

SEVENTH FRAMEWORK PROGRAMME THEME 7: Transport (including Aeronautics)

Structure and first guidelines for Market, Societal, Regulatory trends



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Description of the Task:
<u>Task 5.1 Foresight and Innovation Frames</u>
<p>Framing the Foresight strands - The main trends influencing the world development will be considered by the partners in a first common activity, as the starting point for each of the Tasks 5.2, 3, 4.</p> <p>Foresight methodologies are the most diverse. Although the final decision on the methodology has to be established by the partners in this WP, it can be anticipated that because of the structure of the industry, the fact that the partners are used to work in close relation, ... the preference is likely to be on qualitative methodologies based on evidence and creativity which might end up in a mixed approach by using scenario,</p>

experts, face to face and future workshops methodologies.

Aspects like the demographic change, the growing economies and the world area shifts in economic power and influence, the globalization, markets integration and interdependent global economies, the information explosion and new IT technologies, the energy demand in an environmentally friendly and sustainable manner, the over-exploitation of the resources, the climate change, new technologies like robotics and nanotech, will be all taken into consideration.

Several studies on the issue are already available and will be the basis for the common elaboration of the global trends and of the structuring of the areas of this study: market, societal, regulatory trends. Possible future developing scenarios will be considered as well for the perception of the influence in the three areas, considering as well the needs for education, training and professional skills to adapt to a changing scenario.

The deliverable D.5.1 “Structure and first guidelines for Market, Societal, regulatory trends” will be issued under the responsibility of GL, with the contribution of all the WP partners.



Executive Summary

Work package 5 of MESA will eventually deliver a foresight report which will be based on three distinct contributions: market, societal and regulatory trend reports. To facilitate uniform contributions, the present report outlines the relevant studies and methodologies to be used. Available studies for use within the following tasks are briefly evaluated and the most relevant studies are suggested for future use. Following a review of available foresight methodologies, the Delphi-method is suggested to be used by the working groups to assess the impacts of reported trends on the maritime industry.

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1. Introduction

Background

The MESA foresight activity will provide market, societal and regulatory trends, with the aim to compare these with present and expected technology developments and, thus, being able to derive R&D needs to close identified gaps. In this sense, this foresight activity contributes to the refinement of the European maritime transport RDI policies/strategies (Vision 2030, the Strategic Research and Innovation Agenda and the Implementation Plan of the Waterborne Technology Platform).

Objectives

Within work package 5 of MESA, three reports (5.2, 5.3 and 5.4) will elaborate on market, societal and regulatory trends, respectively. This document provides a structure and first guidelines to facilitate a good level of uniformity for these reports. The timeline and dependency of the activities are shown in Figure 1.

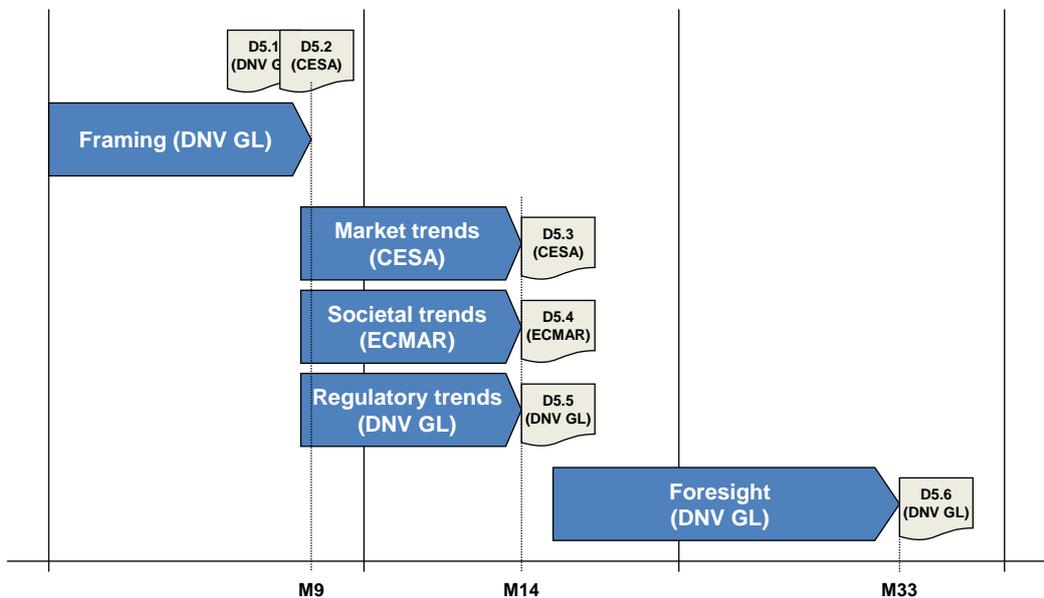


Figure 1: schedule of activities in work package 5.

Scope

To meet the outlined objectives, this document will present

- An overview and an evaluation of existing trend reports and studies considered to be relevant
- An overview and an evaluation of existing trend prediction methods considered to be practical
- Recommendations for developing reports 5.2, 5.3 and 5.4, incl. a template

In this context, the European maritime transport industry relates comprises ship-owners, -managers, -operators, shipbuilders and designers, maritime equipment suppliers, ports and port-infrastructure suppliers, onshore and offshore equipment suppliers, and classification societies.

Many studies exist predicting future market, societal and regulatory developments. These studies have all used different assumptions and methods. To facilitate an efficient and harmonized way of using available studies, this document will present an overview of existing trend reports and studies and aims at evaluating these with the purpose of identifying the most relevant for the later use.

Several foresight methods exist and this document aims at presenting an overview and a recommendation which methods should be used within this foresight activity of MESA. Eventually, a template is suggested to ensure a uniform development of the three main reports addressing market, societal and regulatory trends for the maritime industry towards 2030.

2. Overview of relevant existing studies

Overview and comparison of available studies

DNV GL recently established a new study – called “the Future of Shipping” – and this study took into account many existing trend studies, with a focus on meta trend studies, covering a range of different issue-areas and outlook studies within specific issue/areas. The most relevant are shown in the following table:

Author/ Org	Title	Populati on	Econom y	Energy	Environ ment
HSBC	The World in 2050	●	●●●	-	-
IEA	World Energy Outlook	●	●	●●●	●
National Intelligence Council	Global trends 2030	●	●	●	●
OECD	Environmental Outlook to 2050	●	●	●	●●●
OECD	Looking to 2060: Long-term global growth prospects	●	●●●	-	-
PWC	World in 2050: The BRICs and beyond		●●●	●	
UNEP	Global Environment Outlook	-	-	-	●●●
U.S. EIA	International Energy Outlook 2013	●	●	●●●	-
UN	World Population Prospects	●●●	-	-	-
WBCSD	Vision 2050	●	●	●	●

The size of the dots indicates the degree of focus on the various topics

Table 1: Relevant foresight studies from The Future of Shipping Project for specific global trends

Apart from the global trends and relevant foresight studies listed in Table 1, additional studies have been screened. The focus was widened compared to the assessment made in table 1 to

- further relevant trends, such as ICT (Information Communication Technology), food and water generation and consumption, security, impact from IMO and politics in general and
- specific focus in foresight studies on the areas of waterborne trade and waterborne industry.
- Health & safety aspects. However, the screening of the studies listed in Table 2 did not show a significant focus on this issue in any of them.

The additional studies are presented in Table 2, and the size of the bubble again indicates how strongly each study focusses on certain trends.

Trends & studies	Waterborne industries	Waterborne trade	ICT (Inform.&Comm.Technology)	Food & Water	Security	IMO	Politics	Energy (supply & consumption)	Economy	Climate change & Environment	Health & Safety
Clarkson Research: THE NEWBUILDING MARKET 2013-2025	●								●		
Clarkson Shipping Intelligence Network (2013). Shifting Shipbuilding Shares	●	●				●		●	●		
Wärtsilä shipping scenarios 2030							●			●	
Review of Maritime Transport, 2012, UNCTAD (Freight cost)						●				●	
World Urbanization Prospects: The 2011 Revision, UN 2012 (Urban population by major regions: 1950 – 2050)											●
IEA/IHS (history) and Statoil (forecast): Energy intensity of world economy							●	●			
United Nations (2012). Sustainable Development in the 21st Century: Summary for policymakers.				●				●			
United Nations (2013). Global Sustainable Development Report RESILIENT PEOPLE - RESILIENT PLANET A Future Worth Choosing					●			●	●	●	●
IPCC (2013). "Climate Change 2013: The Physical Science Basis", Summary for policymakers.										●	
Asian Development Bank (2011). Asia 2050: Realizing the Asian Century				●			●	●	●	●	
Food and Agriculture Organization of the United Nations (2009). How to Feed the World in 2050				●				●	●		
HSBC (2012). Consumer in 2050: The rise of the EM middle class				●			●	●	●		
National Intelligence Council (2012). Global trends 2030: Alternative Worlds			●	●	●		●	●	●	●	
UNCTAD (2013). UN Review of Maritime Transport	●	●				●				●	
WTO. Globalisation and trade World Trade Report 2013				●			●	●	●		
HWWI/Berenberg Bank, Maritime trade and transport logistics, strategy 2030, Germany 2007	●	●							●		
McKinsey Global Institute/McKinsey Sustainability & Resource Productivity Practice: Resource Revolution: Meeting the world's energy, materials, food, and water needs				●			●	●	●	●	

Trends & studies	Waterborne industries	Waterborne trade	ICT (Inform.&Comm.Technology)	Food & Water	Security	IMO	Politics	Energy (supply & consumption)	Economy	Climate change & Environment	Health & Safety
Royal Dutch Shell BV, New Lens Scenarios: A shift in perspective for a world in transition.				●				●	●		
UNCTAD: World Investment Report 2011 (UN)				●			●	●	●		
EU Blue Growth: Scenarios and Drivers for growth from Ocean, Seas and Coast	●	●					●	●	●	●	
Waterborne Transport Thematic Research Summary	●	●	●		●						
Europe 2020 Flagship Initiative Energy 2020 A strategy for competitive, sustainable and secure energy State of the Innovation Union 2011					●			●		●	
Europe 2020 Flagship Initiative Innovation Union									●		
Waterborne Strategic Research Agenda Vision 2020 – Route Map WIRM 2011	●	●	●								
IMO Strategic plan for the Organization (for the six-year period 2012 to 2017; 20.12.2011)					●	●					
IMO Strategic plan for the organization (for the six-year period 2014 to 2019; 27.01.2014)					●	●					

Table 2: Relevant additional studies

It is noteworthy to mention that apart from the listed studies there is much more literature available that could be reviewed and analysed for the purposes of tasks 5.2-5.4. In order to increase the confidence in the results achievable in WP5 it is proposed to base the work on foresight studies from institutions which are widely known and have proved to produce relevant studies in a sufficient quality and transparency.

It is further noteworthy to mention that the screening also included a few studies which took a review of the development in the last decade(s). Such information may also be reviewed in order to “learn” from the past and consider if similar development may occur in the future.

Technology trend studies have on purpose been omitted from this overview since technologies are dealt with in the work packages 1,2,3, and 4 of MESA.

Evaluation of available studies

This section outlines which studies should primarily be used for the development of market, societal and regulatory trend reports. Table 3 summarizes the recommended relevant studies.

	Recommended study 1	Recommended study 2	Recommended study 3
Population	World Urbanization Prospects: The 2011 Revision, UN 2012	United Nations (2013). Global Sustainable Development Report	
Food & water	Food and Agriculture Organization of the United Nations (2009)	HSBC (2012). Consumer in 2050: The rise of the EM middle class	McKinsey Global Institute/McKinsey Sustainability & Resource Productivity Practice
Energy supply & consumption	IEA/IHS (history) and Statoil (forecast)	McKinsey Global Institute/McKinsey Sustainability & Resource Productivity Practice	Royal Dutch Shell BV, New Lens Scenarios: A shift in perspective for a world in transition.
Economy	OECD: looking to 2060	PwC – world in 2050	HSBC – the world in 2050
Waterborne trade	UNCTAD (2013). UN Review of Maritime Transport	HWWI/Berenberg Bank, Maritime trade and transport logistics, strategy 2030 2007	EU Blue Growth: Scenarios and Drivers for growth from Ocean, Seas and Coast
Waterborne industries	Clarkson Research: THE NEWBUILDING MARKET 2013-2025	Clarkson Shipping Intelligence Network (2013). Shifting Shipbuilding Shares	HWWI/Berenberg Bank, Maritime trade and transport logistics, strategy 2030, Germany 2007
ICT (Information & Communication Technology)	National Intelligence Council (2012). Global trends 2030: Alternative Worlds	Waterborne Transport Thematic Research Summary	Waterborne Strategic Research Agenda Vision 2020 – Route Map, WIRM 2011
Climate change / Environment	IPCC (2013). “Climate Change 2013: The Physical Science Basis”	Review of Maritime Transport, 2012, UNCTAD	National Intelligence Council (2012). Global trends 2030
Health and Safety	United Nations (2013). Global Sustainable Development Report	World Urbanization Prospects: The 2011 Revision, UN 2012	
Security	National Intelligence Council (2012). Global trends 2030	Europe 2020 Flagship Initiative Energy 2020	Waterborne Transport Thematic Research Summary
IMO strategy plan	IMO Strategic plan for the Organization (for the six-year period 2012 to 2017; 20.12.2011)	IMO Strategic plan for the organization (for the six-year period 2014 to 2019; 27.01.2014)	

Table 3: recommended relevant additional studies

3. Foresight methodologies and prediction techniques

Foresight methodologies are the most diverse ranging from qualitative to and semi-quantitative approaches. Due to the setup of this large project (project partners, distributed in Europe; budget and schedule) an approach is necessary, which allows distributed working and consolidation of results with a very limited number of face to face workshops.

The selected method is based on the **Delphi method** which is a structured communication technique, originally developed as a systematic, interactive forecasting method which relies on a group of experts. Within this method, experts answer questionnaires in two or more rounds. After each round, a facilitator provides an anonymous summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer. Finally, the process is stopped after a pre-defined stop criterion (e.g. number of rounds, achievement of consensus and stability of results) and the mean or median scores of the final rounds determine the results.

Delphi is based on the principle that forecasts (or decisions) from a structured group of individuals are more accurate than those from unstructured groups. The technique can also be adapted for use in face-to-face meetings, and is then called mini-Delphi or Estimate-Talk-Estimate (ETE). Delphi has been widely used for business forecasting.

4. Recommendations for performing tasks 5.2, 5.3 and 5.4

Summary on suggested studies and methods

To guide the work in tasks 5.2, 5.3 and 5.4, the focus in each of the three trend analyses should be on those topics/trends identified in table 4 below and marked with an X. However, this proposal does not mean that the other topics/trends, which are not marked for the individual task, shall be neglected.

Example: For task 5.2 – societal trends, it is proposed to focus on the topics/trends regarding population, food&water, energy consumption, environment, climate change, health&safety. Security may as well be considered within the analysis, however it is proposed to have a smaller focus. Instead in task 5.2, security is proposed to have a major focus in task 5.4 – regulatory trends.

Trend/topic	Task 5.2 – market	Task 5.3 – society	Task 5.4 – regulatory
Population		X	
Food & water		X	
Energy supply and consumption	X	X	X
Economy	X		
Waterborne trade	X		
Waterborne industries	X		X
ICT (Inform.&Comm.Technology)	X		X
Climate change /Environment		X	X
Health and Safety		X	X
Security			X
IMO strategy plan			X

Table 4: recommended focus assignment of trends/topics to subsequent tasks in work package 5

Recommended work flow for tasks 5.2, 5.3 and 5.4

Working methodology for all tasks

A common approach is suggested to facilitate a comparison of results from these tasks and to enable the final consolidation into the work package report on foresight (task 5.5). The following items should be considered:

- Final selection of studies to be considered for group work on the basis of the work of task 5.1
- In-depth analysis of the selected studies with focus on the main objectives of each group as described in the DoW
- Each group member performs the investigation on one or more studies and uses feedback from the group for a revised report

This section emphasizes which assumptions for future developments, main drivers, and development scenarios shall be taken as the common basis for the identification and analysis of future trends.

Work flow for each group

The suggested method of work for the subsequent tasks is shown below in Figure 2.

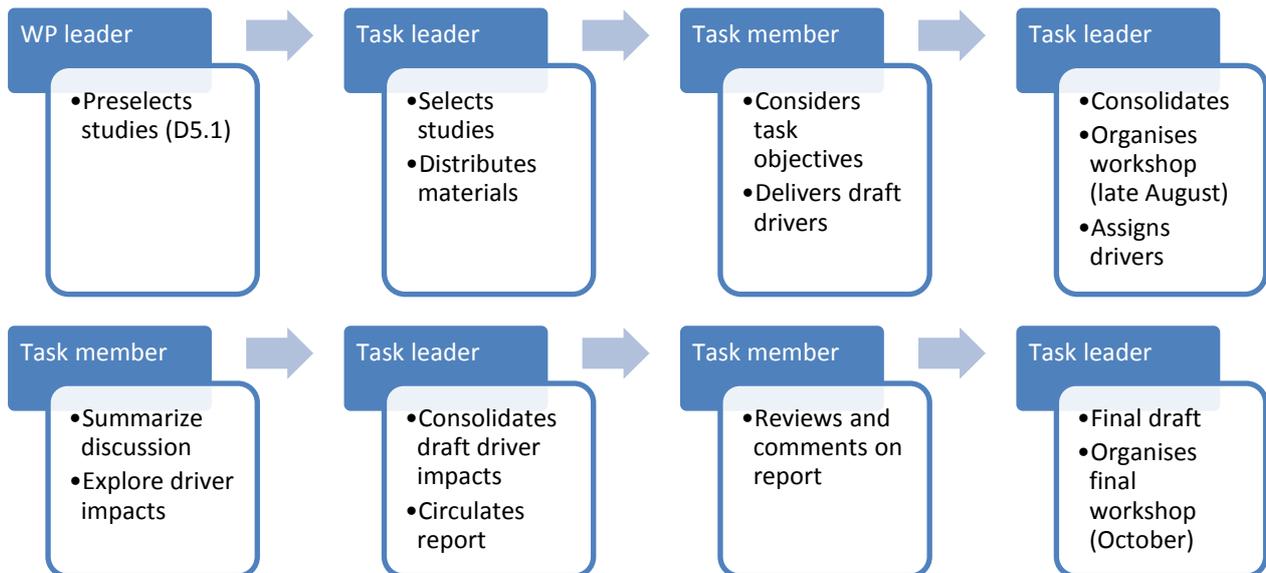


Figure 2: schedule of steps for subsequent tasks.

To facilitate work, the following research questions have been formulated:

- Which impact and when is seen related to ships, incl. inland waterway vessels, leisure craft and fishing vessel?
- Which impact and when is seen related to blue growth?
- Which impact and when is seen related to vessel owners and operators?
- Which impact and when is seen related to yards and systems suppliers?
- Which impact and when is seen related to service suppliers (eg class)?
- Which impact and when is seen related to infrastructure?

The following format is suggested to document work in the subsequent tasks:

Describe impact to	Trend / sub-trend in 2020	Trend / sub-trend in 2030	Reasoning
Ships			
Blue growth			
Owners, operators			
Yards, suppliers			
Service suppliers			
Infrastructure			

References

All relevant studies are listed below with links for assessing them.

Clarkson Research: THE NEWBUILDING MARKET 2013-2025	http://www.clarksons.com
Clarkson Shipping Intelligence Network (2013). Shifting Shipbuilding Shares	http://www.clarksons.net/markets/feature_display.asp?section=&news_id=33889&title=Shifting+Shipbuilding+Shares
Wärtsilä shipping scenarios 2030	http://www.shippingcenarios.wartsila.com/Shipping_scenarios_2030_presentation.pdf
Review of Maritime Transport, 2012, UNCTAD (Freight cost)	http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf
World Urbanization Prospects: The 2011 Revision, UN 2012 (Urban population by major regions: 1950 – 2050)	http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf
IEA/IHS (history) and Statoil (forecast): Energy intensity of world economy	http://www.statoil.com/en/NewsAndMedia/News/EnergyPerspectives/Downloads/Energy%20Perspectives%202013.pdf
United Nations (2012). Sustainable Development in the 21st Century: Summary for policymakers.	http://sustainabledevelopment.un.org/content/documents/UN-DESA_Back_Common_Future_En.pdf
United Nations (2013). Global Sustainable Development Report	http://sustainabledevelopment.un.org/content/documents/975GSDR%20Executive%20Summary.pdf
IPCC (2013). "Climate Change 2013: The Physical Science Basis", Summary for policymakers.	https://www.ipcc.ch/report/ar5/wg1/docs/WGIAR5_SPM_brochure_en.pdf
Asian Development Bank (2011). Asia 2050: Realizing the Asian Century	http://www.oecd.org/site/iops/researchandworkingpapers/48263622.pdf
Food and Agriculture Organization of the United Nations (2009). How to Feed the World in 2050	http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf
HSBC (2012). Consumer in 2050: The rise of the EM middle class	http://www.worldcaptiveforum.com/images/Consumer-in-2050-HSBCGlobalResearch.pdf
National Intelligence Council (2012). Global trends 2030: Alternative Worlds	http://globaltrends2030.files.wordpress.com/2012/11/global-trends-2030-november2012.pdf
UNCTAD (2013). UN Review of Maritime Transport	http://unctad.org/en/publicationslibrary/rmt2013_en.pdf
WTO. Globalisation and trade World Trade Report 2013	http://www.wto.org/english/res_e/booksp_e/world_trade_report13_e.pdf

HWWI/Berenberg Bank, Maritime trade and transport logistics, strategy 2030, Germany 2007	http://www.hwwi.org/fileadmin/hwwi/Publikationen/Partnerepublikationen/Berenberg/Strategy_2030_Maritime_Trade_and_Transport_Logistics.pdf
McKinsey Global Institute/McKinsey Sustainability & Resource Productivity Practice: Resource Revolution: Meeting the world's energy, materials, food, and water needs	http://www.mckinsey.com/insights/energy_resources_materials/resource_revolution
Royal Dutch Shell BV, New Lens Scenarios: A shift in perspective for a world in transition.	http://s03.static-shell.com/content/dam/shell-new/local/corporate/Scenarios/New_Lens_Scenarios_Low_Res.pdf
UNCTAD: World Investment Report 2011 (UN)	http://unctad.org/en/docs/wir2011_embargoed_en.pdf
EU Blue Growth: Scenarios and Drivers for growth from Ocean, Seas and Coast	http://ec.europa.eu/maritimeaffairs/documentation/studies/documents/blue_growth_third_interim_report_en.pdf
Waterborne Transport Thematic Research Summary	http://www.transport-research.info/Upload/Documents/201007/20100705_152106_4661_100630_TRKC-%20Waterborne%20transport%20-%20Thematic%20Summary.pdf
Europe 2020 Flagship Initiative Energy 2020 A strategy for competitive, sustainable and secure energy State of the Innovation Union 2011	http://ec.europa.eu/energy/publications/doc/2011_energy2020_en.pdf
Europe 2020 Flagship Initiative Innovation Union	http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf
Waterborne Strategic Research Agenda Vision 2020 – Route Map WIRM 2011	http://cordis.europa.eu/publication/rcn/14375_de.html
IMO Strategic plan for the Organization (for the six-year period 2012 to 2017; 20.12.2011)	http://administrativeburdens.bimco.org/pdf/imo_res_a_1043-27.pdf
IMO Strategic plan for the organization (for the six-year period 2014 to 2019; 27.01.2014)	http://www.imo.org/About/strategy/Documents/1060.pdf

List all relevant methods:

Foresight Methodology, Popper, R. (2008), in Georghiou, L., Cassingena, J., Keenan, M., Miles, I. and Popper, R. (eds.),

The Handbook of Technology Foresight, Edward Elgar, Cheltenham, pp. 44-88

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