



# STEERER

STRUCTURING TOWARDS ZERO EMISSION  
WATERBORNE TRANSPORT

## **D 3.2. Terms of Reference for the Green Shipping Expert Group**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.875285

<b>Work Package</b>	WP3: Green Shipping Expert Group / Stakeholder Consultation
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<b>Dissemination level</b>	Public
<b>Due date</b>	29/02/2020
<b>Delivery date</b>	31/03/2021
<b>Version</b>	Final version

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# Table of contents

<b>1. Introduction</b> .....	4
<b>1.1 The STEERER Project</b> .....	4
<b>1.2 Context and Rationale</b> .....	6
<b>1.3 Mandate</b> .....	9
<b>2. Objectives, tasks, deliverables and timetable</b> .....	10
<b>2.1 Objectives/tasks</b> .....	10
<b>2.2 Deliverables and timetable</b> .....	13
<b>3. Operation of the Green Shipping Expert Group</b> .....	14
<b>3.1 Number, identification and selection of experts</b> .....	14
<b>3.2 Working Method</b> .....	14
<b>3.3 Meetings</b> .....	15
<b>3.4 Duration</b> .....	15
<b>4. Annex 1 – Description of tasks</b> .....	16
<b>5. Annex 2 – Members of the Green Shipping Expert Group</b> .....	22

# 1. Introduction

## 1.1 The STEERER Project

STEERER (Structuring Towards Zero Emission Waterborne Transport) will coordinate the establishment and communication of a Strategic Research and Innovation Agenda<sup>1</sup> and an Implementation Plan **towards zero-emission waterborne transport, in cooperation with all key stakeholders needed to facilitate the transformation to clean waterborne transport.** In the definition of STEERER, as well as cutting greenhouse gas emissions, all harmful environmental emissions, water pollution and noise emissions have to be eliminated. STEERER's mission is to bring the various initiatives and sectors' stakeholders together to join forces for a combined effort with the maximum impact for the climate, people's health and Europe's economy.

STEERER is coordinated by the Waterborne Technology Platform (SEA EUROPE is responsible for its secretariat), counting with the participation of a total of seven partners from six EU countries.



Figure 1: STEERER's partners

<sup>1</sup> The STEERER project will provide input to the Waterborne TP regarding the development and update of the Strategic Research and Innovation Agenda of the Candidate Co-Programmed Partnership on Zero-Emission Waterborne Transport in the framework of Horizon Europe ([https://ec.europa.eu/info/sites/info/files/research\\_and\\_innovation/funding/documents/european\\_partnership\\_for\\_zero-emission\\_waterborne\\_transport.pdf](https://ec.europa.eu/info/sites/info/files/research_and_innovation/funding/documents/european_partnership_for_zero-emission_waterborne_transport.pdf)).

In sum, STEERER aims to:

- Jointly set emission targets towards 2050 (including targets for 2025 and 2030);
- Contributing to the update of the Strategic Research and Innovation Agenda of the Co-Programmed Partnership on Zero-Emission Waterborne Transport (cPP ZEWT)<sup>2</sup> in the framework of Horizon Europe, to be able to reach these targets in time;
- Develop an Implementation Plan to reach the targets in due course while staying competitive and offering a valid business case;
- Developing and implementing a communication campaign, aimed at broader awareness of the waterborne transport sector and its commitment towards zero-emission transport, to become a fully sustainable mode of transport;
- Monitoring and assessing the implementation of the Strategy defined and adapting where necessary, after the project's conclusion, by the Green Shipping Expert Group.

The consortium will function as a Secretariat, where the broader expertise is involved in the Scientific Committee (SC) and the **Green Shipping Expert Group (GSEG)** to be established by the project.

STEERER is funded by the European Commission research and innovation programme Horizon 2020, with an investment of 1,5 million euro over the course of 36 months, starting in December 2019. STEERER will play an important role in the preparation and execution of the candidate co-programmed Partnership on Zero-Emission Waterborne Transport to be established in the context of the new programme for Research and Innovation currently under negotiation: Horizon Europe.

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<sup>2</sup> [https://www.waterborne.eu/images/documents/201021\\_SRIA\\_Zero\\_Emission\\_Waterborne\\_Transport\\_spread.pdf](https://www.waterborne.eu/images/documents/201021_SRIA_Zero_Emission_Waterborne_Transport_spread.pdf)

## 1.2 Context and Rationale

Amid growing global and European societal pressure to resolve issues related to **climate change**, **air pollution** and the **degradation of the world's oceans**, political and regulatory attention has been increasingly directed towards waterborne transport, due to this mode of transport's high environmental and climate impact<sup>3</sup>. A **number** of major developments are illustrative in this respect:

- **"The European Green Deal"** (December 2019<sup>4</sup>), to ensure that Europe will be the first climate-neutral continent, thereby making Europe a prosperous, modern, competitive and climate-neutral economy, as envisaged in the Commission Communication **"A Clean Planet for All: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy"** (November 2018<sup>5</sup>);
- The **Paris Agreement Objectives** (COP21<sup>6</sup>) and the scientific findings from the **Intergovernmental Panel on Climate Change (IPCC)**<sup>7</sup>, which emphasises the need to limit global warming to 1,5°C above pre-industrial levels, and related global GHG emission pathways, in line with the Paris Agreement;
- The International Maritime Organisation's **(IMO) Initial IMO Strategy on the reduction of GHG emissions** from ships (April 2018<sup>8</sup>);
- The **EU and global sulphur cap**<sup>9</sup> as of 1 January 2020;
- The Central Commission for Navigation of the Rhine's **(CCNR) Ministerial Mannheim declaration**<sup>10</sup> (October 2018);
- The calls from the **European Council**<sup>11</sup> and **European Parliament**<sup>12</sup> to enhance the environmental track record of inland waterway transport;
- The calls from the **European Parliament**<sup>13</sup> to reduce global emissions from shipping and its resolution **declaring a climate and environmental emergency**<sup>14</sup> in Europe and globally;

<sup>3</sup> [https://en.wikipedia.org/wiki/Environmental\\_impact\\_of\\_shipping](https://en.wikipedia.org/wiki/Environmental_impact_of_shipping)

<sup>4</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_19\\_6691](https://ec.europa.eu/commission/presscorner/detail/en/ip_19_6691)

<sup>5</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0773&from=EN>

<sup>6</sup> <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

<sup>7</sup> <https://www.ipcc.ch/sr15/>

<sup>8</sup> <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/06GHGinitialstrategy.aspx>

<sup>9</sup> [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_19\\_6837](https://ec.europa.eu/commission/presscorner/detail/en/IP_19_6837)

<sup>10</sup> [https://www.ccr-zkr.org/files/documents/dmannheim/Mannheimer\\_Erklaerung\\_en.pdf](https://www.ccr-zkr.org/files/documents/dmannheim/Mannheimer_Erklaerung_en.pdf)

<sup>11</sup> <http://data.consilium.europa.eu/doc/document/ST-13745-2018-INIT/en/pdf>

<sup>12</sup> [http://www.europarl.europa.eu/doceo/document/B-8-2019-0079\\_EN.html?redirect](http://www.europarl.europa.eu/doceo/document/B-8-2019-0079_EN.html?redirect)

<sup>13</sup> <https://www.europarl.europa.eu/news/en/press-room/20191121IPR67110/the-european-parliament-declares-climate-emergency>

<sup>14</sup> [https://www.europarl.europa.eu/doceo/document/TA-9-2019-0078\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-9-2019-0078_EN.html)

- The **Sustainable Development Goals** (SDG) of the United Nations Development Programme (UNDP), in particular SDG 9 (Industry, Innovation and Infrastructure)<sup>15</sup>, SDG 13 (Climate Action)<sup>16</sup> and SDG 14 (Life Below Water)<sup>17</sup>.

The tell-tale signs and impacts of climate change – such as the rise in sea level, ice loss and extreme weather – increased during 2015-2019, which is set to be the warmest five-year period on record according to the World Meteorological Organization (WMO)<sup>18</sup>. There is an urgent need to accelerate action. Achieving a net zero-emission waterborne transport sector by 2050 at the latest, and at least 50% reduction of absolute emissions by 2030, entails a race against the clock, since the average age of a modern maritime vessel is **21** years<sup>19</sup>, although this is not uniform across vessel types. Therefore, the transition towards **zero-emission waterborne transport** will need to address **existing, as well as new-build** ships. In addition, it will not only require research and development regarding (the use of) alternative fuels, but will also have to take into account all means to radically improve the ship's energy efficiency and related emission efficiency (both retrofitting and new build). As well as making **seagoing ships** and **inland vessels** zero-emission, the transition towards zero-emission waterborne transport will also require changes to infrastructure, ship design, shipbuilding processes, maritime equipment production, ports, alternative fuel terminals and processing plants, the wider logistics chain and more energy-efficient operations. Measures will also need to be taken in different action areas such as **digitalisation** (e.g. to allow better energy monitoring and to increase energy efficiency) and the **education and training** of the current and future workforce in order to ensure that the implementation of new technologies and concepts is properly executed. To put this ambition and commitment into practice **whilst taking into account the timelines** set out in various regulations, there is a need to start the transition process now.

With regards to pollution (both to air and to water), the need to address these environmental problems is laid down in European and international regulations (adopted by the IMO for maritime transport) and/or in national, regional or local legislation. For inland navigation, the rules are set out by the European Union and, where applicable, are transposed into national legislation. The ambitions and targets for the EU are clear for climate change - with the global ambitions for

<sup>15</sup> <https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>

<sup>16</sup> <https://www.un.org/sustainabledevelopment/climate-change/>

<sup>17</sup> <https://www.un.org/sustainabledevelopment/oceans/>

<sup>18</sup> <https://public.wmo.int/en/media/press-release/global-climate-2015-2019-climate-change-accelerates>

<sup>19</sup> [https://unctad.org/en/PublicationsLibrary/rmt2019\\_en.pdf](https://unctad.org/en/PublicationsLibrary/rmt2019_en.pdf)

international shipping to be reviewed upwards in 2023 - and efforts are now focussed on how to achieve these objectives.

Besides the development of new technologies and concepts, there is a need for the development of coherent international and European regulatory frameworks, which will underpin climate change objectives, **ensure and facilitate the timely transition** to climate-neutral sustainable alternative fuels, technologies and concepts and, at the same time, ensure consistency between guidelines of different regulatory bodies or Member States. The regulatory framework should therefore support the modal shift as envisaged in the European Green Deal. Finally, the deployment of solutions should be stimulated by means of incentives.

However, to fulfil the ambitions of the waterborne transport sector, it is obvious that much **more research, development, innovation (RD&I) and investments** will be necessary in the coming years to address and respond effectively to the current and future **climate and environmental challenges**, while taking into account a **safe implementation** of technologies and concepts. At the same time, the emphasis on a **viable and evolving business case** is essential for the uptake of innovations.

STEERER will be contributing to the development and updating of the Strategic Research and Innovation Agenda of the cPP ZEWT to be able to reach the aforementioned target in time as well as developing an Implementation Plan to reach the targets in due course while staying competitive and offering a valid business case. It is thereby essential, that STEERER is in direct contact with, and provides input to, relevant related initiatives, and in particular collaborates with and supports the Co-Programmed Partnership on Zero-Emission Waterborne Transport in the framework of Horizon Europe.

### 1.3 Mandate

The **Green Shipping Expert Group (GSEG)** consists of experts nominated by carefully selected stakeholders, as well as representatives of the European Commission Services. The GSEG will be beneficial in exchanging opinions, experiences, best practices and other relevant issues between the different segments of waterborne transport. The work in the GSEG will contribute to the exchange of information, allow identifying possible synergies, creating the economies of scale (when involving more segments) and as well common motivation towards a “long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050”.

The GSEG will agree upon the input to the Waterborne TP regarding the development and update of the Strategic Research and Innovation Agenda of the cPP ZEWT and its implementation plan. The Group will be established as part of the STEERER project, and at the final meeting, the continuation of the Group after the lifetime of STEERER will be ensured by an update of the Terms of Reference.

## 2. Objectives, tasks, deliverables and timetable

### 2.1 Objectives/tasks

The main objective of the GSEG is to agree upon the input to the Waterborne TP regarding the development and update of the Strategic Research and Innovation Agenda of the cPP ZEWT and its implementation plan. In order to be able to reach this objective, a number of key items will have to be discussed and agreed upon by the members of the GSEG:

- To agree upon the emission targets in 2025, 2030 and 2050;
- To prioritise research and innovation needs per segment of the waterborne transport sector;
- To identify possible elements of the implementation plan;
- To agree upon the input for the update of the SRIA cPP ZEWT.

To be able to reach these objectives, the following documents will be prepared by the STEERER Consortium and the Scientific Committee which will be discussed during meetings of the GSEG:

**2.1.1 Analysing the state-of-play** which will clearly describe the current situation by consolidating and presenting the existing findings of relevant projects and best practices, initiatives, existing decarbonisation strategies and visions for the (waterborne) transport sector;

**2.1.2 Aligned with the Objectives of the ZEWT partnership, developing scenarios towards zero-emission waterborne transport with quantified targets for 2025, 2030 and 2050.** To help to identify the scenarios the main underlying causes (drivers) leading towards zero-emission waterborne transport will be defined:

- Work will be undertaken on the basis of the broad range of pre-existing studies, publications and scientific papers which will be fully referenced.
- Creating a baseline scenario: A baseline scenario “no policy change” will serve as the basis against which the impacts of other scenarios will be measured and compared;
- Compilation and screening of scenarios to be assessed: the scenarios will be closely linked to the drivers and the identified specific objectives needed to achieve the overall objective, zero-emission waterborne transport;
- Definition of targets for various scenarios: quantification of targets for 2025, 2030 and 2050, concerning GHGs, PMs, SO<sub>x</sub>, NO<sub>x</sub>, energy efficiency and defining potential decarbonisation pathways towards the elimination of harmful air pollution and GHG emissions.
- Identification of the knowledge gaps linked to achievement of the proposed scenarios.

### 2.1.3 Defining areas of intervention and relevant actions to achieve the targets, incl. prioritisation of actions

To achieve the goal of emission free waterborne transport the detailed catalogue of actions will be developed for (at least) the intervention areas shown in figure 1.

- a. Use of Sustainable Alternative Fuels;
- b. Electrification;
- c. Energy-Efficiency;
- d. Design and Retrofitting;
- e. Digital Green;
- f. Ports.

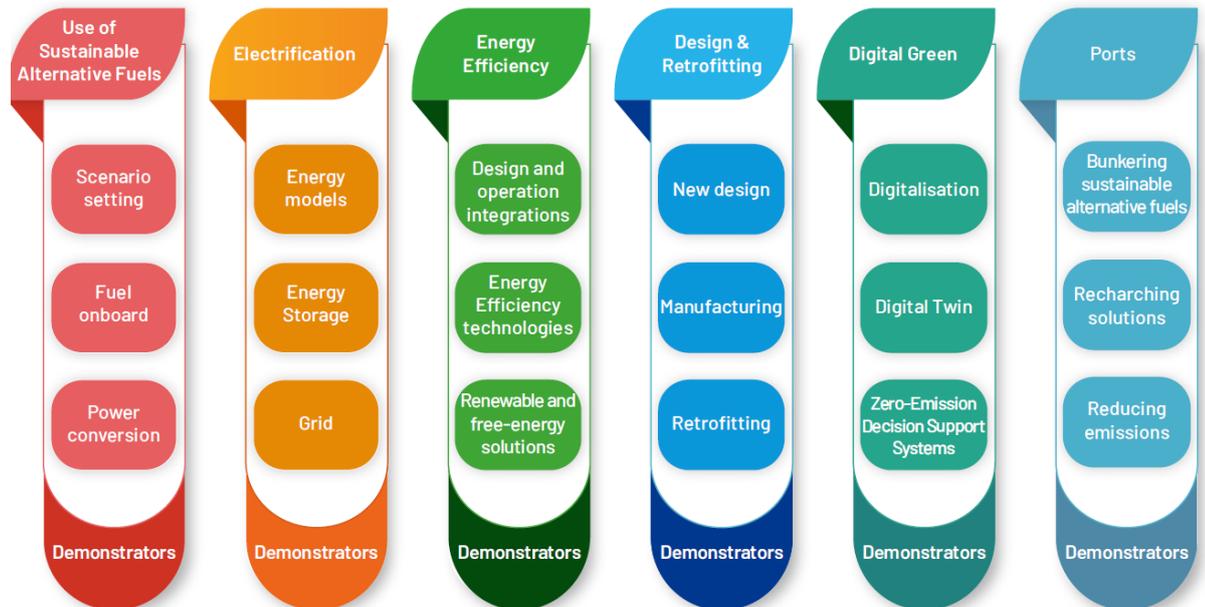


Figure 1: Areas of intervention

STEERER will map existing initiatives and research executed and ongoing in other projects in the waterborne transport sector. STEERER will consolidate and summarise results and initiatives and will develop conclusions.

### 2.1.4 Executing a SWOT Analysis

The execution of a SWOT analysis will provide key insights into strengths, weaknesses and opportunities and threats of the longlist of actions developed. Based on the overview of the different SWOT results, the commonalities will be identified and aggregated SWOT overviews will be prepared. The SWOT will address the most important priorities defined in the previous task.

- 2.1.5 **Elaborating public policy instruments and interventions and other appropriate mechanisms, incentives and business models to increase the take-up and deployment from R&I activities.** The outcomes of the SWOT analysis (in particular the identified gaps) will be the basis for the elaboration of a range of regulatory and non-regulatory instruments or combinations of instruments that may be used to reach the objectives of the intervention.
- 2.1.6 **Drafting input to the strategic RD&I Agenda of the cPP ZEWT including its revisions and developing an Implementation Plan, based on the outcomes of the previous tasks.** The implementation plan will list the various actions which are needed to implement the SRIA of the cPP ZEWT and will identify the main implementation challenges and the key stakeholders taking ownership to carry out the action (emerging from the work done in previous activities) including for example: (i) technical challenges, (ii) economic challenges entailing costs that need careful planning (risk of insufficient financial and human resources), (iii) legal challenges and requirements, (iv) timing challenges, etc. Suitable approaches and solutions will be presented to overcome the challenges and to cope with risks.
- 2.1.7 **Developing monitoring and evaluation arrangements.** STEERER will deliver a proposal on how the monitoring and evaluation of the implementation of the Strategic Research and Innovation Agenda (“STEERER Agenda”) and the Implementation Plan will be done.

A more extended description of the content of the aforementioned tasks is available in Annex 1.

## 2.2 Deliverables and timetable

The seven tasks described in paragraph 2.1. are linked to the six main deliverables of the STEERER project. The timetable of these deliverables is included in the Grant Agreement of the STEERER project.

Deliverable	Expected Month of Finalisation
D2.1 State of play of decarbonisation of waterborne transport - “technology application atlas”	February 2021
D2.5 STEERER Advice to 1 <sup>st</sup> ZEWT Research agenda revision and its Implementation plan	August 2021
D2.2 Scenarios with quantified targets for 2025, 2030 and 2050 - “Common stakeholder target scenarios”	November 2021
D2.3 Areas of intervention and related actions - “implementation plan”	January 2022
D2.4 Public policy instruments and interventions and other appropriate mechanisms, incentives and business models to increase the take-up and deployment from R&I activities	April 2022
D2.7 STEERER Advice to 2 <sup>nd</sup> ZEWT Research agenda revision and its Implementation plan	August 2022
D.2.6 Monitoring and evaluation arrangements of the ZEWT Agenda and its Implementation Plan, feed back to ZEWT	September 2022

## 3. Operation of the Green Shipping Expert Group

### 3.1 Number, identification and selection of experts

The GSEG will play a vital role in endorsing all deliverables (paragraph 2.2.) of the STEERER project, thus ensuring the wide-acceptance of the Advice to the 1<sup>st</sup> and 2<sup>nd</sup> ZEW Research agenda revision and its Implementation plan. The GSEG will be involved by means of a process of workshops developing support and commitment during the project's duration (December 2019 – November 2022). It is envisaged, that the GSEG will remain active after the end of the STEERER project.

The GSEG is the key consultation body created by STEERER. The group will be at the core of the stakeholders' consultation process and will remain as a legacy of the project after its end. The Group will participate eventually in face to face events, discussing the consolidated output prepared by the project partners (participants) and the members of the Scientific Committee. In addition its members will be asked to provide input to online consultations.

The GSEG will be composed of delegates representing a well-balanced mix of different interests: shipowners (both maritime and inland navigation), ports, refineries, classification societies, shipyards, non-governmental (see Annex 2). The members of the GSEG have been selected, following their expression of interest to join the GSEG and/or the SC of the STEERER project. In addition, representatives of the relevant European Commission will be invited to the meetings of the GSEG. The STEERER Consortium may invite experts with specific expertise with respect to a subject matter on the agenda to take part in the work of the GSEG on an ad hoc basis.

An interconnected effort between the STEERER Consortium, the Scientific Committee and the Green Shipping Expert Group will lead to the Advice to the 1<sup>st</sup> and 2<sup>nd</sup> ZEW Research agenda revision and its Implementation plan.

### 3.2 Working Method

The GSEG shall be chaired by the coordinator of the STEERER project, and co-chaired by a representative of DG RTD of the European Commission. The Chair and Vice-Chair of the GSEG decide on its working methods, with a view to ensure an in-depth analysis of the selected topics and maximise to contribution of the SC and GSEG members.

The Chair shall prepare the final report of the GSEG, based on written contributions of the participants and of relevant material and events identified by the GSEG and STEERER members. The Chair will select and organise contributions presented by experts, create presentations and draft summaries of the discussions held at meetings.

The members of the GSEG shall adopt opinions, recommendations or reports by consensus. In the event of a vote, the outcome of the vote shall be decided by a simple majority of the

members. The members that voted against or abstained shall have the right to have a document summarising the reasons for their position annexed to the opinions, recommendations or reports.

### 3.3 Meetings

The meetings of GSEG shall be held, in principle, in Brussels. Where appropriate, meetings may also be organised by audio conference, video conference or other means of communication. The GSEG shall meet at least four times during the duration of the STEERER project.

The Chair and Vice-Chair of the SC will be in regular contact with the members to ensure progress and smooth running of the GSEG. Ad-hoc external experts and observers may be invited to attend the meetings to provide appropriate information and orientations.

Participants in the activities of the GSEG shall not be remunerated for the services they offer. Travel and subsistence expenses incurred by participants in the activities of the GSEG may be reimbursed by the STEERER project.

### 3.4 Duration

The GSEG is due to start following the evaluation of the expressions of interest to join the GSEG and shall continue until the project ends. However, it is intended that the GSEG will stay active following the conclusion of the project.

## 4. Annex 1 – Description of tasks

The current description below is an excerpt of the Grant Agreement of STEERER, and might change, taking into account recent developments. These changes will be agreed upon with the European Commission – DG RTD, and will be communicated with the members of the GSEG.

A principal objective of STEERER will be to support the effective and continued implementation of the ZEWTP CPP and coherence will be ensured with the activities of STEERER and objectives of the ZEWTP partnership.

### WP2 - Strategic Research and Innovation Agenda and Implementation Plan

#### *Task 2.1 State-of-Play (the status quo)*

Waterborne transport must become a clean and greener, as well as a safer and more secure, mode of transport. To that end, all harmful environmental emissions, water pollution and noise emissions have to be eliminated and zero-accidents and zero loss of life achieved. Furthermore, the realisation of the full potential of digitalisation will enhance data flows and lead to a higher degree of automation and autonomy. These developments will improve ship management and operations, safety and the energy-efficiency of waterborne transport, and will also lead to an increase in logistics and mobility flows .

In line with the call text, the focus of the project, thus the main area of interventions will address clean, green and energy-efficient waterborne transport. Aspects of the safe and secure and connected and automated waterborne transport will be addressed to the extent they have an implication on the transformation of waterborne transport towards cleaner, greener and more energy-efficient transport mode.

Task 2.1 State-of-Play (the status quo) will clearly describe the current situation by consolidating and presenting the existing findings of relevant projects and best practices, initiatives, existing decarbonisation strategies and visions for the (waterborne) transport sector. Statistical analysis, available from STEERER consortium members directly involved as well as external stakeholders & associations, scientific papers, public reports, national and other strategic plans will be used in assessment of scenarios. Statistical data will include for example tonnage, fuel consumption, kilometres travelled, operational data, age of fleet, standard refurbishment cycles and others. Focus will be, among others, on consolidation of existing findings and assessments (e.g. cost effectiveness, in case of alternative fuels considering a well-to-propeller viewpoint, etc.) of currently known technological and operational measures, barriers and opportunities, levels of uncertainty, recommendations on most sustainable pathways and knowledge gaps.

The state-of-play will briefly recall any relevant policy objectives of the European Union or International Maritime Organisation (IMO) or authorities responsible for inland waterway transport, as well as policy measures promoting implementation of zero-emission solutions. Additional global trend developments like population development, trade and transport developments, economic growth forecasts, potential of renewable energy production in a

sustainable manner, etc. will be consolidated to define the scenarios in the next step. The global development trends expected in regulatory frameworks (EC, IMO etc) will be considered such as further deployment of the emission control areas or the regional trends and specifics as regards the availability of renewable fuels (energy carriers).

#### *Task 2.2 Scenarios with quantified targets for 2025, 2030 and 2050*

The deployment of innovation in waterborne shipping services will be a dynamic process and will not affect the entire industry at the same time. To help to identify the scenarios the main underlying causes (drivers) leading towards zero-emission waterborne transport will be defined. Examples of such drivers are global, EU and national policies and regulatory frameworks, including standardisation; economic growth and related increase of transportation; nonregulatory alternatives like pressure of the stakeholders and in particular consumers towards greening of transportation; or other market triggered drivers like availability of alternative fuels infrastructure, (limits in sustainable) production and regional availability of the renewable alternative energy. Besides applicability of different zero-emission technologies depending on type of ship, sailing profile and area of operation, global level playing field and competitiveness aspects will be major criterion to conclude on feasible targets for the different market segments.

##### Task 2.2.1 Creating a baseline scenario

A baseline scenario “no policy change” will serve as the basis against which the impacts of other scenarios will be measured and compared. This scenario includes all relevant policies and measures which are assumed to continue in force. In addition, the initiatives that are proposed and clear but still not deployed, e.g. proposal for certain legislation still not adopted, will be included into the baseline. The baseline will include expected socio-economic developments (ageing, GDP growth, etc.) as well as important technological/societal developments. The baseline scenario will be quantified in terms of the projection of emissions from waterborne transport expected for the set time horizons 2025, 2030 and 2050, same time horizons as for the targets (e.g. carbon emissions are projected to increase XX% to XXXX million tonnes by 2035 to the 201X level).

##### Task 2.2.2 Compilation and screening of scenarios to be assessed

The scenarios will be closely linked to the drivers and the identified specific objectives needed to achieve the overall objective, zero-emission waterborne transport. The viability of scenarios and options will be judged based on, technical feasibility, coherence with the global, EU and national policies, effectiveness and efficiency, scalability, impact, supply implications, with consideration of legal implications. It will take into account the current market structure and level of international competition in certain markets (e.g. global deep-sea transport versus local operating ferries in cities) and the potential evolution of these markets.

### Task 2.2.3 Definition of targets for various scenarios

Quantification of targets for 2025, 2030 and 2050, including GHG, PMs, SO<sub>x</sub>, NO<sub>x</sub>, transport efficiency and defining potential decarbonisation pathways, resulting in reduction of GHG, air pollutant emissions and energy consumption will be done. Due to specifics of different segments of waterborne transport leading most probably to different deployment pathways, the targets for defined time horizons will be defined considering different segments of waterborne transport, e.g. Rhine and Danube

ships, deep-sea and short sea shipping, workboats, offshore ships, local ferries, canal boats, cruise ships, and other ship types.

The market segmentation, scenarios and targets will be discussed and agreed with the Green Shipping Expert Group.

### *Task 2.3 Areas of intervention and relevant actions to achieve the targets, incl. prioritisation of actions*

To achieve the goal of emission free waterborne transport the detailed catalogue of actions will be developed for (at least) following specific intervention areas as defined within the ZEWT partnership:

- (i) Use of Sustainable Alternative Fuels;
- (ii) Electrification;
- (iii) Energy-Efficiency;
- (iv) Design and Retrofitting;
- (v) Digital Green;
- (vi) Ports

The relevant actions to be undertaken by various stakeholders addressing intervention areas will be defined. Their clear definition will facilitate the assessment (and quantification) of impacts and will provide insights on the key elements for (political, commercial) choice (e.g. level of benefits and costs, distributional impacts, impact on SMEs, citizens, EU competitiveness, global level playing field, sustainability, etc.).

It is very unlikely that targets defined for the time horizons 2025, 2030 and 2050 will be solved by a single technology. Number of various factors such as the overall efficiency of the ship, the cost of different alternatives / approaches, the design for operational profiles, the comparison between new build and retrofit systems as well as the compliance with future global, European and national/regional regulations need to be taken into account when deciding about the different measures. Global level playing field, thus a genuine regulatory framework, is required to create a level playing field for businesses seeking to cut their emissions and move towards a zero-emission future.

Significant results on a longer time perspective can be achieved through progressive fuel switch towards those with a better emission's footprint. Therefore, STEERER will also look into the possible transition pathways, for example through use of the drop-in fuels or modular drivetrain approaches in order to gradually decrease emissions from transport. Studies, projects and (emerging) technologies addressing the availability and maturity of green fuels and energy carriers will be taken into account.

STEERER will map existing initiatives and research executed and ongoing in other projects in the waterborne transport sector. STEERER will consolidate and summarise results and initiatives and will develop conclusions. The discussion with experts and stakeholders in thematic and structured workshops will be one of the methods (besides the desk research) to carry out the consolidation and assessment and to draft conclusions. Besides the STEERER consortium, we will mobilise members of the Scientific Committee and the Green Shipping Expert Group to share results and to draft conclusions. Moreover, STEERER will reflect and integrate any synergies with all relevant programmes and actions at national, European and international level. If it turns out that detailed information is not available in the network, it will be identified and addressed as uncertainty to be taken into account (e.g. as gap in the SWOT assessment in Task 2.4 and Task 2.6 R&I Agenda).

Based on the consolidation, assessment and drafted conclusions and considering the outcomes of scenarios, prioritisation of actions will be done. The areas of interventions and related prioritised actions will be discussed and agreed with the Green Shipping Expert Group.

#### *Task 2.4 SWOT Analysis*

The execution of a SWOT analysis will provide key insights into strengths, weaknesses and opportunities and threats of the longlist of actions developed in Task 3.3. It will provide a clear insight in the internal and external factors that can have an impact on the different actions contributing to zero-emission pathways for the waterborne transport sector. Consistent with the scenarios and intervention areas, they will be differentiated to the segments of the waterborne transport sector. The SWOT analyses will therefore consist of detailed assessment, in which a range of SWOT overviews will be elaborated for the different submarkets and different actions as identified in the intervention areas (Task 3.3), while taking into account the different scenarios and their drivers (Task 2.2). Based on the overview of the different SWOT results, the commonalities will be identified and aggregated SWOT overviews will be prepared. The SWOT will address the most important priorities defined in the previous task. As much as possible the SWOT overviews will provide quantitative facts and assessments. A SWOT analysis methodology however has the limitation that, to a large extent, it will be of a qualitative nature. In order to ensure the overall support and approval, there is strong role for the Scientific Committee and the Green Shipping Expert Group to provide input and feedback. Here it is foreseen to target specific subgroups within the Green Shipping Expert group in order to have the proper coverage of input from stakeholders and experts for the different segments. Where needed additional interviews and consultations with members of the broader stakeholder group will be done. This will ensure

that results will have wide support providing a stable base for follow-up work to draw conclusions on policy instruments, research recommendations and interventions.

*Task 2.5 Public policy instruments and interventions and other appropriate mechanisms, incentives and business models to increase the take-up and deployment from R&I activities*

The outcomes of the SWOT analysis (in particular the identified gaps) will be the basis for the elaboration of a range of regulatory and non-regulatory instruments or combinations of instruments that may be used to reach the objectives of the intervention. In case of the public policy interventions recommended, these will be supported by arguments and evidence considering aspects like market failure, failing of regulations, biased behaviours or achieving social objectives. STEERER will carry out assessment of business models for identified most important priorities with the highest impact to facilitate the uptake of innovation in the waterborne sector in an economically viable way, thus ensuring competitiveness of the European waterborne transport sector. Further to this STEERER will, where appropriate, identify opportunities for innovative business models for investments in greening the fleet (e.g. pay-per-use), paving the way for CEF/EIB or other funding/financing sources applications.

The consolidated policy instruments, business models and incentives will be discussed and validated with the Green Shipping Expert Group.

*Task 2.6 Strategic R&I Agenda and Implementation Plan*

STEERER will support the regular revisions and update of the ZEWT partnership SRIA and its implementation plan. Based on the tasks previously described STEERER will draft contributions to the annual revision of the ZEWT SRIA, including detailed planning based on a rolling period of two years. In the same way, in coordination with the ZEWT partnership the implementation plan will list the various actions which are needed to implement the ZEWT SRIA and will identify the main implementation challenges and the key stakeholders taking ownership to carry out the action (emerging from the work done in previous activities) including for example: (i) technical challenges, (ii) economic challenges entailing costs that need careful planning (risk of insufficient financial and human resources), (iii) legal challenges and requirements, (iv) timing challenges, etc. Suitable approaches and solutions will be presented to overcome the challenges and to cope with risks.

Each year, as a deliverable, STEERER will provide proposals for the revision of the ZEWT SRIA and its implementation, for the following two years, for example in 2021 for 22-23, in 2022 for 23-24, etc

Strategic elements and actions of the Strategic Research and Innovation Agenda of the cPP ZEWT form the foundation for the Implementation Plan. The Implementation Plan will not only address the follow-up research and development actions (for example in Horizon Europe) but will also address required actions in the field of regulatory measures and financial solutions to ensure a business case and level playing field. The combination of (1) Strategic Research and

Innovation Agenda and (2) Implementation Plan is the result of the fact that there is a close link between both elements and a number of limitations at the same time.

STEERER will support the wider presentation and discussion of the ZEWT SRIA and Implementation Plan and the contributions from STEERER towards the revision of these plans, including towards the Green Shipping Expert Group.

#### *Task 2.7 Monitoring and evaluation arrangements*

STEERER will support the activities towards the monitoring of the ZEWT partnership. Monitoring is necessary to allow the stakeholders, the sector and policy makers, to check if implementation of actions is 'on track' and to generate factual information about implementation that can be used to evaluate whether it is achieving its objectives. Monitoring, as a continuous and systematic collection and processing of data about an intervention shall help identify actual implementation problems and set the mitigation measures.

The STEERER project will review the effectiveness of the monitoring and evaluation of the implementation of the Strategic Research and Innovation Agenda of the cPP ZEWT, its Implementation Plan, KPI's and evaluate their functioning, making recommendations towards the operation of the ZEWTcPP. In this respect it will assist the ZEWT cPP Secretariat in the assessment of the evolving project portfolio and implication for the partnerships strategic planning.

The long-term planning (2025, 2030 and 2050), presence of multiple actors involved in the waterborne transport sector as well as different pathways to deal with climate change (and zero-emission waterborne transport) or societal transformation pose important challenges to monitoring and evaluation. It is expected that the main role will be played by the Green Shipping Expert Group. For this purpose, beside the adaptive monitoring and evaluation arrangements, the updated and by the Green Shipping Expert Group endorsed Terms of Reference will be delivered as part of the WP4.

## 5. Annex 2 – Members of the Green Shipping Expert Group

The GSEG consists of the following members:

1	Diane Gilpin	Smart Green Shipping
2	Poul Woodall	DFDS
3	Sebastiaan Bleuanus	Wärtsilä
4	Daniel Leuckx	Fuels Europe
5	Hege Okland	NCE Maritime Cleantech
6	Turi Fiorito	European Federation of Inland Ports
7	Blandine Vicard	Bureau Veritas Marine & Offshore
8	Benjamin Boyer	Central Commission for the Navigation of the Rhine
9	Hans Anton Tvete	DNV GL
10	Gunther Jägers	Chemgas Shipping B.V.
11	Erik van der Blom	Royal IHC
12	Wolfram Guntermann	Hapag-Lloyd
13	Manfred Seitz	Danube Commission
14	Sandro Vidas	Croatian Shipowners' Association
15	Bernard Dabezies	VP Innovation
16	Asa Burman	Lighthouse
17	Ketil Olaf Paulsen	Kongsberg Maritime
18	Selma Ergin	Istanbul Technical University
19	Dirk Degroote	European Tugowners Association / Cognauship
20	Gregorz Pawelec	Hydrogen Europe
21	Philippe Sergent	CEREMA
22	Ioannis Andreopoulos	Union of Greek Shipowners
23	Lennart Swoboda	Bernard Schulte
24	Wassim Daoud	Ponant
25	Alessandro Iafrazi	National Research Council ?? INM ?? Institute of Marine engineering ?
26	Gavin Allwright	International Windship Association
27	Joghum Bruinsma	Nedstack Fuel Cell Technology
28	Karin de Schepper	Inland Navigation Europe
29	M. Hossein Ghaemi	Gdansk University of Technology
30	Juan Manuel Fernandez Suarez	Porteco
31	Martin Dorsman	European Community Shipowners' Association
32	Antidia Citores	Surfrider Foundation Europe

33	Isabelle Ryckbost	European Sea Ports Organisation
34	Philip Easthill	European Boating Industry
35	Santiago Suarez de la Fuente	University College London
36	Guillaume le Grand	SAS Transoceanic Wind Transport
37	Saimon Conti	CNT Technologies
38	Sander den Heijer	Netherlands Maritime Technology
39	Romain Gibon	Airseas
40	Elio Ruggeri	Gas Infrastructure Europe
41	Faig Abbasov	Transport & Environment