst there is a consensus concerning a need to decarbonise, a partnership is needed to mobilise a critical mass that is committed to the urgent development of the necessary knowledge, technology and ensure its deployment. The partnership is expected to enhance Europe's technological leadership over competitors in other geographical areas, who are seeking to enter the high technology shipping market and are stepping up their R&I investments. The specific objectives of the proposed partnership are to:</p> <ul style="list-style-type: none"> ▪ Within the timescale of Horizon Europe, develop technological solutions which will enable the decarbonisation of the main ship types responsible for the most GHG emissions, which could be first deployed by 2030. ▪ Increase the environmental performance in areas other than air pollution, so that inland and marine shipping has no adverse impact on the water environment, reducing or eliminating noise vibration and water pollution. ▪ Develop new technologies enabling the use of zero-carbon fuels, which are scalable and sustainable in the long term. • Exploit the full potential of smart technologies to increase energy efficiency, including digitalisation, connectivity, and big data – from the design phase, operations to the end-of-the-lifecycle. ▪ Deliver comprehensive risk assessments for the new technologies, facilitating inclusion in the relevant regulatory frameworks and as a result enable faster deployment. ▪ Enable technologies the environmental performance of existing vessels and also develop and deploy new technologies to achieve deep decarbonisation. ▪ Strengthening the competitiveness of European industries in the growing green ship technology market and provide the capability to enter new markets presently dominated by Europe's competitors. ▪ Leverage additional value by focussing efforts and coordinating investments within a single strategy and framework, which overcomes multiplication of efforts on different levels. KPIs should be established to monitor progress on the main objectives. <p>Reaching these objectives should have a positive impact on environment, human health, and on competitiveness of European industry.</p>
Necessity test: rationale for a European	<p>Horizon 2020 invests around 50 million euros per year, supporting small number of topics addressing all aspects of waterborne research, of which zero-emission shipping is a part.</p>

partnership	<p>The EU has pushed for ambitious decarbonisation targets - internationally within IMO and within its own decarbonisation Strategy. Also in her speech, the forthcoming Commission President, Mrs von der Leyen, called for a change from business as usual and specifically referred to the difficult challenge of decarbonising waterborne transport and aviation.</p> <p>Current support through collaborative research does not provide the visibility, necessary scale and synergies between R&I efforts within different fora to achieve the zero-emission goal.</p> <p>There is no single solution to achieve zero-emission shipping and the multiplicity of technologies (e.g. efficiency improvements, fully electric and hybrid propulsion, wind assistance, smart shipping technologies, zero-carbon fuels and their use, integration of fuel cell technology etc.) must be brought together and integrated within a single vessel, and for different applications. This is expected to be facilitated by a partnership, which will ensure a coherent program, and mobilise substantial efforts. Whereas previous initiatives have not principally focussed on waterborne transport and the integration of solutions, and scale of the challenge.</p> <p>The partnership would allow the waterborne sector to develop the necessary collaboration with other sectors and industries, to fully exploit disruptive innovation in particular, as well as the potential of all innovative solutions across the entire waterborne transport sector.</p> <p>The partnership is an important tool to mobilise the firm commitment of all stakeholders (public and private) necessary to meet for the magnitude and ambitious challenge at stake. It will bring together all relevant stakeholders, incl. industrial players, the research community, academia, and with the involvement of Member States (to ensure the necessary underpinning of policies, regulations and research activities). In doing so, the partnership would overcome duplication, improve efficiency of efforts and increase leverage from the EU's actions.</p>
Relevant for the following parts of Horizon Europe	<p>Pillar II 'Global Challenges and European Industrial Competitiveness'</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Cluster Digital, Industry and Space <input checked="" type="checkbox"/> Cluster Climate, Energy and Mobility
Currently identified links with other partnership candidates / Union programmes	<p>The development of zero-emission waterborne transport would ensure strong links with a number of other Partnerships and elements of Horizon Europe, in particular with:</p> <ul style="list-style-type: none"> - Cluster Climate, Energy and Mobility and proposed partnerships directly related to zero and low-emission ships (in particular Batteries and Clean Hydrogen); - Cluster Digital, Industry and Space, addressing important aspects concerning Key Enabling Technologies, technological and industrial capacities for industrial competitiveness, digitized, circular, low-carbon and low-emission economy; - Cluster Food and Natural Resources, addressing healthy seas and oceans as well as mission and partnership 'climate neutral, sustainable, productive blue economy', expected to address aspects like maritime spatial planning, changes in ocean physics and chemistry; - Cluster Health, by having impact on reducing the impacts of waterborne transport emissions on health; - Other research areas such as innovative materials, advanced manufacturing and circular economy. - Synergies should be ensured with – but not limited to – the Connecting Europe Facility, Invest EU and the EIB Green Shipping Guarantee.

Does the proposed partnership build on currently active ones	<p>The partnership does not build upon active partnerships. From the existing partnerships, Fuel Cells and Hydrogen Joint Undertaking (FCH JU), to a limited extent, addresses waterborne applications but it has not addressed broader integration of fuel cells within large scale shipping and has yet to develop the multi MW fuel cells needed for ship propulsion or more fuel flexible solutions, which may offer more feasible pathways towards faster large scale deployment.</p> <p>In addition, the waterborne sector still needs to explore the potential of other alternative fuels and propulsion systems that could actively contribute the necessary emissions reductions (incl. for instance electricity for certain market segments, etc.). The Waterborne Technology Platform has recently created synergies and signed a MoU with Hydrogen Europe. These synergies would be expected to be reinforced by the partnership.</p>
Expected type and composition of partners	<p>Partnership would comprise of relevant umbrella organisations (e.g. SEA Europe, Waterborne TP, Inland Navigation Europe, relevant industry like shipyards, ship owners, maritime equipment manufacturers, ports etc.) undertaking the R&I, the end users (e.g. shipowners, operators), standardisation bodies, responsible national authorities (maritime and inland), to ensure good mix of expertise and inclusion of all relevant sectors to achieve zero-emission waterborne transport.</p> <p>In line with the partnership criteria, an open membership policy will be applied aiming at covering the complete value chain. A frequent review of the technological roadmaps (biannually) shall ensure a dynamic ecosystem, support effectiveness and efficiency, and openness to relevant newcomers. Collaboration with other relevant partnerships (e.g. Batteries, Clean Hydrogen) will be sought.</p>
Contributions and commitment expected from partners	<p>The participants are expected to commit to contribute to the development, deployment and transfer of successful concepts into industrial products and services, with an impact on the R&D&I industrial spending of the involved sectors.</p> <p>The involvement of Member States and of the Commission in the partnership will contribute to guaranteeing that the R&I activities and investments are underpinned by the necessary regulatory and policy initiatives, ensuring the uptake of technologies and concepts developed.</p>
Currently envisaged implementation mode(s)	<p><input checked="" type="checkbox"/> Co-programmed European Partnership</p> <p><input type="checkbox"/> Co-funded European Partnership</p> <p><input type="checkbox"/> Institutionalised European Partnership</p> <p><input type="checkbox"/> Article 185</p> <p><input type="checkbox"/> Article 187</p> <p><input type="checkbox"/> EIT-KIC</p>
Justification of the Implementation Mode	<p>European R&I has supported notable flagship projects supporting clean low carbon shipping, yet the environment remains fragmented, with a range of disparate activities taking place at national, regional and commercial levels. A co-programmed form would allow to add coherence and focus engagement towards a European strategy to achieve zero emission shipping which will in turn induce a larger impact. A Co-programmed Partnership is the preferred option to achieve the largest impact considering the breadth of the partnership and the diverse characteristics of the waterborne sector, technologies and concepts to be developed and deployed. Co-funded model is not considered suitable as it fits partnerships with mainly public authorities.</p>
Proposed starting year	2021