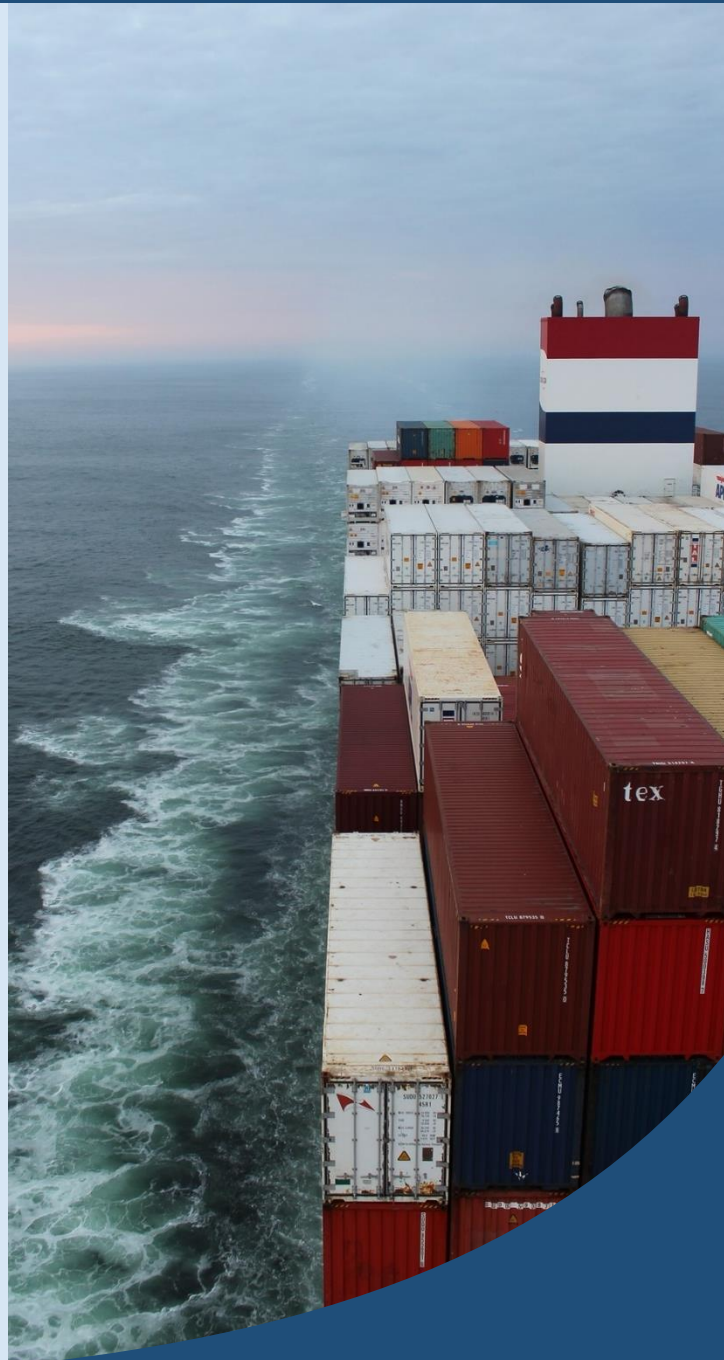


MANUAL OF BEST PRACTICES IN CLEAN SHIPPING FINANCING IN EUROPE

RESEARCH REPORT

February 2021

Tallinn University of Technology



EUROPEAN
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DEVELOPMENT
FUND



Manual of Best Practices in Clean Shipping Financing in Europe

Background document for WP4 22 February 2021

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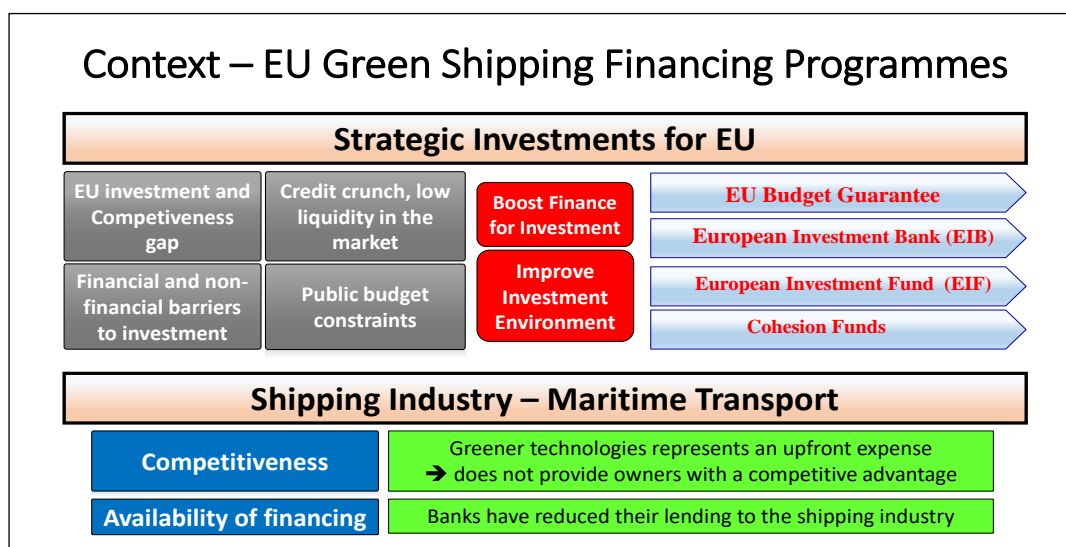
Part 1. State of the Best Practices in Clean Shipping Financing for Industry End-Users

Introduction

The EU aims to build a modern integrated transport system that strengthens the EU's global competitiveness and is able to meet the challenges linked to sustainable, smart and inclusive growth. The first step towards that goal is ensuring a well-functioning infrastructure that can transport people and goods efficiently, safely and sustainably. The EU's physical infrastructure counts over 217 000 km of railways, 77 000 km of motorways, 42 000 km of inland waterways, 329 key seaports and 329 airports. Through the Trans-European Transport Network policy, the EU aims to build an effective EU-wide transport infrastructure network. EU funding programmes and initiatives make available financial support to projects implementing the TEN-T (Figure 1):

- Connecting Europe Facility (CEF) – financial support for strategic investment in transport, energy and digital infrastructure.
- European Fund for Strategic Investment (EFSI) – supports investment in key sectors through financial guarantees.
- Horizon 2020 - provides funding for research and development projects with the aim of transferring great ideas from the lab to the market.
- European Structural and Investment Funds (ESIFs), including notably:
 - Cohesion Fund (CF) – supports projects reducing economic and social disparities and promoting sustainable development in 15 cohesion Member States.
 - European Regional Development Fund (ERDF) – aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions.

Figure 1: Overview of the challenges of shipping industry in Europe



Overall in this book, we consider the above programs, as well as an analytical overview of other most leading programmes such as: (i) *Horizon 2020*'s, the biggest EU Research and Innovation programme ever in Europe; (ii) *Interreg Baltic Sea Region Programme* that provides a framework for the implementation of joint actions and policy exchanges between national, regional and local actors from different Member States; (iii) *Blue Sustainable Ocean Strategy* that helps to improve the health of oceans, build stronger and more resilient coastal environments; (iv) *Green Shipping Loan Programme*, which is the first with a financial institution in the Netherlands and is supported by the "*Connecting Europe Facility*"; (v) *Cleaner Transport Facility*, an initiative to support the deployment of cleaner transport vehicles and their associated infrastructure needs; (v) *LIFE programme*, the EU's funding instrument for the environment and climate action launched since 1992, and some other national and local programs. And here you can find an information about banks that give loans for green shipping and organizations, platforms that can help you with promotion of your project (see the above schema).¹

The remaining of this part provides the important aspects and features related to the main European funding programmes for clean shipping, respectively. It also succinctly analyses the incidence, the use and the purpose of these different programmes with regards to clean shipping, as well as how the ship-owners and stockholders can express interest, ask for help and apply for such programmes for their future investments. We conclude with the European forward-looking vision for clean shipping.

1. Connecting Europe Facility

The Connecting Europe Facility (CEF) is a key EU funding instrument to promote growth and competitiveness through targeted infrastructure investment at European level. It supports the development of high performing, sustainable and efficiently interconnected trans-European networks in the fields of transport, energy and digital services. CEF investments fill the missing links in Europe's energy, transport and digital backbone.

The CEF target all European member states to make travel easier and more sustainable. It aims to enhance Europe's energy security while enabling wider use of renewables and facilitates cross-border interaction between public administrations, businesses and citizens. In addition to grants, the CEF offers financial support to projects through innovative financial instruments such as guarantees and project bonds. These instruments create significant leverage in their use of EU budget and act as a catalyst to attract further funding from the private sector and other public sector actors.

Since January 2014, INEA manages the funding under the CEF. INEA implements most of the CEF programme budget, in total €28.7 billion out of €30.4 billion (€23.7 billion for Transport, €4.7 billion for Energy, and €0.5 billion for Telecom). The CEF is divided into three sectors: energy, telecom and transport. One of the key priorities of CEF is enabling and strengthening the synergies between the three sectors. Actions across sectors may enable costs or results to be

¹ For more insights, see https://ec.europa.eu/transport/themes/infrastructure_en

optimized through the pooling of financial, technical or human resources, thus enhancing the effectiveness of EU funding.

Recently, two opened calls need to be mentioned:

- 2020-2 CEF Telecom call – until 5 November 2020;
- 2019 CEF Transport Blending Facility call – until 13 November 2020.²

CEF Transport

The Connecting Europe Facility (CEF) for Transport is the funding instrument to realize European transport infrastructure policy. It aims at supporting investments in building new transport infrastructure in Europe or rehabilitating and upgrading the existing one. CEF Transport focuses on cross-border projects and projects aiming at removing bottlenecks or bridging missing links in various sections of the Core Network and on the Comprehensive Network (see link)³, as well as for horizontal priorities such as traffic management systems.

In addition, CEF Transport supports innovation in the transport system in order to improve the use of infrastructure, reduce the environmental impact of transport, enhance energy efficiency and increase safety. The total budget for CEF Transport is €24.05 billion for the period 2014-2020. INEA is responsible for implementing €23.7 of the CEF Transport budget in the forms of grants during the same period.⁴

2. European Fund for Strategic Investment

The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by both the European Investment Bank (EIB) and the European Investment Fund, and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

EFSI is a €26 billion guarantee from the EU budget, complemented by a €7.5 billion allocation of the EIB's own capital. The total amount of €33.5 billion aims to unlock additional investment of at least €500 billion by 2020. EFSI is implemented by the EIB Group and projects supported by it are subject to usual EIB procedures. With EFSI support, the EIB Group is providing funding for economically viable projects, especially for projects with a higher risk profile than usually taken on by the Bank. It will focus on sectors of key importance for the European economy, including⁵:

- Strategic infrastructure including digital, transport and energy;
- Education, research, development and innovation;
- Renewable energy and resource efficiency;
- Support for small and mid-sized businesses.

² For more details, see <https://ec.europa.eu/inea/en/connecting-europe-facility>

³ <https://trimis.ec.europa.eu/programme/connecting-europe-facility-cef-transport>

⁴ For useful reviews, check <https://ec.europa.eu/inea/connecting-europe-facility-cef-transport>

⁵ Insights on EFSI, see <https://www.eib.org/en/efsi/index.htm>

European Fund for Strategic Investment vol. 2 (EFSI 2.0)

EFSI 2.0 is an extension of the European Fund for Strategic Investments. Vice-President Jyrki Katainen stated 'The Investment Plan has brought real benefits to companies across Europe ... and we want to do more. We listened to the feedback we received on how the European Fund for Strategic Investments works and we have made some improvements'.

So, what is new in EFSI 2.0? First of all, there is Longer financing period – from 31.07.2018 to 31.12.2020. Second is larger investment target up to €500 billion. Also, more transparency on investment decisions - detailed Investment Committee decisions and project scoreboards will be published on its website. EFSI 2.0 gives a more detailed definition of what makes a project eligible for EFSI support. There is greater focus on sustainable projects. One of the sectors focused is strategic infrastructure including digital, transport and energy. Among the new sectors explicitly available for EFSI 2.0 support are sustainable agriculture, fisheries, aquaculture. At least 40% of EIB projects in line with climate action.⁶

3. Horizon 2020

In addition to the private investment that this money will attract, Horizon 2020 is considered so far as the biggest EU Research and Innovation programme with nearly €80 billion of funding available over 7 years (2014 to 2020). It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.

Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness.

Seen as a means to drive economic growth and create jobs, Horizon 2020 has the political backing of Europe's leaders and the Members of the European Parliament. They agreed that research is an investment in our future and so put it at the heart of the EU's blueprint for smart, sustainable and inclusive growth and jobs. By coupling research and innovation, Horizon 2020 is helping to achieve this with its emphasis on excellent science, industrial leadership and tackling societal challenges. The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

The EU Framework Programme for Research and Innovation will be complemented by further measures to complete and further develop the European Research Area. These measures will aim at breaking down barriers to create a genuine single market for knowledge, research and innovation. Funding areas of Horizon 2020's are clean shipping, energy, environment, climate action, funding researchers, health, ICT research & innovation, transport, and many others.⁷ In what follow, we will present brief descriptive about the priority areas.

⁶ Other details can be found in the following institutional report, see: https://ec.europa.eu/commission/sites/beta-political/files/efsi-2.0-factsheet_en.pdf

⁷ To cross overs all the targeted areas, see <https://ec.europa.eu/programmes/horizon2020/en/find-your-area>

Energy

Energy research and innovation plays an important role in order to satisfy constantly increasing energy needs while fighting climate change. The current fossil-fuel based energy system is unsustainable, not only due to scarce resources, but also because of a negative impact on climate change. Therefore, the European Council has unanimously decided that the EU requires to largely decarbonize its energy system by 2050.

Energy research and innovation has an essential role to play in addressing the challenge of satisfying security of energy supply, competitiveness of the EU industry and ensuring affordable prices for the citizens, whilst at the same time combating climate change. While doing this, we are looking for synergies with other sectors, e.g. telecoms and ICT industry. To provide European citizens with the widest energy source choice, while respecting the right of Member States to decide on their own energy mix, several energy and ICT technologies need to be available. Overall, they should be in line with the following objectives⁸:

- Commitment to reduce greenhouse gas emissions by 20% by 2020;
- Keep these reductions up to 80-95% by 2050;
- Non-nuclear energy (Concentrated Solar Power, Photovoltaics, Wind, Ocean, Hydro, Geothermal, Bioenergy, Fuel Cells and Hydrogen, Electricity Grids, Carbon Capture and Storage, Energy Storage, Energy Efficiency, Smart Cities) and the integration of ICT in all energy fields.

Environment & Climate Action

Environmental and Climate Action research is tackled by a series of actions and opportunities for collaboration in the *Societal Challenge Action*. In this context, the aim is to achieve a resource, water efficient and climate change resilient economy and society. Environmental Research and Innovation's response to the Europe 2020 Strategy, which identifies smart, sustainable and inclusive growth as a means to help the EU and the Member States, develops a resource efficient, greener and more competitive economy while delivering high levels of employment, productivity and social cohesion. The focus of the EU Research and Innovation programme in environment is challenge-driven, funding the whole research and innovation cycle.

Helping to build a green economy, a circular economy in sync with the natural environment, is part of the answer. Activities in the first work programme will therefore focus on moving towards a "green" society and economy. They will address gaps in the knowledge base needed to understand changes in the environment, identify the policies, methods and tools that would most effectively tackle the challenges, and support innovators and businesses to bring green solutions to the market. For the first two years of implementation, waste as a resource and water innovation have been selected as particular priorities, on the grounds of their substantial

⁸ For more insights, see in <https://ec.europa.eu/programmes/horizon2020/en/area/energy>

potential for business opportunities and job creation while tackling important resource efficiency challenges.⁹

As a result it is expected that at least 60% of the overall Horizon 2020 budget should be related to sustainable development and that climate-related expenditure should exceed 35% of the budget, including mutually compatible measures improving resource efficiency.

Transport

European Transport research contributes to find solutions for cleaning shipping, decarbonisation of shipping industry, greening transport; hence, increase mobility of people, with low-carbon technologies, clean vehicles, smart mobility systems and integrated services for passengers and freight. Efficient transport is a fundamental condition for sustainable prosperity in Europe. Transport provides citizens with essential means of mobility and contributes to employment, growth and global exports. The European transport industry represents 6.3% of the Union's GDP and employs nearly 13 million people.

However, our transport systems and habits are too dependent on oil, which will become scarcer and is a serious polluter of our planet. Transport accounts for about 63% of oil consumption and 29% of all CO₂ emissions. Unless the present trends are corrected, the economic costs of traffic congestion will increase by about 50% by 2050, the accessibility gap between central and peripheral areas will widen and the social costs of accidents and pollution will continue to rise. In the transport sector, research is at the core of developing new technologies for greener, smarter, more efficient transport means and innovative solutions for safer, more sustainable and inclusive mobility.¹⁰

Horizon 2020's calls

For the sake of practical, Table 1 below presents a selection practical information for both businesses and stockholders about the Horizon 2020 calls (*upcoming*), as well as its opening and closing dates. For more reviews and insights on Horizon 2020's other upcoming calls, see the following official page: <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-search>

⁹ More explanations can be found here <https://ec.europa.eu/programmes/horizon2020/en/area/environment-climate-action>. Insights on the *Oceans and Seas Areas* of Horizon 2020 as well strategy for sustainable supply chain and blue economy, see: <https://ec.europa.eu/programmes/horizon2020/en/area/oceans-and-seas>

¹⁰ More details for stockholders could be find here: <https://ec.europa.eu/programmes/horizon2020/en/area/transport>

Table 1: List of a selection of open Horizon 2020's calls

Name	Opening date	Deadline date
EIC Horizon Prize for 'Fuel from the Sun: Artificial Photosynthesis' Sunfuel- EICPrize-2021	12 December 2017	3 February 2021
Developing and implementing local integration strategies through multi-stakeholder partnerships, AMIF-2020-AG-CALL-01	15 October 2020	16 February 2021
Towards Climate-Neutral and Socially Innovative Cities, LC-GD-1-2-2020	22 September 2020	26 January 2021
Climate-resilient Innovation Packages for EU regions, LC-GD-1-3-2020	22 September 2020	26 January 2021
European capacities for citizen deliberation and participation for the Green Deal, LC-GD-10-1-2020	22 September 2020	26 January 2021
Innovative land-based and offshore renewable energy technologies and their integration into the energy system, LC-GD-2-1-2020	22 September 2020	26 January 2021
Green airports and ports as multimodal hubs for sustainable and smart mobility, LC-GD-5-1-2020	22 September 2020	26 January 2021
Transparent & Accessible Seas and Oceans: Towards a Digital Twin of the Ocean	22 September 2020	26 January 2021
Integrated solution to enhance the maritime situational awareness, EDIDP- MSC-IS-2020	15 April 2020	01 December 2020
Multifunctional capabilities, including space based surveillance and tracking, able to enhance the maritime awareness (discover, locate, identify, classify and counteract the threats) EDIDP-MSC-MFC-2020	15 April 2020	01 December 2020
Maritime surveillance generated by networks of sensors based on fixed and/or semi-fixed unmanned platforms EDIDP-MSC-NS-2020	15 April 2020	01 December 2020
Maritime Spatial Planning (North Sea and Baltic Sea), MSP-01-2020	09 June 2020	10 November 2020

4. European structural and investment funds

Over half of the EU funding programmes is channelled through the European structural and investment funds (ESIF). They are jointly managed by the European Commission and the EU countries. The purpose of all these funds is to invest in job creation and a sustainable and healthy European economy and environment. The ESIF mainly focus on five areas:

- Research and innovation;
- Digital technologies;
- Supporting the low-carbon economy;
- Sustainable management of natural resources;
- Small businesses.

For the perspective of cleaning shipping and blue economy, the ESIFs are articulated four pools:

- *European regional development fund* (ERDF), promotes balanced development in the different regions of the EU;
- *European social fund* (ESF), supports employment-related projects throughout Europe and invests in Europe's human capital;

- *Cohesion fund* (CF), funds transport and environment projects in countries where the gross national income (GNI) per inhabitant is less than 90% of the EU average. Over the 2014–2020, the targeted countries are: *Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia*.
- *European maritime and fisheries fund* (EMFF), helps fishermen to adopt sustainable fishing practices and coastal communities to diversify their economies, improving quality of life along European coasts.

All these funds are managed by the EU countries themselves, by means of partnership agreements. Each country prepares an agreement, in collaboration with the European Commission, setting out how the funds will be used during the current funding period 2014–2020. Hence, stockholders in each country need to be aware of the partnership agreements their respective countries are managing.¹¹

Cohesion Fund

The Cohesion Fund allocates a total of €63.4 billion to all activities and stockholders from the aforementioned countries under the following categories:

- *Trans-European transport networks*, notably priority projects of European interest as identified by the EU. The Cohesion Fund will support infrastructure projects under the Connecting Europe Facility (see above the CEF presentation);
- *Environment, Energy and Transport*, as long as they clearly benefit the environment in terms of energy efficiency, decarbonisation, use of renewable energy, developing rail transport, supporting intermodality, strengthening public transport, etc.

The financial assistance of the Cohesion Fund can be suspended by a Council decision, if a member state shows excessive public deficit and if it has not resolved the situation or has not taken the appropriate action to do so.¹²

European Regional Development Fund

The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. The ERDF focuses its investments on several key priority areas. This is known as '*thematic concentration*':

- Innovation and research;
- The digital agenda;
- Support for small and medium-sized enterprises (SMEs);
- The low-carbon economy.

¹¹ Others practical information about the ESIFs can be consulted here: https://ec.europa.eu/info/funding-tenders/funding-opportunities/funding-programmes/overview-funding-programmes/european-structural-and-investment-funds_en

¹² More insight and practical details can be found here https://ec.europa.eu/regional_policy/en/funding/cohesion-fund/

The ERDF resources allocated to these priorities will depend on the category of region.

- In more developed regions, at least 80 % of funds must focus on at least two of these priorities;
- In transition regions, this focus is for 60 % of the funds;
- This is 50 % in less developed regions.

Furthermore, some ERDF resources must be channelled specifically towards low-carbon economy projects:

- More developed regions: 20%;
- Transition regions: 15%; and
- Less developed regions: 12%.

European Territorial Cooperation. Under the European Territorial Cooperation programmes, at least 80 % of funds will be concentrated on these four priority areas mentioned above. Specific Territorial Characteristics. The ERDF also gives particular attention to specific territorial characteristics. ERDF action is designed to reduce economic, environmental and social problems in urban areas, with a special focus on sustainable urban development. At least 5 % of the ERDF resources are set aside for this field, through 'integrated actions' managed by cities.¹³

5. Interreg Baltic Sea Region Programme

Interreg Baltic Sea Region (funding cooperation) is one of the two goals for European territorial cooperation (ETC) and cohesion policy. It provides a framework for the implementation of joint actions and policy exchanges between national, regional and local actors from different Member States. Interreg's overarching objective of is to promote a harmonious economic, social and territorial development of the Union as a whole. Interreg Baltic Sea Region Programme 2014–2020 supports integrated territorial development and cooperation for a more innovative, better accessible and sustainable Baltic Sea region. Partners from countries around the Baltic Sea work together in transnational projects on common key challenges and opportunities.

The Programme is an agreement between EU member states Denmark, Estonia, Finland, Latvia, Lithuania, Poland, Sweden and the northern parts of Germany as well as partner countries Norway, Belarus and the northwest regions of Russia. The Programme is funded by the European Union and approved by the European Commission. Projects that are will be founded have to involve at least three partners from three different countries from the Programme area. Total project budgets typically range between €1.5 and 4.5 million for seven or more partners working together for two to three years. The Programme offers funding for four thematic priorities: capacity for innovation, efficient management of natural resources, sustainable transport, coordination of the EU Strategy for the Baltic Sea Region.¹⁴

¹³ For more evidences, see https://ec.europa.eu/regional_policy/en/funding/erdf/

¹⁴ More information are available in the following link: <https://www.interreg-baltic.eu/about-the-programme.html>

Programme funding

The programme is funded by the European Regional Development Fund (ERDF), the European Neighbourhood Instrument (ENI) and Norwegian national funding. Project partners co-finance activities with their own resources. Total funds available at the Programme start:

- European Regional Development Fund (ERDF): €263.8 million;
- European Neighbourhood Instrument (ENI): €8.8 million (subject to signing of the Financing agreement);
- Russian national funding: €4.4 million;
- Norwegian national funding: €6.0 million.

Co-financing rates. For priorities 1-3 (capacity for innovation, efficient management of natural resources and sustainable transport) the programme co-funds:

- Up to 75% of costs generated by partners from Denmark, Germany, Sweden and Finland;
- Up to 85% for partners from Estonia, Latvia, Lithuania, Poland and Russia;
- Up to 50% for partners from Norway (from Norwegian national funding);
- Up to 75% for countries outside the Union part of the Programme area.¹⁵

Sustainable transport: Clean shipping target

Sustainable transport covers capacity building measures ensuring more sustainable transport solutions in the region. In particular, it aims to better connecting the secondary and tertiary nodes of transport corridors in the Baltic Sea region to core network corridors, in particular in terms of linking different transport modes. Furthermore, the priority aims to improve accessibility of distant areas that have accessibility deficits as well as areas affected by demographic changes to urban, administrative and economic centres. Due to the significance of maritime transport for the region the priority also focuses on the improvement of maritime safety and environmental-friendly shipping. Finally, the priority specifically focuses on urban areas of the Baltic Sea region with the aim of increasing environmentally friendly mobility in cities.

Interreg (or ETC) funds the projects that are building institutional capacity of public and private actors to increase interoperability in transporting goods and persons in north-south and east-west connections (specific objective 3.1), improve the accessibility of the most remote areas and regions whose accessibility is affected by demographic change (specific objective 3.2), increase maritime safety and security (specific objective 3.3), enhance clean shipping (specific objective 3.4) and to enhance environmentally friendly transport systems in urban areas (specific objective 3.5).¹⁶

¹⁵ More details are presented in the following link: <https://www.interreg-baltic.eu/about-the-programme/funding.html>

¹⁶ More information can be found in <https://www.interreg-baltic.eu/about-the-programme/priorities/transport.html>

6. Green Shipping Loan Programme

The European Investment Bank and Dutch bank ABN Amro

The European Investment Bank and Dutch bank ABN Amro signed an agreement 21.04.2017 to support investments for greening the European shipping fleet. This framework is the first with a financial institution in the Netherlands, supported by the “*Connecting Europe Facility*”, the ‘EFSI’ (*European Fund for Strategic Investments*) and the *Investment Plan for Europe*.

The framework guarantee agreement will ensure that promoters of sustainable projects in the maritime transport sector can benefit from favourable financial terms as a result of the EIB's AAA rating. The facility is open for both retrofitting of existing shipping as well as for projects that envisage the construction of new vessels with a green innovation aspect, it applies to both inland shipping and seagoing operators.

“The Bank received a clear signal from the market that there was a financing gap for the greening of shipping fleets” said EIB vice-president Pim van Ballekom. “By allowing the EIB to take more risk, the Investment Plan for Europe enabled us to create a new instrument to support shipping companies in complying with the European sustainability standards. This is the second agreement under a €750 million EFSI Green Shipping Guarantee Programme, which was set up after numerous discussions with Dutch counterparts from the public and private sector. We are really looking to ship owners to make use of it so that we can implement it in other countries as well.”¹⁷

This sector risk bearing programme is meant for projects that will improve the environmental performance of transport vessels in terms of diminishing the emission of pollutants as well as increasing fuel efficiency. Projects should be proposed to the ABN Amro Bank and will be subject to their eligibility and risk acceptance criteria.¹⁸

French bank, Société Générale

Many banks agreed to give loans for green shipping projects. For example, French Bank ‘*Société Générale*’ offers a comprehensive range of finance and advisory services for energy projects around the world. This bank has been active in the renewable energy for over a decade, taking a pioneering role in the funding of renewables, supporting innovative start-ups as well as financing large-scale projects.

Société Générale announces it is one of the founding signatories to the Poseidon Principles in collaboration with the Global Maritime Forum, and in league with a significant number of the shipping industry’s leading banks. The Poseidon Principles promote a low carbon future for the global shipping industry by integrating climate considerations into bank portfolios and credit

¹⁷ See also, <https://sites.utu.fi/bre/new-politics-for-financing-clean-shipping/>

¹⁸ More details can be found here: <https://www.eib.org/en/press/all/2017-106-investment-plan-for-europe-eur-150-million-to-finance-green-shipping>

decisions. The Poseidon Principles are consistent with the International Maritime Organisation's (IMO) ambition to reduce shipping's greenhouse emissions by at least 50% by 2050.¹⁹

German bank, KfW IPEX-Bank

KfW IPEX-Bank is a leading ship financier around the world. Their main target groups are: European shipyards: they finance vessels built at German and European shipyards and exported throughout the world; European vessel owners: they finance both the construction of new vessels and the modernisation of existing vessels operated by European ship owners; European and German equipment suppliers: they finance vessels that are built globally with European equipment and/or components.

Their financing products are financing of maritime vessels with European content, German and other European export loans, investment loans for European maritime companies, down payment and post delivery financings, project and corporate loans and related hedging products. They finance maritime vessels with European technology worldwide, including the bulk of projects realised on German and European shipyards: investments by cargo shipping companies, offshore exploration and production and passenger shipping. In this way they promote family-owned enterprises and listed corporates that are world leaders in their industry, as well as their suppliers.²⁰

Dutch bank, ING Bank

ING aim to support the shipping industry's reduction of carbon emissions by 50% by 2050. Together, the banks hold a global shipping loan portfolio of about \$100 billion. ING encourages clients in the shipping sector to adopt ship recycling practices that are environmentally sustainable and socially responsible. To start with, their policy doesn't permit the financing of 'breaking yards' or buyers of scrap vessels. Furthermore, ING seeks to finance leading and reputable shipping companies that follow a responsible policy of breaking down ships, known as 'vessel scrapping'.

In addition, they require customers to adhere to industry best practices and for all vessels to have a Green Passport (inventory of hazardous materials). They also, wherever possible, seek to document customers' obligations within the loan documentation. For example: The ship owner confirms that as long as it's in a lending relationship with ING, it will ensure that any ship it controls that's intended to be scrapped will be recycled at a yard that conducts its recycling business in a socially and environmentally responsible manner.²¹

¹⁹ See details in: <https://www.societegenerale.com/en/NEWSROOM-societe-generale-signs-poseidon-principles-promoting-shipping-industry-decarbonisation>

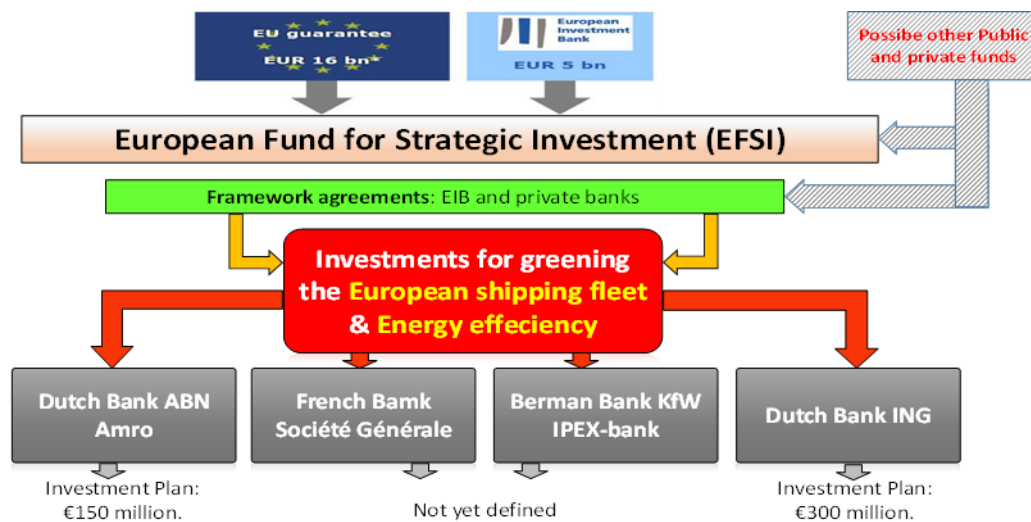
²⁰ More details are presented in the following page: <https://www.kfw-ipex-bank.de/International-financing/KfW-IPEX-Bank/Business-Areas/Maritime-Industrie/>

²¹ Stakeholders can find more details about private financial support in the following page: <https://www.ing.com/Sustainability/Our-Stance/Maritime-sector.htm>

Summary

Figure 2 below displays the framework agreement between the EIB and private banks under the EFSI to support clean and green shipping and energy efficiency investments.

Figure 2: Overview of the European Fund for Strategic Investment



7. Green Loan Principles

The green loan market aims to facilitate and support environmentally sustainable economic activity via using several sustainable financial instruments. The Green Loan Principles (GLP) have been developed by leading financial institutions active in the syndicated loan market, with a view to promoting the development and integrity of the green loan product. Their aim is to create a high-level framework of market standards and guidelines, providing a consistent methodology for use across the green loan market partisans.

The GLP comprise voluntary recommended guidelines, to be applied by market participants on a deal-by-deal basis depending on the underlying characteristics of the transaction, that seek to promote integrity in the development of the green loan market by clarifying the instances in which a loan may be categorized as “green”. The GLP build on and refer to the Green Bond Principles (GBP) of the International Capital Market Association, with a view to promoting consistency across financial markets, in light of the development and growth of the global green loan market.

The fundamental determinant of a green loan is the utilization of the loan proceeds for Green Projects (including other related and supporting expenditures, including R&D), which should be appropriately described in the finance documents and, if applicable, marketing materials. All

designated Green Projects should provide clear environmental benefits, which will be assessed, and where feasible, quantified, measured and reported by the borrower.

A green loan may take the form of one or more tranches of a loan facility. In such cases, the green tranche(s) must be clearly designated, with proceeds of the green tranche(s) credited to a separate account or tracked by the borrower in an appropriate manner.²²

The GLP explicitly recognize several broad categories of eligibility for Green Projects with the objective of addressing key areas of environmental concern such as climate change, natural resources depletion, loss of biodiversity, and air, water and soil pollution. The borrower of a green loan should clearly communicate to its lenders:

- Its environmental sustainability objectives;
- The process by which the borrower determines how its projects fit within the eligible categories;
- The related eligibility criteria, including, if applicable, exclusion criteria or any other process applied to identify and manage potentially material environmental risks associated with the proposed projects.

8. Help and Promotion

This section is devoted to organizations and agreements that helps to develop green shipping and other projects in Europe. Below, we will present information about partnership agreement between the International Maritime Organization and the European Bank for Reconstruction and Development, the European Investment Advisory Hub in charge of helping stakeholders and the European Investment Project Portal.

Partnership between IMO and EBRD

The International Maritime Organization (IMO) has signed a new partnership agreement with the European Bank for Reconstruction and Development (EBRD). The agreement helps to promote sustainable shipping through a range of safety- and environment-focused capacity-building activities in the maritime and port sectors in selected countries. It brings together IMO, the United Nations maritime agency which sets global standards for safe, secure, efficient and environment-friendly international shipping, and the multilateral development bank EBRD, which has experience in supporting comprehensive transport related development activities and practices in the maritime and port sectors.

In addition to providing investment financing, IMO and EBRD will work together under the agreement to provide technical advisory services, project preparation and planning, capacity building and institutional development, focusing initially on joint projects with the national authorities of Azerbaijan, Egypt, Georgia, Morocco, Tunisia and Turkey. Gap analysis will be

²² More evidence on green loan market, see the following document:
https://www.lma.eu.com/application/files/9115/4452/5458/741_LM_Green_Loan_Principles_Booklet_V8.pdf

carried out with specific projects likely to focus on a range of safety- and environment-related issues, centred on implementing and enforcing IMO regulations.²³ These projects could include:

- Investment opportunities in sustainable transport;
- Safe transport of solid bulk cargoes and dangerous goods;
- Facilitation of maritime traffic and electronic business and implementation of a maritime single window;
- Identification of locations and business models for port reception facilities for ship-generated waste;
- Looking at opportunities to improve ships in terms of reducing air pollution and greenhouse gas emissions and improving energy efficiency;
- Potential regulatory and policy reforms associated with ships using shore-based power sources in port;
- Sensitivity mapping and oil spill exercises;
- Identifying opportunities to invest and propose investment for LNG bunkering infrastructure.

The European Investment Advisory Hub

The European Investment Advisory Hub is a partnership between the European Investment Bank Group and the European Commission as part of the Investment Plan for Europe. The Hub is designed to act as a single access point to various types of advisory and technical assistance services. It supports the identification, preparation and development of investment projects across the European Union. Hence, it Hub aim to improve the quality information sharing and investment projects by offering tailored advisory support to European project promoters.

Services via the Hub include project development support throughout all project stages, as well as upstream or policy advice. Financial advice is also provided to enhance companies' ability to access adequate sources of financing. It also engages in non-project specific (or horizontal) activities. These often come from their partners or the European Commission. They also host other initiatives under their work programme. The Hub's services to public entities are free of charge, while a contribution may be requested from private sector beneficiaries to align interests and ensure ownership of results.²⁴

The European Investment Project Portal

The European Investment Project Portal (the EU platform) helps investors and project promoters find the right match. It connects EU promoters with investors worldwide for projects in areas such as healthcare, renewable energies, digital technologies or SMEs. For stockholders and investors looking for opportunity of investments, the Portal allows to browse through a broad choice of viable projects and apply many filters and choice criteria. Then, when

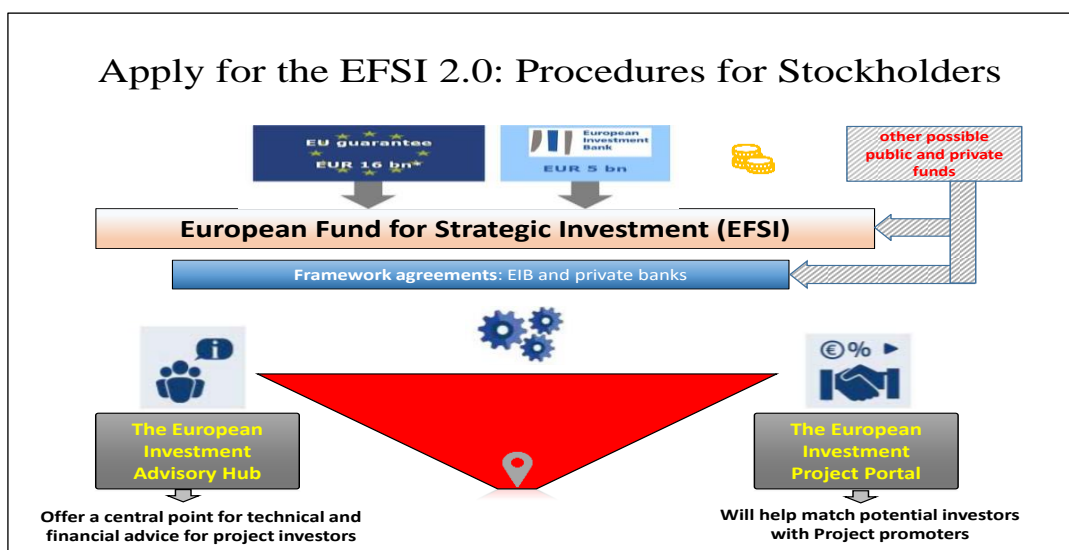
²³ See details in the following page: <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/02-EBRD-IMO-MOU.aspx>

²⁴ Other aspects of the interactive Hub can be check in its official page, see <https://eiah.eib.org/about/index>

stockholders/investors find the programme that matches with the objectives of the projects, then they will put in direct contact with the promoter. Stockholders/investors can also subscribe to any programme's updates according to their interests.

If the person is a project promoter that wants to increase the visibility of his/her project, the promoter can submit it to the Portal *for free*. Once done, the Portal team will start the screening process, and inform promoter about the project's publication. To be able for publication on the Portal the project must fulfil certain criteria. These are listed on the Portal's page.²⁵ Figure 3 presents a summary of the aforementioned procedures:

Figure 3: Overview of the European Investment Project Portal



9. Other programs

The Cleaner Transport Facility

The Cleaner Transport Facility (CTF) is an initiative to support the deployment of cleaner transportation and shipping. The facility targets transport/shipping operating on alternative fuels that have lower greenhouse gas emissions, and thus enhance environmental performance, compared to conventionally-fuelled operations. These alternative fuels include: (i) electricity; (ii) hydrogen; (iii) biofuels; and (iv) natural gas.

By making use of existing EIB products and new financial instruments, the CTF assists in investments in cleaner transport projects, by both public and private stakeholders. The CTF deploys the EIB's technical and financial capacity to adapt to specific market needs in order to explore viable business models and boost opportunities to finance cleaner transport. The support for alternative fuels and cleaner technology in transport is aligned with European Union policies

²⁵ Check more details here: <https://ec.europa.eu/eipp/desktop/en/index.html>

on climate action and sustainable transport, and specifically the strategy of the European Commission on low-emission mobility. Additional benefits of cleaner transport projects include reduced health costs due to cleaner air and lower noise.²⁶

The EIB is supporting this shift with investments in sustainable transport projects through existing EIB products and new financial instruments, such as the green shipping financing programmes under the European Fund for Strategic Investments (EFSI). The EC supports a large number of (pilot) projects including €107 million of Connecting Europe Facility (CEF) grants invested to deploy 650 additional supply points for alternative fuels along transEuropean transport network (TEN-T) roads by 2020, for a total investment of €187 million.²⁷

LIFE programme

The LIFE programme is the EU's funding instrument for the environment and climate action created in 1992. The current funding period 2014-2020 has a budget of €3.4 billion. It is divided in two sub-programmes: (i) environment (representing 75% of the overall financial envelope), and (ii) climate change (representing 25% of the envelope).

Overall, the programme supports projects in the areas of renewable energies, energy efficiency, farming, land use, and peatland management. It provides action grants for best practice, pilot and demonstration projects that contribute to the reduction of greenhouse gas emissions, the implementation and development of EU policy and law, best practices and solutions for clean shipping, etc. It also promotes knowledge sharing and integrated approaches, such as for climate change mitigation strategies and action plans at local, regional or national level. The projects accepted for this programme must receive a co-funding of at least 55%.²⁸

NOx Fund

NOx fund took place between 2007 and 2019 to support the environmental policy measures to reduce NOx emissions. In several industries, especially those with high NOx intensity such as shipping, the fiscal tax reduced the company financial ability to implement measures. Consequently, this did not provide any basis for development and phasing-in of new technology. The fiscal NOx tax was introduced in 2007 at NOK 15 per kilo NOx. This became financial difficult for many shipowners. Therefore, several different business organisations together recommended a solution with a NOx Fund, instead of the fiscal tax, in order to achieve the highest environmental benefits in relation to accrued expenses for the enterprises.²⁹

²⁶ For more insights, see <https://www.eib.org/en/projects/sectors/transport/cleaner-transport-facility.htm>

²⁷ More details are found in the following document: <https://www.eib.org/attachments/press/20161201-vp-pvb-handout-ctf-council.pdf>

²⁸ Insights on the possible funding instrument for shipping related to this programme can be found in the following page: <https://ec.europa.eu/easme/en/section/life/life-climate-action-sub-programme#inline-nav-0>

²⁹ Other details are presented in the following page: <https://www.nho.no/samarbeid/nox-fondet/the-nox-fund/articles/about-the-nox-fund/>

An important motivation for entering into the agreements was to develop new and improved solutions for environmental technology in shipping and fishing, as well as to ensure implementation of the solutions in the market. Electrification of maritime activity using battery technology, LNG operation of ships and NOx cleaning with catalysts are examples of technologies with high volume triggered by the NOx Fund's support. The NOx Fund has been important for shippowner and until the end of 2019, this Fund has:

- Granted support for approx. 1330 projects;
- Paid over NOK 4,4 billion for NOx-reducing measures;
- Reduced over 39,000 tonnes of NOx;
- Reduced over 1 million tonnes of CO₂;
- Contributed to significant development and dispersion of environmental technology.

Innovation Fund

The Innovation Fund plays an important role in greening investments in Europe. It is one of the world's largest funding programmes for demonstration of innovative low-carbon technologies. It Fund focuses on:

- Innovative low-carbon technologies and processes in energy intensive industries, including products substituting carbon intensive ones;
- Carbon capture and utilisation (CCU);
- Construction and operation of carbon capture and storage (CCS);
- Innovative renewable energy generation;
- Energy storage.

The EU Emissions Trading System (EU ETS), the world's largest carbon pricing system, is providing the revenues for the Innovation Fund from the auctioning of 450 million allowances from 2020 to 2030. The Innovation Fund improves the risk-sharing for projects by giving more funding in a more flexible way through a simpler selection process and is also open to projects from energy-intensive industries. For the period 2020–2030, the Fund may amount to about €10 billion, depending on the carbon price. In parallel to the Innovation Fund, the EU ETS provides the main long-term incentive for these technologies to be deployed. It is a key funding instruments that support the EU's economy-wide commitments under the Paris Agreement that object climate neutral Europe by 2050, as recognised also in the European Green Deal Investment Plan.

The first call for proposals under the Innovation Fund contributes to the green recovery of the EU ship-owners by helping businesses invest in clean energy and clean industry to boost green and clean Europe. The application process has two stages:

- Expression of interest, with a first assessment on the project effectiveness, innovation and maturity level. Projects that meet only the first two criteria may qualify for project development assistance.
- Full application, where projects are assessed on all the criteria, including scalability and cost efficiency.

For small-scale projects, the application process will have *only one stage*:

- Project proponents can apply by submitting their projects when there is an open call for proposals;
- The first call for proposals for large-scale projects is open until 29 October 2020. Projects can apply via the EU Funding and Tenders portal.³⁰

Conclusion

From January 1, 2020, all ships were required by the International Maritime Organization (IMO) to comply with a 0.5% cap on sulphur content in shipping fuel (unless travelling within a designated emission control area, where the limit is 0.1 %), with the aim of reducing the shipping industry's reliance on high sulphur fuel oil (HSFO) (which currently has a sulphur content of up to 3.5%). Given the fast-approaching deadline, with "business as usual" no longer an option for fuel source, what are the alternatives for vessels?

One option is simply to switch to a low sulphur fuel, but this is currently more expensive and in limited supply compared to HSFO. Some shipowners are installing an exhaust gas cleaning system (or "scrubber"), which will allow the vessel to continue using HSFO as the resulting exhaust gases are "cleaned" of sulphur such that they comply with the IMO cap. Financing capital expenditure of this nature may be attractive to financial institutions looking to extend green loans and to improve their carbon rating under the Poseidon Principles. So, in this part of book we described basic programmes and banks that can give you some loans for your projects, that you should pay back after contract ending, or just win a grant to do some research or built something – it depends on your goals and projects. Also, we described mechanisms how to get financing, what criteria you should match for it, what are deadlines and gave some advices about platforms for promotion and hub for help. Figure 4 summarises the EU green pools and funds for the Shipping Industry.

Figure 4: Summary of the EU green shipping financing programmes



³⁰ Details about the procedure, see <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/innovfund>

EU budget 2021–2027: focus on maritime economy

For the next long-term EU budget 2021-2027, the Commission proposed €6.14 billion under a simpler, more flexible fund for European fisheries and the maritime economy. The new European Maritime and Fisheries Fund will continue to support the European fisheries sector towards more sustainable fishing practices, with a particular focus on supporting small-scale fishermen. It will also help unleash the growth potential of a sustainable blue economy towards a more prosperous future for coastal communities. For the first time, it will contribute to strengthening international ocean governance for safer, cleaner, more secure, and sustainably managed seas and oceans. Finally, the Commission is reinforcing the environmental impact of the Fund with a focus on protecting marine ecosystems and an expected contribution of 30% of its budget to climate change mitigation and adaptation, in line with the commitments agreed under the Paris Agreement.³¹

In the next part of this book, we will show some practical cases from companies that have already had financed projects by such programs.

³¹ See reference: https://ec.europa.eu/commission/news/eu-budget-2021-2027-focus-migration-and-maritime-economy-2018-jun-12_en

Part 2. EU-Funded Projects and Practical Business Exercises from Private Companies

Introduction

This section will be dedicated to some practical cases of green shipping financial programs for shipowners in Baltic Sea Region. There are real organizations with great and useful ideas that have already got financing for the same programs that was described in first part of the book. Besides, we display can read about projects not only from Baltic region, but from all over the world to gain approximate knowledge about what projects were financed, how much money companies received, how ideas were implemented and what results they achieved.

In this part of the book we used the same contest as in previous, except points with new programs where we couldn't find any implemented project. So, you can easily find theoretical basis of every practical cases in first part of the book as well as applying information for this period.

1. Experiences funded by Connecting Europe Facility

As mentioned in the first part, one of the leading European programme supporting clean shipping and blue economy is the *Connecting Europe Facility* (CEF). The CEF is a key EU funding instrument to promote targeted infrastructure investment at European level. The most urgent priority that surges in the top of the CEF's objectives is green shipping.

Specifically, the *CEF for Transport* is the funding instrument to realise European transport infrastructure policy, including clean shipping. It aims at supporting investments in building new transport infrastructure in Europe or rehabilitating and upgrading the existing one. Here below, we will expose the most leading successful experiences that have benefited for the above projects.

Extension and upgrade of the Mercatordok combined transport Multimodal Terminal

Location of the Action: Belgium (see the snapshot).

Implementation schedule: October 2018 to December 2020.

Figure 5: Mercatordok, project implementation location in Belgium.



Transport corridor: North Sea, Mediterranean, Rhine – Alpine

Maximum EU contribution: 2 155 400 €. Total eligible costs: 10 777 000 €.

Percentage of EU support: 20%.

The North Sea Port in Gent (merged ports of Vliссingen, Terneuzen and Gent) is a Core Maritime/Inland Waterway Port located on the Rhine-Alpine and North Sea-Mediterranean Core Network Corridors. It represents an important hub

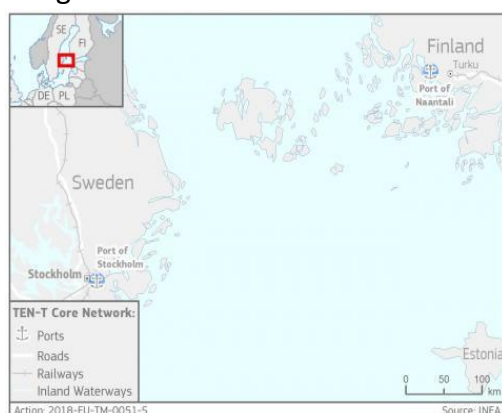
for the distribution and transshipment of wide variety of cargo categories within road, rail, IWW and maritime transport modes. The Action addresses an upgrade of port's multimodal terminal with the main objective to increase its efficiency and transshipment capacity, entailing the following activities:

- Upgrade of the ro-ro dock in order to enable docking of bigger vessels;
- Upgrade of terminal pavement in order to increase efficiency of traffic flows;
- Construction of terminal gate facilities in order to ensure more efficient and fully automatized terminal access;
- Installation of rail trailer handling system in order to facilitate loading/unloading of the combined transport units to/from the rail wagons;
- Upgrade of the rail tracks in order to efficiently accommodate 740 m and longer trains;
- Project management, as well as coordination and publicity tasks.

Through the above-mentioned interventions, this experience was successful, as expected, in supporting the modal shift from road to short sea shipping, clean shipping and other clean transport modes³².

Intelligent Sea - Integrated digital services for efficient and safe maritime navigation

Figure 6: Project implementation location of the integrated digital and safe maritime navigation.



Location of the Action: Finland, Sweden (see the snapshot).

Implementation schedule: October 2018 to December 2021.

Transport corridor: Scandinavian – Mediterranean.

Maximum EU contribution: 1 542 225 €.

Total eligible costs: 3 084 450 €.

Percentage of EU support: 50%.

Our investigations demonstrate that these pilots aim at increasing the safety and efficiency of navigational operations through the investments into the digitalisation of ports and fairways as well as the improvement of data transfers between the ship and shore. The project is in its finales phases, after already accomplished piloting of several studies in the Scandinavian–Mediterranean Core Network Corridor, namely in the Ports of Naantali and Stockholm. The following initiatives have been or will be piloted in both ports:

- A marine high speed 5G broadband network;
- Digital service cloud and smart navigational aids in the form of smart buoys;
- Alternative energy sources for smart navigational aids;
- Sniffer buoys for monitoring of vessels SOX emissions.

³² For more insights, see details in the project's official page: <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2018-be-tm-0146-w>

The EU grants was considerably competitive for these pilots, and the experience remains successful so for the different stockholders. These pilots seek to introduce new technologies, and contribute to enhancing the safety of navigational operations, promoting the environmental compliance of vessels as well as increasing the cost-efficiency of marine operations, and hence enhance clean shipping in the west BSR.³³

Green C-Ports

Location of the Action: Germany, Greece, Italy, Spain (see the snapshot).

Implementation schedule: April 2019 to March 2023.

Transport corridor: Baltic-Adriatic, Mediterranean, North Sea-Baltic, Orient-East-Med.

Maximum EU contribution: 3 577 854 €.

Total eligible costs: 7 155 708 €. Percentage of EU support: 50%.

Green C-Ports is an ambitious project aiming at:

- Reducing the impact of port operations on the cities;
- Monitoring emissions from ports and vessels;
- Increasing the efficiency of port operations and optimize handling of cargo
- Facilitating the access and egress of cargo in and out of core ports.

Figure 7: Green C-Ports, project implementation location



Pilot solutions is scheduled to be tested at the Core Ports of Bremerhaven, Wilhelmshaven, Piraeus, Venice and Valencia, which cover a significant part of freight transport on the Mediterranean, Baltic-Adriatic and Orient/East-Med TEN-T Core Network Corridors. Six case studies are/will be analysed:

- CS 1: Decreasing port traffic congestion;
- CS 2: Improving maritime accessibility to ports;
- CS 3: Improving air quality in ports and port neighbouring areas;
- CS 4: Reducing noise in ports and port neighbouring areas;
- CS 5: Forecasting ship-to-shore crane productivity;
- CS 6: Measuring real-time emissions along a multimodal transport chain.

³³ More practical evidence about this experience as well as the feedback from the stackholders could be found: <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2018-eu-tm-0051-s>

This experience is considered to be successful to link ports of South Europe with ports in North Europe. This leading experience (50% granted by EU) action's results will be a Port Environmental Performance Platform that will gather information from an extensive network of sensors. Moreover, through modelling of artificial intelligence and algorithms the PEP will inform port internal users, port customers and port neighbouring areas and municipalities on key environmental parameters related to the ports operations.³⁴

Rostock-Gedser Motorway of the Sea - Part 2

Figure 8: Rostock-Gedser Motorway, project implementation location



Location of the Action: Denmark, Germany (see the snapshot).

Implementation schedule: January 2014 to December 2017. *Maximum EU contribution:* 6 178 855 €.

Coordinator: Scandlines Gedser-Rostock ApS (Denmark) <http://www.scandlines.com>.

Transport corridor: Orient-East-Med, Scandinavian-Mediterranean.

The Action upgraded and enlarged the maritime capacity of the Rostock-Gedser Motorway of the Sea link. It included conversions of two new RoPax vessels to ensure environmental and efficiency compliance and the required adjustment and improvement works in the TEN-T ports of Gedser (Denmark) and Rostock (Germany).

Based on our interviews and research for this past experience (project already over), the main outputs were:

- Hybrid propulsion system installed on-board the two new RoPax vessels "MS Berlin" and "MS Copenhagen" combining marine fuel operation with energy supply from batteries. These are currently the largest hybrid ferries in the world;
- Exhaust Gas Cleaning (EGC) system in a form of closed loop wet scrubbers installed on the both vessels;
- EGC storage and supply facility for sodium carbonate (needed for the functioning of the scrubber systems) in the Port of Gedser;
- Waste water treatment facility installed at the Port of Gedser;
- Terminal improvements (new sign carrying gantries) and berth adaptations implemented in the Port of Rostock.

³⁴ Project evaluation in detail, see <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2018-eu-tm-0117-s>

These outputs delivered on the planned objectives i.e. it contributed to increased efficiency, improved environmental performance and enhanced competitiveness of the link Rostock-Gedser. Stakeholders highlighted the great support of EU pools in achieving the final objectives.³⁵

Overview on EU financed projects, descriptive summary

And for the general overview for financed projects themes, we provide, in Table 2, examples of maritime projects in the Baltic Sea region funded via the CEF transport programme in CEF Transport calls 2015–2017.³⁶

Table 2: List of a selection of the EU funded projects

Country Project number	Name	Co-funded vessel related investments	EU CEF co-funding in €
Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Sweden 2015-EU-TM-0132-M	FAMOS Odin: Finalising Surveys for the Baltic Motorways of the Sea	The Action is part of a Global Project aiming to complete hydrographic surveying in an area of approximately 26000 km ² of the Baltic Sea according to the BSHC-HELCOM scheme, thereby supporting sustainable and safe shipping in the Baltic Sea and contributing to Blue Growth in the region.	10 789 590
Finland, the Netherlands, Germany, UK 2015-EU-TM-0098-M	DOOR2LNG – Upgrade of the maritime link integrated in the multimodal container transport routes	Additional to the port infrastructure investments, the project is equipping four newly built, larger vessels with the latest innovations around dual fuel LNG engine technology and energy efficiency.	16 958 000
Finland, Sweden 2015-EU-TM-0178-M	Bothnia Bulk – Environmental upgrade of year- round supply in the northern Baltic Sea	Additional to the port infrastructure investment, the project includes procurement of additional environmental efforts (LNG, onshore power) for two new build bulk carriers.	6 800 000
Finland, Sweden 2016-EU-TM-0092-W	NextGen Link –Upgrade of the maritime link with the port interconnection in the ScanMed Corridor	Additional to the port infrastructure investments, the project introduces LNG-powered RoPax vessels to the maritime link.	11 778 630
Denmark, Sweden 2016-EU-TM-0256-W	Nordic Maritime Link – Connecting the ScanMed Corridor via Integrated MoS	Additional to the port infrastructure investments, a hybrid electric battery package will be installed aboard Stena Jutlandica (works) which will replace the auxiliary engine of the RoPax ferry.	3 780 000
Estonia, Finland 2017-EU-TM-0135-W	TWIN-PORT 3	Additional to the port infrastructure investments, three shipping lines operating the route will retrofit 5 vessels enabling the use of Onshore Power Supply (OPS) in ports thus diminishing their environmental impacts.	18 357 255
Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Sweden 2015-EU-TM-0132-M	FAMOS Odin: Finalising Surveys for the Baltic Motorways of the Sea	The Action is one part of the long-term FAMOS project aiming to complete hydrographic surveying in an area of approximately 26000 km ² of the Baltic Sea according to the BSHC-HELCOM scheme, thereby supporting sustainable and safe shipping in the Baltic Sea and contributing to Blue Growth in the region.	10 789 590

³⁵ Publicly information is available, see <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-eu-tm-0520-m>

³⁶ For stockholders and shipowners, more useful information might be found in this institutional report, see <https://www.traficom.fi/sites/default/files/media/publication/Economic%20incentives%20to%20promote%20environmentally%20friendly%20maritime%20transport%20in%20the%20Baltic%20Sea%20region%20by%20Finland.pdf>

2. TEN-T project experiences

As presented above, the TEN-T is now a component of many funding European programs for clean transport. Therefore, exposing experiences might be important in order to understand what were the successful projects that have been funded but such programme over last year. In this section, we will display some project experience related to clean shipping and development of clean mobility around the Euro area. Since the majority of the actions/projects are already closed, we will be presenting bellows a selections of sharing experiences of the most recent and relevant funded project and ideas.³⁷

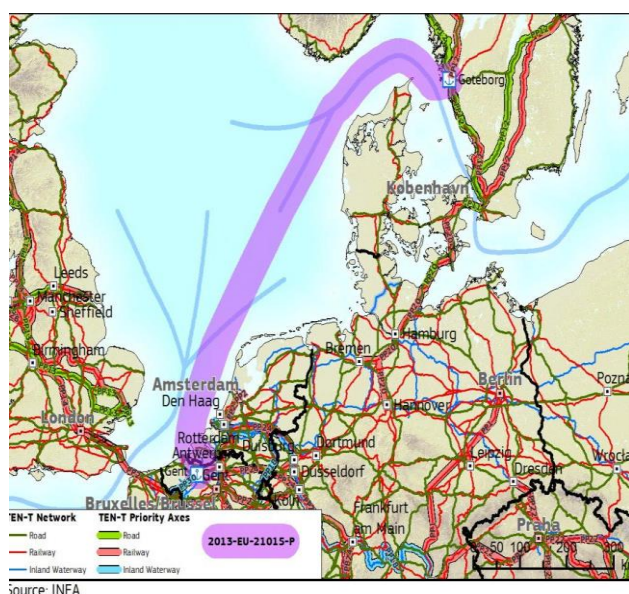
Sustainable Motorway of the Sea Ghent-Gothenburg through environmental upgrade and compliance while maintaining competitiveness of short sea shipping

Member States involved: Belgium, Sweden, Denmark (see the snapshot).

Implementation schedule: start date: January 2013, end date: December 2015.

EU contribution: €2,924,668.

Figure 9: Motorway of the Sea Ghent-Gothenburg, project implementation location



This project aimed to help shipowners reinvest in market new measures related to the environmental upgrade of three modern mid- / large-size RoRo ships. It helped shipowners to install scrubber technologies on: *Freesia*, *Magnolia* and *Primula Seaways* that ensure regular, reliable and frequent³⁸ maritime transport service between the TEN-T category A seaports of Ghent (Belgium) and Gothenburg (Sweden).

This project also made some quality and viability improvements of the maritime link and port terminals. Port handling, terminal and vessel management and reliability were improved by upgrading the intermodal handling equipment (Gothenburg) and

installing a traffic management system with weight measurements (Ghent).

The project was implemented jointly by companies of *DFDS group*, *shipowners* and *operators*, as well as *port terminal operators*. All partners agreed about the necessity of EU pools in making happen this successful this challenging project.³⁹

³⁷ To have a look on the all agency-managed projects 2007-2013 by year, the story and experiences, see <https://ec.europa.eu/inea/ten-t/ten-t-projects/ten-t-projects-year/projects-2007-2013-financial-framework>. In this web page, stockholders can find all the projects, experience sharing and many financial analyses from 2000 to 2006. Each project experience is listed in a separate page.

³⁸ About 6 departures per week and direction.

³⁹ For others information about the project, see <https://ec.europa.eu/inea/ten-t/ten-t-projects/projects-by-country/multi-country/2013-eu-21015-p>

Project design studies providing safe maritime access to the Atlantic basin in the port of Dunkirk

Member States involved: France (see the snapshot).

Implementation schedule: start date: March 2014, end date: December 2015.

EU contribution: €519,899.

This project was part of a Global Project aiming to increase the access capacity to the West container terminal in the French Port of Dunkirk. Concretely, it looks at increasing the number of large container ship calls and container traffic, based on future demand forecasts. It will result in a more sustainable and safer port access and smoother manoeuvrability for the ships.

Figure 10: Atlantic basin in the port of Dunkirk, project implementation location



This specific project has covered the technical design and safety studies for adapting the nautical access to operate ULCS (ultra-large container ships). Its completion has enabled to carry out construction works in the Dunkirk port that have resulted in the following benefits:

The port of Dunkirk is now able to operate 400 meter-long ULCS thanks to the adaption of the turning circle in line with the standards of the "Association Internationale Permanente de Congres de Navigation – AIPCN". The Manoeuvres of the vessels can now be made with higher security.⁴⁰

Development of the green mobility in the port of Civitavecchia through the implementation of the pilot technology REWEC 3

Member States involved: Italy (see the snapshot).

Implementation schedule: start date: March 2014, end date: December 2015.

EU contribution: €568,753.



Figure 11: Green mobility in the port of Civitavecchia, project implementation location

This ambitious project was aiming to reduce the emissions produced by the services and terminal activities of the *Port of Civitavecchia* by installing renewable energy systems expected to satisfy at least 55% of the port's total energy needs by 2020. It covers a feasibility study, including a pilot project, to convert wave energy into electricity to be used in port activities. In particular, it:

⁴⁰ For more experience sharing relative to this project, see <https://ec.europa.eu/inea/ten-t/ten-t-projects/projects-by-country/france/2013-fr-91002-s>

- Tests the wave energy absorbers system REWEC3 (*REsonant Wave Energy Converter 3*) to demonstrate its cost efficiency;
- Evaluates the possible future introduction of green mobility (i.e. electric vehicles) in port operations;
- Studies storage options for the green energy produced by the port;

These actions will pave the way to the installation of 8 REWEC3 systems for a total of 136 turbines, and thus help green mobility in the port of Civitavecchia. Indeed, this experience was considered to be successful in Italy, as it reach its main objective.⁴¹

3. Funded projects related to Interreg Europe: *sharing experience*

As presented in the first part, Interreg Baltic Sea Region Programme 2014–2020 supports integrated territorial development and cooperation for a more innovative, better accessible and sustainable Baltic Sea region. Partners from countries around the Baltic Sea work together in transnational projects on common key challenges and opportunities. Hence, to better understand how the programme was really helping and supporting investments for clean shipping industry, we analyse briefly some successful experiences that have benefitted from Interreg Europe funding. In what follow, we will keep demonstrating project cases that have already been funded and started implementation.

Support Local Governments in Low Carbon Strategies

Budget: €1,848,134.00 from 1 Jan 2017 to 30 Jun 2021.

This support aims to improve the coordination and performance of policy instruments to implement national and regional energy efficiency programmes at local level, through:

- Reduction of the implementation gap and a more effective use of available funding opportunities (including *Structural Funds*);
- Reinforcing the coordination and support role of regions;
- Focusing on the development of more cost-effective and wide-range actions.

Partners work both separately and jointly (and with the collaboration of key regional stakeholders and the technical support of the advisory partner) to analyze their regional backgrounds in the field of energy policies and transfer good practices. Besides, they need define action plans to improve the performance of their energy policy instruments and the spending of structural funds in their regions, also through a more effective implementation of local plans. Our investigation started at the moment when this project has started. Sharing experience from the stockholders and partners are still not yet well established.⁴²

Public Engagement for Sustainable Public Transport (PE4Trans)

Budget: €1,409,791.00 from 1 Jun 2018 to 31 May 2023.

PE4Trans addresses the issue of potential for improvement of public transport policies by including citizens to the process of design and implementation of sustainable transport strategies

⁴¹ More information about the project success, see <https://ec.europa.eu/inea/ten-t/ten-t-projects/projects-by-country/italy/2013-it-92050-s>

⁴² More information are publically available, see <https://www.interregeurope.eu/support/>

and plans with the view to change peoples' mobility habits and routines. It included sectors beyond shipping industry. For the purpose of sharing experience, this project will be briefly introduced below.

Although the limited public information, it is known that PE4Trans partners adopt the approach *"for the people, by the people and with the people"* as a guiding principle for the possible policy improvements for sustainable public transport (including shipping), which go in two directions:

- Influencing the citizens' behavioural change using good practices of environmental solutions;
- Launching in the participating territories transferable mechanisms of public engagement in policy-making processes.

PE4Trans will focus mainly on improvements in the policy instrument governance in each partner territory enhancing the use of sustainable mobility solutions and contributing to substantial reduction of the carbon footprint, both policy-makers and inhabitants benefitting from the outcomes.⁴³

Integrated REgional Action Plan For Innovative, Sustainable and LOw CaRbon Mobility (REFORM)

Budget: €1,444,991.00 from 1 Jan 2017 to 31 Dec 2020.

This project supports the implementation and deployment of Sustainable Urban Mobility Plans (SUMPs) as an instrument for shifting mobility towards low-carbon patterns. Hence, REFORM aims to achieve a rate of 60% of local authorities to have completed the SUMP adoption process, in the four REFORM regions.⁴⁴ The framework of this project, through regional and interregional learning exchanges, will trigger the development process and amplify the SUMP adoption rate by local cities in four European regions:

- Central Macedonia (Greece);
- Emilia-Romagna (Italy);
- Parkstad Limburg (the Netherlands);
- Greater Manchester (United-Kingdom).

4. Experiences from Green Shipping Programme: *Norway pilots*

Following the IMO target that emissions shall be halved by 2050, international markets for green technologies and solutions are becoming reality across all Europe. For that, as presented in the first part, the Green Shipping Programme aims to reach this objective, as well as to find scalable solutions for efficient, clean and environmentally friendly shipping. The aim is to reach to a cost-effective emission cut and to a high competitiveness level for shipping industry. Both authorities and industry actors participate in the programme and are working together to achieve these goals.⁴⁵

⁴³ Other information about the project: <https://www.interregeurope.eu/pe4trans/>

⁴⁴ More information about the project, see <https://www.interregeurope.eu/reform/>

⁴⁵ For more insights, see <https://www.dnvgl.com/maritime/green-shipping-programme/index.html>

Many project are already ongoing that benefited from the Green Shipping Programme. All of them are phasing in low(zero)-emission solutions in shipping towards 2030, with significant climate, environmental and public health benefits.

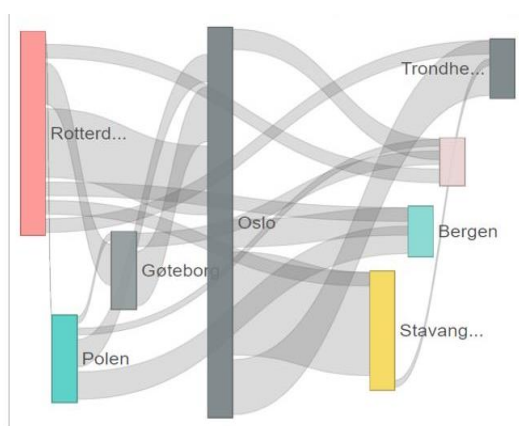
Logistics 2030

Pilot owner: ASKO

Participants: Flowchange, Seatrans, DFDS, Grieg Star, Hydro, Norske Havner, Stavanger Havn, Klima- og miljødepartementet, Oslo kommune/Oslo Havn, Bergen Havn, Flora kommune, Universitetet i Sørøst-Norge (USN), SINTEF, Menon, The Norwegian Coastal Administration, Norwegian Maritime Authority, Enova and DNV GL (*see the snapshot*).

Status: The project was launched in March 2019 and is in the closing stages of mapping cargo volumes and trade patterns between Norway and Europe.

Figure 12: Cities involved in the project implementation



Logistics infrastructure for cargo in Norway is built on the road transport's premises with most goods transported from Europe passing through Eastern Norway. There is now a new national sustainable logistics (terminal structure) that facilitates transition via Eastern Norway to direct maritime transport to the entire country. This will enhance sustainable transport and clean shipping.

Against this, this direct maritime transport (in both ways between Europe and the West, and between Europe and the East of Norway) will reduce costs and

GHG emissions, improve the cargo flow balance and ameliorate the decarbonisation.

Overall, investigations show that the goal of such pilot is to develop a knowledge base and plan that can help realize this sustainable logistics. At the end of the project, partners will be able to test a new sea-based logistics structure between Norway and Europe.⁴⁶ The test will be realized over the course of 3-4 years, followed by large scale implementation resulting in significant cargo transfer from road to sea in 5-10 years. The project work also includes mapping of sustainable transport offering a sea-based sustainable logistics structure for 2030.

Clean Maritime transport of raw materials: HeidelbergCement and Felleskjøpet Agri

Pilot owner: HeidelbergCement and Felleskjøpet Agri

Participants: ABB, Enchandia, Flowchange, Gasnor, Grieg Star, Hordaland Fylkeskommune, Hyon, Kongsberg Maritime, The Norwegian Coastal Administration, Kystrederiene, Norwegian Maritime Authority, SINTEF, Vard and DNV GL

Status: The pilot was initiated in March 2019.

This project led by HeidelbergCement and Felleskjøpet Agri aims to evaluate the feasibility of combining two cargo owners' logistics between the east and the west of Norway, under the hypothesis that the total goods flow combined with long-term chartering contracts can make it

⁴⁶ Phone interviews in addition to in-depth interviews have been conducted for this purpose.

possible to realize a zero-emission bulk carrier. In addition, analyses of historical shipments have revealed a significant potential for coordination and co-utilization of vessels. A requirements specification for the logistics solution with zero emission ships is under development. Zero-emission solutions, green contract regimes and cost-benefit analysis are still ongoing.⁴⁷

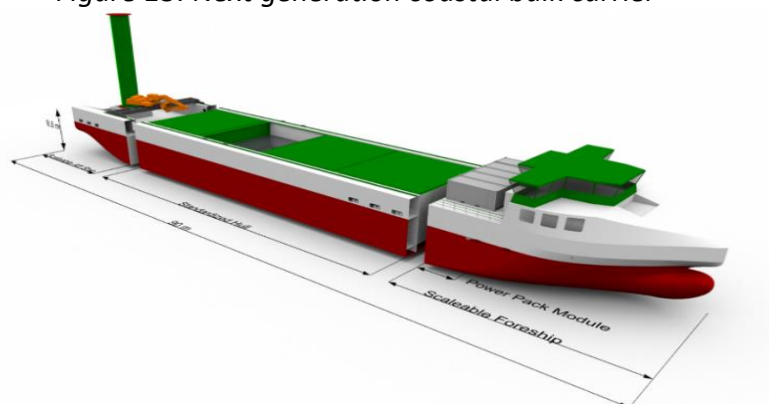
Fleet renewal, next generation coastal bulk carrier

Pilot owner: Vard, Norway.

Participants: ABB, Enchandia, Flowchange, Gasnor, Grieg Star, Felleskjøpet Agri, HeidelbergCement, Hyon, Kongsberg Maritime, the Norwegian Coastal Administration, Kystrederiene, Norwegian Maritime Authority, SINTEF and DNV GL

Status: the pilot was started in April 2019.

Figure 13: Next generation coastal bulk carrier



At the time of our investigations, the ship segment was already mapped, logistics system was evaluated and a roadmap for evaluation and weighing of measures was established. Now, the current phase is focused on design development (see, the associated design is publically available).

The small-sized bulk – and general cargo fleet used for domestic coastal transport has an average age of approximately 30 years. There is a need for green fleet renewal in order to sustain the transport and clean shipping in the future. Overall, Vard's goal with this new pilot is to establish an innovative fleet renewal program for low- and zero-emission self-unloading ships, based on electric transmission and autonomous load/unload solutions, and designed for the market needs up to 2040.

Port transition barometer

Pilot owner: Norske Havner, Norwegian Ports Association.

Participants: Selected member ports, shipowners/cargo owners, Norwegian Coastal Administration and DNV GL.

Status: The pilot initiated in August 2019.

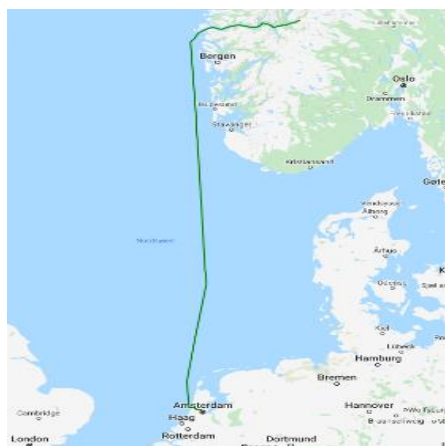
Overall, by this pilot, Norwegian Ports Association aims to promote cargo transfer from road to sea in Norwegian ports, in a bid to reduce GHG emissions in the transport sector and the traffic intensity on roads, and accelerate the development of zero-emission ports (green ports). A

⁴⁷ Investigations started at the beginning of this project, no details from stockholders and partners are yet available. For further analyses, see <https://www.dnvgl.no/maritime/gront-skipsfartsprogram/HC-FKgreenbulk/index.html>

measurement system (port barometer) will be developed, which through a port index can document the ports' facilitation of cargo transfer and measure the effects in terms of increased volumes at quay and reduced emissions. Further, the pilot should facilitate for identification and sharing of best port practices and identify and develop measures for increased green cargo transport through the ports. As the moment of our investigations, this project was just initiated, all stockholders and partners are still did not have publically their EU funding experience.

Hydro(gen)ship

Figure 14: Hydro(gen)ship, project implementation location



Pilot owner: Hydro

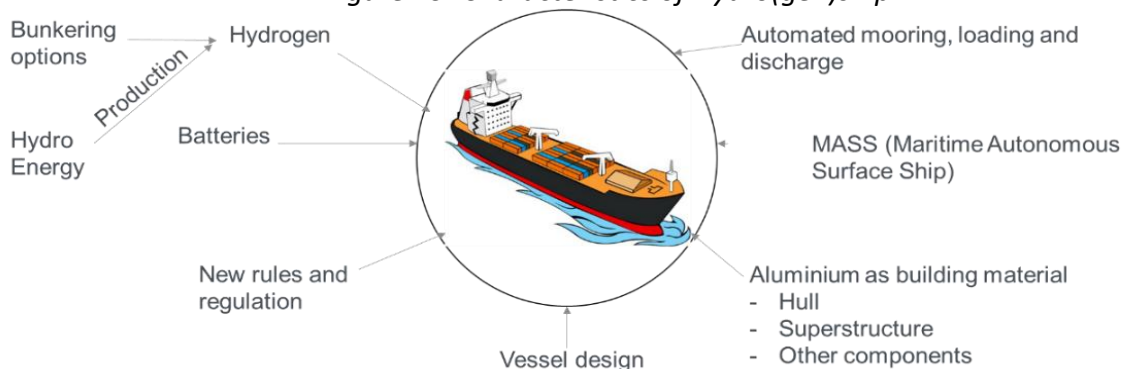
Participants: ABB, Enchandia, Flora Municipality, Flowchange, Gasnor, Hordaland municipality, Hydro Energi, Hyon, Kongsberg Maritime, Norwegian Maritime Directorate, SINTEF, Vard, Wärtsilä, ZEM, DNV GL (see the *snapshot*).

Status: The pilot was initiated March 2019. Work groups have been established to cover the different tasks to be assessed.

To promote clean shipping, one of the challenges is to make a hydrogen fuelled vessel be competitive. This is, a game-changer in the maritime industry as the first zero emission bulk vessel that support the EU greening and decarbonisation of shipping industry.

Discussion that we have attended in the European Maritime Day 2019 (Lisboa)⁴⁸ had raised the issue at the top challenges of the industry. Hence, Hydro Aluminium was presented as regular aluminium shipments to the ARA-area from their production site in Sognefjord (Norway). The pilot's objective is to establish a feasible H2 driven bulk carrier compared to conventional vessel. Based on the experts and the pilots' operators taught, the characteristics of such new funded pilots are presented in the schema below:

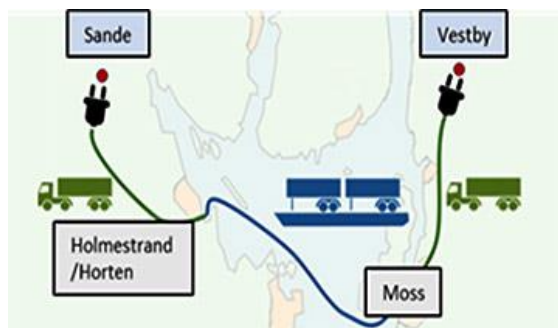
Figure 15: Characteristics of Hydro(gen)ship



⁴⁸ See, <https://cshipp.eu/the-green-course-towards-decarbonisation>

Multimodal transport system with autonomous sea drones

Figure 16: Multimodal transport system, project implementation location



Pilot owner: ASKO.

Participants: Kongsberg Maritime, Naval Dynamics, Norwegian Maritime Authority, Norwegian Coastal Administration, ABB, Enova and DNV GL.

Status: the project is currently developing the concept with focus on the sea drone including propulsion and electrical system, cargo loading/unloading including the berth/terminal and business and technical risk analysis (see the

snapshot).

As there is an urgent need for cost efficient multimodal transport of cargo over short distances to reduce road traffic and eliminate emissions. This project is a leader experience that develops a commercially and technically realizable zero-emission concept, where autonomous, electrical and flexible sea drones transport across fjords and short distances, and in combination with electrical trucks constitute a cost-efficient door-to-door transport system. This flexibility includes transport of different cargos; ro/ro, container and bulk. This experience, as the stockholders stated in many open sourced information, aims basically to coordinate the enhancement of clean shipping across the region.⁴⁹

5. Cases from LIFE programme

Since LIFE is one of the first funding EU, there exists, to date, more than 4,600 co-financed projects over 25 years. Until 2013, LIFE had contributed approximately €3.1 billion to the protection of the all aspects environment. In what follows, hence, we are able to share two main successful cases of financing projects related to clean shipping under LIFE programme.

Clean shipping: helping to silence underwater noise

Marine live is sensitive to underwater noise. While it is a known pressure, the precise impact of underwater noise is less well-known. For instance, the Baltic Sea is designated as a '*particularly sensitive sea area*' by the International Maritime Organisation. Noise levels are increasing. Major sources of noise include shipping, seismic surveys for oil and gas exploration, offshore construction such as marine wind farms, military and mapping sonars, offshore industrial activities, and the use of acoustic deterrent devices.

LIFE programme help business to establish standards for measuring underwater noise in the Baltic Sea. This has greatly increased the capacity of *Member States* to understand this pressure and in the long term to take appropriate actions to achieve good environmental status. Developed a system for tracking marine live and a protocol for ships in their vicinity in the *Ligurian Sea*.

⁴⁹ More information about this experience and stockholders' opinions, see: <https://www.dnvgl.com/maritime/green-shipping-programme/GSPilotProject.html>

LIFE has also successfully pursued a regional approach that could be a template for action in other seas in Europe.⁵⁰

Clean shipping: solutions to minimize eutrophication

Unightly algal blooms on seas and lakes are the most visible sign human activities have enriched water with too much nitrogen and phosphorous.

LIFE is showing new ways to prevent and treat the causes of eutrophication. Nitrogen and phosphorous are the primary inorganic nutrients responsible for the eutrophication of marine waters. Human inputs – including from farming, industrial and domestic waste water, aquaculture and ships' effluents – have increased the load of nitrogen and phosphorous to our seas and oceans. This can lead to eutrophication, which causes biodiversity loss, degraded ecosystems, harmful algal blooms and oxygen deficiency in bottom waters. LIFE programme is at the forefront of introducing policies to help shipowners to implement solutions against these issues.

LIFE provides multiple solutions for tackling eutrophication at source. Funded projects to reduce nitrogen use and run off in agriculture. Supported sustainable aquaculture. Improved the efficiency of industrial and urban wastewater treatment for many shipping company (*nearly 250 projects*). Used blue and green infrastructure for stormwater management and depollution.⁵¹

6. Other experiences: *private shipping companies*

Carnival Corporation & plc

KfW IPEX-Bank provided a loan of approximately €786 million for ship financing, most of which was syndicated out to other banks.

– Contribution of KfW IPEX-Bank,

- Loan of €786 million;
- Full underwriting;
- Primary syndication of €595 million to seven international banks.

– Project profile: financing,

- Financing for the new build cruise liner hull number S. 716 for Carnival Corporation & plc;
- Entire structuring; Sole Book Runner; Initial Mandated Lead Arranger (MLA); Facility Agent; ECA Agent.

⁵⁰ More information about the project, see the following institutional report https://ec.europa.eu/environment/archives/life/publications/lifepublications/lifefocus/documents/marine_environment_web_2018.pdf

⁵¹ More information about the use and effectiveness of LIFE programme to support clean shipping, see the following institutional report https://ec.europa.eu/environment/archives/life/publications/lifepublications/lifefocus/documents/marine_environment_web_2018.pdf

– *Project characteristics: cruise vessel,*

- Dual-fuel engine that runs on LNG and marine diesel;
- LNG-driven standard operation;
- Accommodation of 5,200 passengers (lower berths);
- Built at Meyer Werft shipyard in Papenburg, Germany.
- Scheduled delivery in May 2022.⁵²

Brittany Ferries

The European Investment Bank (EIB), Société Générale and Brittany Ferries (French shipping company) have experienced the success of the first green maritime financing under EIB's €750 million Green Shipping Guarantee (GSG) programme put in place last year by the EIB and Société Générale. The new vessel '*Honfleur*' will be Brittany Ferries' first Liquefied Natural Gas (LNG) powered ferry. It is entered into service in April 2019 on its *Caen-Ouistreham* (France) and *Portsmouth* (UK) route.

Brittany Ferries is today a pioneer in the green maritime transport sector with the signature of the first ship financing supported by the bank of the European Union under the GSG programme whose action is primarily focused on respecting the environment and the fight against the effects of climate change. With the acquisition of its new ship *Honfleur*, Brittany Ferries confirms its momentum to develop LNG, currently the cleanest fuel source, thus contributing to a significant improvement in the environmental performance of its fleet.

Société Générale acted as the main arranger of the €142.6 million financing for the acquisition of the *Honfleur* ferry commissioned by Brittany Ferries, which includes a tranche of €49.5 million fully guaranteed by the EIB. This transaction, which is part of Société Générale's "*Sustainable & Positive Impact Finance*" offer, also demonstrates capacity to innovate and develop new financing solutions that integrate the environmental challenges that the Société Générale bank is offering.

Importantly, the intervention of the EIB, combined with the European guarantee, has made it possible to optimise the structure of the financing by significantly reducing the financial burden borne by Brittany Ferries.⁵³

Scandlines

The EU Connecting Europe Facility (CEF) funds Scandlines' green initiatives (environmentally friendly operation) for clean shipping. This consists on:

⁵² More information about this loan and project, see <https://www.kfw-ipex-bank.de/Business-sectors/Maritime-Industrie/Cruise-ships/>

⁵³ More information about the project: <https://www.societegenerale.com/en/newsroom/The-European-Investment-Bank-Societe-Generale-and-Brittany-Ferries-successfully-sign-first-green-financing-in-the-maritime-transport-sector>

- €6.3 million from EU for the installation of scrubbers and hybrid system;
- Additional co-financing of €2.3 million for the installation of the hybrid system;
- Hybrid propulsion system combines traditional diesel power with electric battery power;

These green initiatives make Scandlines the 1st in the world to make large-scale use of the hybrid technology. Scandlines attested that the EU funding programmes foster their green initiatives.

Summary of interviews with other green shipping companies

Beside information that we raised during our investigations throughout the project, this section provides a summary of a selection of interviews conducted with others companies that received EU funding. For their privacy, we changed real company names for **XXX**. The main interview results are presented below.

The overall conclusion is, that funding from the European Commission aims R&D projects targeting Hydrogen and Liquid Hydrogen as Propulsion for Cruise Vessels. However, projects have to be tailored not only to the companies' needs but also to the very specific objectives of the calls/programme. A detailed understanding of any call is mandatory to access if it is worthwhile to undertake the task of gathering a project consortium and undertaking an application.

In addition, the Connection Europe Facility (CEF) has been examined. While the CEF seems to be the funding instrument available, the CEF-Transport Programme does not support investments developed as such for cruise vessels just as the calls are all directed towards the deployment of innovative technologies. Nevertheless, the open call under the priority '*Motorways of the Sea*' has been examined and described in the report, as XXX may be able to shape an application/a project deploying (parts of) innovative technologies along the Core Network of the TEN-T in connection with the use of Hydrogen and Liquid Hydrogen for Propulsion on different vessel types.

The European Regional Development Fund (ERDF) funding is available through a vast number of programmes, amongst others Interreg programmes. While it could be possible to attract funding via ERDF (as ERDF/Interreg programmes provides also funding for the cruise industry and transport), calls also direct themselves towards the deployment of technologies rather than R&D projects, just as XXX would need to indicate a geographical area/scope in order to assess if funds could be available for the scope of their project.

National funding could be a possibility for XXX to attract funding. For Denmark, it could be possible to submit applications to the Danish Maritime Fund and the Innovation Fund Denmark and these funding options have been included in the report. Alternatively, the European Commission disposes of a vast number of funding instruments, which are segmented into thematic and geographical areas and administrated by different agencies.

In regards to thematic grouping, the European Commission has gathered the administration of infrastructure, research and innovation projects in the fields of transport and energy at the

Innovation and Networks Executive Agency (INEA) subsequently making INEA the ad-hoc agency the most relevant to the stakeholders and shipowners before any application.

Dissemination and knowledge sharing

Three events were organized to share knowledge about the green EU pools and funding programmes and experiences with investors, stakeholders and policy makers:

- CSHIPP's workshop "*The green course towards decarbonization: winning the challenge*" which was jointly organised by Waterborne European Technology Platform, SeaEurope, European Hydrogen and Fuel Cell Association (HydrogenEurope), CSHIPP Clean Shipping project platform and NABU German Nature and Biodiversity Conservation Union. See, <https://cshipp.eu/the-green-course-towards-decarbonisation>
- CSHIPP's workshop on "*Clean Shipping Financing – Challenges and Best Practices*" organised in Tallinn. The event aimed to address the present situation and future needs for clean shipping solutions as well as discussing best practices in clean shipping financing. The event was organised and hosted jointly by CSHIPP partners Tallinn University of Technology and Maritime Development Center. See, <https://cshipp.eu/clean-shipping-financing-discussed-in-tallinn>
- CSHIPP's webinar on business potential in clean shipping, hosted by Maritime Development Center and Tallinn University of Technology, under the theme of "*Collaboration as a catalyst for environmentally and economically sustainable shipping*". Discussions and knowledge sharing provide insight into the environmental impacts of shipping, the business opportunities provided by clean shipping solutions as well as the ways in which the transition towards environmentally and economically sustainable shipping can be supported. See, <https://cshipp.eu/business-opportunities-in-clean-shipping>

7. Russian experience

The Russian government has three priorities when formulating policies that concern the shipbuilding sector. *First*, is the creation of competitive, specialized marine equipment, including what is needed for the exploration of the continental shelf and for the development of the Northern Sea Route, and the production of high-tech, medium-tonnage transport and supply vessels, high-tech fishing ships, and marine and river research vessels. *Second*, is the implementation of institutional changes in the industry, including a clusters in its development, introduction of integrated structures for the production of marine equipment, and leasing mechanisms for marine fishing equipment and river equipment. *Third*, is bringing Russian leading manufacturers back to a world-class standard.

Overall view

The supportive measures are divided into “*systemic*” ones applicable to industries with a long production cycle, and “*special*” ones aimed directly at the development of shipbuilding.

The “*systemic*” measures include:

- No VAT on imported equipment that have no analogous products manufactured in Russia;
- Subsidizing of interest rates on loans from domestic commercial banks, as well as of costs associated with the use of other financial instruments for the manufacturing of ships in Russia;
- Co-financing of investment projects related to the modernization of production facilities.

The “*special*” measures include:

- Development of a set of measures to secure the priority right of Russian shipping companies to construct sea shelf exploration equipment;
- Restrictions on the use of foreign ships and ships built abroad for coastal shipping and on inland waterways;
- Creation of a mechanism to stimulate the manufacture of fishing vessels by domestic enterprises;
- Development of a leasing system for shipping companies acquiring Russian river vessels.

Subsequently, in order to implement the adopted strategies for development of the shipbuilding industry, the Ministry of Industry and Energy proposed additional “*special*” financial measures in 2008, as follows:

- Exemption from VAT and import duty for ship components that are not produced in Russia, as well as reduction of VAT to 10% for vessels produced by domestic shipyards;
- Exemption from property tax and land tax for shipbuilding enterprises;
- Reimbursement from the federal budget of part of the interest on loans received by Russian shipping companies for the purchase of ships and marine equipment from Russian shipyards, and by Russian shipbuilding companies for investment in technological re-equipment of their shipyards;
- Use of federal budget funds to increase the authorized capital of a specialized leasing company that will lease out domestic river and fishing vessels;
- Use of federal budget funds for the acquisition, by Russian shipbuilding companies, of licenses on advanced foreign technologies for the manufacture of ships and ship equipment not previously produced in the Russian Federation;
- State guarantees to investors who provide loans for the construction of new shipbuilding facilities or for capital modernization of existing shipbuilding facilities in Russia.
- The main instruments of current government support are described in the state program “Development of Shipbuilding and Facilities for Offshore Fields, 2013 – 2030”. Three main activities are covered:
 - Stimulating development of innovative production in the shipbuilding industry;
 - Assistance in the development of leasing arrangements for ships and offshore structures built in Russia;
 - Establishing utilization funds for particular types of vessel (fishing, passenger within river navigation)

Actual situation: selection of practical cases and ongoing successful projects

Since 2011, certain restrictions regarding the use of foreign-made vessels and ships sailing under foreign flags have been discussed and introduced. In particular, only ships built in domestic shipyards are allowed to extract (catch) aquatic biological resources in the Russian Federation's internal waters. In 2016, the government proposed to grant vessels sailing under the Russian flag the preferential right to transport and tow within the continental shelf 'On Amendments to the Merchant Shipping Code'. At the same time, the national government planned to preserve the possibility of carrying out this transportation and towing by ships under foreign flags.

In 2017, the government proposed to grant Russian vessels an exclusive right to transport and store hydrocarbons in the waters of the Northern Sea Route. This proposal gave rise to vigorous debate. As a result, on December 30th 2018, amendments to the Merchant Shipping Code came into force, according to which Russian ships have the exclusive right to transport hydrocarbons produced in Russian territory and loaded onto vessels in the Northern Sea Route area. Exceptions to this rule are allowed only by intervention of the government. The amendments do not apply to contracts as well as international treaties signed before the end of 2018.

In October 2019, the Government of Russian Federation developed and approved a "Strategy of shipbuilding industry development for the period up to 2035". The goal of the Strategy is to create conditions for the development of the industry. The amount of financing in the Strategy is determined within the framework of three scenarios. The basic idea is as follows: *the higher the growth rate of the industry, the more actively the state will fund it.*

In the *conservative scenario*, support is provided to key shipbuilding enterprises to fulfill the orders from the state defense order, as well as to implement only top-priority investment projects. This scenario provides a low level of state funding and support. The *innovative scenario* assumes a neutral level of state funding and support, provided demand for shipbuilding products is high and human resource development is at an average level. Significant funds are allocated for the development and restructuring of manufacturing plants. While, the *target scenario* provides for the large-scale creation of new production facilities and modernization of existing ones, as well as a significant increase in labor productivity. High levels of state funding, state nonfinancial support, demand for shipbuilding products, and human resource development are assumed. The vast majority of effective demand for civilian vessels and marine equipment by domestic customers is satisfied by domestic enterprises.

One example of providing a support for clean technologies in shipping could be found in St. Petersburg. The project of building a network of electric fueling stations for electric-driven passenger ships in the historical center of St. Petersburg. Approximatively its support value is €1 million.

In order to reduce harmful emissions, as well as to estimate the projected reduction of operational costs of shipowners for the operation and maintenance of ships, it is proposed to create a network of electric fueling stations for passenger ships in the historical center of St. Petersburg for a water electric transport equipped with modern energy storage systems, as well as the infrastructure. Ships are under construction / development now, for e.g.:

- *Ecovolt*, see <https://unicont.com/ships/en/ecovolt/>;
- *Cityvolt*, see <https://unicont.com/ships/en/cityvolt/>;
- *Ecocruiser*, see <https://unicont.com/ships/en/ecocruiser/>, by company MSA company, St. Petersburg.

In Russia, Liquefied Natural Gas (LNG) is also started to be used as a fuel for ship in one of the leading project that started for *Chaika SPG* – new passenger ship for clean shipping reported by managers to started in Feb. 2020.⁵⁴

Russian pools

In Russia, the top players in financing green projects and clean shipping are as follows:

- *Vnesheconombank*, a state-owned entity in charge of development of Russian economy, participates in the implementation of projects in Russia devoted to better using of natural resources, environmental safety and green economy development. The bank announced it aimed to help Russian firms to raise €4,3 billion for green projects, including green shipping.⁵⁵
- *Russian Industrial Development Fund*, provides loans with lower subsidized interest rates for development of new modern hi-tech products and processes based on best available solutions. One of the criteria for providing loans is ecological impact of the product or technology. Russian shipowners and stockholders can benefit from green loans to finance their clean shipping investment.⁵⁶
- *Sberbank*, plans to develop green bonds market. Green bonds are supposed to be emitted by project companies. On September 1, 2018, about 50 of Russian companies had issued corporate or concessionary bonds, with a total of 420 issues in circulation worth 6.5 trillion rubles.⁵⁷
- *Skolkovo foundation*, has a program called GreenTech Startup Booster. This program sets up with support of the Ministry of Natural Resources and Ecology. It targets all type of stakeholders and investors in clean shipping industry and sustainable investments.⁵⁸

⁵⁴ For further details, see <https://www.gazprom.ru/press/news/2020/february/article500623/>

⁵⁵ Other information and details are presented in the following page, see <https://www.banki.ru/news/daytheme/?id=10928450>

⁵⁶ See details in <http://idfrf.com/>

⁵⁷ Insights on green bonds market for stockholders, see <https://roscongress.org/en/materials/zelyenye-finansy-povestka-dnya-dlya-rossii-diaagnosticheskaya-zapiska/>

⁵⁸ Complement information are publicly available in <https://greentech.sk.ru/>

Conclusion

Shipping industry is leaving no stones unturned in order to contribute towards a greener marine environment and clean shipping. At both manufacturing and funding levels, shipping industry is taking advantage of the latest technologies to ensure that new ships contribute as low as possible to the global pollution/emission. So far, there are an increasing number of shipping companies and operators that have invested in green and clean technologies.

The EU offers several sets of institutional green pools and private funding dispositive that help stockholders to shift toward clean shipping. In parallel, there are great possibilities to take green loans from banks or apply for institution EU grants to invest in clean technology for shipping. Our analyses of many projects that have already been financed by those green pools and funds demonstrate that all the stakeholders in shipping industry are involved and willing to contribute to the EU global goal for decarbonisation and clean shipping.