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## 1.6.1 Report on blue economic potential, sectors strategies and development trends



# ABSTRACT

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## **Abstract:**

The Blue economy concept and the Blue Growth agenda as a set of strategic objectives, offer principles and guidance to identify blue economy potential for the cross-border Maritime Spatial Planning (MSP) processes. Coastal regions and areas are recognised as having economic growth potential that exceeds the levels of inland regions, which indicates that the sea basin withholds valuable strategic resources in aiming for sustainable growth in the Plan4Blue (P4B) project area in Finland and Estonia. This report outlines the current status of the selected blue economic businesses in the Plan4Blue (P4B) project area in Finland and Estonia and depicts some possible development trends, based on their nine-years past development. This analysis of the blue industry development is primarily based on Orbis Europe database and national statistics databases. The sectoral development is illustrated with graphs presenting turnover and employment figures development and some future trends in the P4B project area in Finland and Estonia separately. All key sectors show positive long-term development, tourism industry showing the strongest future growth potential in terms of expected number of employees. In terms of productivity, the energy sector and marine construction sector are the highest performers out of the selected blue industry sectors in the P4B project area.

This report builds on the current state analysis to outline and summarise some key strategic visions, aims and objectives for the future, communicated by a wide range of blue economy stakeholders in the Baltic Sea Region (BSR) and globally, that is the EU, OECD, UN and focal blue industries that have all published visions and guidelines or strategic objectives and policy papers to pursue future growth in a sustainable manner. The strategies for the key blue industries call for cross-border and cross-sectoral development in the Baltic Sea region to achieve blue growth effectively. In order to maintain and improve the health of the Baltic Sea and wellbeing in the coastal areas requires strategic goal setting for short, medium and long-term. The blue economy industries are interconnected and interdependent, which should be seen as an advantage in the strategy formation and differentiation in the markets to achieve economic growth in the future.

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# INTRODUCTION

## Background to the Blue Economy and the Blue Growth Agenda

For many nations, the sea and its resources represent a phenomenon influencing the culture, livelihood of the nation and the economy in an all-encompassing way. Trade and exchange of ideas with neighbouring nations is one of the means by which civilizations have advanced and evolved over centuries (Westerdahl, 1994). The concept of Blue Economy is a topical and widely acknowledged issue in maritime economy development. The concept itself can be seen as an umbrella of aims and objectives related to the resources and activities linked to the seas and oceans (Keen et al., 2017). The term blue economy was popularised by the influential book “The Blue Economy: 10 years – 100 innovations – 100 million jobs” by Gunter Pauli (2010) and many others have since emphasized the importance of harmonizing and coordinating the traditional ocean, coastal and marine economic activities with sustainable economic values and to drive sustainable growth (Smith-Godfrey, 2016; COM, 2017; COM, 2014). Blue Economy can be seen as the “sustainable industrialisation of the oceans to the benefit of all”, incorporating the Green Economy origin of the concept, the methods, aims and ideology of an economic activity in a non-traditional operating environment, balancing improvements in equity and wellbeing of both humankind and the environment, and enabling the evaluation of effectiveness of the values and activities in calculable terms (Smith-Godfrey, 2016).

The blue economy development within the EU relies on the notion that the individual sectors of the blue economy are interdependent and, that they rely on common skills and shared infrastructure such as ports and electricity distribution networks (COM, 2012). In Europe, where the sea is a distinctive part of European characteristics with 22 countries with coastlines (Ecorys, 2012, 5), the blue economy is calculated to represent 5,4 million jobs and gross value added of around 500 billion euros per year. The application of the blue economy perspectives in research and development is closely associated with the global quest of long-term sustainable development in balancing the economic benefits with health of the world’s oceans and seas (UNEP, 2015; CSIRO, 2015). In order to build understanding over the economic potential of the selected blue industries in the Plan4Blue project region, economic part of this report concentrates on analysing the current status of the sectors in terms of number of companies, turnover and employment.

In the Baltic Sea Region (BSR), the multitude of socio-economic linkages between nations, regions and organizational networks have existed and developed over centuries in accordance with political whirlpool and spurts. The significant direct and indirect influences of the sea to the national economies in the EU and at the BSR level have been widely recognised and as a consequence, the European Commission adopted a 'Sustainable Blue Growth Agenda for the Baltic Sea Region' in 2014 (COM, 2014b). The objective of the Commission has been to stimulate inter-regional, multi-sector and inter-cluster cooperation and promote a pipeline of projects for innovation and sustainability. A study, *Towards an Implementation Strategy for the Sustainable Blue Growth Agenda for the Baltic Sea Region* was made available at the BSR Strategy Forum in June 13/14th 2017 in Berlin (COM, 2017). To complement the strategic development of the blue economy in the BSR, member states receive support for cross-sectoral maritime spatial planning (MSP) in the sea basin. Linkages between planning authorities, research institutions and universities - together with participatory approaches to engage wider public and private stakeholder audiences to MSP – is believed to positively influence and support the wider sustainable development of the BSR (COM, 2014a).

In accordance with the earlier presented definition of blue economy, the EU-coined concept of "Blue Growth" is an initiative that means a long-term strategy that supports the growth of the marine economy as a whole. According to the strategy, the seas and oceans are important engines for the European economy and have a significant potential for innovation and growth. Blue growth promotes the implementation of the Europe 2020 strategy for smart, sustainable and inclusive growth within the framework of the EU Integrated Maritime Policy (Maritime Affairs, 2017). The European Commission perceives that growth in the blue economy offers new and innovative ways to help steer the EU out of its economic crisis (COM, 2012). Furthermore, it can contribute to the EU's international competitiveness, resource efficiency (COM, 2011), job creation and new sources of growth whilst safeguarding biodiversity and protecting the marine environment, thus preserving the services that healthy and resilient marine and coastal ecosystems provide (COM, 2012).

The European blue growth strategy aims at creating a match between blue industry needs and ecosystem services through utilizing appropriate policies (COM 2017). Although much strategic work has been carried out over the last decade in the EU and Baltic Sea Region (BSR) to support sustainable development and future Maritime Spatial Planning (MSP) processes, (e.g. in connection with Vision and Strategies Around the Baltic Sea (VASAB) and the Helsinki Commission (HELCOM), closer regional analysis is needed to better understand national and cross-border blue growth potential in specific areas, such as the Plan4Blue project area. Identifying and understanding the past and future economic development of the regionally significant blue economy industries and stakeholders is vital for successful MSP processes that support regional blue growth initiatives and sectoral strategies in Finland and Estonia. According to the EU MSP Directive (2014), the planning needs to be a coherent process involving all relevant actors in the maritime sector. This requires effective networking and active involvement from the planners and economic actors including individual companies, representatives of industry sectors and regional interest groups. The stakeholders need to exchange future-related information for outlining joint visions and strategic steps that can be acknowledged in the MSP processes to support sustainable blue growth.

Currently, the blue industry sectors and global, European and national policy makers have all set their visions to embrace sustainable development and address economic, social and environmental objectives they want to pursue in the future. This report attempts to bring together some of those visions and strategies that set perspectives to the blue economy development in the Plan4Blue project area in Finland and Estonia. A noteworthy fact is that although the communicated sustainability aims have many overlapping and joint elements, e.g. the quest for energy efficiency, recycling and cleaner production, the individual industries all see themselves in the centre of development. Strategic decision-making and market differentiation may still require actions that support and benefit certain growth areas more than those areas with less (sustainability) potential in the future. For this, MSP planners and policy-makers need information that clarifies the current economic development and future trends of blue industries. Understanding the global and national policies and industry guidelines together with the local stakeholder involvement are likely to influence the success of MSP processes in supporting cross-border and cross-industry cooperation and sustainability. The blue economy industries are often characterised as being interdependent and interconnected. To recognise how the existing strategies affect BSR blue industry companies and coastal regions are positioned and which trends and drivers impact the future development of the industries is needed for decision-making that supports effective future MSP processes in the P4B project area.

## Blue growth in the BSR and the significance of coastal regions in Estonia and Finland

In the Plan4Blue project the focus industries include the following sectors: marine fishing and aquaculture; maritime transport; and marine construction; maritime tourism; and energy. These sectors are considered to represent those business sectors having most growth potential and significance for the Maritime Spatial Planning process. The flagship initiative of the Europe 2020 Strategy 'The Roadmap to a Resource Efficient Europe' (Roadmap 2011) recognizes that marine resources are a key component of our natural capital, and provide economic opportunities to a wide range of sectors such as minerals extraction, pharmaceuticals, biotechnology and energy. Pursuing these in a sustainable manner is essential for the marine environment to provide its key ecosystem services, such as the natural regulatory functions that help combat climate change or slow coastal erosion (EUBSR, 2017b).

Marine and maritime sectors create opportunities for sustainable growth, competitiveness and jobs. According to Eurostat (2011), the share of coastal regions in Finland is almost 60 % and in Estonia almost 65 % of the total share of the regions. The gross value added (GVA) of the coastal (NUTS 3) regions in Finland was over 67 % and in Estonia over 82 % of the national GVA in 2010. Additionally, the Gross Domestic Product (GDP) per capita in Finland's coastal regions was 11.3 % higher than that of the national average GDP per capita. The population mostly lives near the sea. In Finland almost 64% and in Estonia 74 % of people live in the coastal regions (COM, 2013). Further, the employment rate is higher in the coastal regions. In both countries, out of the Plan4Blue coastal regions the capital city regions have the highest population density. These special characteristics of the coastal regions clearly show the blue growth potential and wider economic importance of the industries and communities in the coastal regions.

### Blue sectors and the economic potential

In the EU context, the Europe 2020 Strategy's flagship initiative 'The Roadmap to a Resource Efficient Europe' (Roadmap 2011) states marine resources as a key component of our natural capital that provide economic opportunities in a wide range of sectors. Marine and maritime sectors create opportunities for sustainable growth, competitiveness and jobs. This requires climate change policies, a focus on resource efficiency, and research and innovation. The vision stated in the Roadmap to a resource-efficient Europe is the following:

*By 2050 the EU's economy has grown in a way that respects resource constraints and planetary boundaries, thus contributing to global economic transformation. Our economy is competitive, inclusive and provides a high standard of living with much lower environmental impacts. All resources are sustainably managed, from raw materials to energy, water, air, land and soil. Climate change milestones have been reached, while biodiversity and the ecosystem services it underpins have been protected, valued and substantially restored.*

In 2011, the *BaltSea Plan Vision 2030* (BaltSea Plan 2011) was formulated by the BaltSeaPlan partners. The vision identified key transnational topics for a sustainable development of the Baltic Sea requiring cross-border cooperation: healthy marine environment, coherent pan-Baltic energy policy, safe maritime transport and sustainable fisheries. Three interdependent visions were formulated: environmental, socio-cultural and economic visions. The key growth areas and development potential, such as the significance of tourism for the region, can be found in the BaltSeaPlan economic vision:



*The Baltic Sea generates high quality employment. Both green and blue technologies are pursued. Port locations benefit from new offshore uses and offer a wide range of industrial production facilities. The Baltic Sea is important for safe, efficient and environmentally friendly interregional transport and connects the entire region to the outside world; as such it makes an essential contribution to the region's competitiveness. Tourism based on a healthy Baltic Sea is a key sector of the economy, creating jobs and income along the entire Baltic Sea coast.*

The economic potential of the blue sectors can only be assessed in relation to their societal impacts and environmental impacts, and in relation and in comparison to those of the other blue sectors and also the non-blue sectors. The potential of the blue sector is impacted by the synergies and conflicts with other sectors in the regional economy. Blue growth potential is based not only on economic capital (finance and investments) but on social capital (expertise, cooperation, networks, trust, institutions) and environmental capital (sustainably managed ecosystem services).

## Methods

The data presented in this report illustrates the potential and future development of the Blue Economy in the P4B project area and will provide information for the MSP process aiming at supporting sustainable growth. The blue industry sectors and global, European and national policy makers have all set their visions to embrace sustainable development and to address economic, social and environmental objectives they want to pursue. By involving cross-sectoral participants in the investigation of Blue Economy, this report attempts to bring together some of those sectoral visions and strategies that set perspectives to the blue economy development in the Plan4Blue project area in Finland and Estonia. Since quantitative, qualitative and desk research was utilised, the applied method can be characterised as *mixed*.

In the following chapters, the EU level and national or regional strategies for the marine sectors in the BSR, policy guidelines and future development trends are primarily based on the synthesis of previous EU and BSR level studies, OECD and UN reports. We have also used ORBIS Europe database, Eurostat and national Finnish and Estonian statistical databases as sources in the analysis. The combination of a range of methods aims at providing useful and up-to-date information to support the future maritime spatial planning processes in the Plan4Blue project region. All the company information and analysis is based on the selected blue industry companies that have at least two employees and an annual turnover of 1000 euros or more during any year between 2007-2016 in ORBIS database. It should be noted that the business activities of the blue industry companies located in the Plan4Blue project area may partially take place outside the project area and similarly, the activities may either be majorly land and/or sea based. For these reasons the business databases alone do not reveal the significance of individual company activities to the regional MSP processes but the main purpose here is to have a deeper understanding of the wider regional blue economy in the Plan4Blue area as a whole. The gathered data is complemented by information from previous EU blue growth and BSR studies and national industry reports.

Because of data limitations in the ORBIS Europe database – time series is only nine years from 2007 to 2016 – the trend analysis for forecasts was made only until the year 2025. In addition, a significant annual fluctuation of some time series causes additional difficulties to make sufficiently reliable trend analysis. Reliability is improved mainly by two ways. Firstly, instead of point estimates for the future trends, interval estimates are used. A probable scenarios are formed around the baseline trends, with a range of either  $\pm 10\%$  or  $\pm 20\%$  depending on the magnitude of the time series variations. Thus, in

order to allow better comparison between the figures, a stable trend space is constructed by the such a min-max analysis. Concretely, it is specified that if the relative standard deviation ( $\text{rstdev} = (\text{stdev} * 100) / (\text{absolute value of average})$ ) is  $\leq 20\%$ , then the range in the trend forecast is  $\pm 10\%$  from baseline trend. If the variation of time series is high and  $\text{rstdev}$  is  $> 20\%$  then the range of the trend forecast is specified to be  $\pm 20\%$ . Secondly, we have made conservative trend forecasts (i.e. moderate changes in the predictions) by choosing a logarithmic form for the basic trend forecasts, if the original time series was significantly variable and the slope of the basic trend is positively or negatively growing on average between 2007 and 2016.

## Interviews

To complement the chosen methodology described above and to enable a deeper multi-stakeholder involvement in the understanding of sustainable blue growth; a mixed-method approach is utilised throughout the industry development descriptions to aim for a holistic, comprehensive, and poly-vocal view of the complex and multifaceted phenomenon of the future development of the blue sectors. Consequently, both quantitative and qualitative methods were combined into an integrative mix in our enquiry of identifying pathways to the sustainable use of the sea areas and resources when envisioning an implementation strategy for a sustainable blue growth agenda for the Baltic Sea region by 2050.

*Aim of the interviews* - "Updating and finalising the analysis of the economic potential"

The aim of gathering data through interviews with blue growth businesses was to acquire a deeper understanding of the future economic development and adoption of blue business innovations and new technologies across the blue industries. This dialogue with the representatives of the blue growth business companies and public business-support organizations, in particular, was expected to provide sector-specific perceptions of the economic, social, and environmental sustainability aspects supporting blue growth and thus deepen the economic and networking analysis of the future trends of the blue sectors/subsectors within the P4B project area. Consequently, the analysis of the interview data is included in the *Final report on blue economic potential, sector strategies and development trends* (D.T1.6.1) and the *Final report on economic and social networks* (D.T1.7.1.) as well as in the *Blue Growth Scenarios* (D.T.1.10.1), in which quotes of the interviews have been included to indicate the content of the interviews.

The interviews, all three Delphi expert survey rounds and both cross-border scenario workshops may be considered to form a wider set of qualitative data gathered in the P4B project and reflected in the reports thus contributing to creating future trends for the blue economy sectors in the Gulf of Finland and its archipelago.

### *Interview guide*

In order to identify the trends and drivers of blue growth potential, a thematic interview guide was applied as it would allow the themes and questions that are necessary for in-depth understanding of blue growth potential in Gulf of Finland and Archipelago Sea area. A thematic interview method would also allow for the interviewer to be flexible.

The interview guide was developed in a collaborative process with the Finnish and Estonian P4B team members who brought many kinds of expertise to the planning of data gathering. The challenge was to formulate the questions in a way that they would be fast and easy to answer by telephone but also bring in-depth views of the drivers and future trends of each sector and/or sub-sector. The themes of the interviews related directly to the future scenarios of the blue economy sectors and/or the sub-sectors: energy; marine cluster; tourism and services for leisure activities; blue bio-economy and sub-sea resources.

The interviews covered the topics of business development and networking on the time horizon of 10–20 years. The interviewees were asked, for example, about the factors they think will most affect the long-term development of their business and to describe what kind of opportunities and/or hindrances they see in their business in 2025–2030. They were also asked about their networks and what should be done to develop their networking and by whom. For the interview guide, see Appendix 2.

Due to the tight time schedule of gathering data through interviews most of them were conducted by an external interviewer who perhaps more strictly followed the interview guide. Five of the interviews were conducted by three of the P4B project team members and they were more like conversations between equals about the topics loosely following the questions of the interview guide. These five interviews typically lasted 35–45 minutes and they were tape-recorded for a transcription while the interviews by the external interviewer were shorter (10–15 minutes) and notes were made of them. Regarding the interviews conducted in Finland, a sector based summary was made of all interviews. The interviews with Estonian organizations were conducted by Estonians and with Finnish organizations by Finnish native speakers. It was assumed (and learned from the experience of the networking interviews in 2017) that more thorough or reliable information could be received if the language was not a restriction. All interviews were translated into English for an analysis.

### *Selection of informants*

The selection of informants was also a result of the co-creation process between the P4B project partners. At first, all team members both in Finland and Estonia were asked about the candidates for interviewing. The list of potential organizations and representatives was then composed and complemented by the networks of the University of Turku. The selection of the informants was done based on the four main blue economy sectors in Plan4Blue project in Finland and Estonia. The sectors considered were: energy, maritime cluster, tourism, culture and services for leisure activities, and the blue bio economy and sub-sea resources. The perceptions of private business companies would particularly be appreciated when selecting candidates for interviewing but the representatives of public sector business-support organisations and NGOs were also considered important to catch general views of a specific industry rather than that of a single company. Consequently the interviewees come from both private and public sectors as well as NGOs.

In terms of the selection of interviewees of each sector, the focus of the blue bio-economy was on fish farming, in particular, multitrophic aquaculture. Consequently the informants are aquaculture and sub-sea producers. Regarding the maritime tourism sector, the interviewees represent national and regional business-support organisations for tourism, tourism companies and specific leisure associations, as well as services for cruise tourism. Regarding the energy sector, the future development of renewable energy sources were focused in the selection of informants. The interviewees come from

the fields of wind, solar and wave energy. In terms of the maritime sector, the interviewees were selected among ports and ship owners, as well as their associations and business-support organization.

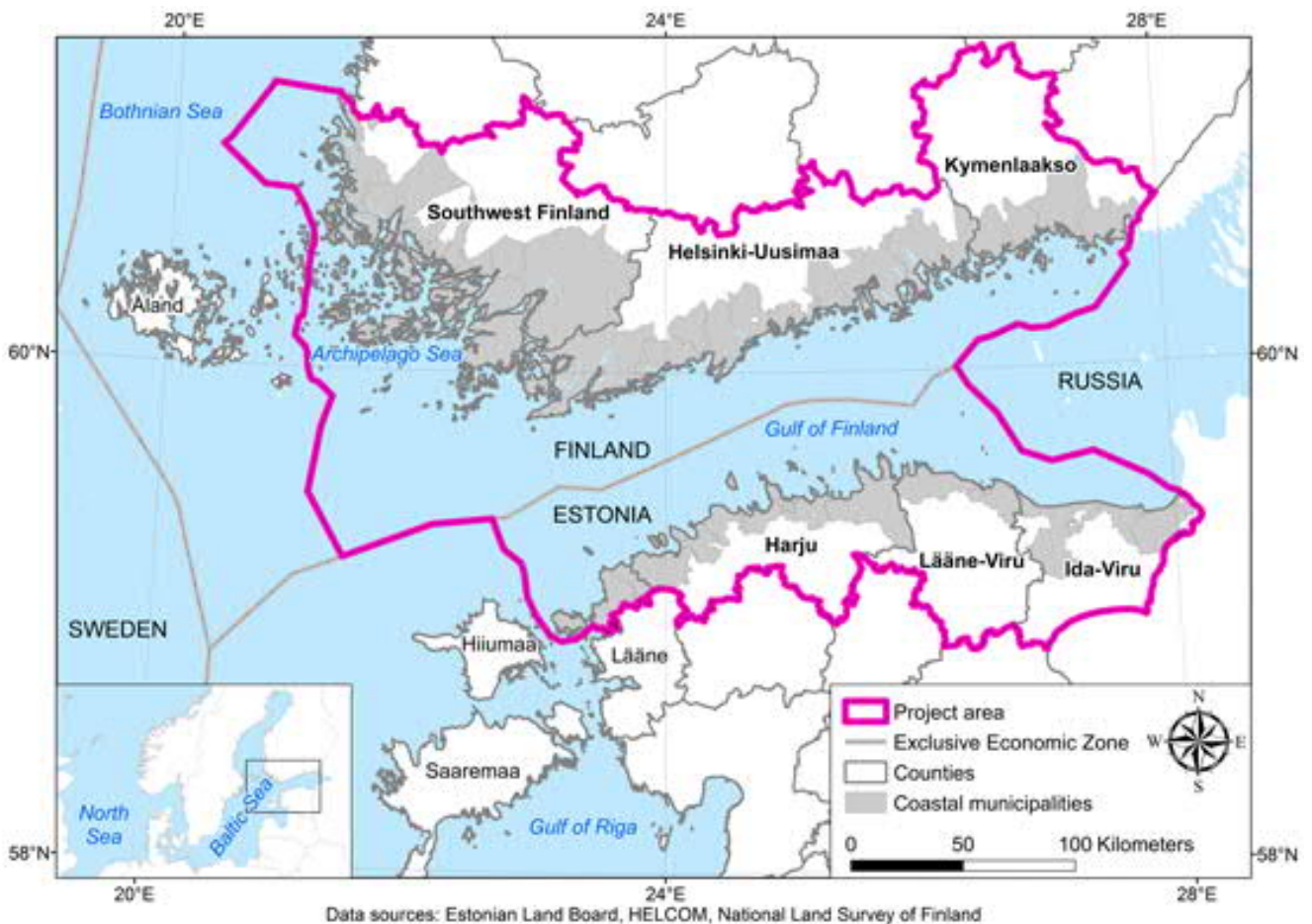
On the final list of the interviewees there were 30 organizations or persons from Finland and 13 from Estonia. Most of them were contacted either by the P4B project team members responsible for data gathering through interviews or the externally hired interviewer. May it be the tight time schedule of conducting interviews, difficulties to reach the candidates, busy informants or reluctance of some candidates to participate in the interview that 16 interviews were conducted in Finland (3 companies in Energy sector, 5 companies in Maritime sector, 5 companies in Tourism sector and 2 companies in Bio-economy and subsea sector and one company from other sector) and 7 in Estonia (one company in Energy sector, 3 companies in Maritime sector, one company in Tourism sector, one companies in Bio-economy and subsea sector and one company from other sector).

### *Analysis*

The results of the interviews have been summarized by each sector characterizing the perceptions of the future development from the perspective of the coastal tourism business.

## **Plan4Blue project area**

Coastal regions (NUTS 3 level) in Finland and Estonia have been the unit of the analysis in the study. The industry data will enable coastal area (LAU 2 level) analysis too, should it be needed in the later stages of the Plan4Blue project. The blue industry data has also been used to place individual companies on the map and to visualise, for example, their size in terms of the annual turnover and the number of employees. The Figure 1 illustrates the geographical Plan4Blue project area.



**Figure 1. The Plan4Blue project area**

The coastal areas amount to a significant proportion of the total regional economy in both countries (COM, 2013). Hence, the impact of the sea to the regional economy may be much more overwhelming than the levels analysed in the blue economy and blue growth studies in the BSR that are based on an analysis of a handful of typical blue (growth) industry sectors. According to Eurostat (2011) the share of the coastal regions in Finland is almost 60 % and in Estonia almost 65 % of the total share of regions. There are also other indicators that show the potential of the coastal regions. The gross value added (GVA) of coastal (NUTS 3) regions in Finland was over 67 % and in Estonia over 82 % of the national GVA in 2010. Additionally, the Gross Domestic Product (GDP) per capita in Finland's coastal regions was 11,3 % higher than the national average GDP per capita. The population live nearby the sea: in Finland almost 64 % and in Estonia 74 % of the people live in coastal regions (COM, 2013). Generally speaking, the employment rate is also higher in the coastal regions. Out of the Plan4Blue coastal regions in both countries the capital city regions have the highest population density.

## CURRENT STATUS AND DEVELOPMENT OF KEY SECTORS

The selected key industries and business sectors are spread throughout the project area and they constitute a substantial share of the total business activities in the Plan4Blue project region.

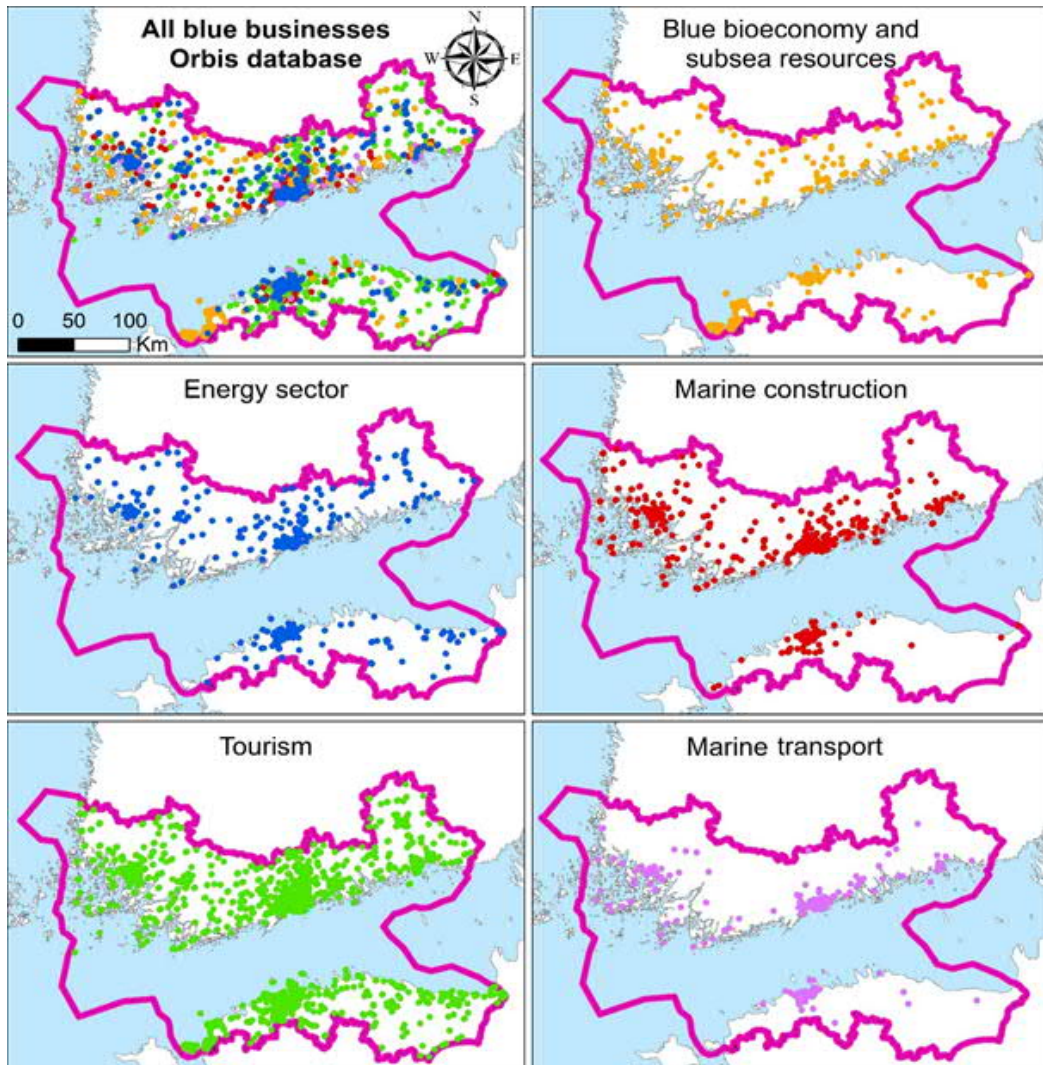


Figure 2. The Blue industry locations in the project area

The Figure 2 shows the location of the selected blue industry companies in the Plan4Blue project area based on the ORBIS Europe database of the beginning of 2017.

Figure 2. Location of the selected blue industry companies in the Plan4Blue project area based on ORBIS Europe database, 2017

In the following sections, the sectoral development is illustrated with graphs presenting turnover and employment figures development and some future trends in the P4B project area in Finland and Estonia separately. The total turnover identifies the general situation of the sector related companies over the years 2007-2016 and the number of employees gives an overview of how many jobs each sector has created and hence its effects on the whole economy.

# ENERGY SECTOR

## Existing strategies in Energy sector

Renewable energy sources in the European Union (EU) include wind power, solar power (thermal, photovoltaic and concentrated), hydro power, tidal power, geothermal energy, biofuels and the renewable part of waste. The use of renewable energy has many potential benefits, including a reduction in greenhouse gas emissions, the diversification of energy supplies and a reduced dependency on fossil fuel markets (in particular, oil and gas). The growth of renewable energy sources may also have the potential to stimulate employment in the EU, through the creation of jobs in new 'green' technologies.

## Global challenges and goals for energy production

Climate change is the most important global challenge impacting national energy policies and strategies. The EU is a member to the Kyoto Protocol, which is an attachment to the United States Framework Convention on Climate Change (UNFCCC), and so are the EU Member States. Kyoto Protocol requires the EU and its Member States to reduce emissions of greenhouse gases as agreed in the protocol. For every member of Kyoto Protocol, there is emission limit which the member is not allowed to exceed. Member States are required to report to UNFCCC. The Member States need to give so called country reports every four years. These reports include information of expected emission development, politics related to environmental issues, adaption to climate change, financing, education and national conditions.

The emission limits of the Kyoto Protocol are now being replaced by the requirements under the Paris Agreement. The Paris Agreement from 2015 is similarly under the UNCCC. It aims is to keep a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels, while pursuing efforts to limit the temperature increase to 1.5 degrees. The agreement also focuses on the ability of countries to deal with the impacts of climate change (mitigation). The Paris Agreement requires all Parties to put forward their best efforts through "nationally determined contributions" (NDCs) and to keep raising these efforts. All Parties report regularly on their emissions and on their implementation efforts. In 2018, Parties will take stock of the collective efforts to progress towards the temperature goal and to inform the preparation of NDCs. There will be a global stocktake every 5 years to assess the collective progress towards achieving the goal and to inform further individual actions by Parties. On 5 October 2016, the threshold for entry into force of the Paris Agreement was achieved. The Paris Agreement entered into force on 4 November 2016. (UNFCCC web page.)

## Marine energy production types

According the European Commission, marine energies have the potential to enhance the efficiency of harvesting the European energy resource, minimize land-use requirements of the energy sector and reduce the European greenhouse gas emissions by about 65 Mt CO<sub>2</sub> in 2020 (COM, 2012b).

Main marine energy types are marine wind energy, wave energy, tidal energy, and floating solar energy. In addition, ocean currents can be harnessed for energy production. In Europe, there are possibilities for wave energy and tidal energy. In Finland and Estonia, however, marine wind energy seems to be the only one that is interesting for investors and gaining at least some societal support.

According to Deloitte & WindEnergy (2017), GDP attributed to wind energy was 36 billion in Europe in 2016. Wind energy employed 260 0000 people and the value of exports was 8 million. Subsectors include wind energy developers, wind turbine manufacturers, component manufacturers, service providers, and offshore wind energy substructures.

## EU level objectives and strategies

In 2007, the EU set its 2020 goals for renewable energy (20% share of energy production), energy efficiency (improvement by 20%) and the reduction of greenhouse gases (reduction by 20%).

The 2030 goals are stricter. They were adopted in 2014. *The 2030 climate and energy framework* sets three key targets for the year 2030:

- At least 40% cuts in greenhouse gas emissions (from 1990 levels)
- At least 27% share for renewable energy
- At least 27% improvement in energy efficiency

There are two means to reach the greenhouse gas emission target. The sectors that are part to the emissions trading system (ETS), need to cut emission by 43%, and the non-ETS sectors will need to cut them by 30%. The latter goal will be reached by translating it to individual binding targets for Member States. Renewable energy targets have been set for each Member State. The 2030 target set by the EU for Finland for renewable energy sources is 38% of the overall energy consumption, and for Estonia..

For energy efficiency, there are no national targets. The EU is targeting this goal through its Energy Efficiency Directive 2012/27/EU. In 2016, the Commission proposed an update to the Directive, including a new 30% energy efficiency target for 2030.

In Finland, energy efficiency has been increased by means of voluntary energy efficiency agreements in different sectors. The new goods transport and logistics energy efficiency agreement is valid during the years 2017-2025. The agreement is under the supervision of the Ministry of Transport and Communications. (Transport and the environment 2013; <http://www.energiatehokkuussopimukset2017-2025.fi/energiatehokkuussopimukset/> )

In 2016, the European Commission released a set of proposals on *a new rule book for the EU energy market*. The rules will allow the energy system to be ready for the rising share in variable renewable energy. By 2030, a half of the EU's energy needs will be met by renewables, up from 29% in 2014. (COM, 2016b).

By 2050, the EU intends to curb the greenhouse gas emissions even further. Already in October 2009, the European Council supported an EU objective to reduce greenhouse gas emissions by 80-95% by 2050 compared to 1990 levels (COM, 2017b). In March 2011, this decision was followed by "A Roadmap for moving to a competitive low carbon economy in 2050". By 2050, electricity will be produced without use fossil fuels, but fossil fuels may still be used in the industry and in transports (COM, 2011).

Circular economy is considered to have a deep impact on the energy sector's future development although its clear role and effects are yet to be seen (Gustafsson, 2017).



## Baltic Sea Region energy production strategies

Energy is considered as one of the 13 Priority Areas of the EU Baltic Sea region (*EUBSR*) strategy. The strategic objectives of the EU include facilitation of diversification of energy sources and since security and sustainability are driving forces of development, attention must be paid to the resilience of infrastructure to natural and man-made disasters (EUBSR, 2017b). The EU's strategic aim is to improve the access to and the efficiency, sustainability, reliability and security of the energy markets (EUBSR, 2017b). Renewable energy sources are perceived as vital for the future sustainable infrastructure development in the BSR that supports coastal regions' communities, services and activities (ECORYS & S.Pro, 2017).

*The Baltic Sea Region Energy Cooperation Initiative* (BASREC) and its "Post Kyoto" project had the goal of developing energy policy strategies of the Baltic Sea Region for the future. According to the final report (BASREC 2012), the region has potential for a low carbon transformation as it is "endowed with vast natural resources in terms of biomass, wind and hydro power potential", and also has the required industrial and administrative capacities, technology, and knowledge. The main solutions to fighting climate change are seen in renewable energy, energy efficiency, nuclear energy (depending on the political and public support), and carbon capture and storage (CCS) (BASREC 2012, 27). The report states that wind power will likely "play a much greater role" in the Baltic Sea Region in the future, both onshore and offshore (BASREC 2012, 19). Solar power is seen as having potential on the longer run. As solar panels are evolving, more common raw materials may be used for manufacturing them in the future (TEM 2017). The experts that have participated the Plan4Blue project scenario work have considered solar and wind power as having greater future potential in the P4B region compared to wave energy.

A long-term strategic objective of the EU is to integrate all member states to wider energy networks (gas and electricity) so that importing energy from third countries is not necessary (EUBSR, 2017b). Estonia is currently not yet fully integrated into the EU energy networks and Estlink between Estonia and Finland is the only power connection of Estonia to another EU-country. The Baltic Energy Market Interconnection Plan (BEMIP) is an extension of the Nordic electricity market model to Estonia, Latvia and Lithuania. Monitored by the EUBSR, the BEMIP develops coordinated offshore wind farm connection solutions and other options to increase the use of renewable energy.

What will also change the infrastructure and technology related to energy provision and consumption is the EU's requirement that national governments will have to ensure that consumers can generate and store or consume their own electricity or sell it back to the grid. Every consumer will be able to offer demand-response and receive remuneration directly or through aggregators. (COM, 2016b) Another Interreg BSR project, BalticLINES (2016-2019), will provide information for MSP purposes about the energy corridors in the region.

In addition to energy production, the development of the blue energy sector also offers growth opportunities for companies in related industries, e.g. for companies providing smart meters and other monitoring devices and energy-efficiency tracking solutions for marine industries.

## Finnish strategies for energy production

Finland has a relatively high electricity demand due to cold winters and energy-intensive industries. (BASREC 2012, 18). Fuel consumption in transports is also high due to long distances. The 2030

target set by the EU for Finland for renewable energy sources is 38% of the overall energy consumption.

The Finnish government has published its *Government report on the National Energy and Climate Strategy for 2030* (TEM 2017). Marine energy is not at focus in the report. Neither is wind energy. According to the Strategy, the share of renewable energy will rise to more than 50% during the 2020s and the self-sufficiency in renewable energy to more than 55%. The greatest opportunities are seen in liquid biofuels and biogas. Coal will be phased out and the use of imported oil will be halved. The use of waste and side-streams for energy production will be promoted. Finland wants to invest in new technologies and to promote the commercialization of innovations for clean and smart energy systems and has joined the Mission Innovation project (2016) where countries have agreed to double their R&D investments in clean energy over five years.

The energy industry in Finland has provided comments on how to achieve the EU 2030 and national energy objectives. Marine energy is not at focus. The energy industry (Energiateollisuus web page 2016) calls for the following actions:

- Ensure the competitiveness and availability of domestic fuels
- Continue to support investments in small-scale energy production through household depreciation and energy support
- Continue investment in new technologies for renewable energy and energy efficiency
- Support major demo projects for new clean energy technologies

According to a recent survey (Energiateollisuus 2016), Finnish citizens consider the following as the most important goals of energy policy: reduction of emissions and fighting climate change, increasing the share of renewable energy, reasonable energy price, self-sufficiency in energy, and commercialization of energy innovations.

Marine energy production is very insignificant in Finland (Tike 2016). The first offshore wind farm in Finland was built in front of Tahkoluoto, Pori in 2017. Wind conditions are better at sea than on land, and components are easier to move. Residents on land are typically against windmills in their vicinity. Waves, humidity, salinity, and ice still create challenges for marine wind energy. Finnish shipbuilding and offshore expertise is useful also for marine wind energy construction. (Teknologiateollisuus.fi)

## Estonian strategies for energy production

*The Estonian National Development Plan of the Energy Sector Until 2030* (ENMAK 2030) was adopted in October 2017. The plan brings together the future activities related to the electricity, heating and fuel sector and energy use in the transport and housing sectors. ENMAK 2030 describes Estonian energy policy goals until 2030, the vision for energy sector until 2050 as well as ENMAK 2030 general and specific objectives and measures to achieve them.

The plan defines amongst others the following objectives/expected results for 2030:

- The annual final energy consumption will remain 32 TWh (as in 2010), the share of renewable energy will be 50% of the final energy consumption and at least 28% of primary energy con-

sumption. The primary energy consumption will become significantly more efficient. The construction of new renewable electricity production facilities will take place under open electricity market conditions without additional national support.

- 80% of the heat produced in Estonia is produced on the basis of renewable energy sources, the importance of local energy sources in heat production is further increased by peat. The objective is mainly achieved on a market basis. The reduction of greenhouse gas emissions in the energy sector by 2030 will be at least 70% (as compared to 1990), and by 2050 it is realistic to achieve a reduction of greenhouse gas emissions by more than 80%.
- The production of oil shale electricity will decrease and shale oil production will increase, and to achieve this, the development plan foresees the need for the development of a favourable tax environment for investments.
- The long-term use of biofuels in the period up to 2050 is planned to generate electricity and heat in line with the growth of forests. The use of biomethane and other alternative motor fuels is increasing.
- The share of fuel-free energy sources in final consumption will be at least 10% in 2030. The potential of hydropower is in use today, the use of solar energy in small solutions will increase by up to 100 MW by 2050, covering almost 1% of the country's electricity demand. In 2050 wind energy could cover a third of the country's electricity consumption.
- In 2030 domestic consumption of primary energy is 10% less than in 2012. The energy intensity of the Estonian economy will decrease from the current 5,6 MWh/1000 €<sub>SKP 2012</sub> to 2 MWh/1000 €<sub>SKP2012</sub>
- Estonia has achieved energy independence by 2030 with no any share of imported electricity (vs the dependency rate of 13.6% in 2013).

The financing of the development of the energy sector is planned from a variety of sources. The financing of the measures of the development plan from the state budget is planned only for activities in which market failures exist to achieve the goals of the development plan or which are necessary for the fulfilment of the tasks of the state. The biggest burden of financing lies on the private sector, therefore the state's primary task in implementing the development plan is to create an attractive investment environment through legislation and tax policy.

*The vision for 2050* is described as follows: In 2050, Estonia will mainly use domestic resources to meet its energy needs, not only in electricity, but also in heat production and transport. Investments in the energy sector have led to a doubling of the efficiency of using local fossil fuels compared to today's level. According to the objectives set in the "Energy Roadmap 2050", the CO<sub>2</sub> emissions in the energy sector have decreased by more than 80% (compared to 1990 levels). In the developed regional gas market, gaseous fuels of indigenous origin in Estonia are competitive and their production capacity will enable to cover, if necessary, up to one third of the gas consumption in Estonia.

Estonia has become the country exporting energy using modern and environmentally-friendly technologies in the North Baltic energy market. The energetic independence of Estonia and its long-term consolidation are the key to the economic well-being of the people of the country, the competitiveness of the companies operating in the country and the energy security of Estonia.

The state has developed a solid and long-term vision of resource ownership policy that supports the development of the Estonian industrial sector. The state ownership profit from use of energy resources is directed primarily towards sustainable energy supply programs, thus ensuring the continuation of energy independence of the state after the exhaustion of fossil fuel resources.

*The “Renewable Energy Action Plan Until 2020”* and its operational programme represent the road map for achieving Estonia’s objective in the field of energy from renewable sources – 25% share of renewable energy in final consumption by 2020. The action plan also foresees an investment support for marine wind farms with the result indicator of 500 MW installed offshore wind farms by 2020. (Ma- jaandus- ja Kommunikatsiooniministeerium, 2010)

### **Renewable energy for shipping**

So far, we have discussed the strategies for energy production, including the possibilities for producing energy at the sea. For a sustainable blue economy, we also need to consider how the blue industries are consuming energy. The International Convention for the Prevention of Pollution from Ships (MARPOL) has stipulated mandatory technical and operation measures, which require more efficient maritime energy use with less emissions. The regulations came into force in 2013. The industry itself has set targets to reduce carbon dioxide emissions by 20% by 2020 and 50% by 2050. For reaching the targets, the shipping industry needs cleaner fuel and power options. Rising bunker fuel prices on a globally volatile market also provide reason to scale up shipping solutions that are based on renewable sources and technologies. (IRENA 2015, 3.)

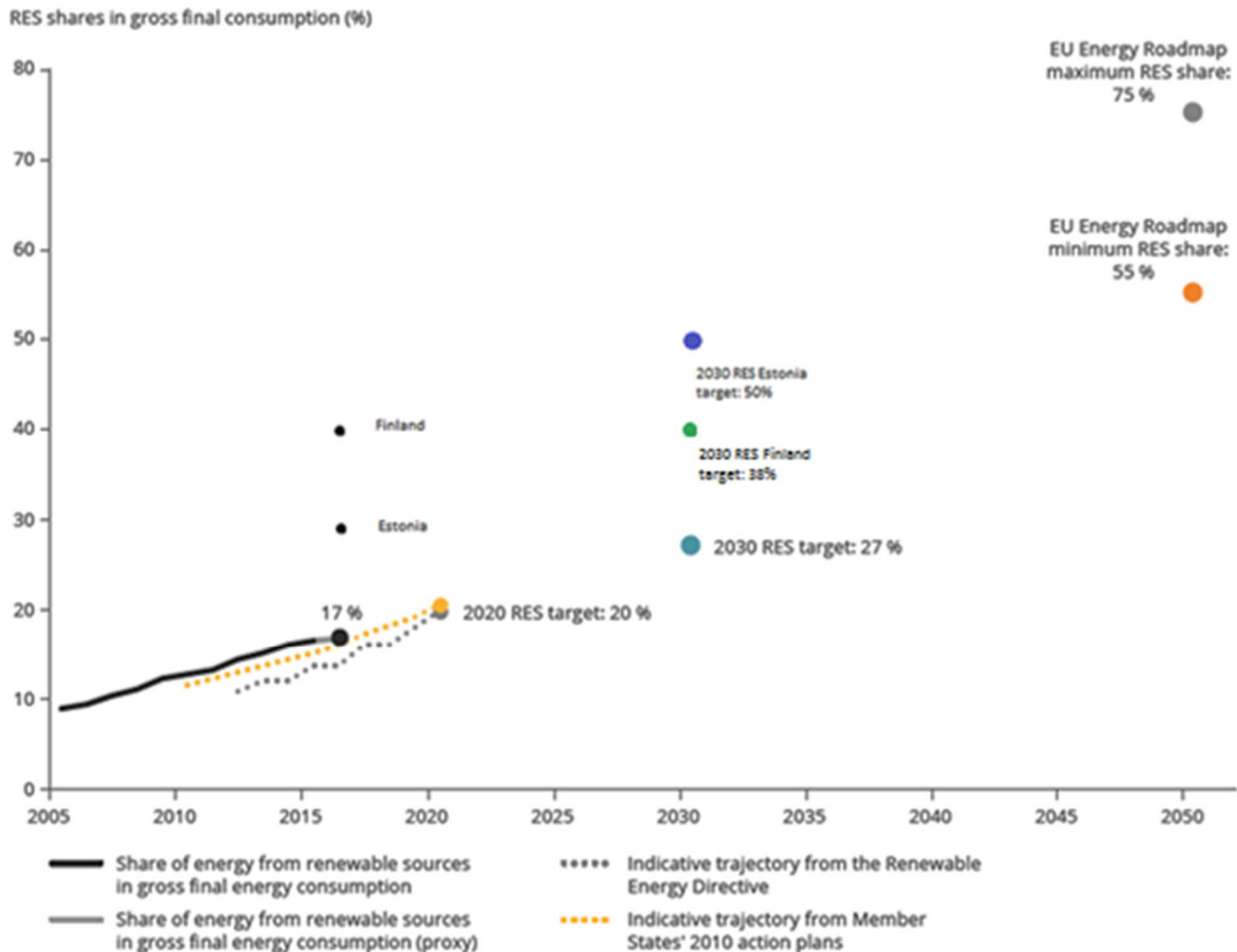
**Renewable energy options for ships** of all sizes include options for primary, hybrid and/or auxiliary propulsion, as well as on-board and shore-side energy use. Potential wind energy sources for shipping include soft sails, fixed wings, rotors, kites and conventional wind turbines. In addition, there are applications on solar photovoltaics, biofuels, wave energy and the use of super capacitors charged with renewables. These solutions can be integrated through retrofits to the existing fleet or incorporated into new shipbuilding and design. (IRENA 2015, 4). According to IRENA 2015, a small number of new ships are striving for 100% renewable energy or zero-emissions technology for primary propulsion. The IRENA report concludes that a set of organisational/structural, behavioural, market and non-market barriers needs to be removed before renewables can make meaningful contributions to the energy needs of the shipping sector.

## **Energy sector: Current economic situation and development trends**

As was mentioned earlier, in October 2014 the European Council reached an agreement resulting in three higher EU-wide targets to be achieved by 2030 at least 27% of renewable energy in gross final energy consumption (European Council, 2014). The proposed legislative package and the 2030 renewable targets are currently under discussion in the EU Parliament, Council and Commission. The final 2030 targets and legislation are expected to be adopted in 2018.

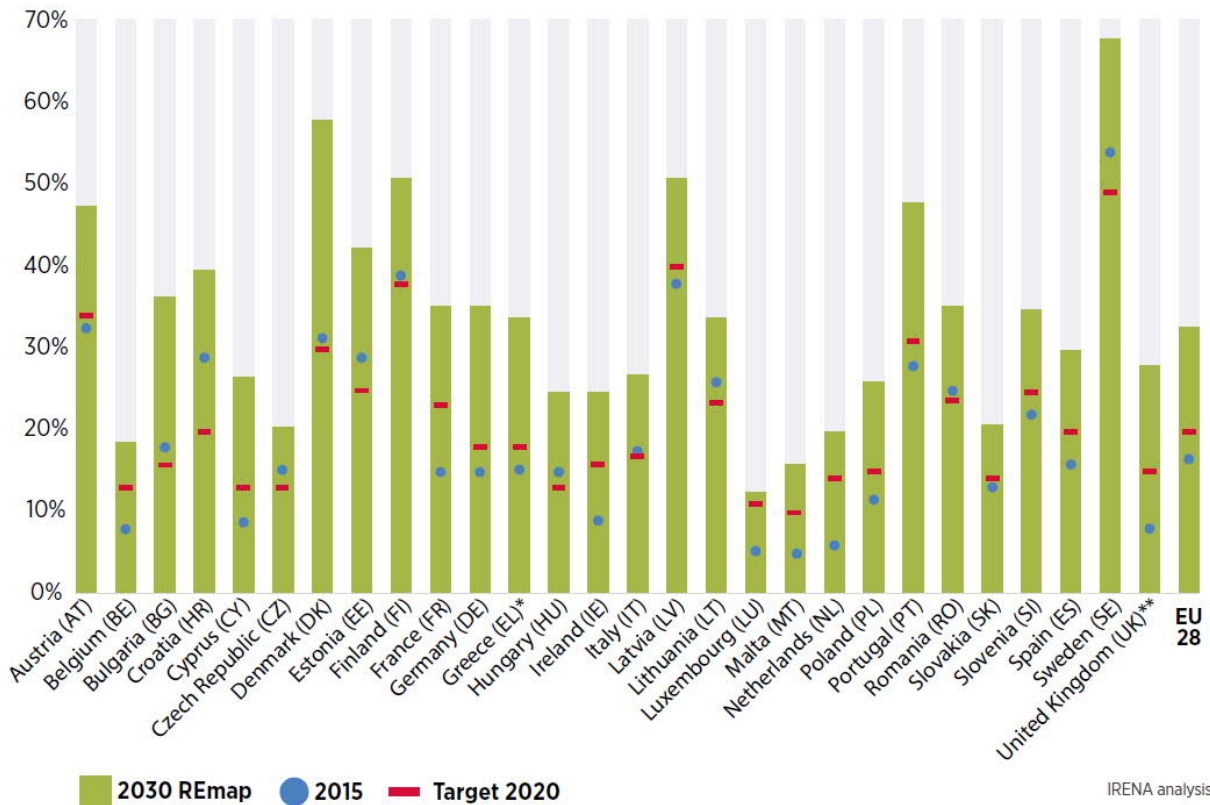
In accordance with the strategic plans, both countries focused their attention on the development of renewable energy sources and achieved outstanding results in this. Finland and Estonia exceeded the planned figures for 2020 already in 2017. Finland with 39,3% and Estonia with 28,6% have both done

well in achieving the objectives on the share of renewable energy (Eurostat 2017). The goals for 2030 for both countries are higher than those planned for in general the European Union Finland for 11% and Estonia for 23% (Graph 1 and 2). Among the renewable energy sources, offshore wind energy is recognized by experts as the most promising energy industry in the project area. In addition, it is the wind power industry that has the least harm to the environment what plays such a big role for MSP.



**Graph 1. Share of energy from renewable energy sources (RES) in the EU's gross final energy consumption, 2005-2050. Source: European Environment Agency, 2017**

The outlook for renewable energy for the European Union, the International Renewable Energy Agency observed that since 2014 a lot things have changed. Due to the improvement of technologies in solar and wind offshore energy, an impressive reduction in costs and a possible increase in the cost-effective potential have been achieved, which will have a very positive effect on the development of renewable energy sources. In addition, technical development has accelerated in end-use sectors, such as electric vehicles for example, as well as new technologies are changing the approach to the design and operation of energy systems. Thanks to this development that the 27% target for the share of renewable energy in the total final energy consumption in 2030 could be considered as a conservative goal. (IRENA, 2018)

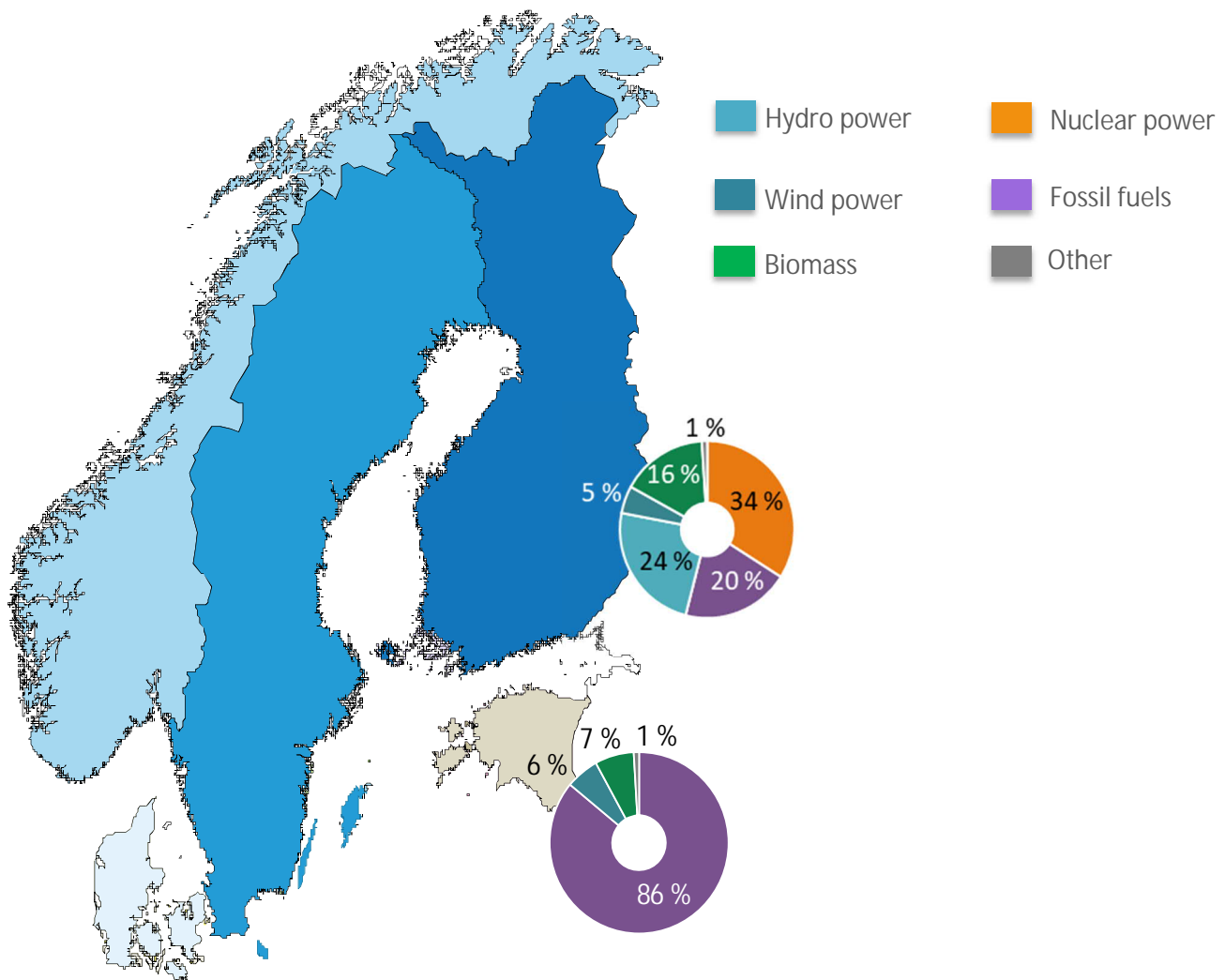


\* The code "EL" follows the European Commission's Europa guidelines. Greece (the Hellenic Republic) is also known internationally by the ISO code "GR".  
 \*\*The code "UK" follows the European Commission's Europa guidelines. The United Kingdom of Great Britain and Northern Ireland is also known internationally by the ISO code "GB".

**Graph 2. Renewable energy share in gross final energy consumption – 2015, 2020 target and 2030 potential with accelerated uptake of renewables (REmap) (Renewable Energy Prospects for the European Union, by The International Renewable Energy Agency (IRENA), 2018)**

According to ENTSO-E, Statistical Factsheet 2016 Electricity generation by wind power in Finnish market area in 2016 is 5% and in Estonia is 6% from general Electricity generation (Graph 3.)

According to the EU climate and energy package, it was planned that by 2020 12% of energy from renewable sources should consist of wind energy. To achieve the targets by 2020 29 new offshore wind farms are either under construction, formally authorized or that have been applied in the Baltic Sea region. For the period from 2020 to 2030 another 25 offshore wind farms are planned to be built. Thus, if these plans are implemented by 2030, there will be 67 wind power stations with a total capacity of 25,000 MW in the Baltic Sea region, which means growing by 6,000% in the coming 20 years in wind energy according to the Future Trends in the Baltic Sea - WWF Baltic Ecoregion Program. (Future Trends in the Baltic Sea – WWF Baltic Ecoregion Programme)



**Graph 3. Electricity generation in Finnish and Estonia market area 2016. Source: ENTSO-E, Statistical Factsheet 2016 (provisional values as of 4 May 2017) Source: Finnish Energy (ET) <https://energia.fi/en>**

FOW-technology was previously confined to R&D and has been developing in recent years. Now FOW is on the rise and semisubmersible and spar buoy floating substructures are deemed appropriate for widespread launch and operations. The barge and the tension leg platform (TLP) floating substructure concepts are still under development and will be available in the coming years. The latest technologies will bring benefit to the floating offshore wind sector and will enable costs to fall significantly in the years to come for wind energy. (Wind energy in Europe: Outlook to 2020 by WindEurope)

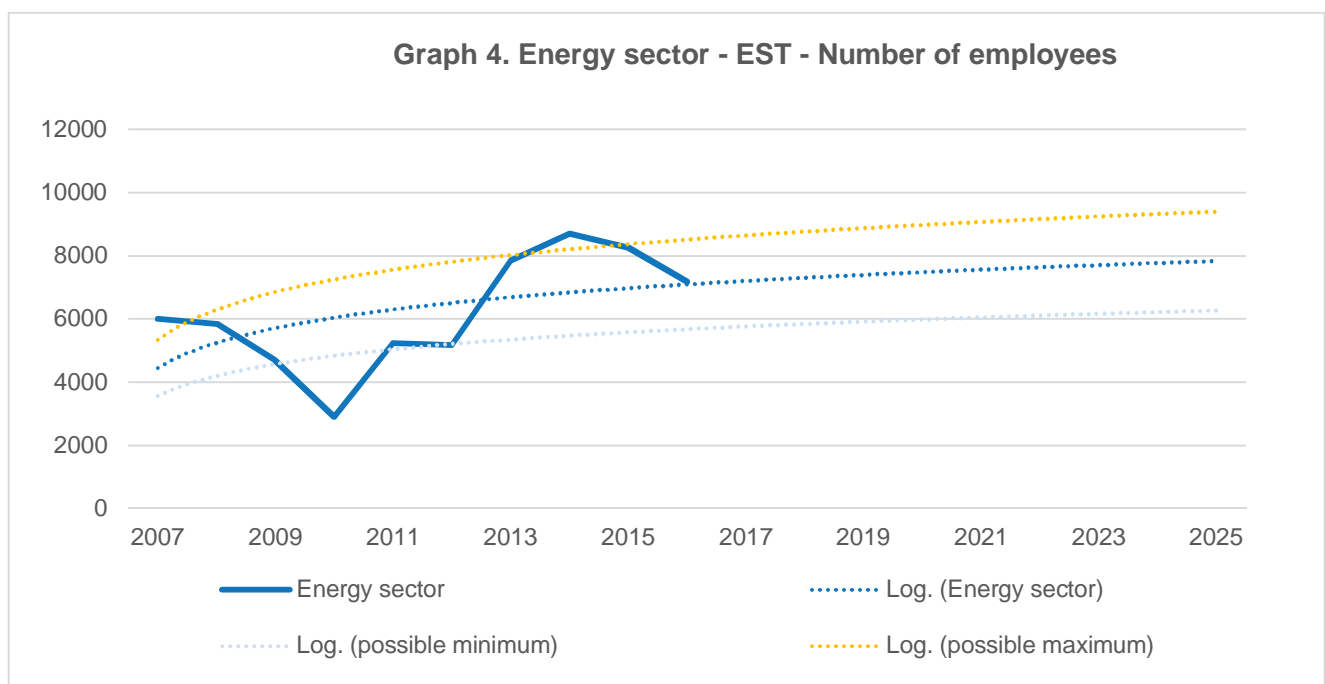
Excellent results were obtained, exceeding the expectations for the first in the world commercial-scale floating wind farm Hywind Scotland. The station is located 25 km from the coast of Peterhead in Aberdeenshire and its productive capacity 30 MW and powers 20,000 households. During the three months of operation from November to January 2017, the construction withstood one hurricane, one winter storm with waves up to 8 meters and despite the strong wind characteristic of winter in this region, the capacity factor of the wind farm achieved an average of 65% for the entire period. The average water depth of offshore wind farms where work was carried out in 2017 was 27.5 m and the average distance to shore for those was 41 km. Hywind Scotland has an average water depth twice as deep as that of other bottom-fixed offshore wind farms in 2017. (Offshore Wind in Europe, Key trends and statistics 2017)

## Energy sector: Current economic situation and development trends in Estonia

According to publication from January 22, 2018 in Renewables Now - Renewable power facilities in Estonia produced 1,612 GWh of electricity in 2017, meeting 16.8% of the country's total demand, according to data by transmission system operator (TSO) Elering. Estonia has set a goal to lift the share of renewable generation in its total power to 17.6% by 2020 (interim goal was 15.2%, which has been surpassed). Renewables generation grew 14% over 2016 and covered 15.1% of the country's overall consumption, according to the statistics. Wind accounted in 2017 for 42% with generation of 670 GWh, rising 13% year-on-year. The output of solar parks almost doubled in 2017 to 5 GWh and so did subsidies for solar power. In total, renewable energy and combined heat-and-power (CHP) subsidies in 2017 grew by 13% to EUR 78.3 million.

The energy sector in the P4B project area consists of all energy companies in Estonia and Finland that have two or more employees and annual turnover over 1000 euros. The following statistical sectors will be included in the analysis: Extraction of crude petroleum and natural gas (06), Support activities for petroleum and natural gas extraction (091), Manufacture of coke and refined petroleum products (19), Manufacture of industrial gases (2011), Electricity, gas, steam and air conditioning supply (35), Electric power generation, transmission and distribution (351), Distribution of electricity (3513), Manufacture of gas; distribution of gaseous fuels through mains (352), Manufacture of gas (3521), Distribution of gaseous fuels through mains (3522), Wholesale of solid, liquid and gaseous fuels and related products (4671).

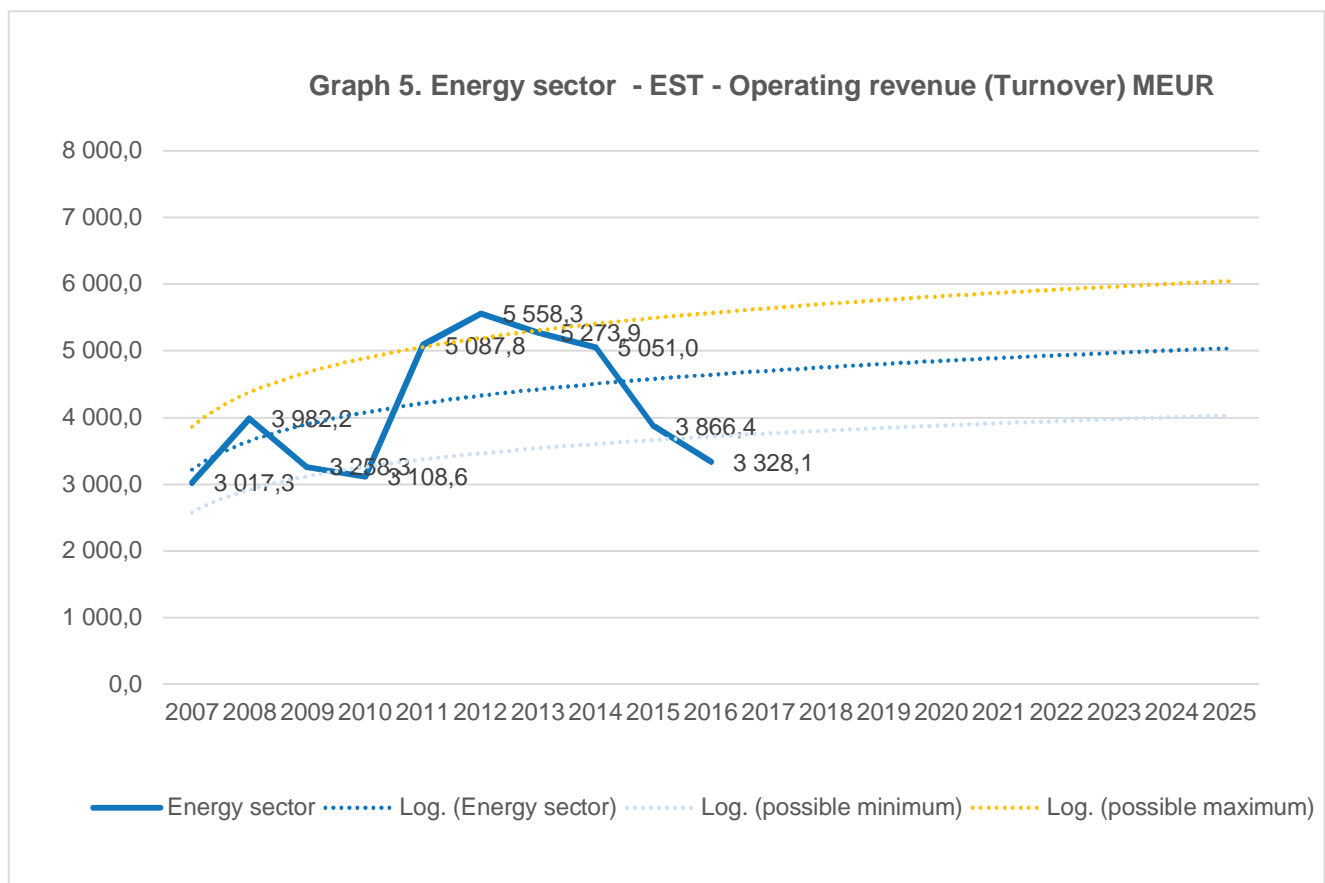
The overall sectoral development can be characterised as positive in terms of company turnover and productivity (turnover/employees) figures. With the current development trend of the energy sector, based on the nine-year curve, the number of employees in the P4B Estonia region will reach over almost 8000 employees by the year 2025 and according to possible forecast probably will be between 6000 and 9500 of people. The Graph 4. illustrates this positive development.





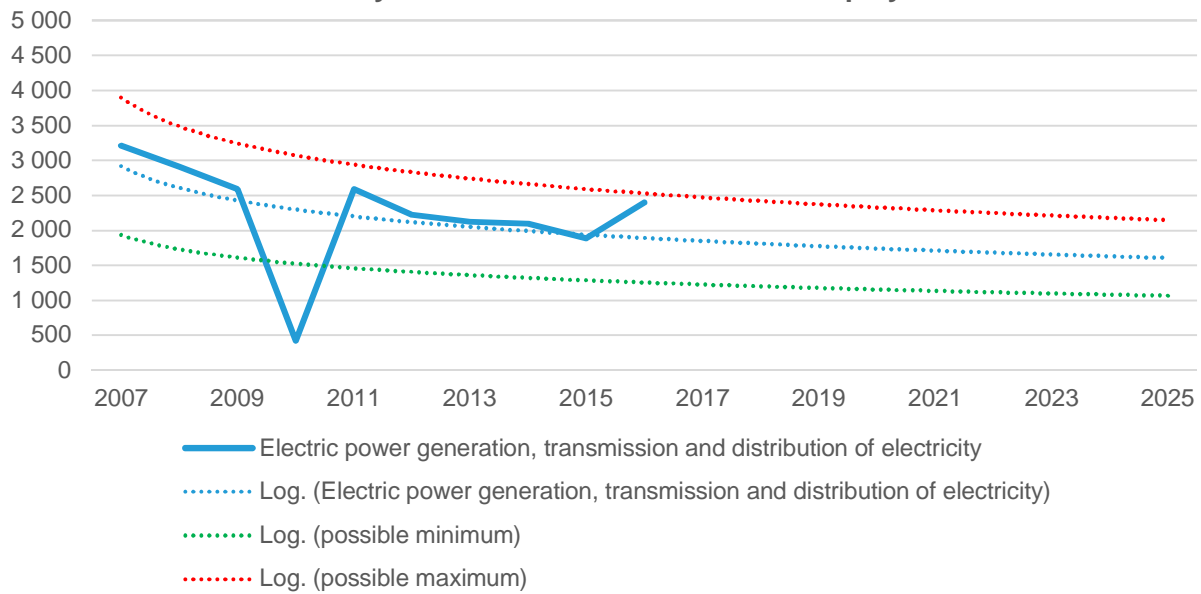
The logarithmic trendline reveals the long-term positive progress of the industry the total turnover of the energy sector will be more than 5 billion euro in the year 2025 and possible will be in space between maximum 4 billions euro and minimum 6 billions euro. When considering the technological development, outsourcing trends and continuous innovations in the global field of energy, it can be assumed however, that the total number of employees in the energy companies in the Plan4Blue area in Estonia may reduce in the future, even if the economic growth in the sector stays strong. A clear indication of this can be observed in Graph 5. depicting the energy sector development in Estonia with the equivalent data.

The logarithmic development trendline in energy sector in P4B Estonia area (see Graph 5.) reveals the long-term positive progress of the industry more than 5000 MEur level in 2025. New forms of energy are expected to offer novel growth opportunities globally and companies in the energy sector are increasingly adopting new high-tech solutions to improve their economic and environmental performance. Such developments are supported by market demand and increasing environmental legislation in the EU and on the national level, rising from the topical environmental concerns and continuous quest of improving industry competitiveness.



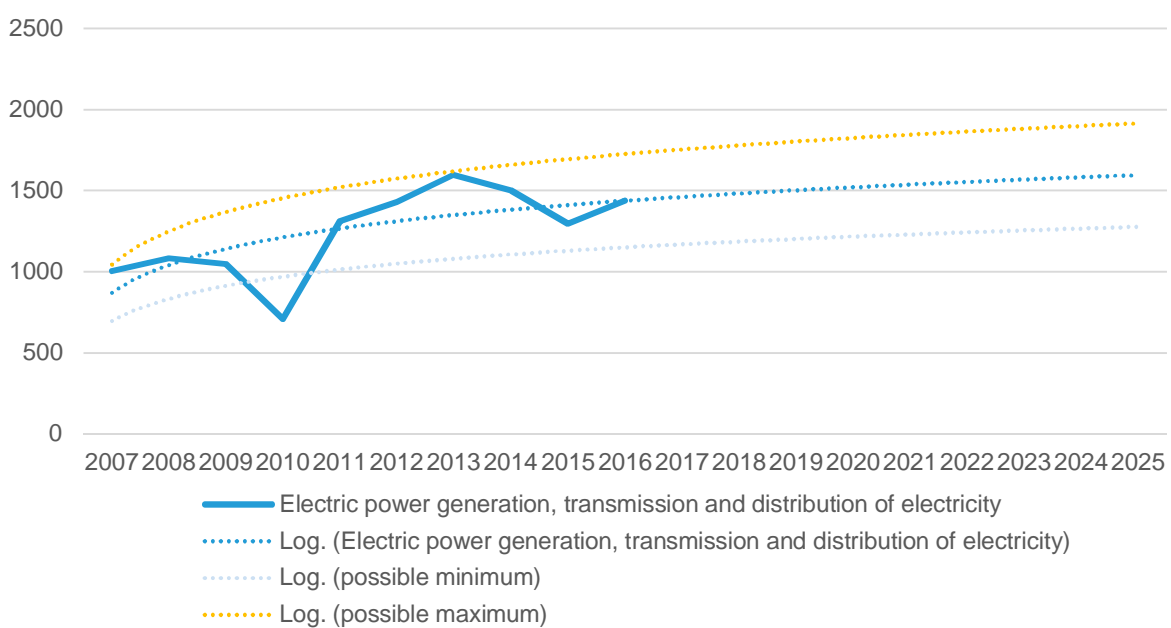
In energy subsectors related to electricity, gas, steam and air conditioning supply (35); electric power generation, transmission and distribution (351) and distribution of electricity (3513) number of employees according to logarithmic trendline is estimated to be between minimum 1100 and maximum 2100 people and turnover in subsector could reach a level of 1.5 billion euro and probably would lie between minimum 1.25 billion euro and maximum almost 2 billion euro.

**Graph 6. Electric power generation, transmission and distribution of electricity subsector - EST - Number of employees**



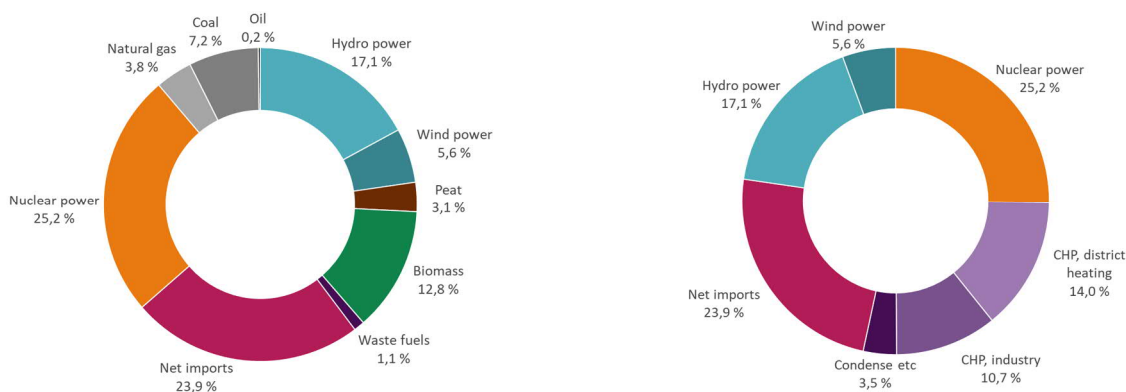
When considering the technological development, outsourcing trends and continuous innovations in the global field of energy, it can be assumed, that the total number of employees in the energy companies in the P4B Estonia area may reduce in the future, even if the economic growth in the sector stays strong.

**Graph 7. Electric power generation, transmission and distribution of electricity subsector - EST - Operating revenue (Turnover) MEUR**



## Energy sector: Current economic situation and development trends in Finland

The share of renewable energy in total consumption has risen by nearly 10 % in the 2010s. The share of renewable energy sources in Finland rose to 39.3% in 2017 according to Statistics Finland's. Finland's target for the share of renewable energy is 38% of final energy consumption in 2020, and this share was reached for the first time in 2014. Share of renewable energy in final consumption in Finland is the second largest in the EU.

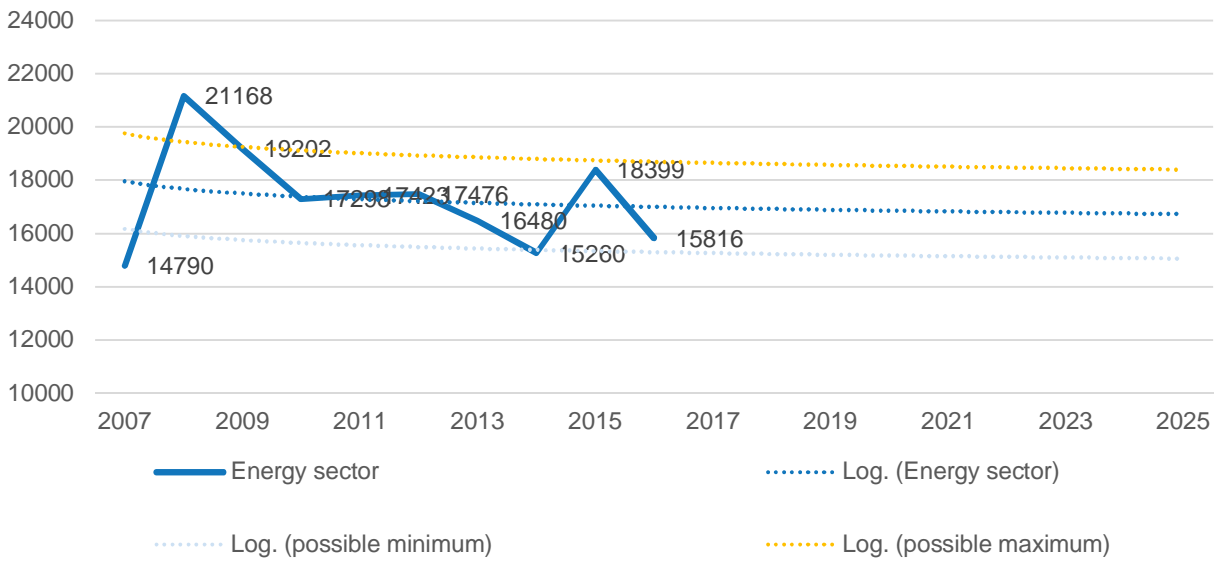


**Graph 8. Electricity Consumption in Finland and Imports 2017 (85.5 TWh) and Electricity by Energy Source 2017 (85.5 TWh). Source: Finnish Energy**

Of renewable energy sources, wind power grew relatively most as its production rose by as much as 57% and its share of electricity production reached 7% in 2016 and 5.6% in 2017. Hydro power accounted for 23% of electricity production. The water situation in Finland has been weaker than usual in the past few years and the production of hydro power went down by 6% in 2017. According to preliminary data, the production of solar power grew by 49%, but its share of Finland's electricity production was still under half a per mil. Net imports of electricity to Finland amounted to 20.4 TWh, which corresponded to 24% of total electricity consumption. Almost all exports of electricity from Finland were directed to Estonia, amounting to 1.7 TWh.

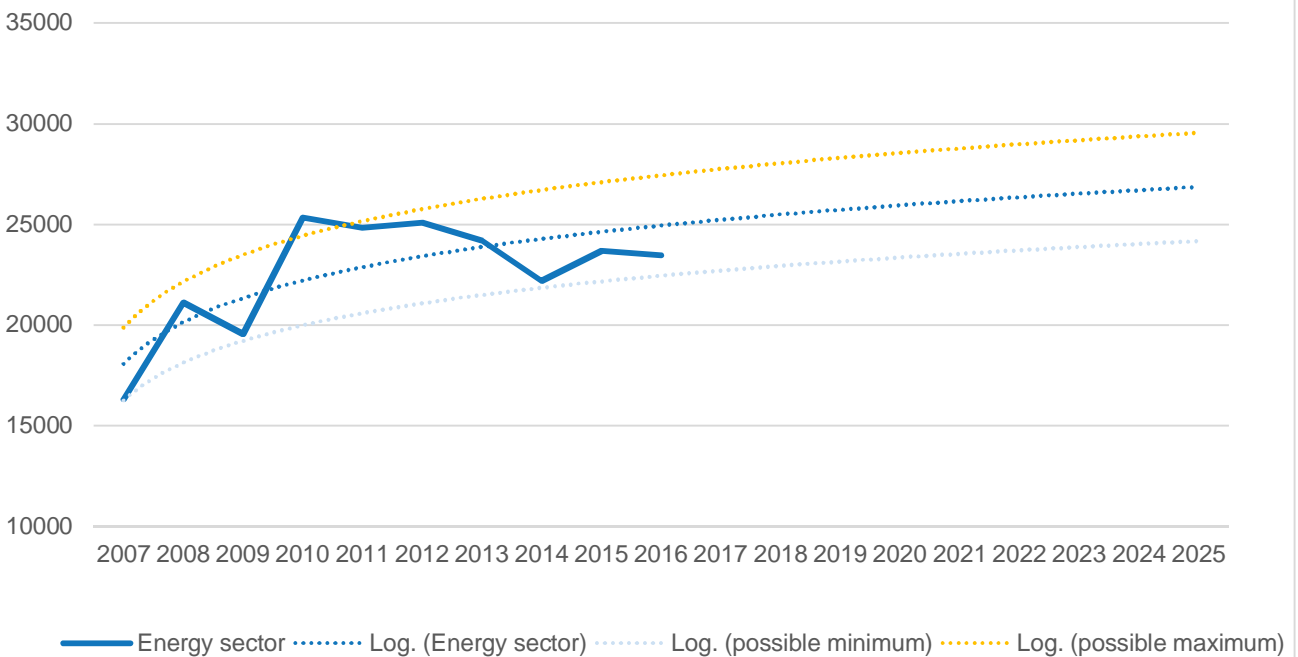
In the P4B Finnish area the number of employees working in the energy sector has been steadily decreasing during the last decade (see Graph 9.). Economic growth, new forms of energy and the establishment of new energy production sites, for example, wind power stations around coastal areas, have not been able to maintain the number of company employees on the past levels. Partially this may be explained through outsourcing operations, when energy companies are increasingly utilising their external networks to provide supporting functions and operations, such as building and maintenance of the energy production sites. Thus, although the number of employees working in the energy companies is decreasing in Finland, there may be network effects that are not captured in this analysis.

**Graph 9. Energy sector - FIN - Number of employees**

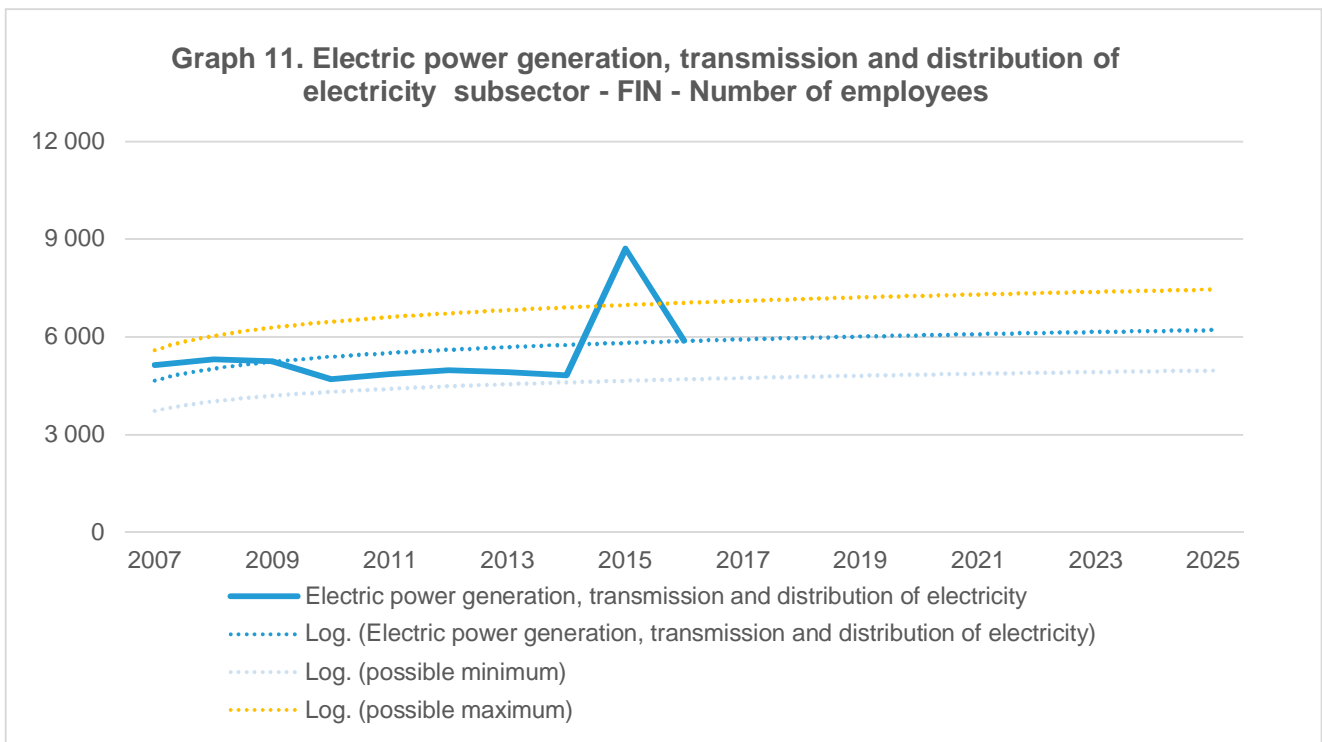


According to the logarithmic trendline curve, it can be estimated that in the year 2025 there could be almost 17000 employees working in the energy sector companies in the P4B project area in Finland and according to possible minimum and maximum prognoses would be between 15000 and 18000 people. As mentioned above it should be stressed that despite of this seemingly negative trend of the employment development among the energy companies in Finland, future developments, including the previously stated outsourcing effect and decentralisation of energy production, may result in a less steep decrease in the level of employment on the regional economy level.

**Graph 10. Energy sector - FIN - Operating revenue (Turnover) MEUR**

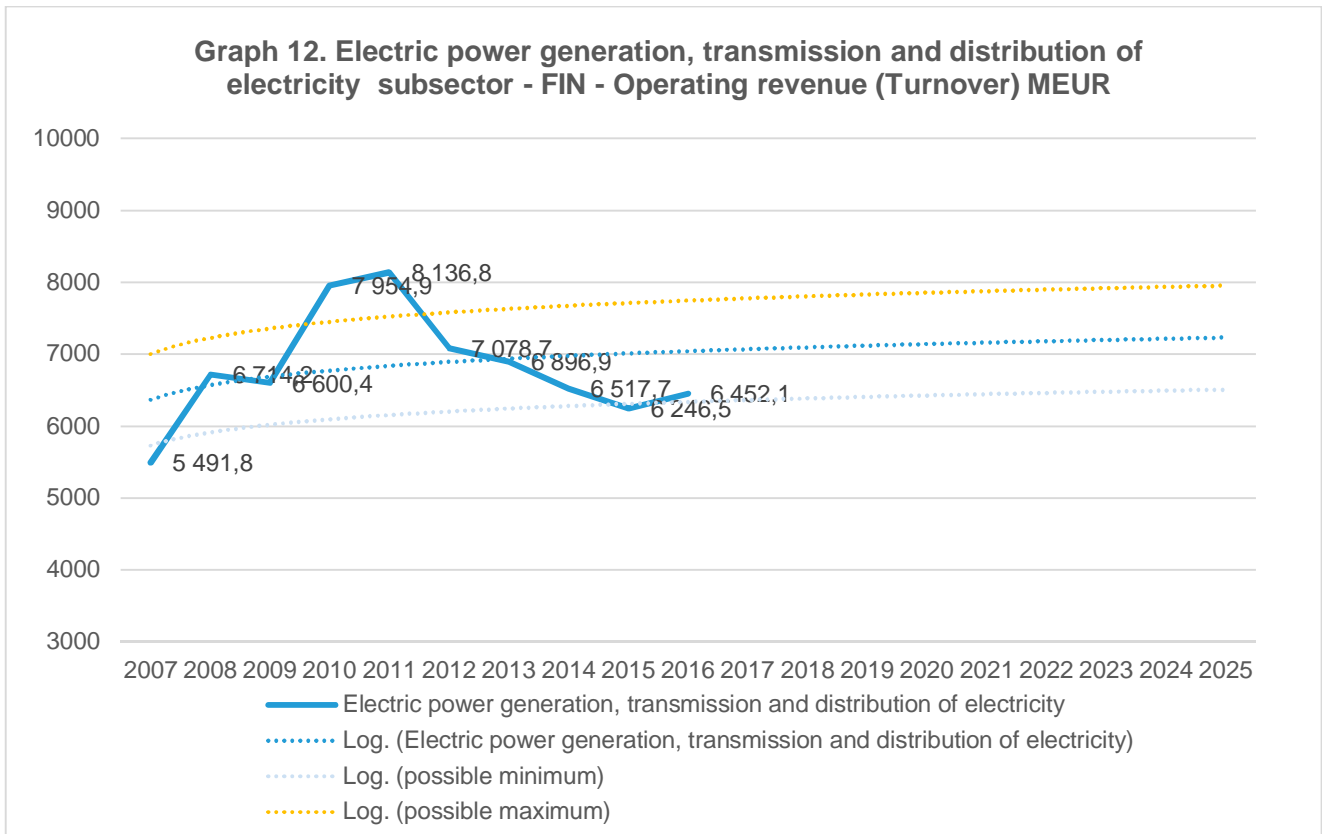


Out of the 466 companies identified for the analysis in the project area in energy sector, only seven companies reach a turnover level calculated in billions of Euros. The top 100 companies include those that have a turnover level of 10 million euros or more. Almost 30 companies out of the top 100 ones reach a 100 million or above annual turnover level. When compared with other blue industries under investigation, the companies in the energy sector are performing well. Their turnover development is positive and the level of productivity is high compared with many other blue business sectors. The positive trend is likely to continue according to the logarithmic trendline depicted in Graph 10. the industry turnover level in the year 2025 will reach 27 billion euros and possibly would be between minimum 24.5 billion euros and maximum 30 billion euros.



In the subsectors related to electricity, gas, steam and air conditioning supply (35); electric power generation, transmission and distribution (351) and distribution of electricity (3513) number of employers probably could reach according to logarithmic trendline possible minimum 5000 and maximum almost 8000 employers.

Although the energy sector and its expert tasks are becoming more international, the tasks will not disappear abroad in the future either. As the energy operations extend to the entire country, the need for manpower applies to all regions of Finland, unlike in many other sectors. The remuneration level in the sector is one of the best in Finnish industries. (Finnish Energy)



In the subsectors related to electricity, gas, steam and air conditioning supply (35); electric power generation, transmission and distribution (351) and distribution of electricity (3513) turnover level in the year 2025 will probably be between minimum 6500 and maximum 8000 million euros.

## MARITIME TOURISM SECTOR

### EU level strategies

In the EU Commission Blue Growth Strategy, maritime tourism is seen as an important area for growth potential. The Vision for 2030 is the following:

- Wide range of visitors incl. non-EU
- Capacity limits of destinations are respected.
- Marinas offer an attractive environment year-round.
- Cooperation with local residents, local actors drive tourism
- Remote areas of BSR are better accessible.
- Pan-Baltic data portal on maritime tourism
- Nature tourism packages and combinations
- Cruise tourism as a gateway-----
- More senior citizens travelling
- Sustainability highly valued

## The BSR-level strategies

To advance the strategic guidance of tourism development in the BSR, “Tourism Policy in the Baltic Sea Region” steering group was created to ensure that *the EU Strategy for the Baltic Sea Region* is anchored all over the region (EUBSR, 2017). In 2014 the Commission outlined that it would ensure that coastal and maritime tourism is included in other EU policies like IT connectivity, sustainable transport, safety issues and freedom of movement for workers. Cross-cutting policy aspects such as environmental protection, regional development, training, consumer protection and climate change mitigation and adaptation policies will also be considered.

On the BSR level, cross-boundary cooperation and aims to develop BSR as a coherent travel destination on a global tourism market, remain some of the key strategic objectives for the future (BSR Tourism Forum, 2017). The Estonian Tourist Board, in co-operation with the tourism industry and regional tourism organisations, developed common marketing strategies for those target markets with the highest tourism revenue potential, determined the roles of the various actors, and planned joint activities and the funding commitments/budgets for a two year period. Strategies include an action plan for managing demand in target markets, while representing the interests of the state, destinations and operators. (OECD, 2016)

In 2016 *the Baltic Cruise Dialogue* agreed to promote natural and cultural heritage in the Baltic Sea region, as well as local traditions, as a core business value to preserve and develop. Additionally, they agreed to promote a holistic approach for sustainability policy for maritime and coastal tourism in the Baltic Sea region, aiming at mitigating and minimizing the environmental impacts of cruise tourism to local inhabitants, to the marine environment and to air quality. The dialogue also agreed to work jointly to identify and remove bottlenecks hindering the effective implementation of the Baltic Special Area under MARPOL Annex IV by the agreed timeline 2019/2021, by sharing best practice and taking into account the need for timely planning of itineraries. (Maritime affairs, 2016)

A key element in the BSR tourism, Coastal Tourism, is defined as tourists spending at least one night in a municipality with a coastline or that has more than 50% of its area near the coast. In accordance with this definition, the share of coastal tourism is particularly significant in P4B region. Since 2012 the contribution of this sector to the EU's economy has been measured from surveys of tourists in their place of residence and accommodation establishments in these coastal municipalities. The figures indicate a steady growth in the spending, particularly from those residents outside the EU. The increasing tendency for more frequent but shorter vacations is indicated by the significant proportion of spending that is spent on travel. Along with high emphasis on ecological trends in tourism, previous reports have identified activities such as snorkeling and diving creating future potential for tourism development in Estonia and Finland (Ecorys, 2013).

The most common form of arrival for non-residents is by air (COM, 2017) yet, cruise tourism in another form of transportation associated with future growth in BSR (COM, 2012b). According to Baltic Transport Outlook 2030 study, the number of air passengers is expected to rise 62% between 2010-2030. This figure alone offers valuable insights to understand the nature of expected growth in the tourism sector. The global trend over time has been for air transport to grow at a somewhat faster pace

than surface transport, e.g. by roads, rail or water, thus the share of air transport is gradually increasing (UNWTO 2017). Helsinki-Vantaa airport works as a central hub in the P4B area through which tourist flows spread to explore the Baltic countries and the Scandinavia. Since the Helsinki airport has been developed to respond growing passenger numbers, along with Finnair's strategic investments to new fleet and Asian routes, there is high growth potential in developing existing and designing new cross-boundary service paths to satisfy the diversifying tourist needs and to generate more turnover in P4B tourism sector overall in Estonia and Finland. Service infrastructure and logistics have a crucial role in facilitating growth in tourism. Currently the car is dominant as a means of transport in coastal tourism in the BSR (Source: Flash Eurobarometer, 2011). The improvement or development of attractive public transport and modal split from in-land city-hubs to the coastline is considered highly necessary (Ecorys, 2013).

## National/regional strategies for Finland

Tourism development relies on long-term strategic aims in Finland, integrated on a national cross-industry level with a focus on digital & low-carbon means and being approved at the highest level of the government (OECD, 2016). In Finland the number of international tourist arrivals was 2,8 million in 2016. It is estimated that tourism will employ 180 000 people in total in Finland in 2025 (OECD 2016).

In Finland the strategic aims of collaboration and networking were utilized in the *Roadmap for Growth and Renewal in Finnish Tourism for 2015-25* that was compiled in 2014 to accelerate new ways to growth. Other development measures that currently guide tourism development include:

- Finrelax – Turning Finland into a top country of wellbeing tourism,
- Making the Finnish archipelago internationally known,
- Finland Stopover – making Finland a leading stopover country,
- Making tourism services easy to find and buy digitally,
- Creation of a demonstration project targeted at sustainable water-based tourism, utilising bio-economy, clean technology and digital technology.

A number of specific tourism programmes and initiatives in line with the roadmap include:

- The Air Transport Strategy to 2030. This supports a major promotion of Helsinki Airport as an international transit hub for Asian routes, with a growth from 16 million passengers in 2014 to 23 million in 2030, backed by considerable investment in airport facilities. The strategy recommends improvements in networking and marketing in order to ensure a solid foundation for Finnish air transport and tourism.
- Finland's Strategy for the Arctic Region, which highlights the importance of tourism and the growth in nature and adventure experiences.
- National co-ordination of theme-based tourism development, supported by Outdoors Finland (summer activities) and Cultural Finland (culture and tourism) umbrella programmes.
- Development of Finland's first Food Tourism Strategy. One of the first actions was to establish the Hungry for Finland competition, as an inter-ministry initiative aimed at increasing awareness



of food products and experiences, with participants including events, museums, service businesses, restaurants, cafes and countryside tourism companies.

- A commitment to sustainable development and the promotion of appropriate training and certification programmes for tourism businesses as well as supporting solutions that encourage future consumers to make sustainable choices. (OECD, 2016)

## National/regional strategies for Estonia

In Estonia, the number of international tourist arrivals was 3,1 million arrivals in 2016 (OECD 2016).

In Estonia, the overall budget for tourism development is stated in **the National Tourism Development Plan for 2014-20** as approximately EUR 123 million, the majority of which is financed through Enterprise Estonia/Estonian Tourist Board. The development plan aims at increasing the tourism sector by approximately a third by 2020. Tourism development contributes to the achievement of the objectives of the competitiveness strategy Estonia 2020, particularly by increasing the share of Estonia's exports in world trade, raising the employment rate, reducing youth unemployment and encouraging the development of international transportation routes (OECD, 2016). In the coastal region of northern Estonia, in Narva and Tallinn tourism development is considered one of the most important business areas (Põhja-Eesti Turism SA, 2016). In Estonia currently, visitor exports amount to 10% of total exports in Estonia and this is expected to grow 4,2% annually. Likewise, in 2017, the total contribution of Travel & Tourism to employment, including jobs indirectly supported by the industry was 15.3% of total employment (99,500 jobs). This is expected to rise by 1.1% in 2018 to 100,500 jobs and rise by 0.5% pa to 105,000 jobs in 2028 (16.8% of total). (Travel & Tourism Estonia, 2018).

The main strategic goals of the National Tourism Development Plan 2014-20 in Estonia are to increase the awareness of Estonia as a travel destination; tourism product development, development of tourism attractions of international interest and regional tourism destinations (Ministry of Economic Affairs and Communications website, 2017). The section of the plan that focuses on Northern Estonia, lists all recent and current tourism development projects in P4B project area in Estonia, many of which are reaching to year 2020, see **Põhja-Eesti Turism SA** (2016) for further information. Current tourism product development relies on diversification and global trends such as well-being and demand for nature stimulate markets.

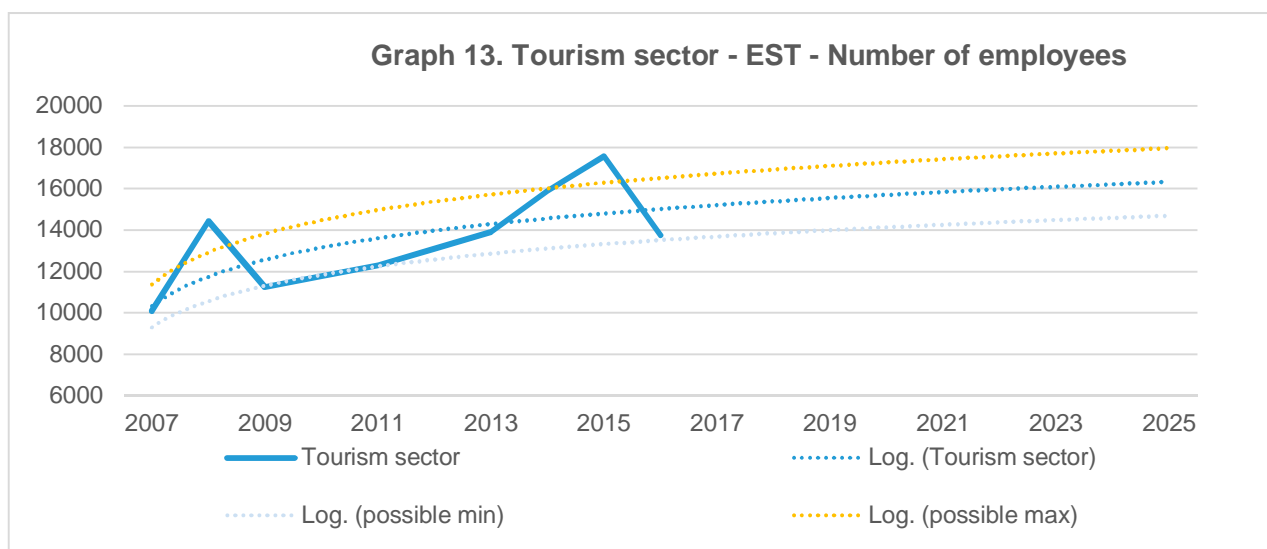
## Maritime Tourism sector: Current economic situation and development trends

Tourism ranks as world's third largest export category. Sea and coastal tourism is the largest sub-sector of tourism, the largest single maritime economic activity and the key economic driver in many coastal regions and islands in Europe (COM, 2014c). The significance of tourism and maritime experience industry is also recognised as one of the high-potential emerging areas in pursuing blue growth by the BSR countries (COM, 2012b). In Northern Europe alone the amount of international tourist arrivals has tripled since 1990, being over 80 million in total in 2016. Traditionally European tourism has

been heavily interregional (80 % of arrivals), however, the economic development especially in Asia has resulted that, for example, China overtook the USA as the world's largest outbound travel market in 2014 both in terms of generated arrivals and total travel expenditure (Croese, 2016). Arguably, the Chinese tourists are currently also among the most attractive target groups in European tourism market development, and at the EU-China Summit in 2016 the year 2018 was proclaimed to be "The EU-China Tourism Year". In the BSR cruise dialogue, cruising is considered a tourism product with high potential among non-EU tourists, particularly from China, and the intention is to build awareness of cruising by developing attractive thematic packages and promotion campaigns (Maritime affairs, 2016). For more information on the future directions and trends can be found in the *European strategy for more growth and jobs in coastal and maritime tourism COM* (2014), in which the European Commission reflected on the diversity of the coastal regions in EU and their capacity to generate wealth and jobs, in line with the EU's *Blue growth strategy COM* (2012).

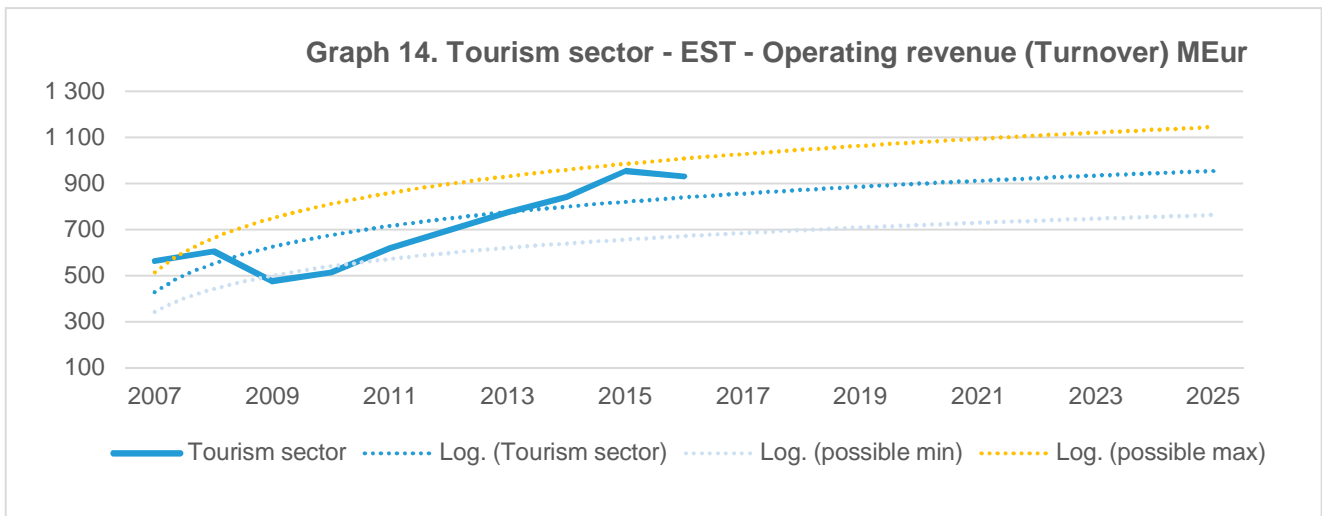
In Finland the value of the total expenditure by international visitors at collective tourism establishments was 2,7 billion and in Estonia the value of overnight international visitors was 1,5 billion euros in 2016 (UNWTO, 2017). These growth predictions along with their positive effects on the employment within tourism industry are likely to explain the positive estimates of the future development of (coastal) tourism. In the P4B project area Finland, the share of employment in the travel industry, adding up to almost 68000 employees, was reported to 5,5 % of the total share of employment in the P4B region in 2014 according to the national statistics (Visit Finland, 2017).

The analysis of the Tourism sector in Finland and Estonia includes data of Hotels and similar accommodation (551), Holiday and other short-stay accommodation (552), Camping grounds, recreational vehicle parks and trailer parks (553), Other accommodation (559), Restaurants and mobile food service activities (561), Beverage serving activities (563), Travel agency, tour operator reservation service and related activities (79), and Amusement and recreation activities (932). The employee and turnover development at the sector level for Estonia will be presented in the Graphs 13 and 14.

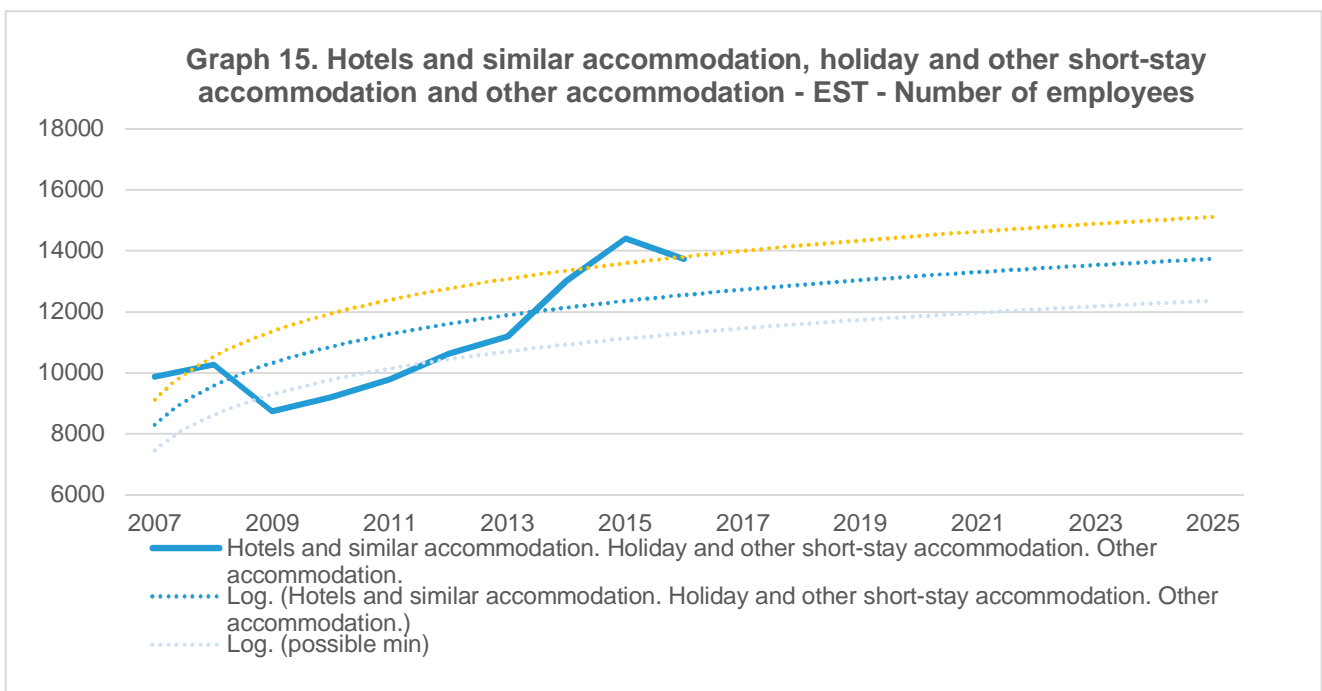


Following the positive trend line and growth expectations of tourism, and despite of the recent drawback in tourism sector employment level, by 2025 there will be over 16000 employees in the Plan4Blue Estonia region working in the tourism sector.

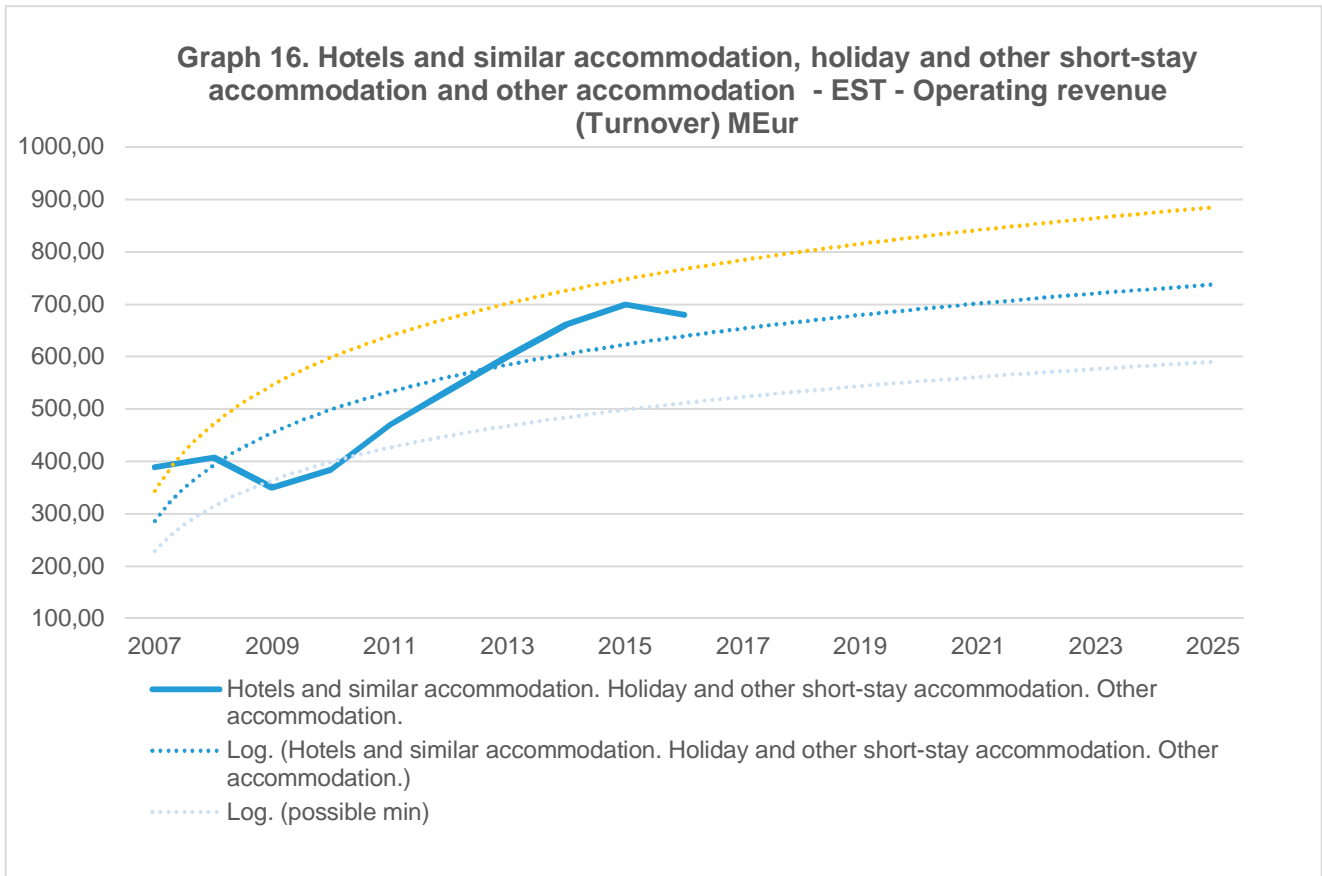
Coastal tourism is considered one of the key blue growth industries in the P4B region. The total turnover level has progressed firmly since 2009 and with the current development trend the industry is getting closer to reach 1 billion euros level by 2025 in P4B Estonia region (see Graph 14).



Also in all tourism subsectors depicted in this analysis concerning Estonia, it is expected that the employment and economic development continue to develop in a positive manner. This was also identified and supported in the P4B interviews of the Estonian representatives. For example, the interviewees saw cruise tourism being one of the fastest growing area in tourism in the near future, which, together with other forms of logistics (eg. Rail Baltica) also creates sustainability challenges on the coastal ecosystem. Hence, many consider guidance or even partial restrictions necessary to limit the impacts of mass tourism. When considering other major tourism subsectors in Estonia, some interviewees saw activity based (eg. fishing and bird watching) services and lifestyle positioning crucial perspectives to consider when attracting travel customers of the future. The future growth is supported by implementing efficient digitalisation strategies in the tourism industry and understanding the possibilities of social media solutions in the tourists' value creation.

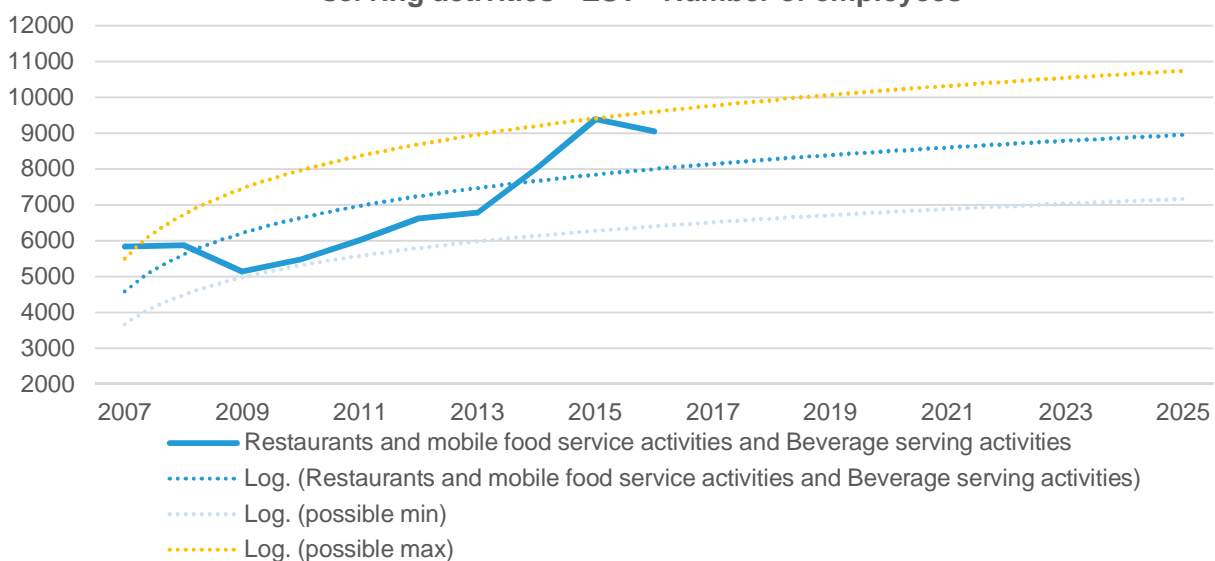


As with the most recent EU level transportation and tourism studies, most of the blue industry experts contacted during the Plan4Blue research process saw the overall number of visitors rising steadily in the future, both from outside and inside the EU. The statistical overview conducted on the development of number of employees in hotels accommodation facilities in Estonia also supports the expert views and clearly, a steady positive development can be anticipated.



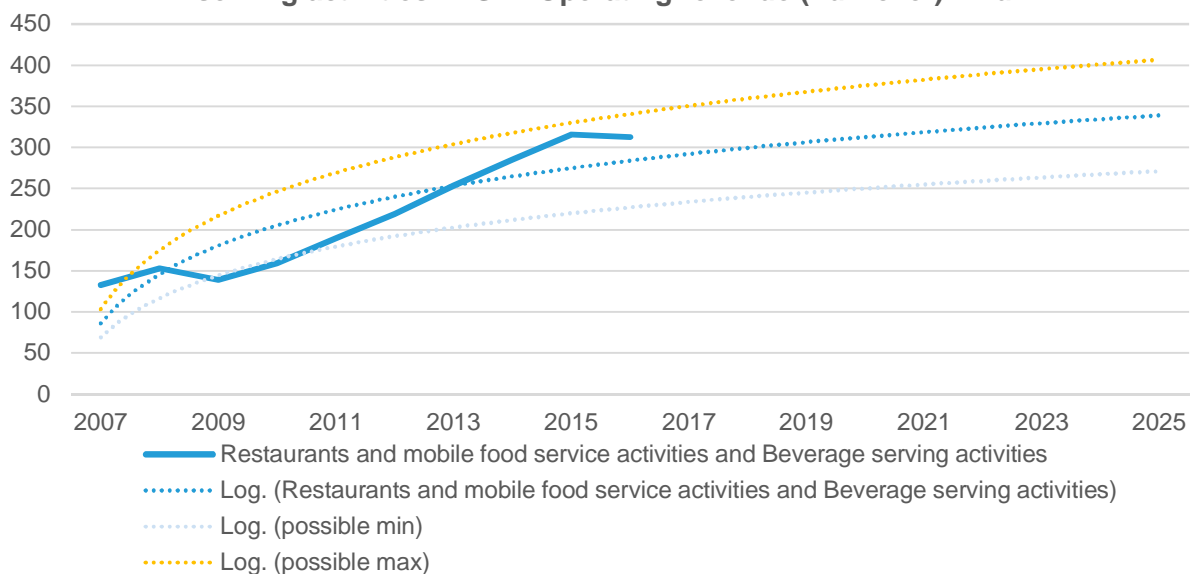
The turnover development of hotels and accommodation in Estonia was especially strong from 2009 to 2015. Economically, this may also indicate that the industry has capability to successfully manage the expected positive growth and future changes in customer demand and (environmental) regulation.

**Graph 17. Restaurants and mobile food service activities and Beverage serving activities - EST - Number of employees**



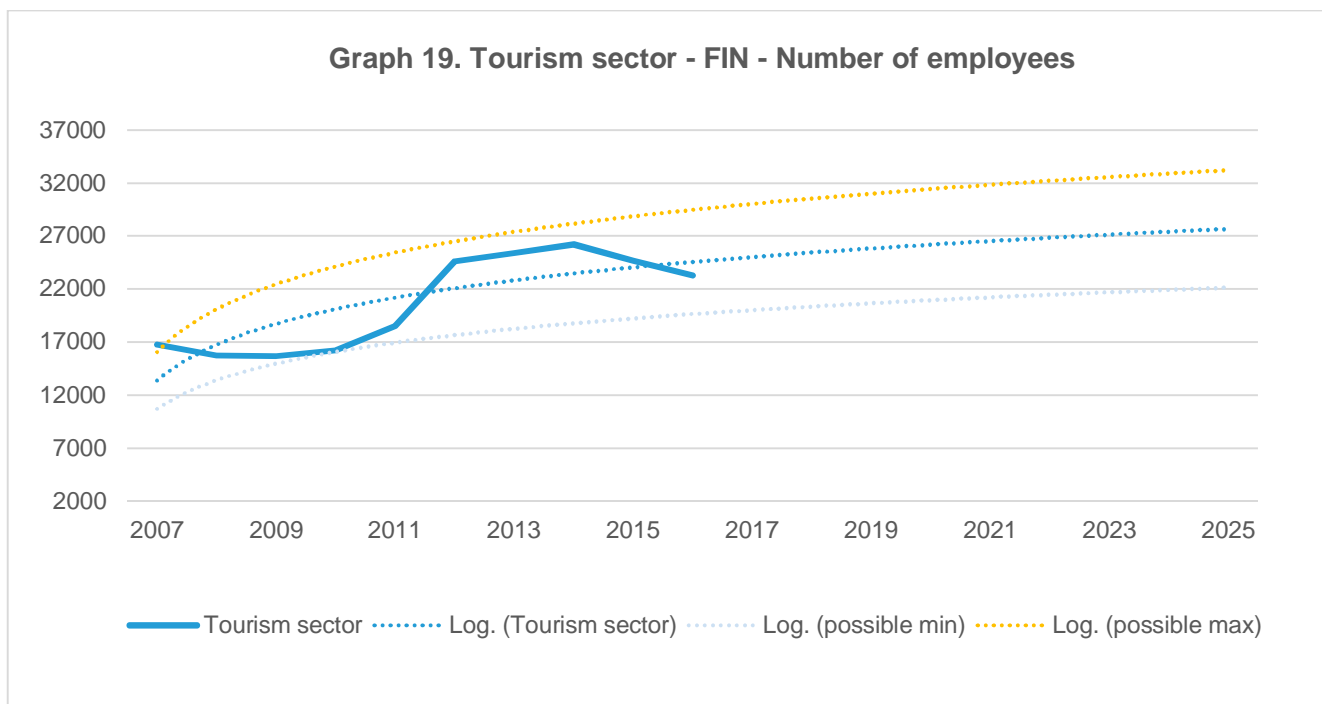
Practically all tourism sub-sectors in Estonia illustrate inter-linked development and thus the major changes in the past can be identified in all of the sub-sectors' revenue and number of employee graphs.

**Graph 18. Restaurants and mobile food service activities and Beverage serving activities - EST - Operating revenue (Turnover) MEur**



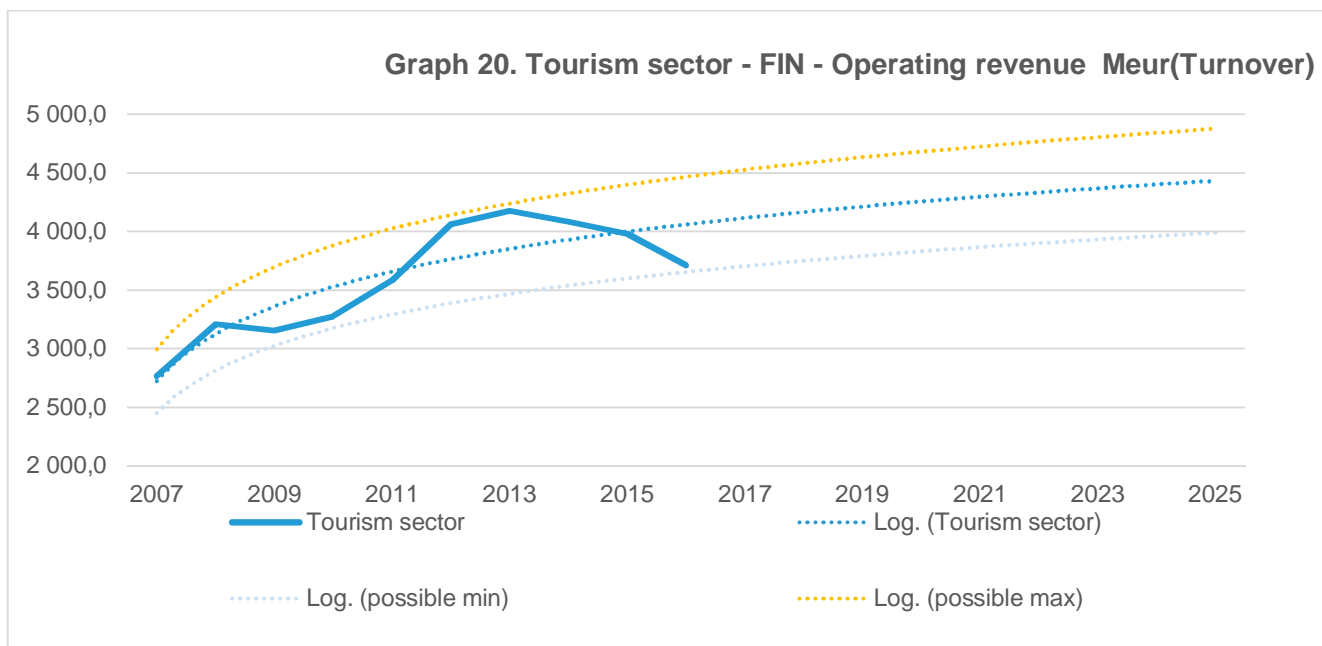
Highly positive development in the tourism sector is also expected in the P4B region in Finland (see Graph 19). According to the depicted trend line there will be around 28000 employees in the industry by 2025. Digitalisation and self-service development may however influence these high predictions negatively. Since this is a global trend, even though high turnover levels could be reached, the use of labour might be much less intensive in the tourism service provision in a few decades' time.

**Graph 19. Tourism sector - FIN - Number of employees**



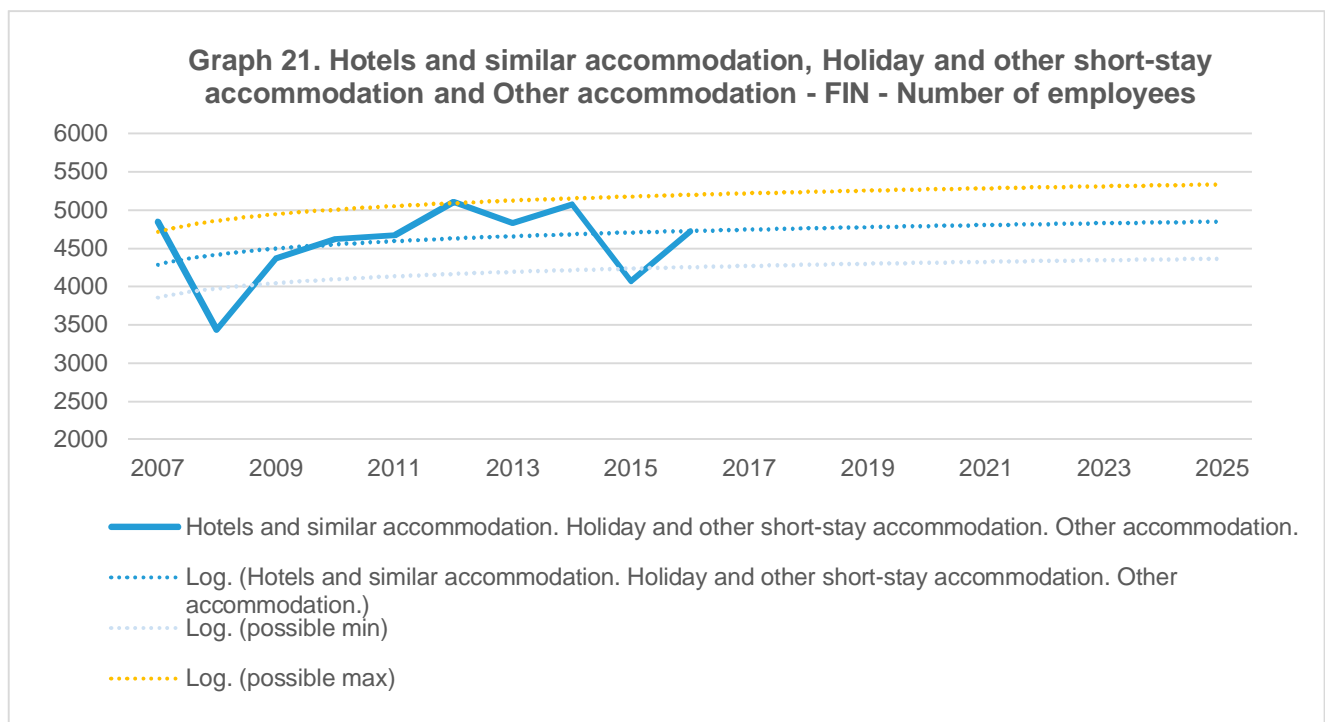
In terms of the industry turnover, by 2025 the total level of 4.5 billion euros in the P4B region may be reached. For the turnover development see the Graph 20. below. The interviewees saw especially the increasing sea traffic and digitalisation and faster information sharing within the industry changing the tourism sector in the future. The overall impact to the level employees needed may be negative according to some interviewees. It is anticipated however that there will be more all-year-around services available for international visitors.

**Graph 20. Tourism sector - FIN - Operating revenue Meur(Turnover)**



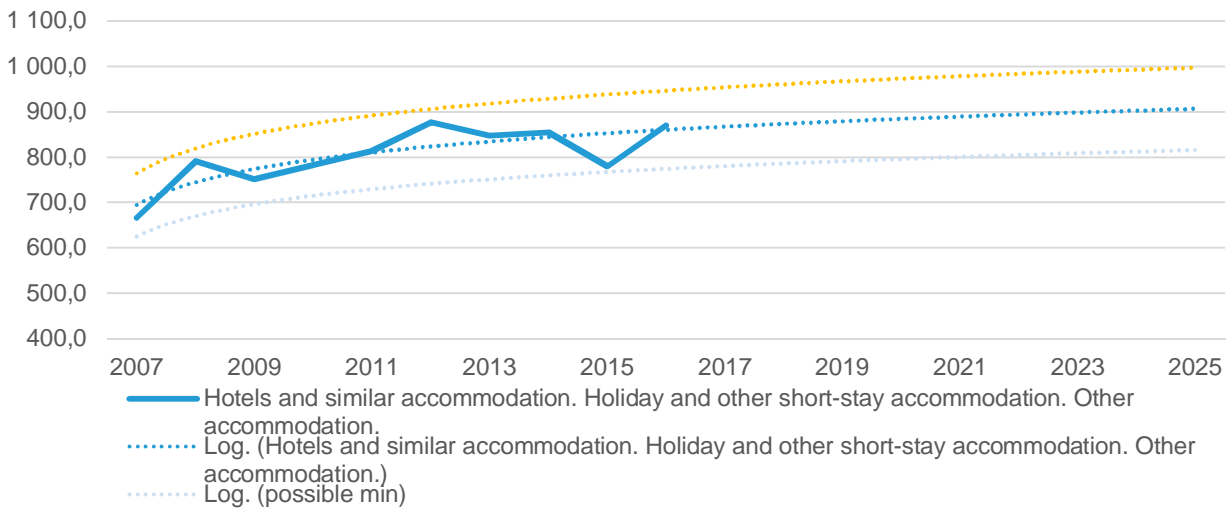
The data on the employee numbers in coastal and maritime tourism with reason shows that it is one of the growth sectors of the maritime economy in the BSR generating a significant number of jobs. It is noteworthy that the promotion of skills and maritime careers has been identified important also for this

promising sector with a huge growth potential. The lack of suitable skills and competences as well as an ageing workforce have been identified as the problems for the future development (COM, 2014b). It was brought up in the interviews that for some smaller tourism sector companies situated in remote locations, finding skilled workforce is considered currently a challenge.



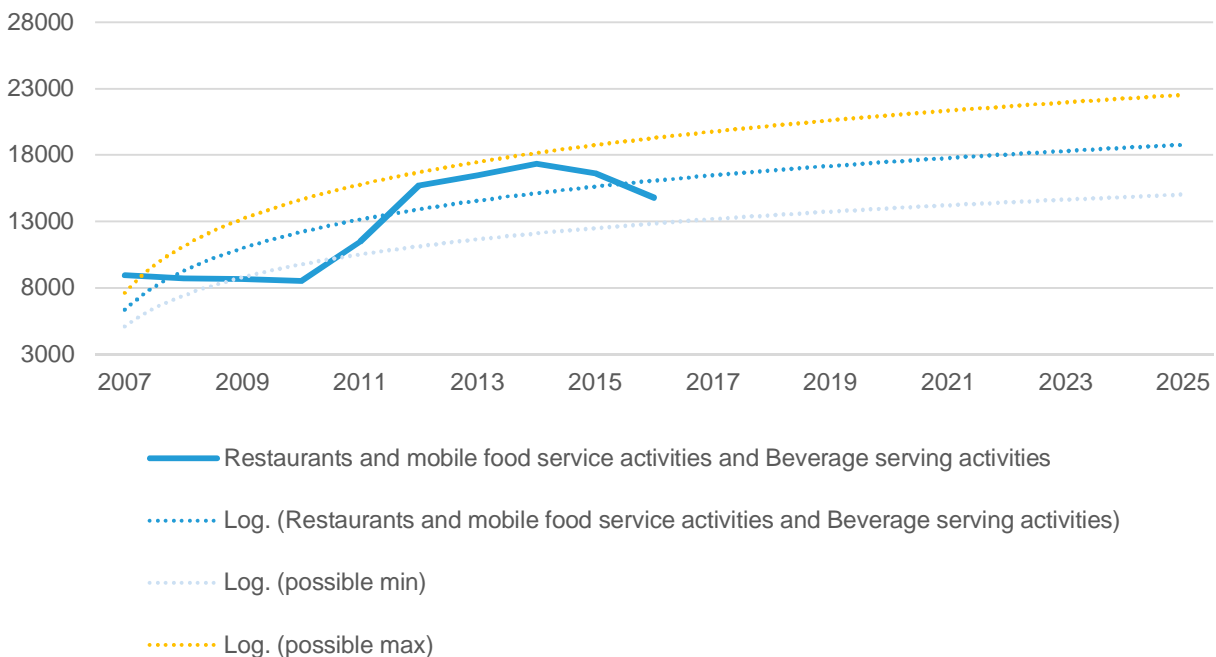
Despite the fluctuations in the number of employees over the years within the tourism sector as a whole, it seems these fluctuations do not have a real effect on the number of employees in short-stay and holiday accommodation subsector. Logarithmic trend line predictions estimate similar modest growth development for the future. One possible explanation for the modest employment development may relate to the increasing use of technology and self-service processes in the workforce-intensive subsectors. The rise of sharing economy related services and resources are also expected to bring new actors and platforms in the market, eg. holiday houses and small yachts and boats, which are considered perhaps less attractive to own in the future.

**Graph 22. Hotels and similar accommodation. Holiday and other short-stay accommodation. Other accommodation - FIN - Operating revenue Meur (Turnover)**



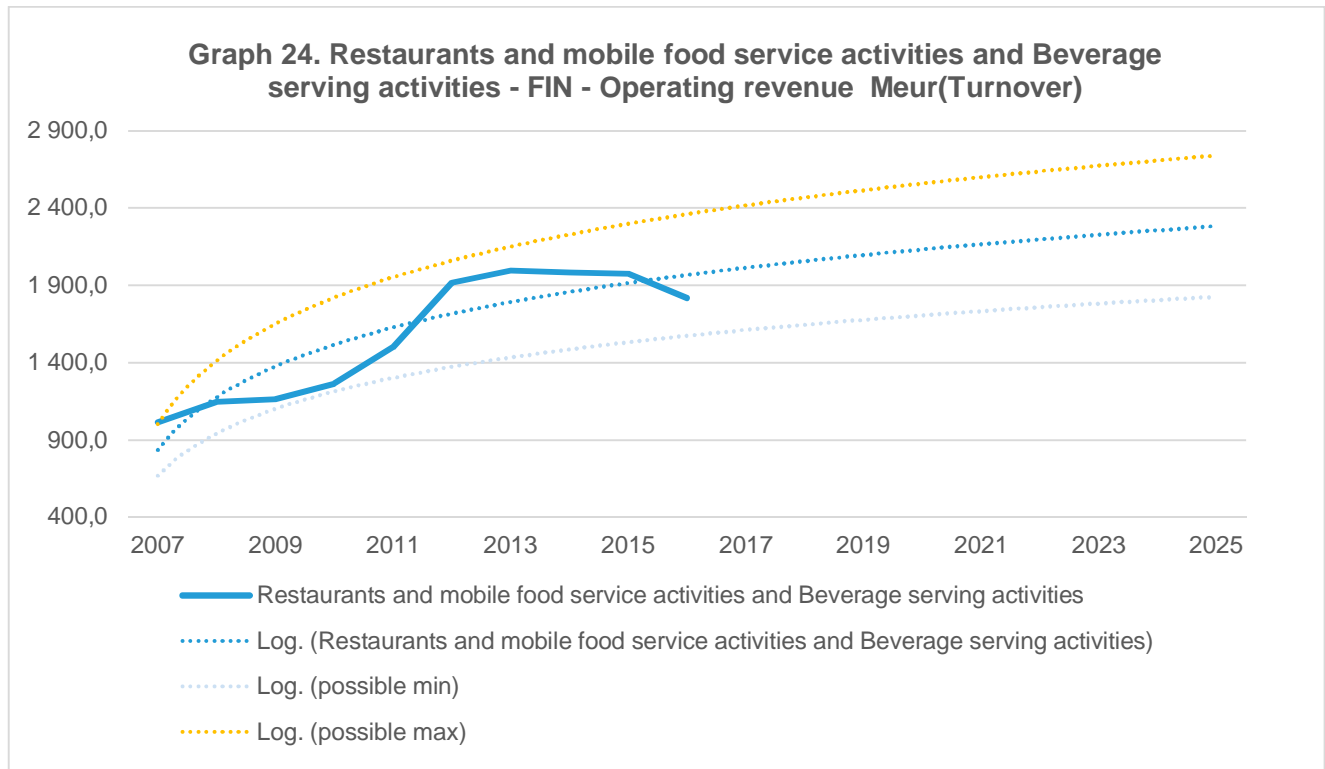
The turnover development in holiday and short-stay accommodation subsector shows a long term positive development, which is expected to continue for years to come. The general estimates relating to tourism growth in the BSR region predict highly positive economic development and hence, even brave growth figures in turnover figures may be expected to realise. According to the interviews conducted in the tourism sector, traffic communication will be an important issue and its overall accessibility to support coastal tourism. The functionality of the central lane connections are considered vital. Coastal experiences are expected to rise to a focal role in tourism development in the area, which should also lead to lengthening the service seasons.

**Graph 23. Restaurants and mobile food service activities and Beverage serving activities - FIN - Number of employees**





Tourists' and local spending increase in food and beverages serving activities is expected to have a positive effect also on the number of employees needed in the future. Similarly, the turnover growth is expected to show steady positive growth levels in the future years. It remains a question mark, what kind of effect will international cruise tourism have on coastal services in the future. According to the conducted interviews, already the growth of tourism sector has been more rapid than anyone expected earlier.



The interviewees see changes in the future tourism markets. Traditional group travel has decreased and individual trips have increased. People want to book their travels alone. Online booking has therefore increased. Also, environmental travel has now a great momentum since people want to experience the unique nature in the region. This should lead to increase in coastal trips, activities and service provision overall.

## MARINE FISHING AND AQUACULTURE

### EU-level strategies and policies

In 2013, a new and reformed *Common Fisheries Policy* (Regulation (EU) No 1380/2013) was agreed at the EU level and has been implemented since. The aim is to support the traditional European fisheries sector by making fishing sustainable and simultaneously, to improve the economic and social situation of fishermen. Community-Led Local Development (CLLD) has been implemented under the European Maritime and Fisheries Fund since 2014. Fishing tourism development is one example of

helping fishermen to diversify their activities and reduce the pressure on stocks. Another area is the promotion of the local catches in restaurants and hotels. (COM, 2017.)

The fishing sector is a well-established and mature industry in the BSR and P4B project area. In the future, fishing continues to be a key blue industry sector but greater growth potential lies in the development of aquaculture solutions and services. Related to these two sectors, blue biotechnology is widely established and used as an enabling technology for thriving food and feed, pharma, cosmetics and other industries. Blue biotechnology plays a role as an enabler through the whole value chain, also having positive effects on the neighbouring development fields of blue biomass production and sustainable fish aquaculture. (ECORYS & S.Pro, 2017) The European Commission's *Strategy and Action Plan on bioeconomy* (COM 2012) builds on a circular thinking and links sustainable bioeconomy to all parts of the green and blue economy. It recognises a future challenge and a need to explore how to transform the increased demand of biomass and bio-based products into sustainable solutions in the entire value chain from biomass to food, innovative bio-based products and bioenergy. (COM, 2012)

Aquaculture is farming of fish, crustaceans, molluscs, aquatic plants, algae, and other aquatic organisms. From a legal perspective, it is the cultivation of aquatic organisms by some techniques, where the organisms remain the property of a natural or legal person throughout the process (EU Regulation 2013 on Common Fisheries Policy, Article 4(1)(25)). For producing animal protein, nutrition efficiency is typically better in aquaculture than with many animals farmed on land (MMM 2014, 2). In 2015, the global production of fish farming exceeded that of beef for the first time (LUKE). The Food and Agriculture Organization of the United Nations (FAO 2010) estimates that aquaculture will produce 65% of global fish consumption by 2030. Prevention of food losses and reducing waste are important for resource efficiency and food security (HLPE 2014). FAO (2010) emphasizes the need to focus on the policy and governance of aquaculture, especially in relation to employment and poverty alleviation.

In the EU blue growth strategy (COM 2012), aquaculture has been recognized as one of the five most potential blue growth areas (along with maritime and coastal tourism, marine energy, marine mineral resources and blue biotech). EU regulation 1380/2013 on the Common Fisheries Policy states that European aquaculture should contribute to meeting the growing world demand for aquatic food and provide growth and jobs for EU citizens (preamble 53). The goal is that "fishing and aquaculture activities are environmentally sustainable in the long-term ... with the objectives of achieving economic, social and employment benefits..." (EU2013a, Article 2(1)). According to *the EU Commission's strategic guidelines for sustainable aquaculture* (2013b), the goal is to grow significantly. Of the EU consumption of fishery and aquaculture products (13.2 million tonnes), 25% comes from EU fisheries, 10% from the EU aquaculture, and 65% from imports. EU aims to fill the gap at least partly by "*environmentally, socially and economically sustainable EU aquaculture*". One percent of EU consumption means around 3000 to 4000 jobs if produced by EU aquaculture. (EU 2013b, 2). Business diversification may provide additional sources of income: fish farming may, for example, be integrated with angling and tourism (EU 2013b, 7).

According to European Commission's Blue Growth Strategy report (COM 2017), the vision for 2030 of the blue bioeconomy is the following:

- Clear regulatory framework in place
- Bio-based products & services available
- Mussel farms for environmental services
- BSR is a global knowledge hub of biorefinery and circular economy
- Wild biomass for biogas, feed or food ingredient

- Commercial macroalgae cultivation
- Blue biotechnology upscaling
- Positive consumer attitudes

## National/regional strategies for Finland

*The Finnish aquaculture strategy* (MMM 2014) states that the development and competitiveness of Finnish aquaculture is determined by legislation, demand, and worldwide market situation (MMM 2014, 2). Aquaculture may have a large impact on local economy in distant regions (MMM 2014, 5). The Finns eat 80 000 tonnes of fish a year, of which Norwegian salmon accounts for half and one third is Finnish (MMM 2014, 4). Salmon is the most common farmed fish in Finland with a 90 % share, and whitefish is the second most popular. Finnish aquaculture targets to growing from current 13 000 tonnes to a yearly production level of 20 000 tonnes by 2022 (MMM 2014, 7). Circular economy is seen as R&D –based innovative activity (MMM 2014, 6) and organic and environmentally certified production is listed as a possible production strategy (MMM 2014, 10). For setting up an aquaculture facility, the farmer must apply for an environmental permit according to the Environmental Protection Law, and structures on water need a building permit according to the Water Law.

## National/regional strategies for Estonia

In Estonia, the number of professional fishermen has decreased over the years. There were approximately 2420 professional fishermen in Estonia in 2016, including 1670 coastal fishermen, 497 inland water fishermen, 189 fishermen working on trawlers and 80 in the long-haul fisheries. As of 2016, there were 36 vessels in the Baltic Sea and 5 fishing vessels in the Atlantic Ocean in the Estonian fishing fleet and, according to data provided by the Fisheries Information System, there were a total of 1508 coastal fishing boats and 484 inland fishing boats. (Fisheries Information Centre.)

*The Estonian Fisheries Strategy (EFS) for 2014–2020* includes Estonia's state of fish stocks, coastal fishery, trawling, recreational fishing, distance fishing, processing, marketing, as well as research and development activities. Its main objective is the sustainable development of Estonian fisheries industry as a branch of economy and enhancing the competitiveness of the fish production in the domestic and foreign markets. The document provides for focusing more on increasing knowledge and innovation to use the existing technical base as effectively and cost-efficiently as possible. To achieve the objectives set out in the strategy, the sustainability of fish stocks must be ensured through the optimum use of fishery resources. Commercial fishing in conjunction with recreational fishing should not exceed the fishing capacity established.

The strategy serves as a basis for *the European Maritime and Fisheries Fund (EMFF) operational programme*, which determines the proposed measures for the development of the fisheries sector. The goal of developing the trawling sector for the years 2014-2020 is to shape Estonia as an important Baltic herring and sprat logistics center for the Baltic Sea region. The objective of developing recreational fisheries in the years 2014-2020 is to promote, develop and diversify recreational fishing and fish tourism and related economic sectors, also development of relevant infrastructure. The objective of developing coastal fisheries (up to 12 nautical miles or 20 m depth) and inland fisheries in 2014-2020 is to increase the economic sustainability. The priority will be given to supporting the development of ports, sustainable and innovative solutions for processing and fishing (selectivity), opportunities for

direct and joint marketing, diversification of activities and promotion of cooperation. (Ministry of Rural Affairs, website; Põllumajandusministeerium, 2013)

Estonia has developed *an aquaculture strategy for 2014-2020* (Tallinna Ülikool, Eesti Maaülikool, 2013). Estonia has set targets to grow aquaculture significantly. While the current (2016) production is 868 tonnes (including 680 tonnes (78%) rainbow trout) (Statistics Estonia, 2017), production capacity was 2000 tonnes in 2014 due to recent investments, and expected to rise to 5000 tonnes by 2020. The strategy sets targets for Estonian aquaculture production to achieve more than 50% share of the Estonian internal market and more than 5 Million Euro export of aquaculture products by 2020, which means an increase in the total Estonian aquaculture production to more than 4300 tonnes by 2020 (including more than 3000 tonnes for internal market and more than 1300 tonnes for export). However, according to expert judgement (Jaanuska, 2015), these production targets are not realistic to achieve by 2020.

The strategy does not define the share of marine aquaculture in future targets but currently (2017) there is no functioning marine aquaculture in Estonia, except some test projects. Future competitiveness and production volumes are seen mainly to depend on the quality and price competition with the Norwegian salmon. The export target is expected to be achieved with the development of farming of highly demanded species such as European eel and crayfish, sturgeon, and whitefish (Tallinna Ülikool, Eesti Maaülikool, 2013). To enable future economic growth in fishing and aquaculture, new products are continuously being developed to make best use of what has previously been regarded as waste or side-streams of the industries such as mussel shells or fish skin. A more efficient use of resources and raw materials also supports the industries' marketing efforts by influencing consumer attitudes towards regionally and sustainably produced, high-quality fish and seafood products so that they are ready to pay a higher price for fish and other aquaculture products compared to imported products from retail markets. (ECORYS & S.Pro, 2017)

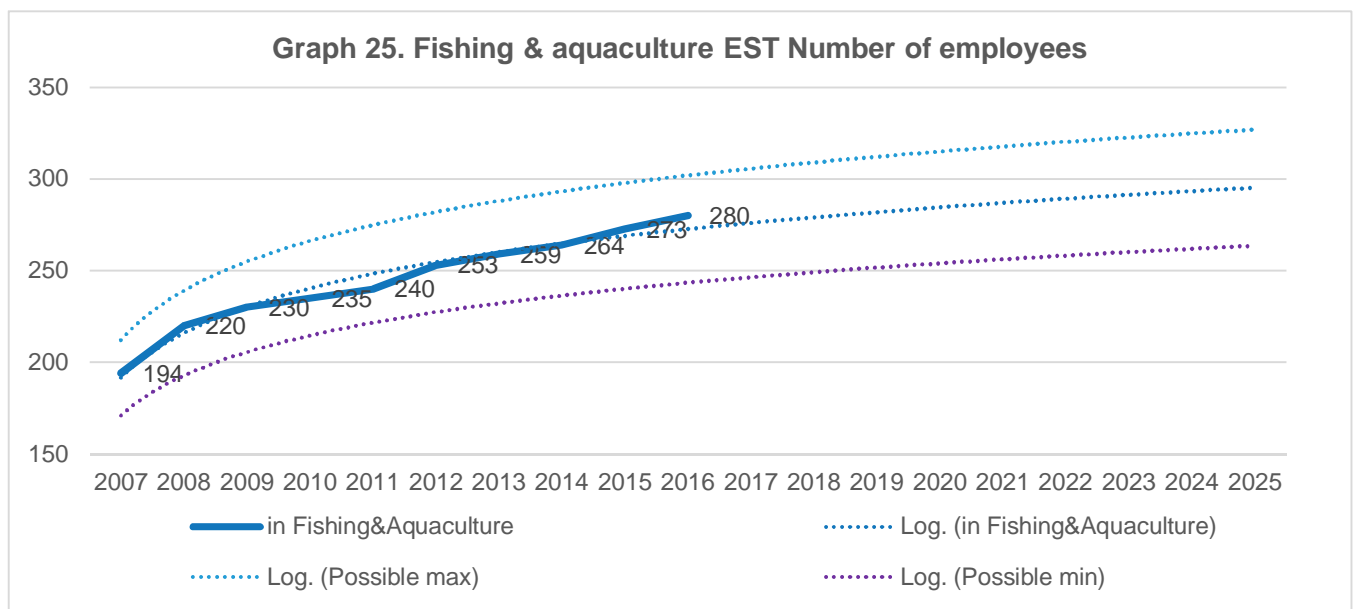
## **Marine Fishing and aquaculture: Current economic situation and development trends**

According to Luke (2017), the growth of the fish market in Finland is mainly based on imported fish. Half of the fish were domestic in the 1980s; now the share of imports is already over 80 %. Approximately 50 % of the imported fish are from Norway. Salmonids cover more than half of the fish market. Most of the salmonids are imported. Salmonids have been replaced especially by herring, which was the most important trade in the early 1980s. Now it's Norwegian salmon. About 90 % of the catch of professional fisheries in the sea area is Baltic herring, which is about 70 % of the total value of the catch. Herring is thus by far the most important commercial fish species. More than half of the herring and sprat fish are used for fur livestock feed.

The consumption of Baltic herring for human food in Finland has collapsed. Even in the early 1980s, Finns ate more than 30 million kilos of herring. Current consumption is no more than a tenth of it, 3,5-4 million kilos. Pike, whitefish, perch and salmon are also caught by the coastal fisheries. The production of domestic fish farming was at its highest in the early 1990s. Since then, production volumes have dropped from about 19 million kilograms to about 13 million kilograms. Most of the production and value of domestic fish farming is a rainbow trout. Next, the most important species is whitefish. Earlier, mainly goat and herring were exported from Finland. Today, almost half of the value of exports is salmonids. Salmonids are exported to Estonia, Russia, Sweden and Latvia. A significant part of the production returns to the domestic market in Finland as fish fillets and other refinements. Today, almost

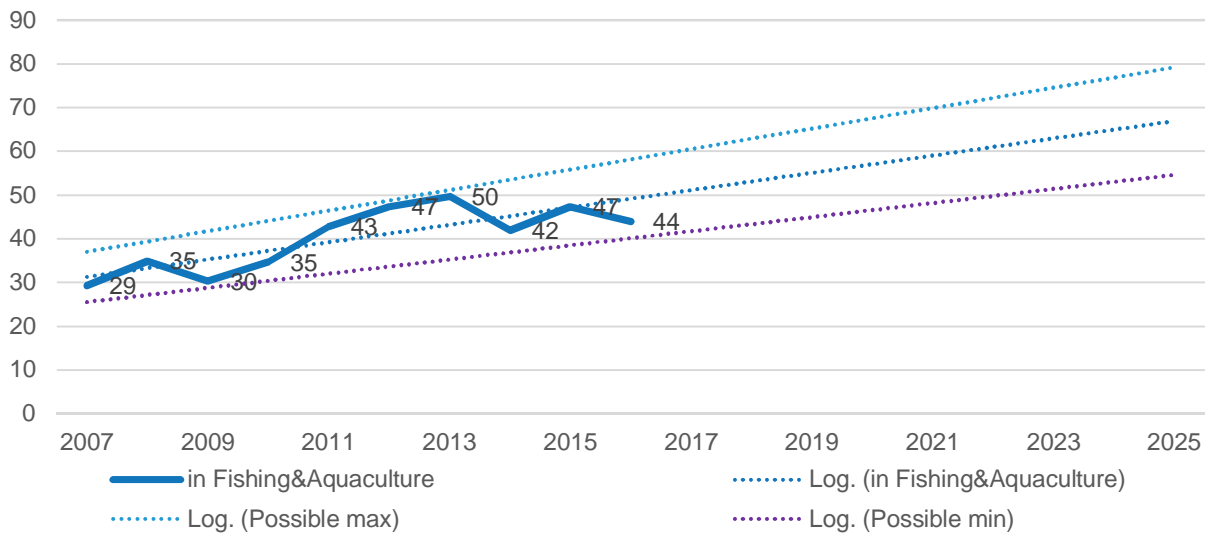
three times more fish are processed in Finland than in the early 1990s. More than half of the fish used for fish products is domestic. Salmon and rainbow trout make up more than half of the raw material, 40 % of which is herring. Most of the herring is frozen for export (Luke, 2017).

To illustrate the recent Fishing and aquaculture industry developments in the P4B project area, 22 largest and most active Estonian companies were identified in the Orbis Europe database for the analysis. These companies employed two or more people and have an annual turnover of 1000 Euros or more in 2007-2016. The data includes Marine fishing (0311) and Marine aquaculture (0321). Based on the nine-year development in 2007-2016, in the case of logarithmic trend development, the estimated number of employees in year 2025 will grow almost over 300 in the P4B Estonian area alone, assuming that the development trend will actualise. This is illustrated in Graph 25 below. This however is highly unlikely since the predicted volume growth in the Fishing and aquaculture sector is emerging in fish farming and within similar activities that are investing in product development and adopting new technologies to improve productivity. Compared with aquaculture activities, such as fish farming, traditional fishing is more labour-intensive and has less potential for (radical) innovations and hence cannot match the positive profitability development in aquaculture.

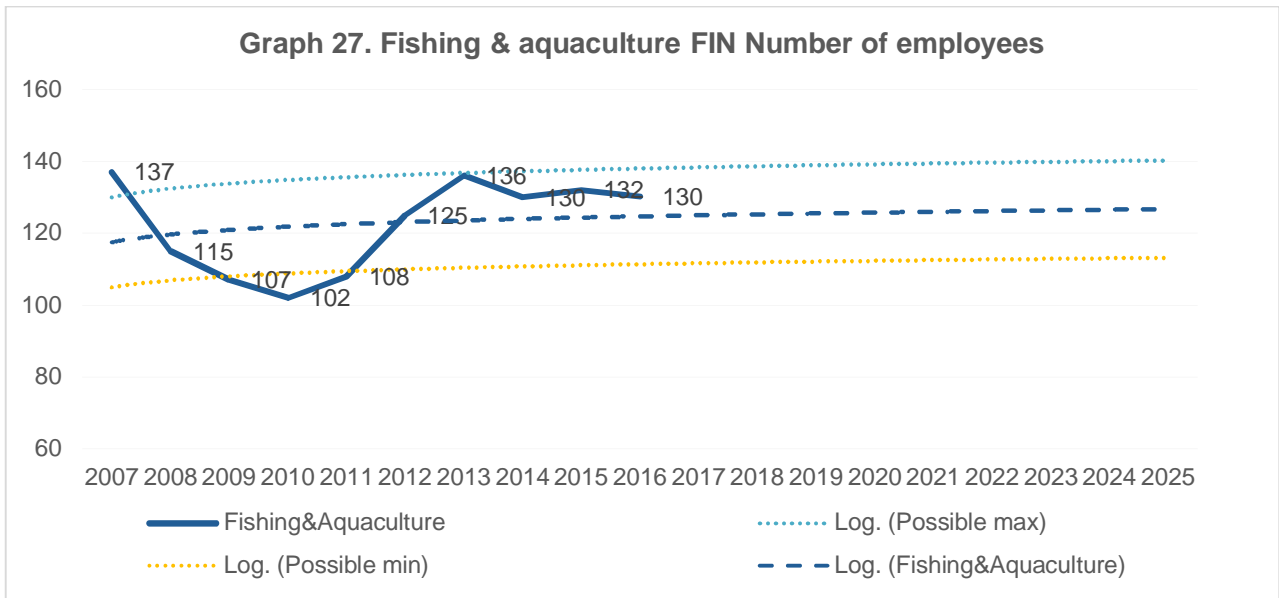


In terms of employment, the commercial fishing sector related to the Baltic Sea waters was estimated to employ in total 2070 people in Estonia and 1847 people in Finland (HELCOM, 2017). The estimated total turnover of the Fishing and aquaculture sector in the P4B Estonian area has practically doubled within the last decade. The Graph 26. below illustrates a strong positive turnover growth rate and its continuing logarithmic trend until 2025. Due to the continuing product development and investments in the industry, the actual turnover in the becoming decades may reach even higher numbers than those predicted by the logarithmic trend. According to the depicted logarithmic development trend in Graph 26, the total turnover of Fishing and aquaculture industry in the P4B Estonian area will reach about 67 million euros by 2025. Previously it has been reported that in the Baltic Sea region the total estimated gross value added (GVA) in commercial fishing was 9,3 million euros in Estonia and 15,5 million euros in Finland (HELCOM, 2017).

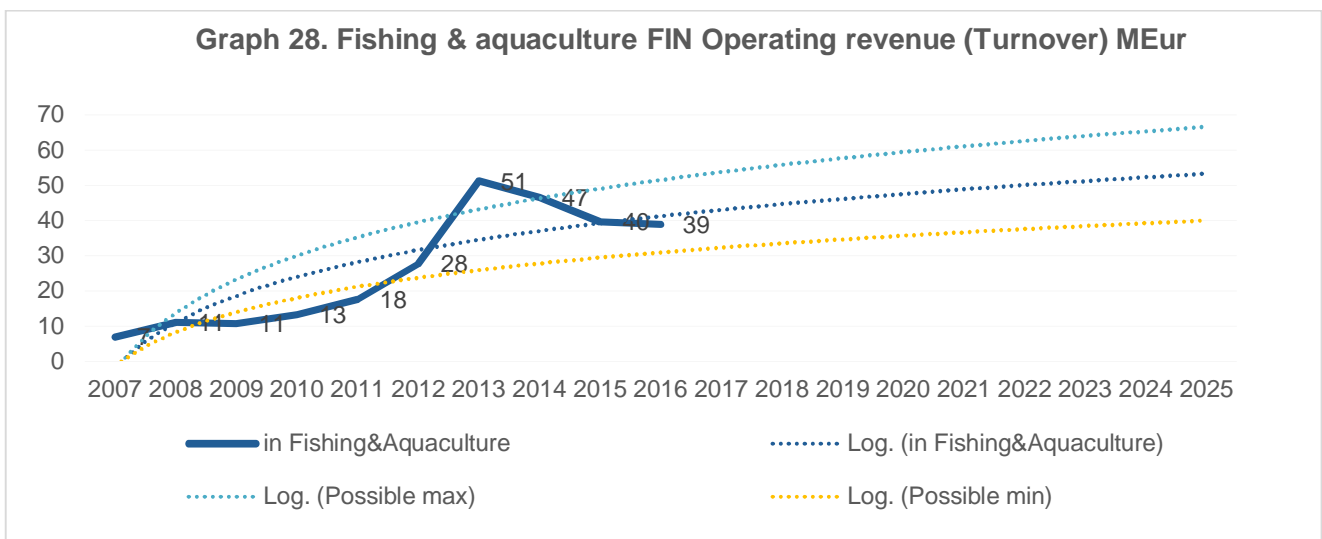
**Graph 26. Fishing & aquaculture EST Operating revenue (Turnover) MEur**



Based on the Orbis Europe database listings, the equalent number of Fishing and aquaculture companies in the P4B Finland project area was 226 in total. According to Statistics Finland, the number of aquaculture companies alone in 2015 in the P4B area in Finland was 25. In 2007 the same number was 38 companies. (Kunto, 2017) At the same time, however, the total annual turnover has risen from 13,3 in 2007 to 18,3 million euros in 2015 and labour productivity has risen from 200 to 272 euros per employee. To determine the number of employees in Marine fishing and aquaculture in the P4B project area in Finland (see Graph 27. below), we have utilized the data provided by Statistics Finland in their Kunto database. This was done to avoid some overly conflicting estimations of the past development trends and number of employees in the P4B area with the national statistics. It should be noted here that the official industry employee numbers provided by the Statistics Finland offer somewhat lower-number estimates of employee levels than Orbis Europe database, partially due to the reporting principals and exclusion of data by Statistics Finland to avoid the identification of individual companies in the data. The general trend esimates, however, are comparable. If the future development of employment continued following the logarifmic trend line, by the year 2025 there would be 128 employees in the sector. Based on the national statistics by Luke, the number of fishermen in commercial marine fishing in Finland has decreased by 50 % in 30 years. Despite of this, the total amount of caught fish has doubled since the early 90's and the value of caught fish in commecial marine fishing has doubled in the last ten years on a national level. In recent years the profitability and productivity development in marine fishing in Finland has been strongly positive only with larger fishing vessels.



Major structural changes have taken place in the development of marine fish farming in Finland in the last few decades. Since 1996 the industry has witnessed a 50 % decrease in the number of fish farming units on a national level. The total number of fish farming units in the P4B project area in Finland has dropped from 200 units in year 2000 to 130 units in 2016 according to Luke. Nevertheless, on the national level in Finland the profit levels remain considerably higher in aquaculture (over 60 million euros in 2014) compared to marine fishing (around 40 million Eur in 2014) according to Luke. They estimated the value of the fish farming production in Finland to be 69 million euros in 2016, compared to the value of commercial marine fishing catch that was 39 million euros in 2016. Within the aquaculture sector, fish breeding is a key growth area that has more than doubled its profit levels since 2008. Considering the recent industry developments in turnover and productivity levels, it is likely that the anticipated growth is primarily coming from the aquaculture supported by the investments in new technology and innovations which further improve the efficiency and productivity of the industry. The industry interviewees saw domesticity of production a major challenge for the future. Coastal fishing is a subsector that urgently needs a special focus to be kept vibrant. Fish as healthy food is considered an emerging trend currently and the environmental protection emphasis should be balanced with social and economical sustainability perspectives according to the industry representatives.



Reflecting on the logarithmic development trend depicted in Graph 28, the total turnover level in P4B area in Finland will reach over 50 million euros in 2025. Out of the two major type of marine fishing; coastal and open sea fishing; coastal fishermen are reported to earn less than those fishermen engaged with trawling. The income and profitability of trawlers is better, but the sector has also been in the process of shifting the number of vessels to foreign ownership over the last few years (Ammattikalastajaliitto, 2015).

According to the interviews conducted in the project, the future perspectives of the fishing industry overall are considered positive in Finland and there are continuous cooperation opportunities with Estonia. Despite the potential of increasing fish consumption and health related benefits, the representatives of fishing industry call for balance of sea conservation activities with the economic growth potential benefits. Networking is vital in small countries and the gains should be considered carefully. Actions are needed to maintain the viability of coastal fishing and domestic raw materials above all.

## MARITIME TRANSPORT SECTOR

The development of the marine transport sector is heavily influenced by the altering levels of global demand over time and the development in other industry sectors. As to external factors, fuel price levels have been recognized to have a great impact on the current structure of the sector, since a large share of the costs consists of fuel costs. In particular, on shorter distances short sea shipping competes with land modes road and rail. Increases in fuel prices may imply a shift from road and rail to more energy efficient shortsea shipping. (ECORYS, 2012.) Before 2008, there was a continuous annual growth of two per cent in the national economy and transport volumes. Thereafter, there has been a time of uncertainty and stagnation. The basic business itself has not changed: the core business is the sea transport of goods and / or passenger traffic.

### IMO

Maritime transport is global and much regulated at the international level. The International Maritime Organization (IMO) is a specialized agency of the United Nations responsible for improving maritime safety and preventing pollution from ships (Transport and the Environment, 2013). IMO's regulations are legally binding for all shipping companies at a global scale. Increasingly, EU introduces IMO regulations as a part of EU law. EU legal acts include regulations, which are directly legally binding, and directives which must be included into the national laws. (Transport and the Environment, 2013).

IMO has adopted an initial IMO strategy on reduction of GHG emissions from ships (13 April 2018). The aim is to reduce total annual GHG emissions by at least 50 % by 2050 compared to 2008. It includes also reduction of CO<sub>2</sub> emissions per transport work, as an average across international shipping, by at least 40 % by 2030, pursuing efforts towards 70 % by 2050, compared to 2008. (IMO, 2018)



## EU-level strategies and policies

The EU transport policy as stated in the 2011 White Paper on Transport aims towards a form of mobility that is sustainable, energy-efficient and respectful of the environment. According to COM (2016), the aim is to reduce the adverse effects of freight transport by using multimodal transport - optimally combining various modes of transport within the same transport chain with a preference to non-road transport for long distance freight transport. Such a modal shift - a reduction of the share of road transport in all transport - towards less polluting and more energy efficient modes of transport can help to reduce the overall environmental impact of freight transport. The target set in the White Paper is to achieve "a modal shift of 30 % of road freight over 300 km by 2030, and more than 50 % by 2050" with respect to business as usual developments (COM, 2016). The future of long-haul shipping and ports is seen bright.

The EU blue growth vision for European Commission (2017) Vision 2030 foresees the following developments:

- Digitalisation and green shipping has changed the sector.
- Skilled labour is available due to adapted education.
- Most ships are e-navigation compatible with some automated functions.
- Environmentally sound shipping and port operations.
- Harmonized infrastructure network exists for alternative fuel bunkering and shore-sided electric power supply.

## National/regional strategies for Finland

Finnish shipping companies have long been specialized in a particular segment, for example, ro-ro traffic has been a strength for more than one operator (TEM 2016). According to TEM (2016), maritime transport will continue to be competitive. New forms of production, such as 3D printing, are seen as an opportunity to expand the logistics business by combining transport and production, meaning that part of the production can be carried out during transport (TEM, 2016).

Finland has its Maritime Transports Strategy (2014). A vision for 2030 is "A prosperous Finland – efficient sea routes":

- Finnish foreign trade and domestic waterborne transport are smoothly functioning and socio-economically viable and international competitiveness is ensured also in winter.
- The Baltic Sea is safe and healthy and it attracts recreational activities and tourism to the area and provides high-quality maritime services for the use of the market area.
- Finnish maritime transport sector will become the leading service provider of the Baltic Sea countries in terms of sustainable logistic concepts.

## National/regional strategies for Estonia

For the Estonian Maritime administration, safe water traffic is strategic (VTA, 2017). The Government has adopted *Estonian Marine Policy 2012–2020* (Majandus- ja Kommunikatsiooniministeerium, 2011) as a long-term planning basis for the maritime sector. The goal of the development plan is to sustainable use Estonia's marine resources and contribute to the development of the maritime sector. For that

purpose, the development of maritime business should be supported, mainly accompanied by the improved safety of vessel traffic and other marine-related activities, the protection of marine and coastal environment and marine cultural heritage. The priorities of the development plan are:

1. Entrepreneurship environment in the marine sector is entrepreneur-friendly and competitive at international level.
2. The marine sector is safe, secure and contributes to diminished environmental pollution load.
3. Public sector activities support the development of the marine sector.
4. The marine education, research and development activities of Estonia meet the contemporary level requirements.
5. Coastal life and visiting environment are attractive and facilitate marine tourism and the development of local entrepreneurship and passing marine sector's cultural heritage along to coming generations.

The goals by 2020 are the following:

- Added value in maritime sector increases quicker than GDP (share of maritime sector in GDP was 3-4% in 2016)
- Number of employees in maritime sector 25 000 (in 2016 it was 9100)
- At least 50 cargo ships under Estonian flag (currently 0)
- Cargo turnover of ports at least 35 Million tons (21 M tons in 2016)
- Container shipping will not decrease (202327 TEU in 2016)
- Investments into ports at least 18 MEUR/year
- Annual number of passengers on international lines at least 12 Million (10,17 Million in 2016);
- Annual number of cruise tourists at least 500 000 (500 000 in 2016);
- Estonian ship building and renovation sector is internationally competitive and its added value at least 100 MEUR;
- Number of recreational craft visiting Estonian ports is 20 000 in 2020;
- Network of small ports will be ready in 2018
- There are also environmental targets (achieve GES by 2020, decrease P content by 220 t and N content by 900 t during 2017-2020;
- Increase reaction capacity to pollution accidents from 1,8 km<sup>2</sup> during 24 hours in 2014 to 2,4 km<sup>2</sup> by 2020) but these are mainly based on Estonian Marine Strategy and its Programme of Measures (according to EU MSFD). (Majandus- ja Kommunikatsiooniministeerium 2011& 2017.) 2011 & 2017a

*Estonian Transport Development Plan for 2014-2020* stresses the importance of marine transport. Estonia's location on the eastern border of the Baltic Sea allows to participate in international transit, which is growing in the long run following the global economic trends. Estonia has an interest in increasing the share of container goods in transit and adding value to them in addition to the storage and transport of goods. The plan also points out the importance of seaports as logistics centres that need

to have good connections with inland (including railway cargo transport system). The plan predicts increase of capacity to service international cargo through Estonian ports to 60 Million tons by 2020 (in 2012 it was ca 43 Million tons). The government supports the development of all major cargo ports through the development of the necessary terrestrial connections and the creation and development of international contacts. The importance of ensuring ice-breaking capacity is stressed and it is planned to submit an application for EU funding for the construction of a new icebreaker (in addition to the icebreaker purchased by Port of Tallinn in 2012). The plan also foresees a measure to develop international ferry connections for passenger transport, especially development of service capacities of Tallinn Old City Harbour.

Opportunities for passenger transport through other ports will also be explored by the Estonian government and a network of small ports will be developed. Ferry connection with St. Petersburg is still a small part of the number of trips but in the long run, however, it is an important supplement to increasing the number of tourists. The country's potential to boost ferry connection with St. Petersburg is to promote tourism and business connections with Russia. The plan also supports the implementation of *the EU Blue Belt initiative* to facilitate intra-EU maritime transport. (Majandus- ja Kommunikatsiooniministeerium, 2013)

## **Maritime Transport sector: Current economic situation and development trends**

EU policies are designed to reinforce the efforts of the Member States and regions and provide common building blocks and guidance for the Blue economy. One of those initiatives is "The European Maritime Transport Space without Barriers", which aims at simplifying administrative procedures for maritime transport and which is considered to be further developed into a 'Blue Belt' of free maritime movement in and around Europe (COM, 2012).

## **Maritime Transport sector: Current economic situation and development trends in Estonia**

According to Statistics Estonia, in 2017, compared to 2016, the number of international traffic passengers served by Estonian ports increased by 3%, the number of national traffic passengers increased by 7% and the freight volume of ports in tonnes increased by 3%.

Last year, a record number of passengers used the services of Estonian ports. In 2017, nearly 10.9 million passengers visited Estonian ports by international transport, which is 3% more than in 2016. The growth was mainly due to a gradual increase in the number of passengers travelling between Estonia and Finland, which reached 9 million. 160,000 more passengers arrived from Finland and 114,600 more passengers departed to Finland compared to 2016. Also 592,300 cruise passengers arrived by sea, i.e. 19% more than the year before. Three out of four passengers used Estonian ships in international sea traffic.

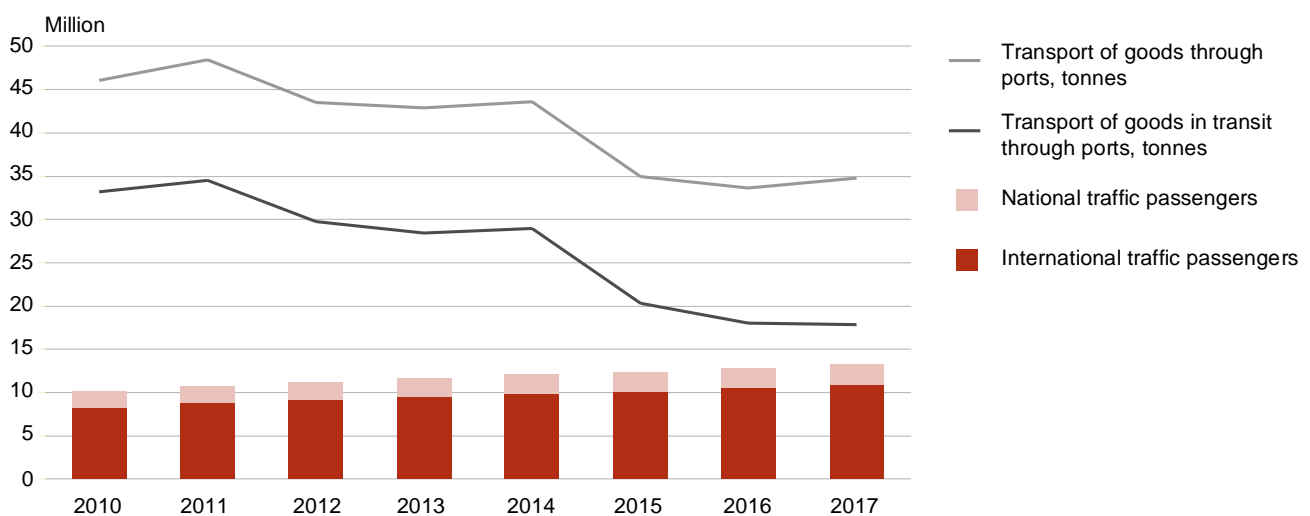
The number of passenger ship calls at Estonian ports in international sea traffic was around 6,170, i.e. 1% less passenger ships (incl. ro-ro passenger ships) than in 2016, and 326 cruise ships (285 in 2016) called at Estonian ports. On international routes, around 2 million vehicles (excl. transit vehicles) were served by ports; 71% were passenger cars and 26% were trucks and trailers.

On main national ship lines, around 2.4 million passengers were transported, which is 7% more than in 2016. On those lines, 899 ship trips more were made than in 2016 (in 2016, there were over 15,200 trips, and in 2017, over 16,100 trips). On main national lines, approximately 1.02 million vehicles were served, i.e. 85,700 more vehicles than in 2016.

In 2017, Estonian ports handled 34.8 million tonnes of cargo, which is 3%, or 1.2 million tonnes more than the year before. Estonia almost reach target for this decade, according to *Estonian Marine Policy 2012–2020* where cargo turnover of ports should reach at least 35 million tons by 2020. Also 23.5 million tonnes of goods were loaded and 11.3 million tonnes of goods were unloaded in Estonian ports in 2017. 4% more goods were loaded and 2% more goods were unloaded than in 2016. In 2017, 114 more cargo ships called at Estonian ports than in 2016. The average gross tonnage of cargo vessels totalled about 11,100.

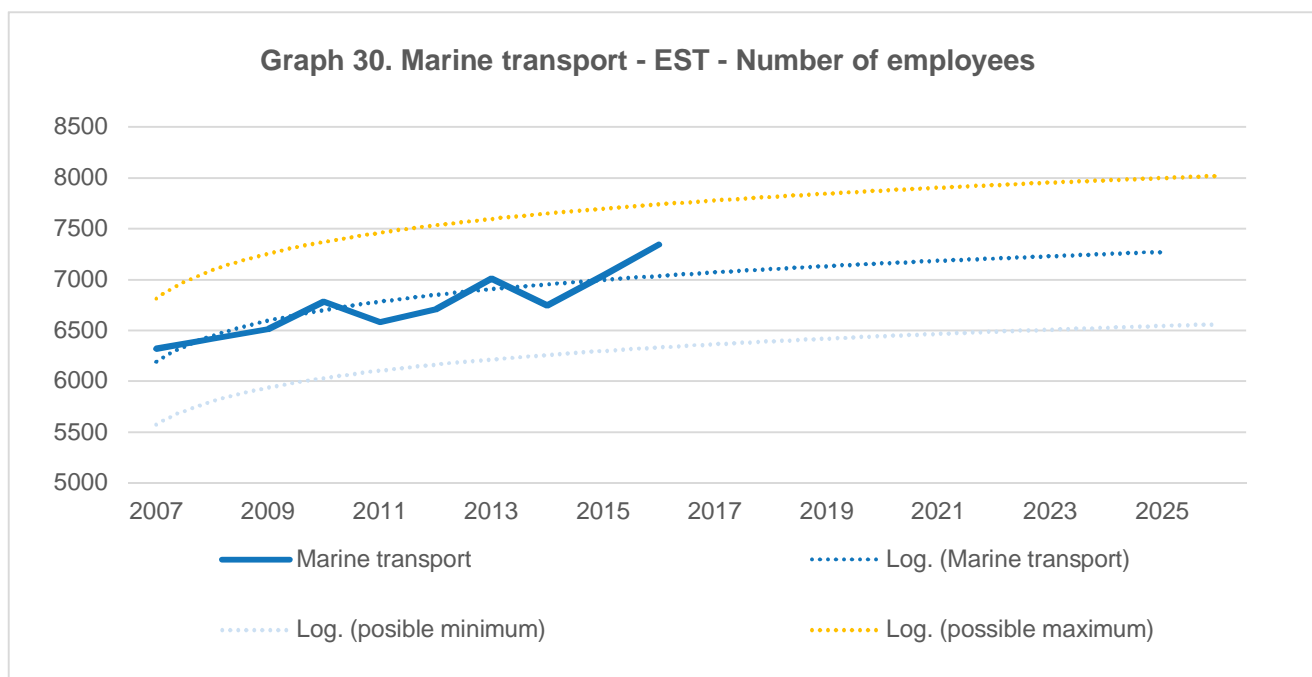
Transit goods were loaded and unloaded in ports in the amount of 17.9 million tonnes, which is 1% less than in 2016. 12.7 million tonnes of transit cargo were loaded and 5.1 million tonnes unloaded at Estonian ports. The most frequently handled group of transit goods at Estonian ports was refined petroleum products (11.4 million tonnes), although the transport of these products decreased by 5% in a year. The loading and unloading of chemicals and chemical products as transit goods amounted to 4.7 million tonnes, which is 5% more than the year before. In addition to transit goods, 10.7 million tonnes of goods were transported abroad through ports and 6.2 million tonnes of goods arrived at Estonian ports, which is respectively 9% and 10% more than in 2016. Goods transported abroad through ports were mainly a mixture of types of goods transported together (3.1 million tonnes) and products of forestry and logging (nearly 2.2 million tonnes). Goods that arrived at Estonian ports included primarily a mixture of types of goods transported together (3.1 million tonnes) and products of mining and quarrying (1.4 million tonnes).

Sea container transportation through ports (expressed in TEUs) increased by 13% compared to the previous year, amounting to around 230,400 TEUs in 2017. The number of containers shipped out of Estonian ports on vessels was around 111,900 TEUs, and the number received at Estonian ports was nearly 118,500 TEUs. It should be noted that this level was achieved despite the fact that according to *Estonian Marine Policy 2012–2020* aim for container shipping was just not to decrease from the level of 2016 (202327 TEU in 2016).

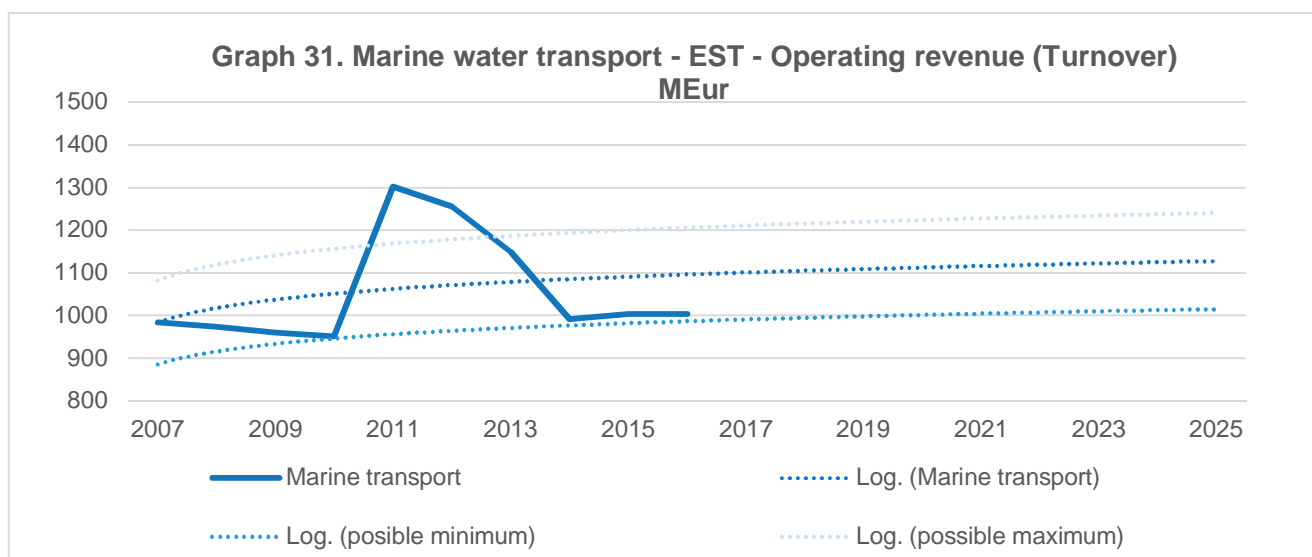


Graph 29. Passengers and goods transported through Estonian ports, 2010–2017

The analysis of the maritime transport sector in Finland and Estonia includes data of the following statistical sectors: Sea and coastal passenger water transport (501), Sea and coastal freight water transport (502), and Renting and leasing of water transport equipment (7734).

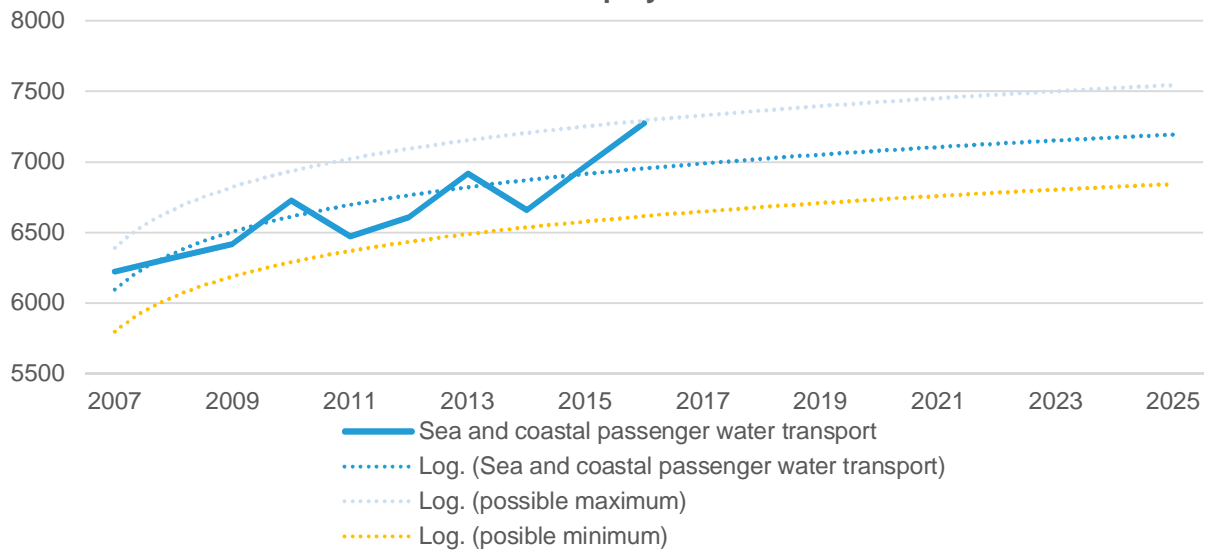


In the studied period, the amount of employees in the Estonian maritime transport sector has risen by 1000 employees in the P4B area shown in Graph 30. above. If the positive trend continues, there should be 7300 employees by 2025.



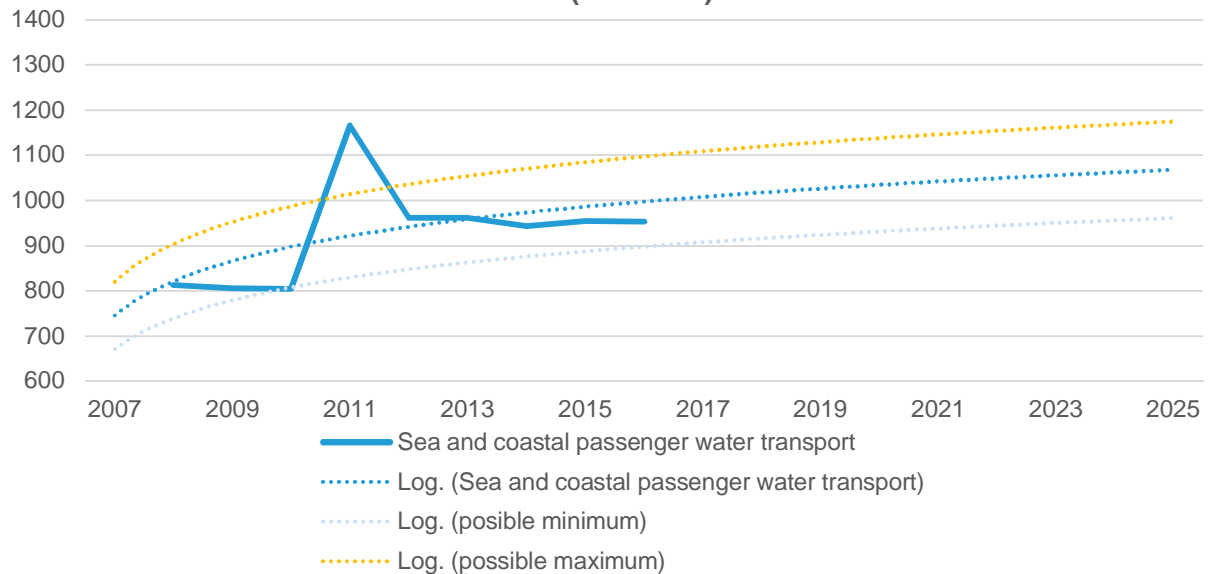
The industry data for the Estonian maritime transport shows major changes in the revenue development during the last ten years. Even if the development has been modest during the last few years, the trend line will point to a realistic average estimation of the future performance of the industry, and the total turnover will reach 1150 million euros by 2025 (see Graph 31. above).

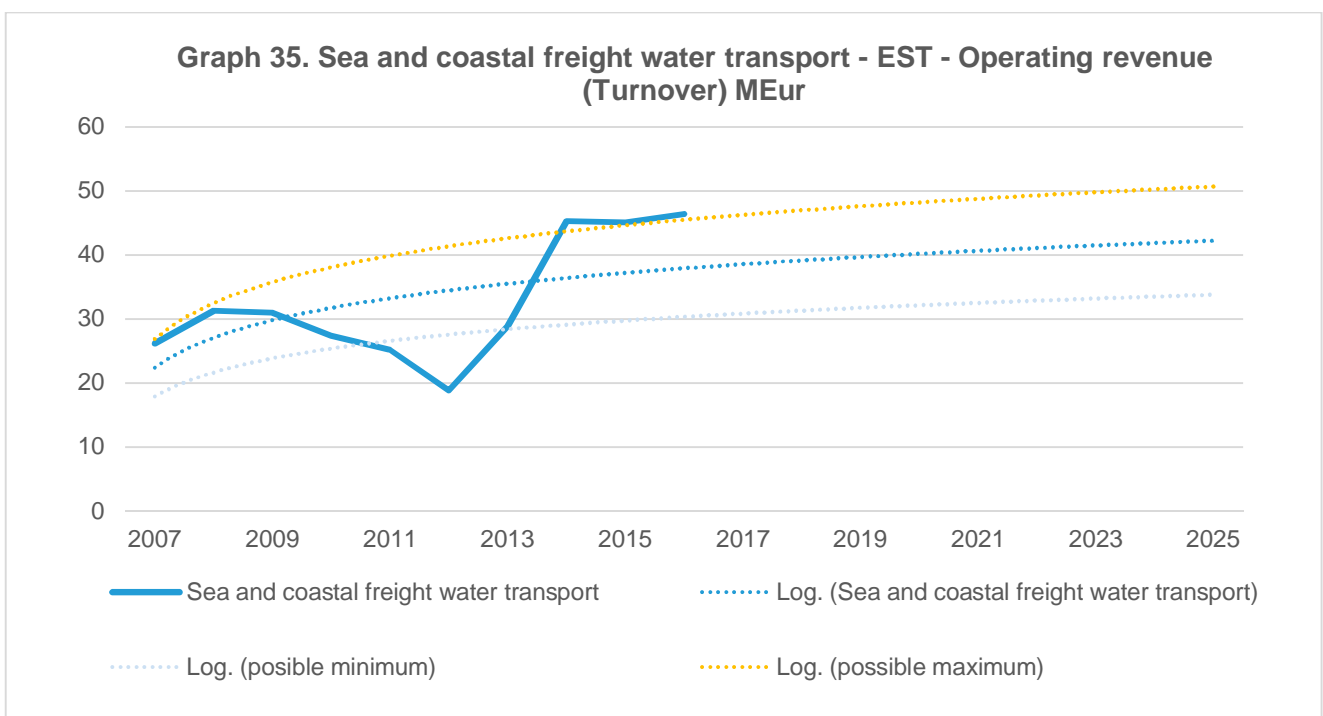
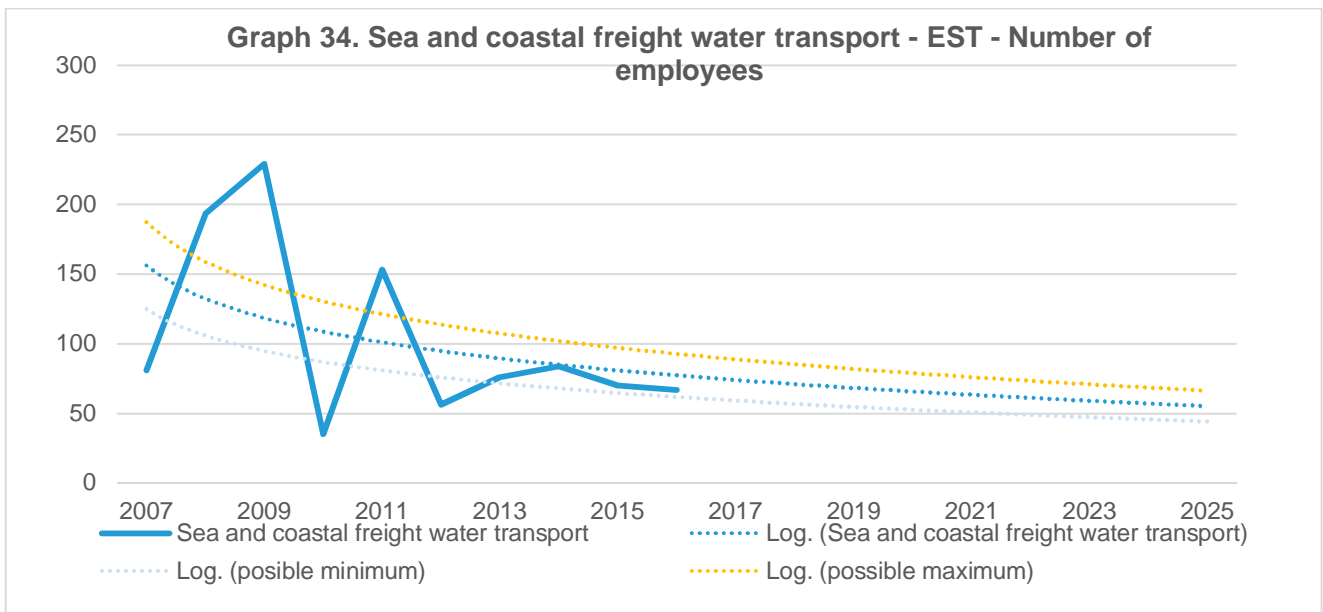
**Graph 32. Sea and coastal passenger water transport - EST - Number of employees**



In maritime subsectors related to Sea and coastal passenger water transport number of employees according to logarithmic trendline will be between minimum 6800 and maximum 7550 people and turnover in subsector will be between minimum 960 and maximum 1180 MEur.

**Graph 33. Sea and coastal passenger water transport - EST - Operating revenue (Turnover) MEur**





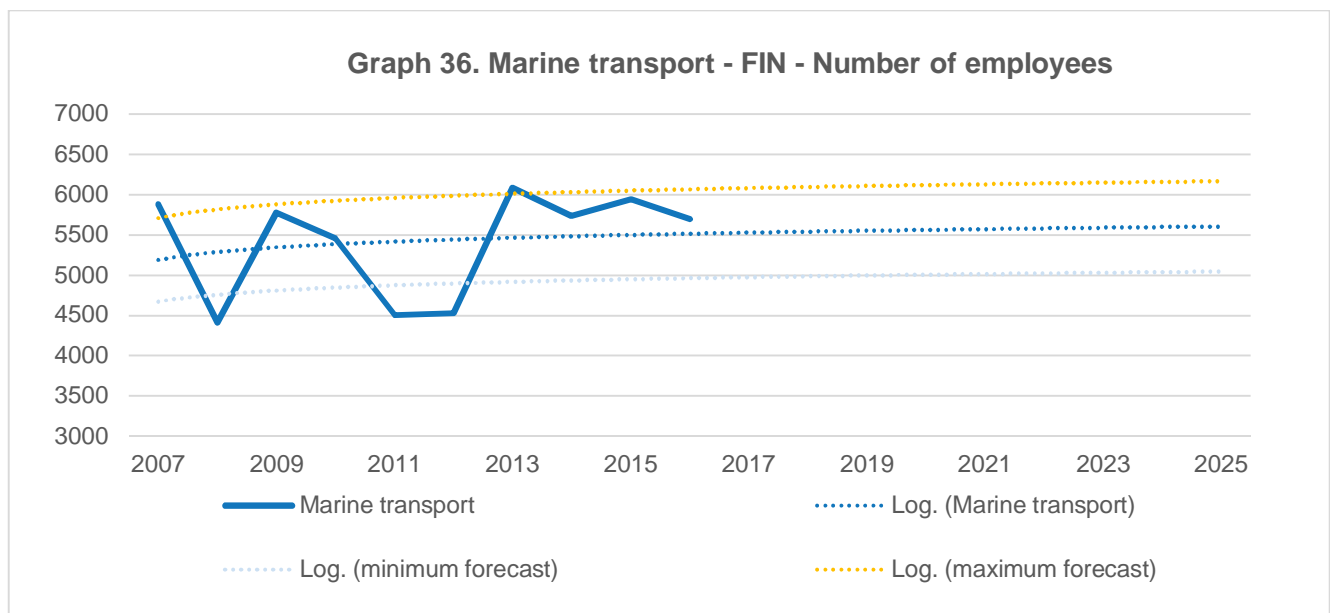
In maritime subsectors related to Sea and coastal freight water transport number of employees according to logarithmic trendline will be between minimum 45 and maximum 70 people and turnover in subsector will be between minimum 34 and maximum 51 MEur.

## Maritime Transport sector: Current economic situation and development trends in Finland

According to Port of Helsinki statistics 2017, Helsinki grew to become the busiest passenger port in Europe and possibly the entire world with 12.3 million passengers. Passenger numbers continued to increase on the Helsinki-Tallinn route in particular, reflecting the development of Helsinki and Tallinn

into 'twin cities' with close economic and social ties. While international cruise traffic increased significantly, liner traffic to Stockholm, St Petersburg and Travemünde remained stable, as it has been for several years. In 2017, the Port of Helsinki's total number of ship passengers grew by 2.4% compared to the previous year. The number of liner traffic passengers alone grew by 1.8%, to 11.8 million. A total of 9 million passengers (+3.2%) passed between Tallinn and Helsinki, while 2.3 million (-0.1%) passed between Stockholm and Helsinki. During the year, Helsinki also recorded 266 international cruise ship visits and 478,000 (+ 16.8%) cruise ship passengers, which was an all-time record. (Finnish Port Association)

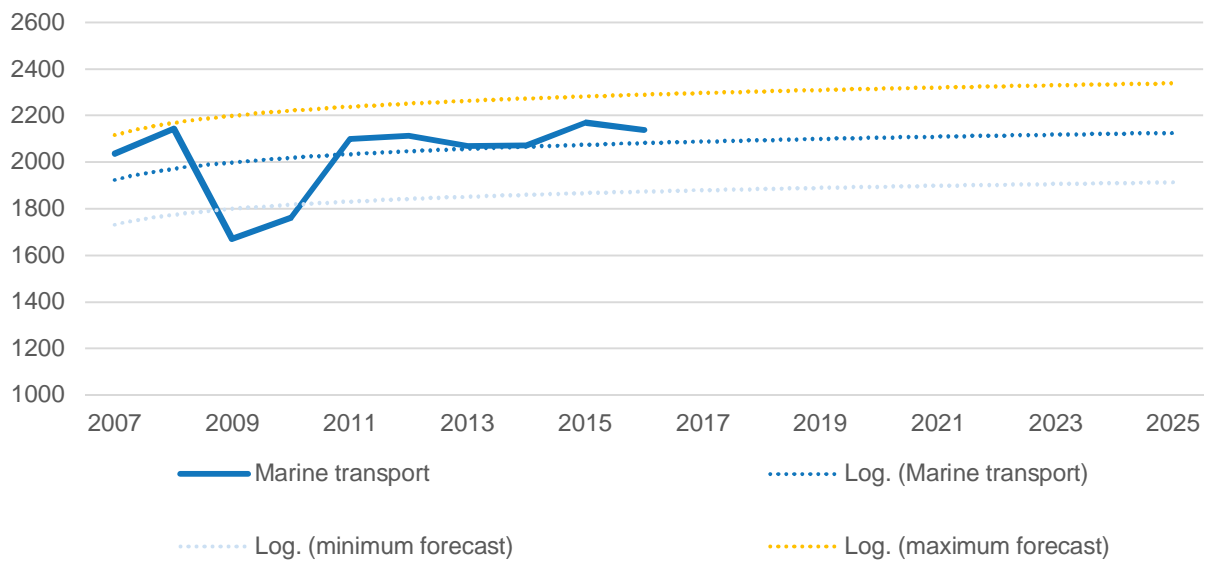
For Finland, the long-term development of the number of employees in maritime transport shows a positive trend (see the Graph 36. below). According to current development trend by 2025 the industry will employ more than 5600 people.



What remains to be seen in the next five to ten years is the impact of the rising passenger numbers in the Gulf of Finland coming from inside and outside the EU. Marine transport sector is among those benefiting from cross-sectoral blue economy growth.

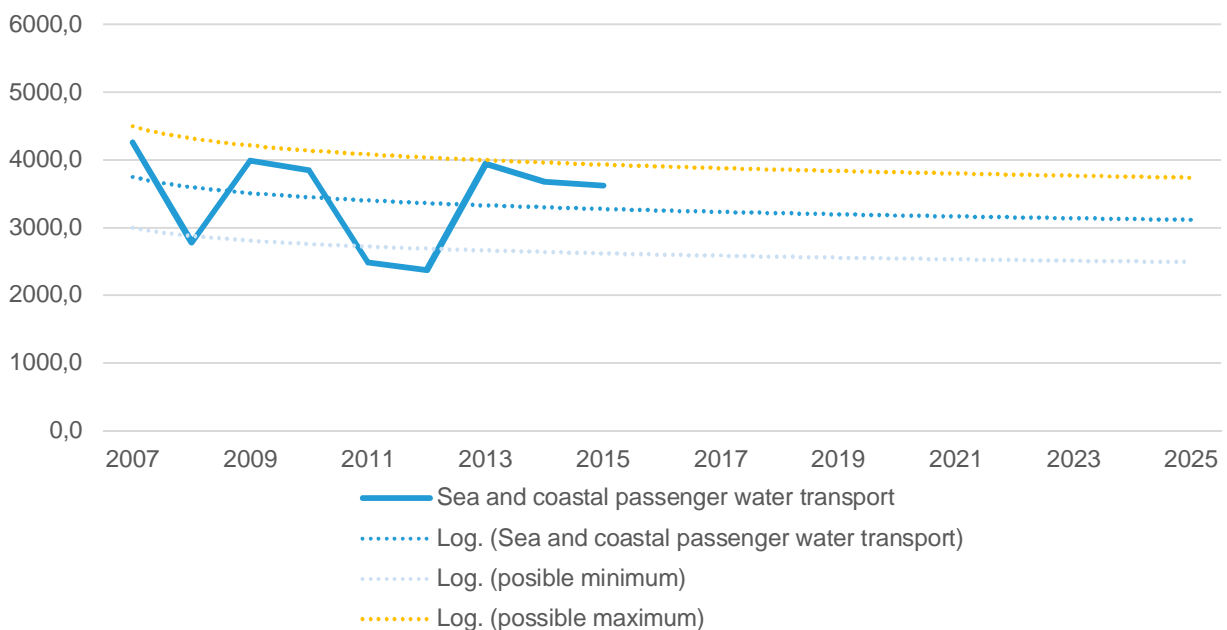


**Graph 37. Marine water transport - FIN - Operating revenue (Turnover) MEur**

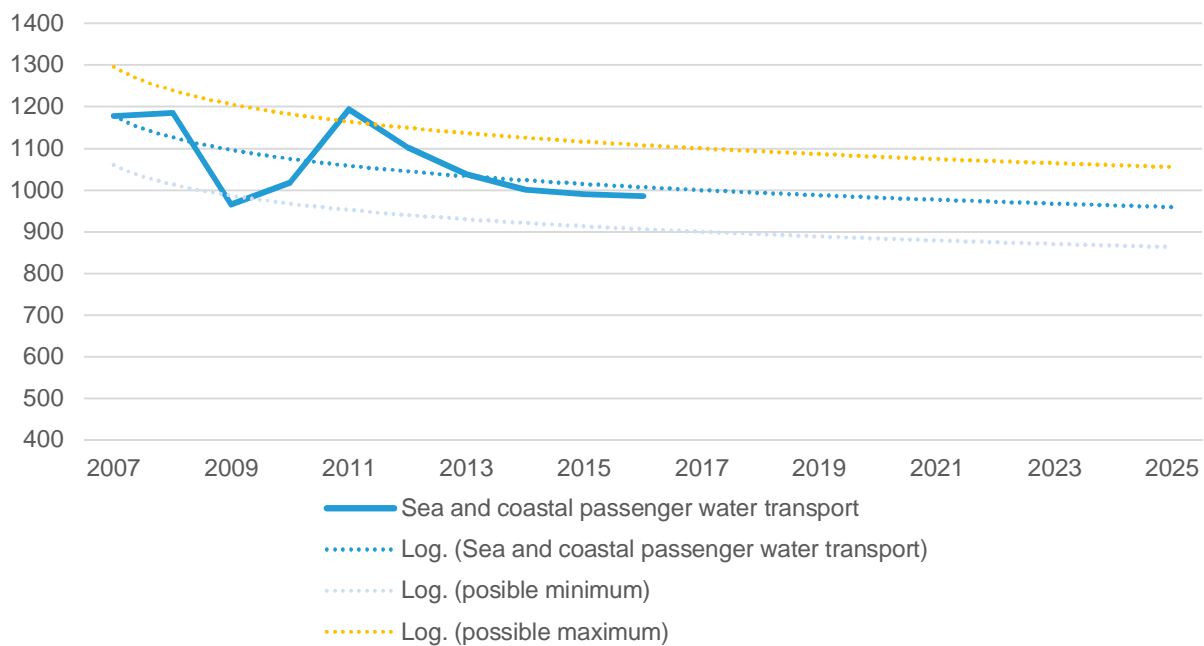


The turnover of the Maritime sector for Finland also shows a positive trend development, despite of the downturn in 2009. By 2025 the industry would reach a turnover level of more than 2100 million euros.

**Graph 38. Sea and coastal passenger water transport - FIN - Number of employees**

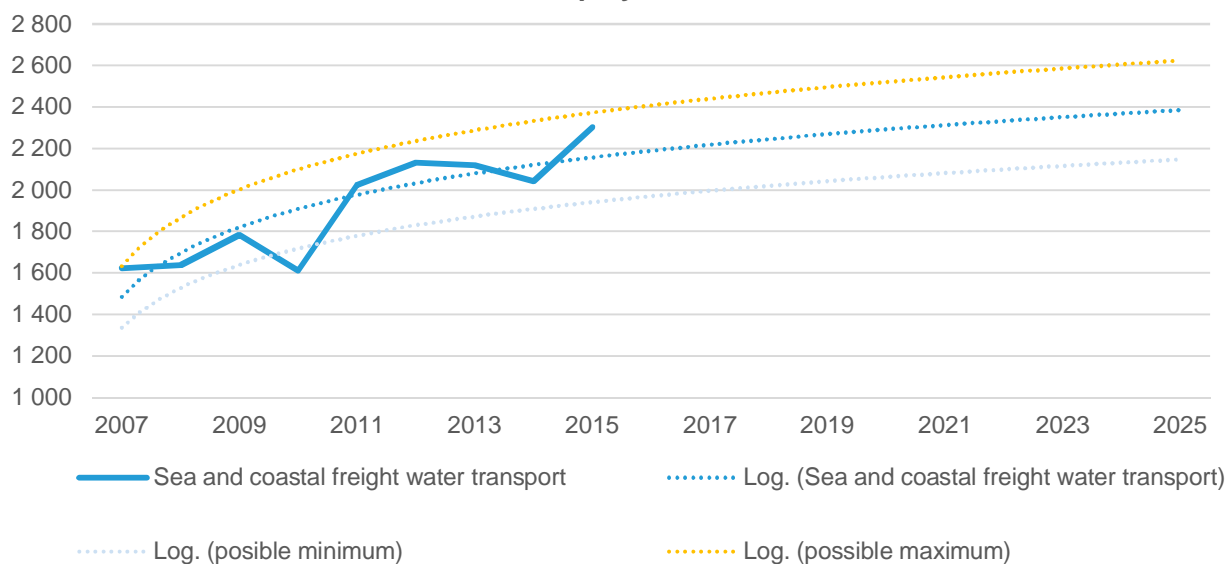


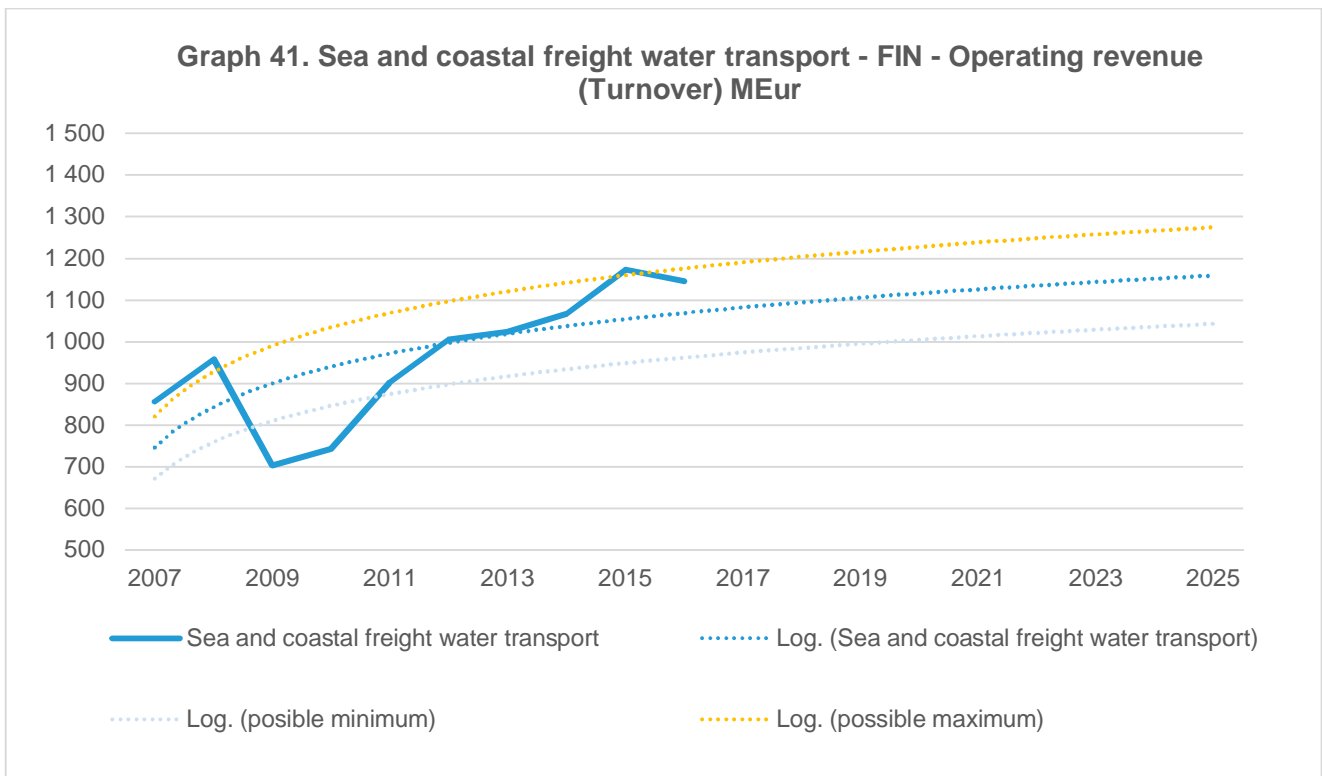
**Graph 39. Sea and coastal passenger water transport - FIN - Operating revenue (Turnover) MEur**



In the subsectors related to Sea and coastal passenger water transport number of employers Would probably reach according to logarithmic trendline possible minimum 2500 and maximum almost 3750 employers. Turnover level in the year 2025 would probable be between minimum 890 and maximum 1050 million euros.

**Graph 40. Sea and coastal freight water transport - FIN - Number of employees**





In maritime subsectors related to Sea and coastal freight water transport number of employees according to logarithmic trendline will be between minimum 2100 and maximum 2600 people and turnover in subsector will be between minimum 1050 and maximum 1290 MEur.

## MARINE CONSTRUCTION SECTOR

The value creation in the marine construction industry relies on the ability of products to provide benefits to the buyer. Achieving individual transactions is primarily not the main strategic aim today as building longer-term relationships and networks has replaced the shorter-phase marketing cycles. A typical example of this is the rise of aftermarket services, i.e. value creation will be built on after-sales service, spare parts access, product and process updates. More marine cluster companies invest in a global service networks. Another aftermarket point of view is that nowadays marine cluster companies see the later stages of the life cycle of ships and equipment as business opportunities.(TEM, 2016) This development illustrates the increasing service-orientation development in advanced industrial markets.

### EU-level strategies and policies

From the EU perspective, many maritime technology sectors have the potential to provide more jobs, growth, renewable energy sources and climate-smart solutions. The aim of EU's intervention is to tackle these issues and create the conditions for mobilising investment in demonstration projects for new technologies, bringing them from lab to market and avoiding the costly duplication of work via programs such as Horizon 2020. (COM 2017).

In the Blue Growth Strategy (COM 2017), the Vision 2030 for shipbuilding is the following:

- Shipbuilding remains at the current level of economic importance
- Shipyards have completed the retro-fitting of existing vessels
- High-end, specialised vessels and maritime equipment
- Environmental monitoring technology seen as a separate emerging sector.

## National/regional strategies for Finland

In Finland, the maritime industry has emerged and developed around Finland's traditionally strong shipbuilding industry. The maritime industry and the entire maritime cluster have a significant impact on the Finnish economy and society. The *Maritime Transport Strategy for Finland* (2014) identifies opportunities in innovation in the energy efficiency of vessels, alternative fuels and emission reduction technologies.

Major technology companies in the marine construction sector in Finland have recently made notable strategic investments in the South-West coast of Finland, which will positively influence the sector's future development and employment situation. There has been uncertainty in the future of traditional shipbuilding in the Plan4Blue region, however marine technology and cleantech companies have shown strong international performance. The sector's development is driven by strong orientation on sustainable development, e.g. clean shipping, cleantech solutions and energy efficiency, which are central concerns currently in global markets and the solutions also enable compliance with latest international environmental legislation and rules.

## National/regional strategies for Estonia

The marine construction sector is covered by the national development plan "*Estonian Marine Policy 2012-2020*" in which "*Internationally competitive Estonian shipbuilding and repair operations*" is one of the objectives under Priority 1 "*The marine business environment is business friendly and internationally competitive*". The measures of achieving this objective include increasing the competitiveness of both subsectors: shipbuilding and repair and recreational craft building and repair. The activities planned include improving availability of qualified workforce, supporting involvement of foreign experts and investments into infrastructure and production equipment as well as development of new technologies; mapping the need for renovation of state fleet; establishment of competence centre for recreational craft building; supporting product development and marketing in recreational craft building; creation of craft repair possibilities in the selected small ports. According to the development plan, the added value of ship building and repair sector should be at least 100 MEUR and of recreational craft building and repair sector at least 15 MEUR in 2020. (Majandus- ja Kommunikatsiooniministeerium, 2011)

## Marine Construction sector: Current economic situation and development trends in Estonia

The competitive edge of Estonian companies lies mainly in building special and more complex ships, using technological updates and providing flexibility in fulfilling orders. However, entering the market

with a new product is complicated, because potential buyers need certainty that these products function (Eesti merenduspoliitika 2012–2020, 2011). The offshore segment provides an opportunity for the Estonian shipyards, for example, as subcontractors to Norwegian contractors. There are also opportunities to increase the life-cycle activities of the shipyards as this area has a lot of underused potential. For example, the more stringent environmental regulations provide opportunities for retrofits, conversions etc (Nommela & Purju, 2016).

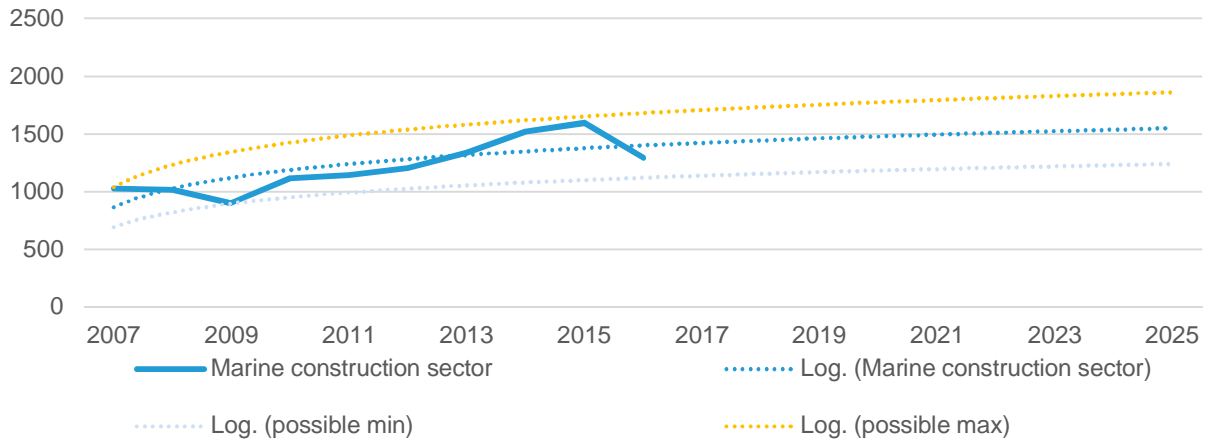
In Estonia, shipbuilding and repair sub-cluster have 22.8 % of turnover and give a job to 33 % of employees in Maritime sector (Estonian Maritime Cluster Outlook 2013). According to the commercial register, altogether 155 companies operated in the field of building ships and floating structures and repair of ships and boats in Estonia in 2010. There are only four large shipbuilding companies that employ most of the employees (Eesti merenduspoliitika 2012–2020, 2011). The companies related to the Maritime sector are mostly concentrated in Tallinn and the surrounding Harju County. In 2012, 65 % of all the studied companies were registered in Harju County. The turnover of the companies registered in the county constituted 95 % of the turnover of the whole maritime cluster and 93 % of the total number of employees in 2012. The biggest field of activity in Harju County was the sub-cluster of maritime service and intermediate commercial transactions that constituted 32 % of the registered companies.

The largest company in Estonia is the Baltic Ship Repair Company (BLRT) located in the P4B project area. The BLRT activities are shipbuilding, ship-repair, production of large-scale metal constructions, metal processing, machine building, medical and technical gases. The company has been producing floating structures for Norway's fisheries and for wind farms located in sea area (offshore wind farms). BLRT has diversified its production capacities, especially in Estonia and Lithuania, and has managed to keep a competitive quality-cost ratio. The other companies in the sector are small and medium-sized companies and producers of niche products. They use local resources and their labour costs have been competitive. There is a small cluster of producers on the Estonian islands, where costs are lower and local tradition plays an important role in developing this sector (Nommela & Purju, 2016, p. 117).

In the graphs below the analysis includes data of Building of ships and boats (301), Building of ships and floating structures (3011), Building of pleasure and sporting boats (3012), Repair and maintenance of ships and boats (3315), and Construction of water projects (4291).

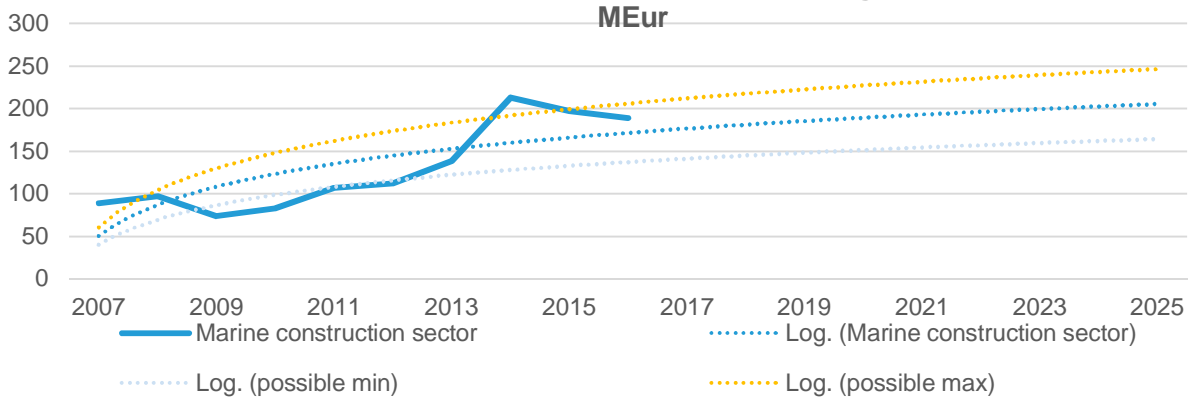
The general development in the number of employees in the Marine construction sector for Estonia has been somewhat positive during the last decade as shown in Graph 42. It can be estimated that there will be around 1550 employees in total by 2025, if the depicted logarithmic trendline turns into reality in the future.

**Graph 42. Marine construction sector - EST - Number of employees**

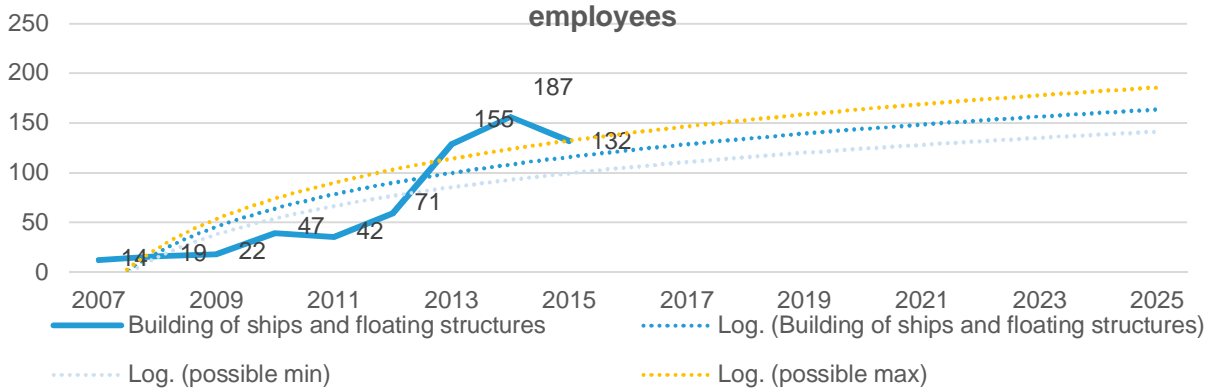


The nine-year turnover development for the Estonian marine construction sector also shows a positive trend among the 138 companies in Estonia. If the turnover development gets back on track, the industry will raise its turnover figure in 2025 amounting 200 million euros (see Graph 43. below).

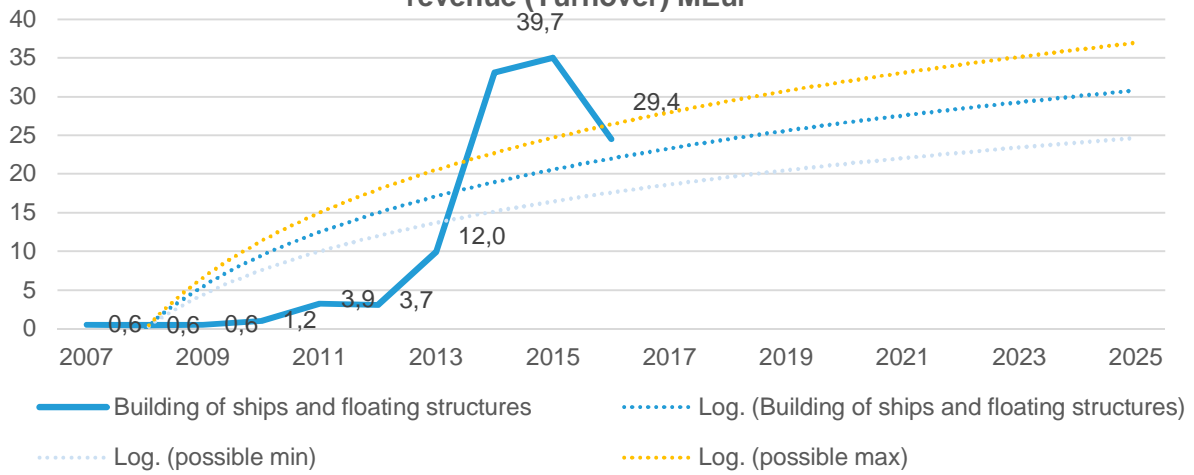
**Graph 43. Marine construction sector - EST - Operating revenue (Turnover) MEur**



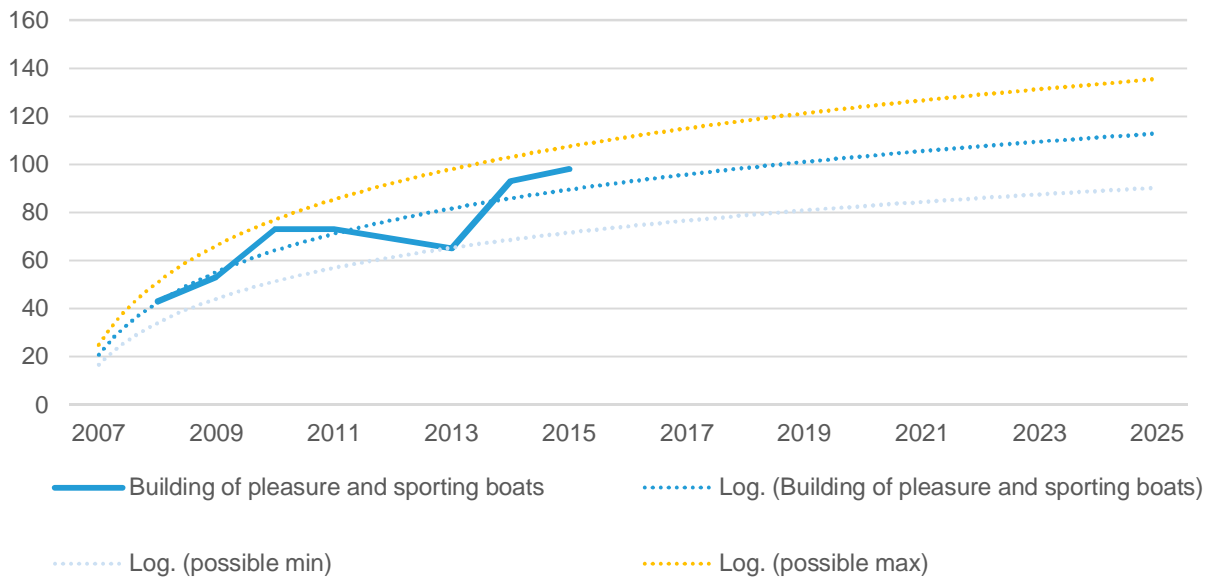
**Graph 44. Building of ships and floating structures - EST - Number of employees**



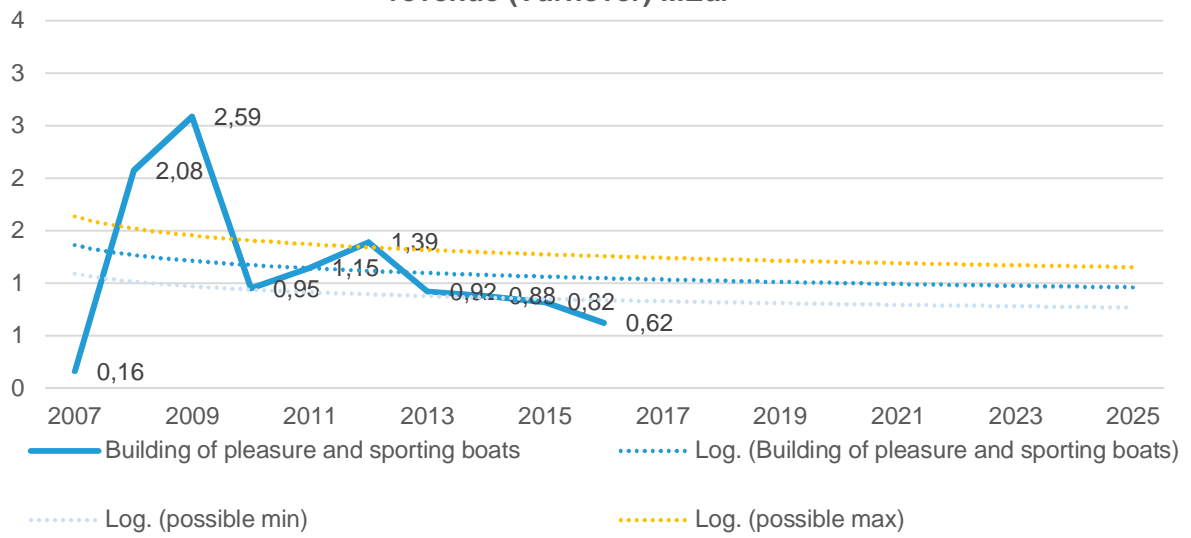
**Graph 45. Building of ships and floating structures - EST - Operating revenue (Turnover) MEur**



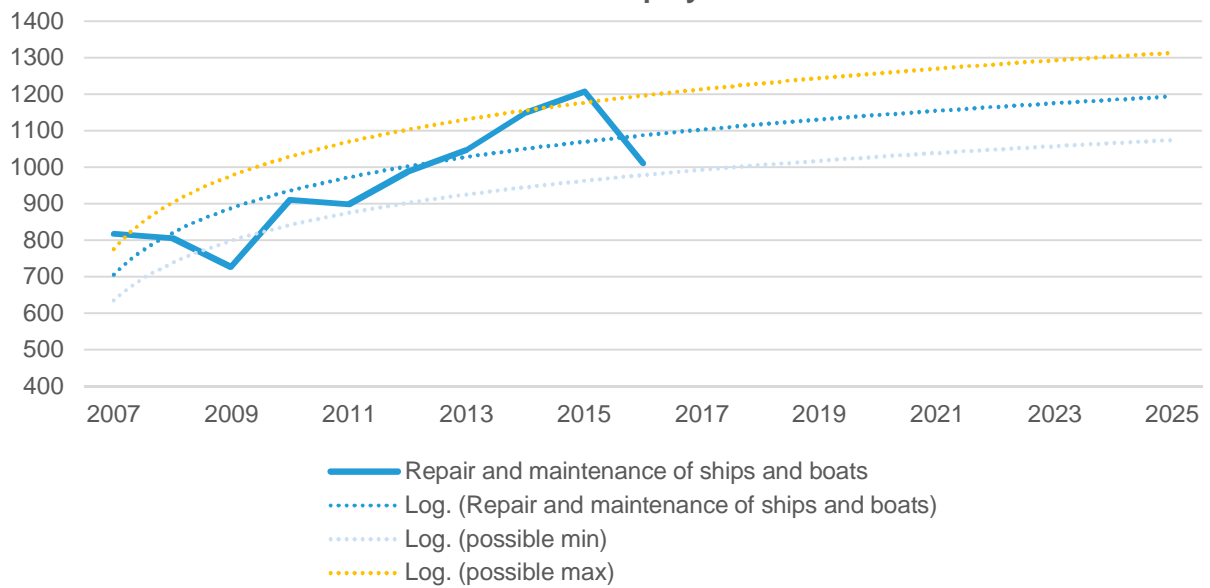
**Graph 46. Building of pleasure and sporting boats - EST - Number of employees**



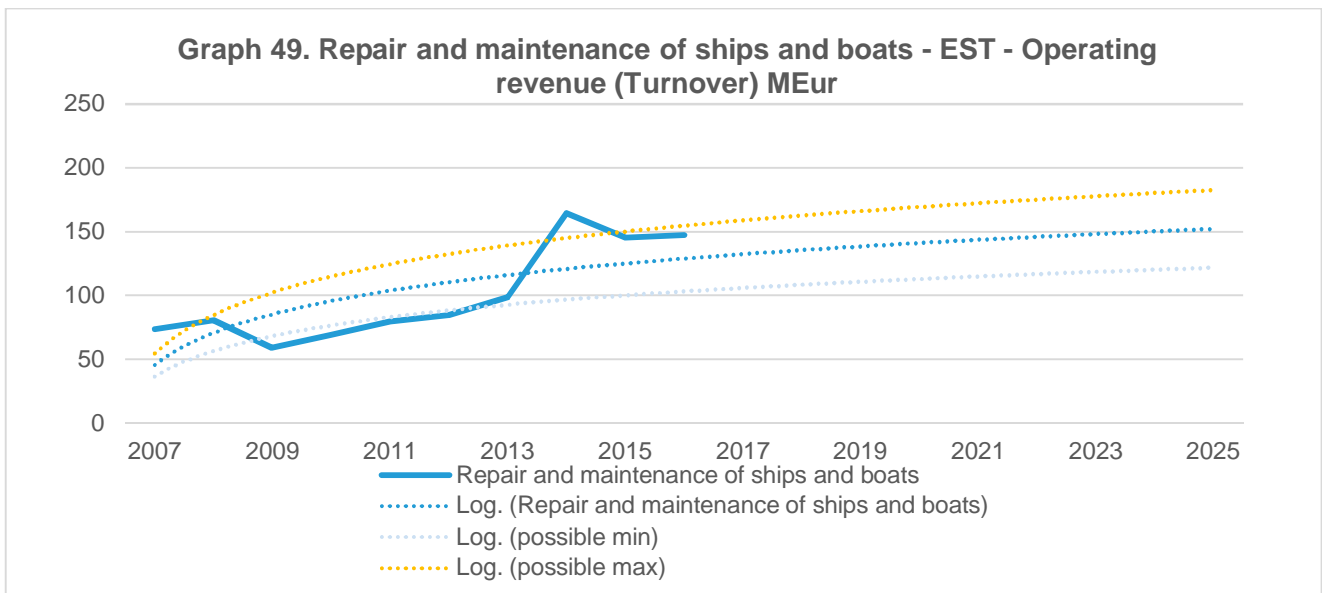
**Graph 47. Building of pleasure and sporting boats - EST - Operating revenue (Turnover) MEur**



**Graph 48. Repair and maintenance of ships and boats - EST - Number of employees**







## Marine Construction sector: Current economic situation and development trends in Finland

The main competitive advantage of the Finnish shipyards lies in a high degree of specialization and innovation; highly specialized vessels requiring a high level of expertise and conceptual development, particularly, in energy saving; excellent project management; short and reliable delivery times; and cost control. The competitiveness of the Finnish marine construction cluster is, however, highly dependent on the vessel type. For standard vessels, competitiveness is on a low level due to the strategic decision of the production of specialized vessels instead of that of standard cargo vessels. This means that the Finnish shipyards have a different cost structure than the large Asian (mainly Korean and Chinese) shipyards which are specialized in serial production of standard vessels and can deliver them to a price that is very hard to compete with (Nommela & Purju, 2016, p. 112).

The Finnish marine construction concerns mainly the Turku and Helsinki shipyards. The Turku shipyard has specialized in cruise vessels and car-passenger ferries that use high-technology solutions, including LNG fuels (Meyer, 2017). Today Meyer Turku has around 1700 employees which makes it a major employer in the South-Western Finland. Besides cruise ships, Finnish shipbuilding is specialized in passenger ferries, icebreakers and warships. Mayer Turku has confirmed orders from Carnival corporation (1,6 billion euros) and from Royal Caribbean cruises (est. 2 billion euros). The Mayer shipyard will produce eight ships in total by 2024 (Yle 10.5.2017) and will increase the number of employees to 2000 (Kaleva 5.5.2017). The Helsinki shipyard specializes in arctic shipbuilding technology, e.g. building icebreakers and other arctic offshore and special vessels. The Helsinki shipyard has constructed 60 % of all icebreakers operational today worldwide.

Costa Smeralda is part of an important effort of Costa's mother company, Carnival Corp, to bring the world's first LNG powered cruise ships into operation. Meyer Turku has been a pioneer in LNG ship building with already two very successful LNG ferries delivered (Viking Grace in 2014 and Tallink Megastar in 2017). Now Meyer Turku has worked together with sister shipyard Meyer Werft, Papenburg to create the LNG propulsion plant for the Costa Smeralda. Costa Smeralda will start operation in October

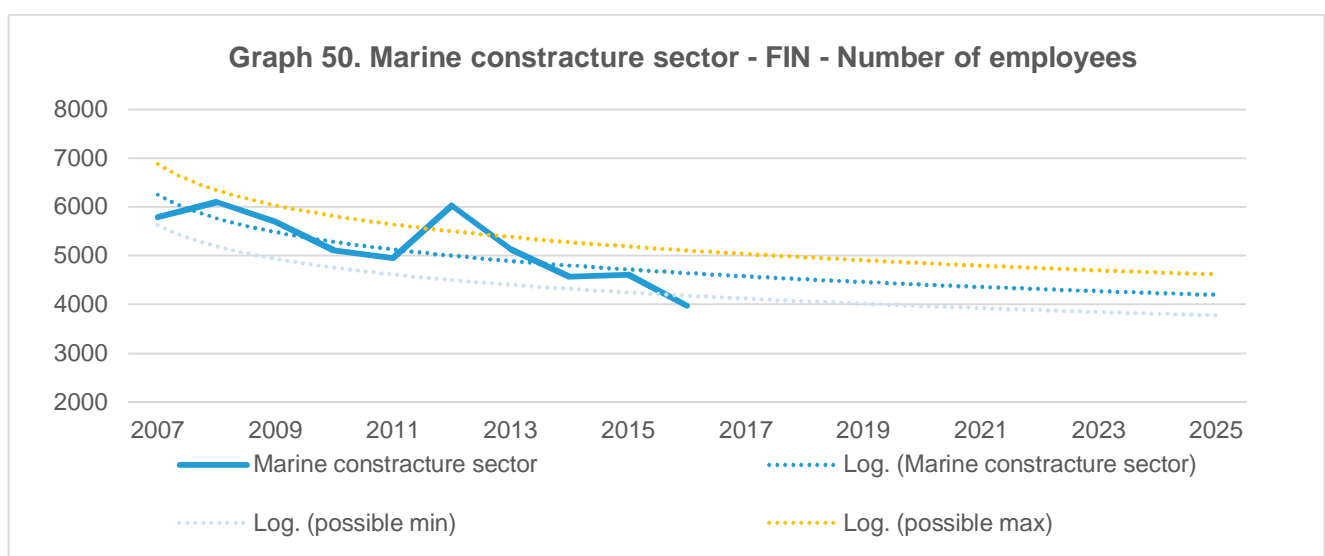
2019. With 180 000 gross tonnages she will have 2600 cabins. A sister ship to Costa Smeralda will be delivered from Turku in 2021. (Meyer, Turku)

Environmental friendliness was also in focus in the design of New Mein Schiff 1. New Mein Schiff 1 Meyer Turku is making another big step ahead by engineering it for a 10% energy efficiency improvement compared to last year's Mein Schiff 6. Mein Schiff 1 is one of the first cruise ships to be equipped with catalytic converters for the main and auxiliary engines, reducing nitrogen oxide emissions. At the shipyard, New Mein Schiff 2 is already under construction and TUI Cruises recently ordered a third sister ship to New Mein Schiff 1 & 2 for delivery from Turku in 2023, which will be called 'Mein Schiff 7'. (Meyer, Turku)

A global order book in February of 2018 comprises more than 90 vessels, and growing – the cruise business has never before seen such exciting times. Contrary to the logic of other segments of the shipping industry, the cruise sector's success hinges upon its ability to grow its share in the leisure industry and attract new passengers. The only true limiting factor is yard capacity. DNV GL expects new yards to open both in Europe and Asia over the next five to ten years, which will further boost growth. (DNV)

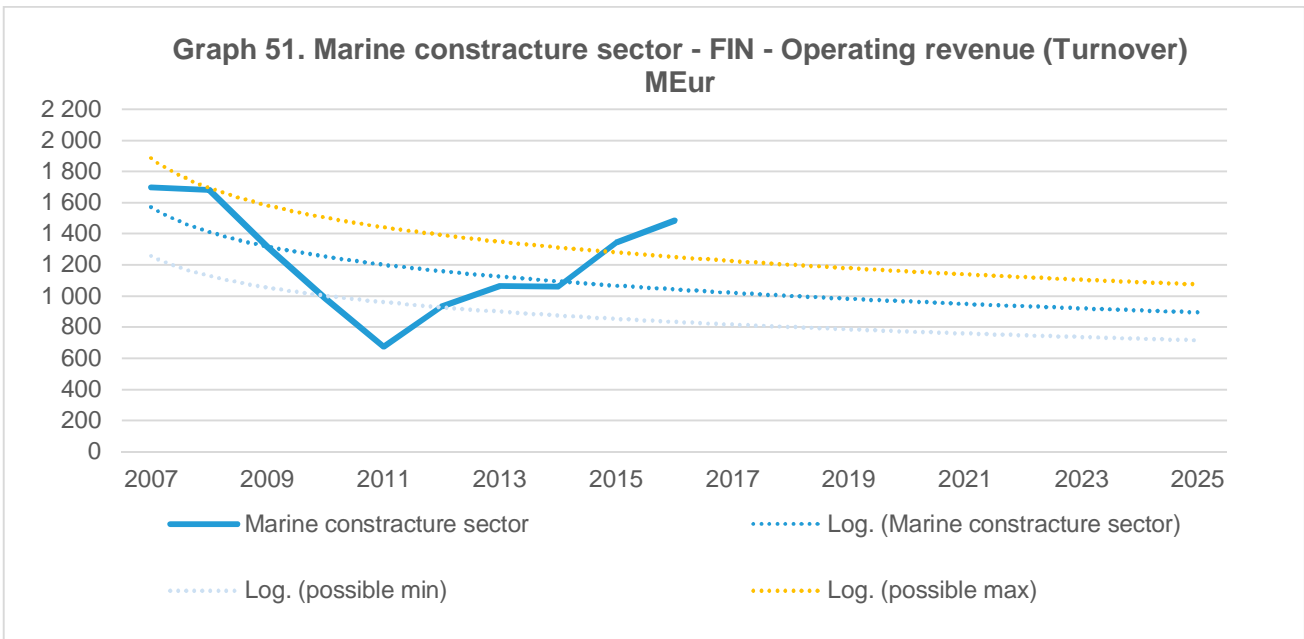
Innovation in cruise ship building occurs in two dimensions: marine technology innovation, which involves all efforts to make ships more fit for purpose, energy-efficient and cost-efficient; and passenger-facing innovation, which develops new features to make the “product” more attractive to passengers and targets new passenger segments. There are dramatic improvements on both sides: technically, the shipbuilding industry is making giant strides towards improving fuel performance, developing new fuels and engine technologies. At the same time line operators and shipbuilders are carefully observing new trends and searching for ever new ideas to innovate the passenger experience and offer on-board entertainments never seen before.(DNV)

For Finland, there will be not less than 4250 employees in total working in 494 companies in the P4B area by 2025 (see Graph 50.). In terms of the turnover development for the Finnish marine construction sector, the total turnover of the 494 companies will reach not less, than 850 million euros by 2025. The turnover development is shown in Graph 51.

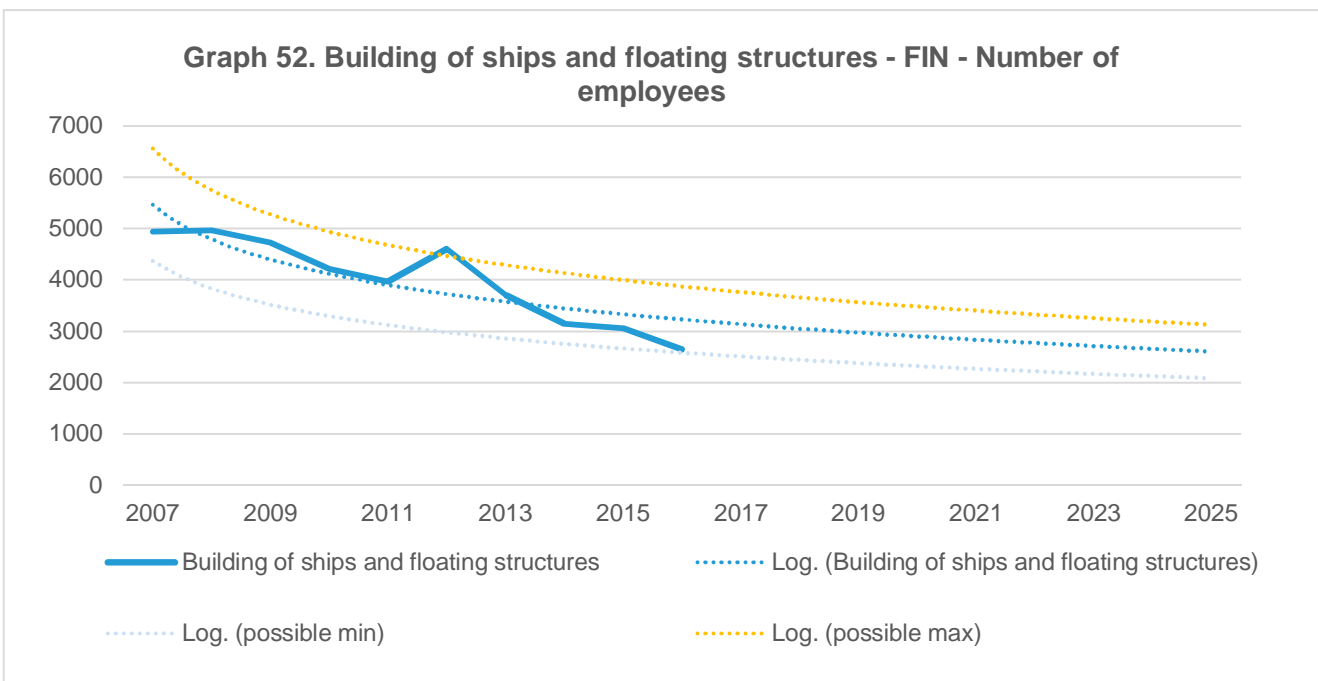


The reason for a decrease in turnover and in a number of employees in the Finnish marine construction may be due to outsourcing. In addition, the changes in ownership and management of the Finnish

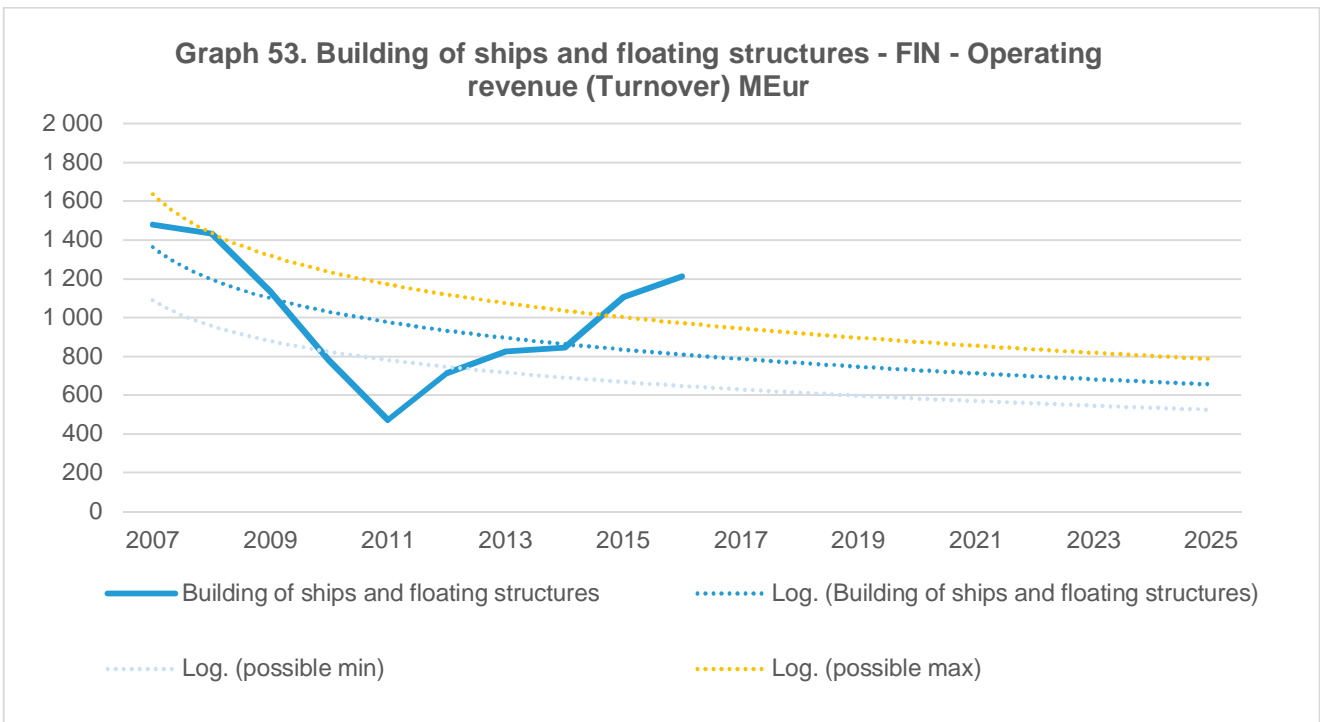
shipyards are considered a drawback that has resulted in a lack of long-term thinking also influencing the investments negatively (Nommela & Purju, 2016, p. 112).



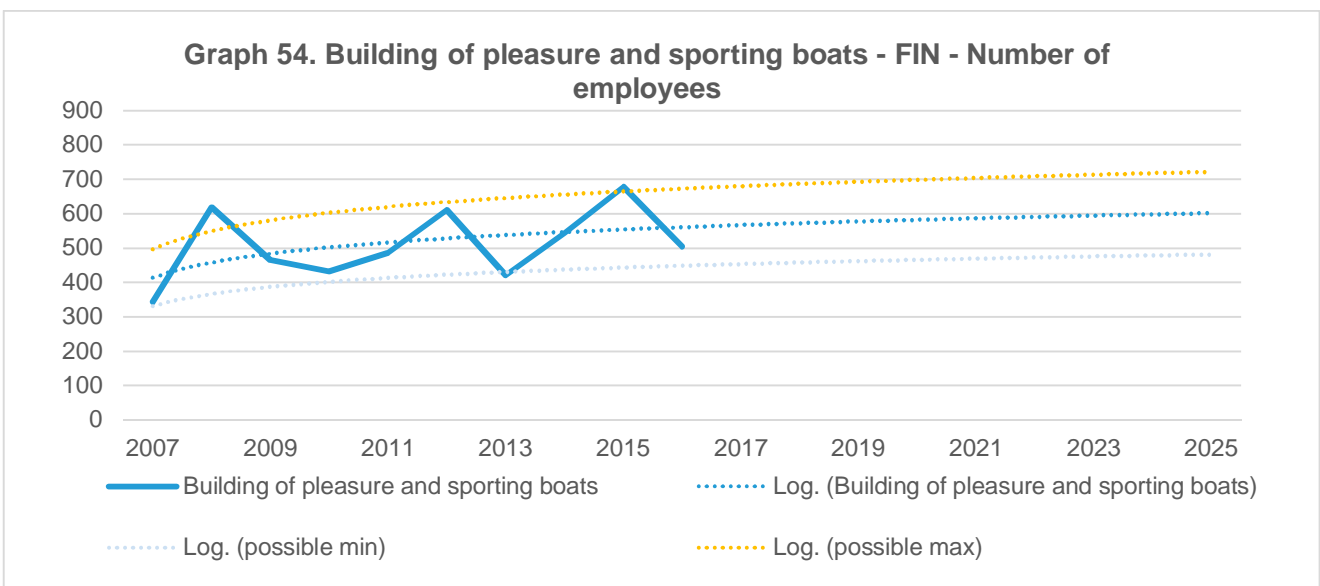
Although the EU has banned direct subsidization, there has been a large amount of support aimed towards the marine construction industries through government actions, such as export guarantees, innovation support and supporting R&D through large research programs involving companies from the whole cluster. Shipbuilding has a high prestige and is regarded as nationally important in Finland as it has a big impact on employment. However, in some sectors the decreasing numbers of employees show that companies implement the automation of production and new technologies (Maritime Cluster Analysis, 2012).



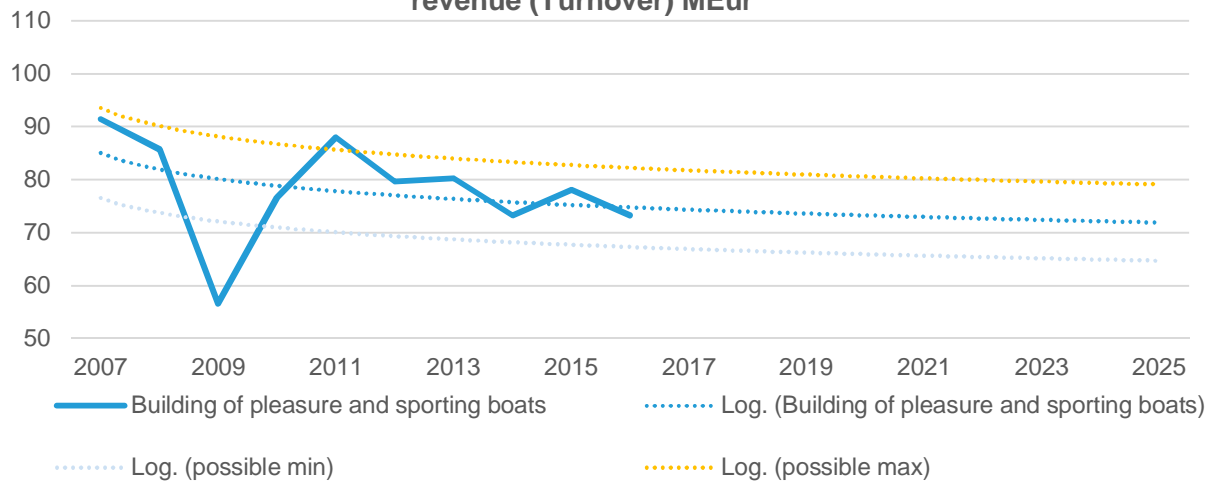
In recent years, the shipbuilding industry in Finland has undergone a transformation and historical growth that cannot be identified in the employment trend figures.



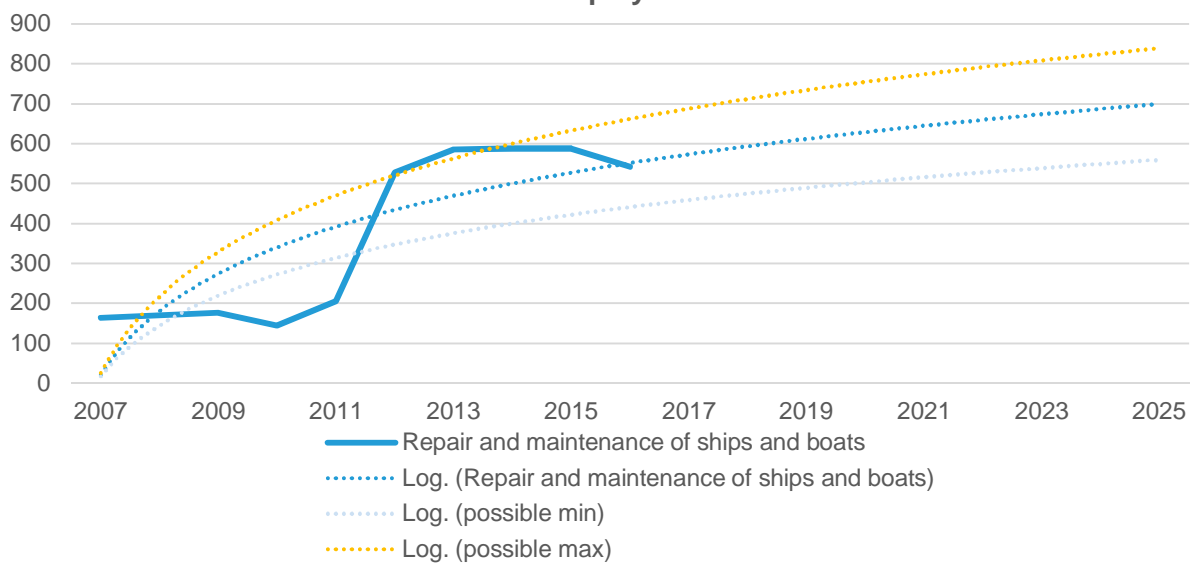
The growth in revenue levels illustrated from year 2011 onwards better reflect the recent actual development trend direction. The trend lines starting from earlier years even suggest a moderate decline in turnover levels, which does not reflect the current economic reality.

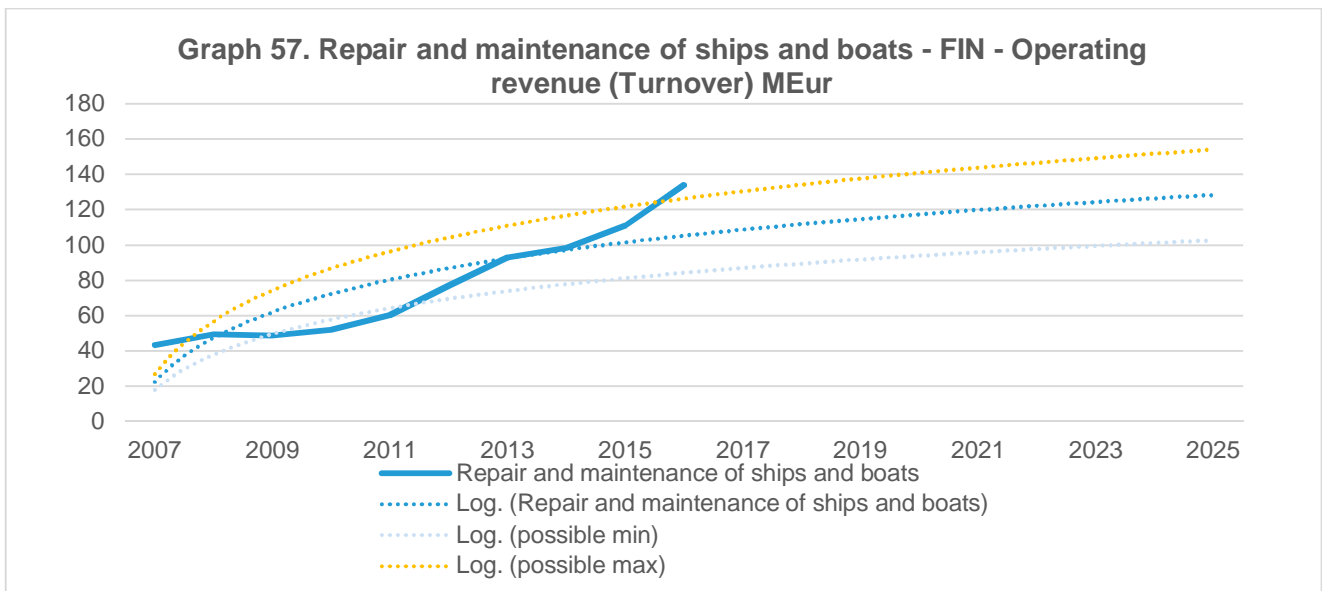


**Graph 55. Building of pleasure and sporting boats - FIN - Operating revenue (Turnover) MEur**



**Graph 56. Repair and maintenance of ships and boats - FIN - Number of employees**





New opportunities for both countries could be the renewal of the aging ferry fleet in Europe. New segments such as offshore and renewable energy will also need vessels with a high degree of innovation. Simultaneously, the competition is fierce as there is plenty of free capacity in the shipyards globally. There will also be stricter environmental regulations by IMO which will require new fuel types and machine technology solutions. (Nommela & Purju, 2016, p. 117). Currently, only a few LNG fuel ships sail on the Baltic Sea. Tallink as well as the Swedish company Rederi AB Gotland have made or intend to make contracts for the construction of one new ship that uses LNG as fuel. AS Tallinna Sadama has also contracted the building of four new LNG-ready (allowing transition to LNG fuel) passenger ferries for the shipping lines that connect Saaremaa and Hiiumaa (Strategic Environmental Assessment of Estonian Marine Strategy's Programme of Measures to achieve and maintain Good Environmental Status of Estonian marine area, 2015).

## CONCLUDING REMARKS

### Infrastructure

To enable and support the growth of the blue economy in the BSR, the infrastructure plays a crucial role for all industries. The EU level aims to transfer 30% of cargo from roads to waterways by 2030 and more than 50% by 2050 (COM, 2011) offers blue growth potential not only to ports and shipping companies in the P4B area but to wider service networks connected to logistics of people and cargo. Infrastructure development secures and improves the accessibility to relatively distant settlements and raw materials extraction sites in Finland and Estonia. The strategic importance of the infrastructure is further amplified by the needs relating to the aging society and sparsely populated areas that are heavily affected by the availability and frequency of transport services. One key transportation aspect to consider is rising from the anticipated coastal tourism development: the coastal areas and archipelago have been identified as the key resources and locations for future sustainable blue tourism. Since transport networks and modes are recognised as not being fully interoperable in the BSR (Baltic Lines, 2017), there is potential to further improve transportation efficiency and to reduce logistical bottlenecks.

Possible new EU-level pilot programs will enable the P4B region to tap into the development of multi-modal transport that connects the area and the current logistics nodes firmly into the BSR industrial transportation links and even beyond, eg. to Russian Federation. Opening a new, more direct, passenger and cargo transport line between ports in eastern Finland and Estonia could well support the EU blue growth aims and future cross-boundary cooperation.

## Sustainability

This report provides a multitude of current issues and trends that outline some of the key development trends within the P4B industries and shed light on what possibilities some industry-specific future development trends may enable in terms of sustainable growth. Some of these forces may have stronger and earlier impacts within the industries than is now expected. The forces that may have a major impact on the future of all maritime industries include:

- Fossil fuels substitute for renewable resources
- Climate change
- Increasing global competition
- Raw materials transport routes change
- Marine resources use
- International and national restrictions and regulations
- ICT, digitization and the use of "big data"
- Energy Efficiency and Emission Reduction
- Recycling and sustainable development
- The level of maritime transport costs (TEM 2016).

These forces both challenge the current development processes within industries and value networks but simultaneously, will enable the blue industries to work towards supporting sustainable growth. Being aware of the major trends and proactively developing new solutions to overcome the increasing global competition and societal challenges, will offer growth potential within BSR and beyond. When it comes to future aiming for future growth of industries, studies have indicated that sustainability development and investments not only support individual companies' and industries differentiation and competitiveness but, they also build and strengthen regional-level (e.g. BSR or coastal) brand positioning and national country brands (see for example: Lähteenmäki *et al.*, 2017; Brodie and Benson-Rea, 2016; Fetscherin, 2010; Yan, 2008 and Ma, 2004). Building and maintaining such intangible assets, like a country, region or industry brand, is a core factor in sustainable customer value creation and business success, e.g. in tourism where products have strong regional and place-related connections. All P4B key industry sectors have identified and applied various methods to achieve sustainability goals but joint efforts in cross-boundary and cross-industry coordination may enable new innovative openings. The individual sectors of the blue economy are characterized to be interdependent and, they rely on common skills and shared infrastructure such as ports and electricity distribution networks (European Commission, 2012). This interconnectedness and linkages of the blue industries to the wider regional and national economy should be noted when evaluating the sustainability of individual activities in the MSP processes. The blue industry boundaries and sustainability effects are typically not limited to any single MSP area.

## Current status of blue economy business sectors and development trends

Blue growth sectors have been identified as having high future growth potential and hence the revealed positive trend estimates were more or less expected. Despite of the possible fluctuations the ten-year development shows a clear positive trend in the development of industry turnover. What may be more difficult to estimate accurately is the number of new employees needed in some decades' time. Most industries are exploring various options and possibilities related to high-technology and digitalisation in their process improvements and new service development and thus, much less employees will be needed in the future to create a higher level of customer value. What will continue to be key driving forces for sustainability are legislation and political factors. Proactively complying with the environmental legislation has been identified as a success factor for many marine technology companies, especially for those that produce cleantech solutions which directly address new regulation in the market (See for example Repka et al., 2017). Due to the higher level of employment and population density in the coastal regions in Finland and Estonia, the cities and communities in the area may be more resilient to market changes and hence, offering greater blue growth potential compared with the inland regions. Since population is aging in the EU and cultural diversity is increasing in the future, growth opportunities and new initiatives need to be carefully identified and evaluated to build competitive advantages.

High growth opportunities are expected to actualise already in the near future in the tourism sector, which should remain in the centre of the P4B cross-border blue growth development. To set realistic expectations and to get more perspective to the future development, according to COM (2012) tourism covers about half of the employment of the blue economy as a whole. Another indication for growth rate and potential lies with registered patents. According to patents directory accessed via Orbis Europe, out of around 12 000 maritime activities or products related patents registered in Estonia and Finland between years 1900 - 2016, 3500 patents are registered after year 2000.

To gain a deeper understanding of the blue business and growth dynamics, future studies should look into what characterizes the development and diffusion of blue business innovations and the adoption of new technologies across blue industries and markets. In order to achieve this, novel industry sub-sectors which have high growth potential should be selected for a closer investigation.

## Other future development perspectives for the blue growth industries

In the changing global markets with new sustainability challenges, a question is raised on who should be the key stakeholder groups of the blue economy development. For example, since marine and maritime sectors are now increasingly utilizing new technology and IT solutions and providing more intangible value, i.e. services, to their customers and, many blue industries now fostering transparency and responsibility of operations – should more reference groups (stakeholders) be actively involved in the business development processes? High customer involvement may lead to improved value creation processes and thus high sustainability performance. Another changing aspect in the future is the age and cultural structures of the population. Arguably, the cultural diversity of population is high and increasing especially in the capital city regions of the P4B area, which may provide challenges for adaptation but also offer new skills and growth opportunities for industries seeking to adapt to international markets. Aging population effects may become especially apparent in the rural areas of the P4B



region. Demographic changes and global consumption trends also impact the values and norms apparent in the market. Views on ownership and possession of products, what meanings are perceived and what outcomes are expected from consumption processes, how working time and free time is valued and allocated etc. In order to improve the productivity levels of the blue industries – along with maximum and smart use of digitalization; cleantech solutions, artificial intelligence, augmented and virtual reality, sensory devices and 3D printing etc. - right kind of skills, know-how and education should be made available. Joint marketing efforts are needed to promote and build (global) image for BSR and to design attractive cross-border and cross-industry blue service paths and products.

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## ANNEX 1. BLUE GROWTH STRATEGIES

### 1. Energy sector

Policy	Country	Details	Time line	Sector
COM, 2011	EU	"A Roadmap for moving to a competitive low carbon economy in 2050". By 2050, electricity will be produced without use fossil fuels, but fossil fuels may still be used in the industry and in transports.	2050	Energy
Energy Efficiency Directive 2012/27/EU (upload at 2016)	EU	<ul style="list-style-type: none"> <li>○ At least 40% cuts in greenhouse gas emissions (from 1990 levels)</li> <li>○ At least 27% share for renewable energy</li> <li>○ At least 27% improvement in energy efficiency</li> </ul> <p>There are two means to reach the greenhouse gas emission target. The sectors that are part to the emissions trading system (ETS), need to cut emission by 43 %, and the non-ETC sectors will need to cut them by 30 %.</p>	2030	Energy
Paris Agreement from 2015	EU, World	It aims is to keep a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels, while pursuing efforts to limit the temperature increase to 1.5 degrees.	meeting 2018 report every 5 years	Energy
COM, 2016b	EU	By 2030, a half of the EU's energy needs will be met by renewables, up from 29% in 2014. Requirement that national governments will have to ensure that consumers can generate and store or consume their own electricity or sell it back to the grid. Every consumer will be able to offer demand-response and receive remuneration directly or through aggregators.	2030	Energy
COM, 2017b	EU	By 2050, the EU intends to curb the greenhouse gas emissions even further. Already in October 2009, the European Council supported an EU objective to reduce greenhouse gas emissions by 80-95% by 2050 compared to 1990 levels	2050	Energy



Policy	Country	Details	Time line	Sector
EUSBSR (EU Strategy for the Baltic Sea Region), 2017b	EU	<p>The EU's strategic aim is to improve the access to and the efficiency, sustainability, reliability and security of the energy markets. The strategic objectives of the EU include facilitation of diversification of energy sources. As security and sustainability are driving forces of development, attention must be paid to the resilience of infrastructure to natural and man-made disasters.</p> <p>A long-term strategic objective of the EU is to integrate all member states to wider energy networks (gas and electricity) so that importing energy from third countries is not necessary.</p>		Energy
TEM 2017	Finland	<p>The aim of the agreements is to improve the efficiency of energy use in industry, the energy and service sectors, the real estate sector, the municipal sector and in oil-heated properties.</p> <p>The agreements are made on a voluntary basis and are a means jointly chosen by the central government and the participating sectors for meeting the international energy efficiency obligations imposed on Finland without having to introduce new legislation or other new coercive measures. According to the Strategy, the share of renewable energy will rise to more than 50 per cent during the 2020s and the self-sufficiency in renewable energy to more than 55 per cent. The greatest opportunities are seen in liquid biofuels and biogas. Coal will be phased out and the use of imported oil will be halved. The use of waste and side-streams for energy production will be promoted. Finland wants to invest in new technologies and to promote the commercialization of innovations for clean and smart energy systems and has joined the Mission Innovation project (2016) where countries have agreed to double their R&amp;D investments in clean energy over five years.</p> <p>Ensure the competitiveness and availability of domestic fuels.</p> <p>Continue to support investments in small-scale energy production through household depreciation and energy support.</p> <p>Continue investment in new technologies for renewable energy and energy efficiency.</p> <p>Support major demo projects for new clean energy technologies.</p> <p>Maintain the conditions of the existing water and wind power capacity.</p>	2020-2030	Energy

Policy	Country	Details	Time line	Sector
BEMIP (Baltic Energy Market Interconnection Plan) 2017	European Commission and Denmark, Germany, Estonia, Latvia, Lithuania, Poland, Finland, and Sweden. Norway participates as an observer.	The Baltic Energy Market Interconnection Plan (BEMIP) is an extension of the Nordic electricity market model to Estonia, Latvia and Lithuania. Monitored by the EUBSR, the BEMIP develops coordinated offshore wind farm connection solutions and other options to increase the use of renewable energy.	2025	Energy
ENMAK 2030 (Estonian National Development Plan of the Energy Sector Until 2030)	Estonia	<p>The annual final energy consumption will remain 32 TWh (as in 2010), the share of renewable energy will be 50% of the final energy consumption and at least 28% of primary energy consumption. The primary energy consumption will become significantly more efficient. The construction of new renewable electricity production facilities will take place under open electricity market conditions without additional national support.</p> <p>80% of the heat produced in Estonia is produced on the basis of renewable energy sources, the importance of local energy sources in heat production is further increased by peat. The objective is mainly achieved on a market basis. The reduction of greenhouse gas emissions in the energy sector by 2030 will be at least 70% (as compared to 1990), and by 2050 it is realistic to achieve a reduction of greenhouse gas emissions by more than 80%.</p> <p>The production of oil shale electricity will decrease and shale oil production will increase, and to achieve this, the development plan foresees the need for the development of a favorable tax environment for investments.</p>	2030	Energy

Policy	Country	Details	Time line	Sector
		<p>The long-term use of biofuels in the period up to 2050 is planned to generate electricity and heat in line with the growth of forests. The use of biomethane and other alternative motor fuels is increasing.</p> <p>The share of fuel-free energy sources in final consumption will be at least 10% in 2030. The potential of hydropower is in use today, the use of solar energy in small solutions will increase by up to 100 MW by 2050, covering almost 1% of the country's electricity demand. In 2050 wind energy could cover a third of the country's electricity consumption.</p> <p>Estonian offshore wind energy resources could be 250 MW by 2020 and 1550 MW by 2030.</p> <p>In 2030 domestic consumption of primary energy is 10% less than in 2012. The energy intensity of the Estonian economy will decrease from the current 5,6 MWh/1000 €SKP 2012 to 2 MWh/1000 €SKP2012</p> <p>Estonia has achieved energy independence by 2030 (vs the dependency rate of 13.6% in 2013). The share of imported electricity will be 0% (vs 0% in 2012).</p>		
GPCP 2050 (General Principles of Climate Policy until 2050, from 2017)	Estonia	Set to reduce the emission of GHG by 80% by 2050 in comparison with the emission levels of 1990.	2050	Energy

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## 2. Marine sector (Shipping)

Policy	Country	Details	Time line	Sector
The International Convention for the Prevention of Pollution from Ships (MARPOL) from 2013	World	<p>The industry itself has set targets to reduce carbon dioxide emissions by 20% by 2020 and 50% by 2050. For reaching the targets, the shipping industry needs cleaner fuel and power options.</p> <p>IMO has adopted an initial IMO strategy on reduction of GHG emissions from ships (13 April 2018). The aim is to reduce total annual GHG emissions by at least 50 % by 2050 compared to 2008. It includes also reduction of CO2 emissions per transport work, as an average across international shipping, by at least 40 % by 2030, pursuing efforts towards 70 % by 2050, compared to 2008. (IMO, 2018)</p> <p>IMO (2018). Adoption of the initial IMO strategy on reduction of GHG emissions from ships and existing IMO activity related to reducing GHG emissions in the shipping sector. Resolution MEPC.304(72). Adopted on 13 April 2018. [5.6.2018]</p> <p><a href="https://unfccc.int/sites/default/files/resource/250_IMO%20submission_Talanoa%20Dialogue_April%202018.pdf">https://unfccc.int/sites/default/files/resource/250_IMO%20submission_Talanoa%20Dialogue_April%202018.pdf</a></p> <p>Since 1 January 2015 the sulphur limit for fuel oil used by ships in SOx Emission Control Areas (ECAS) established by IMO has been 0.10% m/m.</p>	2050	Shipping
EU Commission (2015)	EU	<p>Trans-European Transport Networks (TEN-T) aims for a more sustainable EU transport system.</p> <p>EU's Detailed Implementation Plan for Motorways of the Sea (2015)</p> <p>Further develop maritime spatial planning processes with interactions between land and sea</p> <p>Better connections between MoS and short-sea shipping with blue growth and maritime spatial planning.</p> <p>Promote collaboration among countries concerning maritime spatial planning</p> <p>Encourage information sharing among countries and regions in this field.</p>	(2030)	Shipping

Policy	Country	Details	Time line	Sector
COM, 2016	EU	Aim is to shift 30% cargo load from roads to water transport by 2030 and 50% by 2050	2030-2050	Shipping
EU Commission (2017)	EU	Digitalisation and green shipping has changed the sector. Skilled labour is available due to adapted education. Most ships are e-navigation compatible with some automated functions. Environmentally sound shipping and port operations. Harmonized infrastructure network exists for alternative fuel bunkering and shore-sided electric power supply	2030	Shipping
European Commission, 2017, Vision 2030	EU	Shipbuilding remains at the current level of economic importance. Shipyards have completed the retro-fitting of existing vessels. High-end, specialised vessels and maritime equipment. Environmental monitoring technology seen as a separate emerging sector.	2030	Shipbuilding
The Ministry of Transport and Communications Finland. Finland's maritime strategy 2014–2022.	Finland	A vision for 2030 is “A prosperous Finland – efficient sea routes”. Finnish foreign trade and domestic waterborne transport are smoothly functioning and socio-economically viable and international competitiveness is ensured also in winter. The Baltic Sea is safe and healthy and it attracts recreational activities and tourism to the area and provides high-quality maritime services for the use of the market area. Finnish maritime transport sector will become the leading service provider of the Baltic Sea countries in terms of sustainable logistic concepts.	2030	Shipping
Estonian Marine Policy 2012–2020 (Majandus- ja Kommunikatsiooniministeerium, 2011)	Estonia	<ul style="list-style-type: none"> <li>• Entrepreneurship environment in the marine sector is entrepreneur-friendly and competitive at international level.</li> <li>• The marine sector is safe, secure and contributes to diminished environmental pollution load.</li> <li>• Public sector activities support the development of the marine sector.</li> <li>• The marine education, research and development activities of Estonia meet the contemporary level requirements.</li> </ul>	2020	shipping tourism

Policy	Country	Details	Time line	Sector
		<ul style="list-style-type: none"> <li>• Coastal life and visiting environment are attractive and facilitate marine tourism and the development of local entrepreneurship and passing marine sector's cultural heritage along to coming generations.</li> <li>• Added value in maritime sector increases quicker than GDP (share of maritime sector in GDP was 3-4% in 2016);</li> <li>• number of employees in maritime sector 25 000 (in 2016 it was 9100);</li> <li>• at least 50 cargo ships under Estonian flag (currently 0);</li> <li>• cargo turnover of ports at least 35 Million tons (21 M tons in 2016);</li> <li>• container shipping will not decrease (202327 TEU in 2016);</li> <li>• Investments into ports at least 18 MEUR/year;</li> <li>• annual number of passengers on international lines at least 12 Million (10,17 Million in 2016);</li> <li>• annual number of cruise tourists at least 500 000 (500 000 in 2016);</li> <li>• Estonian ship building and renovation sector is internationally competitive and its added value at least 100 MEUR;</li> <li>• number of recreational craft visiting Estonian ports is 20 000 in 2020;</li> <li>• network of small ports will be ready in 2018</li> </ul> <p>There are also environmental targets</p> <ul style="list-style-type: none"> <li>• achieve GES by 2020, decrease P content by 220 t and N content by 900 t during 2017-2020;</li> <li>• increase reaction capacity to pollution accidents from 1,8 km<sup>2</sup> during 24 hours in 2014 to 2,4 km<sup>2</sup> by 2020</li> </ul>		
Transport Development Plan for 2014-2020	Estonia	<ul style="list-style-type: none"> <li>• predicts increase of capacity to service international cargo through Estonian ports to 60 Million tons by 2020 (in 2012 it was ca 43 Million tons).</li> <li>• to participate in international transit, which, in the light of global economic trends, is growing in the long run. Estonia has an interest in increasing the share of container goods in transit and adding value to them in addition to the storage and transport of goods.</li> </ul>	2020	

Policy	Country	Details	Time line	Sector
		<ul style="list-style-type: none"> <li>• the importance of seaports as logistics centres that need to have good connections with inland (including railway cargo transport system).</li> <li>• the development of all major cargo ports through the development of the necessary terrestrial connections and the creation and development of international contacts.</li> <li>• The importance of ensuring ice-breaking capacity is stressed and it is planned to submit an application for EU funding for the construction of a new icebreaker (in addition to the icebreaker purchased by Port of Tallinn in 2012).</li> <li>• to develop international ferry connections for passenger transport, especially development of service capacities of Tallinn Old City Harbour. Also opportunities for passenger transport through other ports will be explored and a network of small ports will be developed. Ferry connection with St. Petersburg is still a small part of the number of trips into this direction, but in the long run, however, is an important supplement to increasing the number of tourists. The country's potential to boost ferry connection with St. Petersburg is to promote tourism and business connections with Russia.</li> <li>• the implementation of the EU Blue Belt initiative to facilitate intra-EU maritime transport. (Majandus- ja Kommunikatsiooniministeerium, 2013)</li> </ul>		
Estonian marine strategy 2016-2020	Estonia	<ul style="list-style-type: none"> <li>• the development of marine business should be supported mainly accompanied by the improved safety of vessel traffic and other marine-related activities</li> <li>• the protection of marine and coastal environment and marine cultural heritage.</li> </ul>	2020	shipping tourism

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### 3. Tourism sector

Policy	Country	Details	Time line	Sector
OECD (Organisation for Economic Co-operation and Development), 2016	EU	A commitment to sustainable development and the promotion of appropriate training and certification programmes for tourism businesses as well as supporting solutions that encourage future consumers to make sustainable choices.	2030	Tourism
OECD (Organization for Economic Co-operation and Development), 2016	EU/Estonia	<p>Estonian Tourist Board, in co-operation with the tourism industry and regional tourism organisations, developed common marketing strategies for those target markets with the highest tourism revenue potential, determined the roles of the various actors, and planned joint activities and the funding commitments/budgets for a two year period. Strategies include an action plan for managing demand in target markets, while representing the interests of the state, destinations and operators.</p> <p>Tourism development contributes to the achievement of the objectives of the competitiveness strategy Estonia 2020, particularly by increasing the share of Estonia's exports in world trade, raising the employment rate, reducing youth unemployment and encouraging the development of international transportation routes (OECD, 2016)</p>	2030	Tourism
COM, 2017, Vision for 2030	EU	Wide range of visitors incl. non-EU. Capacity limits of destinations are respected. Marinas offer an attractive environment year-round. Cooperation with local residents. Remote areas of BSR are better accessible. Pan-Baltic data portal on maritime tourism. Nature tourism packages and combinations. Cruise tourism as a gateway. More senior citizens travelling. Sustainability highly valued. Local actors drive tourism.	2030	Tourism
National Tourism Development Plan 2014-20	Estonia	<ul style="list-style-type: none"> <li>• as approximately EUR 123 million, the majority of which is financed through Enterprise Estonia/Estonian Tourist Board. The development plan aims at increasing the tourism sector by approximately a third by 2020.</li> <li>• are increasing the awareness of Estonia as a travel destination;</li> <li>• tourism product development, development of tourism attractions of international interest and regional tourism destinations</li> </ul>	2020	Tourism

<b>Policy</b>	<b>Country</b>	<b>Details</b>	<b>Time line</b>	<b>Sector</b>
Baltic Cruise Dialogue (Maritime affairs, 2016)	Estonia	Was agreed to promote natural and cultural heritage in the Baltic Sea region, as well as local traditions, as a core business value to preserve and develop. Additionally, they agreed to pro-mote a holistic approach for sustainability policy for maritime and coastal tourism in the Baltic Sea region, aiming at mitigating and minimizing the environmental impacts of cruise tourism to local inhabitants, to the marine environment and to air quality. The dialogue also agreed to work jointly to identify and remove bottle-necks hindering the effective implementation of the Baltic Special Area under MARPOL Annex IV by the agreed timeline 2019/2021, including through sharing of best practice and taking into account the need for timely planning of itineraries.	2019/2021	Tourism
Roadmap for Growth and Renewal in Finnish Tourism for 2015-25, 2014	Finland	Finrelax – Turning Finland into a top country of wellbeing tourism; Making the Finnish archipelago internationally known; Finland Stopover – making Finland a leading stopover country; Making tourism services easy to find and buy digitally; Creation of a demonstration project targeted at sustainable water-based tourism, utilising bioeconomy, clean technology and digital technology.	2015-2025	Tourism
The Air Transport Strategy to 2030.	Finland	This supports a major promotion of Helsinki Airport as an international transit hub for Asian routes, with a growth from 16 million passengers in 2014 to 23 million in 2030, backed by considerable investment in airport facilities. The strategy recommends improvements in networking and marketing in order to ensure a solid foundation for Finnish air transport and tourism.	2030	Tourism
Development of Finland's first Food Tourism Strategy.	Finland	One of the first actions was to establish the Hungry for Finland competition, as an inter-ministry initiative aimed at increasing awareness of food products and experiences, with participants including events, museums, service businesses, restaurants, cafes and countryside tourism companies.		Tourism
Finland's Strategy for the Arctic Region	Finland	Highlights the importance of tourism and the growth in nature and adventure experiences.		Tourism

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#### 4. Blue bio-economy

Policy	Country	Details	Time line	Sector
COM, 2012	EU	The Euro-pean Commission's Strategy and Action Plan on bioeconomy builds on a circular thinking and links sustaina-ble bioeconomy to all parts of the green and blue economy. It recognises a future challenge and a need to explore how to transform the increased demand of biomass and bio-based products into sustainable solutions in the entire value chain from biomass to food, innovative bio-based products and bioenergy.	since 2012	Blue bioeconomy
EU Commission's strategic guidelines for sustainable aquaculture (2013a,b)	EU	<p>The goal is that "fishing and aquaculture activities are environmentally sustainable in the long-term ... with the objectives of achieving economic, social and employment benefits..." (EU2013a, Article 2(1)). According to the EU Commission's strategic guidelines for sustainable aquaculture ((2013b), the goal is to grow significantly. Of the EU consumption of fishery and aquaculture products (13.2 million tonnes), 25% comes from EU fisheries, 10 % from the EU aquaculture, and 65% from imports. EU aims to fill the gap at least partly by "environmentally, socially and economically sustainable EU aquaculture". One percent of EU consumption means around 3000 to 4000 jobs if produced by EU aquaculture. (EU 2013b, 2). Business diversification may provide additional sources of income: fish farming may for example be integrated with angling and tourism (EU 2013b, 7).</p> <p>The Regulation required EU Member States to draft aquaculture strategies by 2014 that improve competitive-ness, enable innovation and diversification, lessen the administrative burden, and promote access to suitable locations (preamble 55, Article).</p>		Blue bioeconomy/ fishing and aquaculture
EU regulation 1380/2013 on the Common Fisheries Policy	EU	EU regulation 1380/2013 on the Common Fisheries Policy states that European aquacul-ture should contribute to meeting the growing world demand for aquatic food and provide growth and jobs for EU citizens (preamble 53).		Blue bioeconomy/ fishing and aquaculture

European Commission (2017) Vision 2030	EU	Clear regulatory framework in place. Bio-base products & services available. Mussel farms for environmental services. BSR is a global knowledge hub of biorefinery and circular economy. Wild biomass for biogas, feed or food ingredient. Commercial macroalgae cultivation. Blue biotechnology upscaling. Positive consumer attitudes.	2030	Blue bioeconomy/ fishing and aquaculture
COM,2017	EU	Fishing tourism development is one example of helping fishermen to diversify their activities and reduce the pressure on stocks. Another area is the promotion of the local catches in restaurants and hotels.	since 2017	fishing
Common Fisheries Policy	EU	The aim continues to support the traditional European fisheries sector by making fishing sustainable and simultaneously, to improve the economic and social situation of fishermen.	since 2013	fishing
Estonian aquaculture strategy, 2013	Estonia	The strategy sets targets for Estonian aquaculture production to achieve more than 50% share of Estonian internal market and more than 5 Million Euro export of aquaculture products by 2020, which means increase of total Estonian aquaculture production to more than 4300 tonnes by 2020 (including more than 3000 tonnes for internal market and more than 1300 tonnes for export).	2020	Blue bioeconomy/ fishing and aquaculture
The Finnish aquaculture strategy (MMM 2014)	Finland	Finnish aquaculture targets to grow from current 13 000 tonnes to a yearly production level of 20 000 tonnes by 2022.	2022	fishing

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2. COM (2012) Communication from the European Commission; Innovation for Sustainable Growth: A Bio economy for Europe, 60 final.
3. Fisheries Information Centre website (looked in January 2018), <http://www.kalateave.ee/et/kalapuuk>

## 5. Blue growth strategies which include all sectors

Policy	Country	Details	Time line	Sector
EU blue growth strategy (EU 2012)	EU			Blue bio-economy/ fishing and aquaculture > all blue economy sectors
Directorate-General for Maritime Affairs and Fisheries (European Commission) ECORYS; S.Pro		Towards an implementation strategy for the Sustainable Blue Growth Agenda for the Baltic Sea Region.		All blue economy sectors
Prime Minister's office Finland	Finland	Finland's Strategy for the Baltic Sea Region (2017)		All blue economy sectors

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2. Prime Minister's office Finland. Finland's Strategy for the Baltic Sea Region (2017). <http://vnk.fi/en/finland-s-strategy-for-the-baltic-sea-region>
3. Towards an implementation strategy for the Sustainable Blue Growth Agenda for the Baltic Sea Region. <https://publications.europa.eu/en/publication-detail/-/publication/60adf799-4f19-11e7-a5ca-01aa75ed71a1>
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5. Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning, OJ L 257, 28.8.2014, p. 135.
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9. Maa- ja metsätalousministeriö (MMM 2014) Vesiviljelystrategia 2022. Kilpailukykyinen, kestävä ja kasvava elinkeino. Valtioneuvoston periaatepäätös 4.12.2014. Available at : <http://mmm.fi/kalat/strategiat-ja-ohjelmat/vesiviljelystrategia> .
10. VTA ( 2017) Republic of Estonia Maritime Administration mission, [www.vta.ee/mission](http://www.vta.ee/mission)



## ANNEX 2. INTERVIEW GUIDE

### Business questions

1. *How do you see the future of your business/your company ...say in 2025-2030?*
2. *Which factors do you think will most affect the long-term economic development of your company...say in 10-20 years (turnover, number of employees)?*
3. *Do you see an increasing or perhaps a decreasing trend in your business/in the business of this field?*
4. *What kind of new opportunities and possibilities do you see in your business/in the business of this field ...say by the year 2025 - 2030?*
5. *Is it anything you would like to say about the future of your business or the business of this field?*
6. *A sector specific question*

### Networking questions

#### I Drivers

##### General drivers for networking:

In what kind of networks are you participating?

Why have you joined these networks?

##### Drivers for Maritime Spatial Planning (MSP) networking:

Do you do any networking in MSP?

Describe that networking

What has made you to do this kind of networking?

#### II. Trends

##### Trends in networking:

What do you see as a future in cross-border networking in Gulf of Finland and Archipelago sea area in your sector? Between sectors? Between Estonia and Finland? Is it increasing? Decreasing? Why?

What characteristics dominate the future networks in Gulf of Finland and Archipelago sea area? Why?

#### III. Suggestions

##### Improvement of networking in Gulf of Finland area:

What do you suggest should be done to make networking better / more intense in Gulf of Finland and Archipelago sea area?

Who should do that? Why?



European Regional Development Fund

European Union



[SYKE.FI/PROJECTS/PLAN4BLUE](https://syke.fi/projects/plan4blue)