



STUDY ON BLUE GROWTH, MARITIME POLICY AND EU STRATEGY FOR THE BALTIC SEA REGION



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Country Fiche Denmark	

1. General overview

Morphological structure of the coastline

- Located in Northern Europe, Denmark borders both the Baltic and North Seas. The country has a coastline of 7.259 km, equal to 5,3% of the total coastline length of the EU-22 coastal Member States.
- The country's coastal zone (within a range of 10 km from the coast) covers 25.648 km², representing 6,2% of the corresponding EU-22 coastal area.
- With the majority of the Danish mainland being coastal (no point in the country is further than 50 km from the nearest sea or fjord) and the existence of many islands, the total surface of the country's coastal region is 42.881 km².
- Denmark has 391 inhabited islands.

Population and related social conditions for maritime areas

- The population of Denmark in 2012 was 5.580.516 people (Eurostat). Since no point in the country is further than 50 km from the nearest sea and all NUTS 3 regions are considered as coastal areas, 100% of the Danish population can be said to live in coastal areas.
- In 2012 total employment in the population aged 20-64 years was about 2,46 million people representing 1,27% of the employed labour force in all the EU-22 coastal Member States (100% of the Danish labour force).
- In 2012 total unemployment in the population aged 20-64 years was about 186 thousand people, representing 0,84% of the unemployed persons in all the EU-22 coastal Member States (100% of the Danish unemployed persons).

Economic role of maritime areas over the national total

- In 2010, the Gross Domestic Product (GDP) per capita in the coastal areas was EUR 42.626 (same as national level data).
- Gross Value added (GVA) in 2010 reached 203,66 billion Euros (same as national level data).

GVA – Details by NACE activities

Sector	GVA of coastal regions (billion EUR)	Share in the national GVA for the sector
Agriculture, Aquaculture and Fishing (A)	2,93	100
Manufacturing (C)	23,20	100
Construction (F)	8,89	100
Wholesale and retail trade; transport; accommodation and food service activities; information and communication (G-J)	49,46	100

Employment – Details by NACE activities

Sector	Employment of coastal regions (thousand)	Share in the national employment for the sector
Agriculture, Aquaculture and Fishing (A)	72,60	100
Manufacturing (C)	315,00	100
Construction (F)	162,60	100
Wholesale and retail trade; transport; accommodation and food service activities; information and communication (G-J)	806,20	100

2. Marine and maritime economic activities (MEAs)

Table 1 - Overview of relevant maritime economic activities in Denmark at NUTS-0 level

Maritime economic activity		GVA (EUR, billion)	Employment (*1000)	Number of enterprises	Further indicators	Source & Reference year
0. Other sectors						
0.1	Shipbuilding (excl. leisure boats) and ship repair	0,21	3,584	260		Eurostat (2010)
0.2	Water projects	0	0	0		Eurostat (2010)
1. Maritime transport						
1.1	Deep-sea shipping	0,27	1,01	44	Based on Eurostat data on gross weight of goods transported to/from main Danish ports, in 2010 DSS represented 9% of the total gross weight of goods transported to/from main Danish ports. ¹	Eurostat (2010) Danmarks Statistik (2010)
1.2	Short-sea shipping (incl. Ro-Ro)	2,72	10,19	448	Based on Eurostat data on gross weight of goods transported to/from main Danish ports, in 2010 SSS represented 91% of the total gross weight of goods transported to/from main Danish ports.	Eurostat (2010) Danmarks Statistik (2010)
1.3	Passenger ferry services	0,87	3,27	74		Eurostat (2010) Danmarks Statistik (2010)
1.4	Inland waterway transport	0	0	0	See Table 2	Eurostat (2010) Statistics in Focus (2012)
2. Food, nutrition, health and ecosystem services						
2.1	Fish for human consumption	0,76	10,84	N/A		Eurostat (2010). NACE 47.11 is confidential. In the other Baltic countries the share of 47.11 of the total MEA is between 8-22%, so a share of 15% was estimated for Denmark
2.2	Fish for animal feeding	0,12	1,71	N/A		Eurostat (2010)
2.3	Marine aquaculture	0,01	0,19	N/A		The Economic Performance of the EU Aquaculture Sector – 2012 exercise (STECF-13-03)
2.4	Blue biotechnology	0	0	0		
2.5	Agriculture on saline soils	0	0	0	See Table 2	Joint Research Center, European Soil Format (2013)
3. Energy and raw materials						
3.1	Offshore oil and gas	6,10	2,66	44		Eurostat (2010)
3.2	Offshore wind	0,07	0,33	44		Eurostat (2010)
3.3	Ocean renewable energy	0	0	0	See Table 2	Eurostat (2010) Energistyrelsen (2012)
3.4	Carbon capture and storage	0	0	0	See Table 2	Energistyrelsen (2012)
3.5	Aggregates mining (sand, gravel, etc.)	0,01	0,10	23		Eurostat (2010)

¹ It should be noted that this result is due to the methodology of the study (which is applied consistently throughout the whole EU). According to the Danish Maritime Authority the relative importance of DSS (compared to SSS) is much bigger as the bigger part of the GVA (and also the employment) in DSS is not generated by calls in Denmark itself but by international calls of ships of the Danish fleet (see also table 2).

3.6	Marine minerals mining	0	0	0	See Table 2	Energistyrelsen (2011)
3.7	Securing fresh water supply (desalination)	0	0	0		Ministry of Environment (2005)
4. Leisure, working and living						
4.1	Coastal tourism	0,69	19,46	1.502		Eurostat (2010)
4.2	Yachting and marinas	0,016	0,225	24		Eurostat (2010)
4.3	Cruise tourism	0,31	1,15	26		Eurostat (2010)
5. Coastal protection						
5.1 – 5.2	Coastal protection	0,015	0,07	N/A		Eurostat (2010)
5.3	Protection of habitats	0,29	1,35	N/A		Eurostat (2010) Danmarks Statistik (2010) Employment taken from Danmarks Statistik for Environment. % calculated based on Eurostat data for total environment vs. protection of biodiversity.
6. Maritime monitoring and surveillance						
6.1	Traceability and security of goods supply chains	0,0103	0,26	2,1		Danmarks Statistik (2010). Public expenditure for defence and police: 1,59% applied to define the maritime share, then 40% applied as the share of this MEA.
6.2	Prevent and protect against illegal movement of people and goods	0,0154	0,39	3,1		Danmarks Statistik (2010). Public expenditure for defence and police: 1,59% applied to define the maritime share, then 60% applied as the share of this MEA.
6.3	Environmental monitoring	0,11	0,51			Danmarks Statistik (2010). Figures for "Waste and waste water management, pollution abatement" sector were taken into account, and 50% applied as it is considered that this is the share of the activities carried out in big cities.

Table 2 Overview of relevant maritime economic activities in Denmark at NUTS-0 level

Maritime Economic Activity	Overview	Socio economic indicators	Source & Reference year
0. Other sectors			
0.1	Shipbuilding (excl. leisure boats) and ship repair	Over the past two decades Danish shipyards have been closing or switching to repair and maintenance activity. Traditionally, Denmark has been a strong shipbuilding nation, but nowadays the shipbuilding industry is focused on the construction of small and medium-sized ships, ship repairs and special segments such as fishing trawlers, research ships, ferries, etc. The country also has a strong and innovative sector producing equipment and supplies used in the construction of ships and has a number of world leading companies (e.g. MAN Diesel, Viking A/S, Desmi among others), though the sector is also challenged by countries in the vicinity of Denmark with lower production costs. Shipbuilding in Denmark is generally outsourced (e.g. to China, South Korea, Japan). Currently there are three	In the run of 2008-2010 GVA decreased by 20,7%, employment by 24,4% while the number of enterprises increased by 8.
			Eurostat (2010) (NACE Rev. 2 codes counted: C30.1.1 - Building of ships and floating structures; C33.1.5 - Repair and maintenance of ships and boats)

		<p>shipyards where vessels are made – Frederikshavn and Rinkøbing in Jutland, and Marstal on Ærø island (Baltic Sea). However, repair and maintenance is an important economic sector as the shipyards are also doing repair and maintenance for the oilrigs.</p> <p>In the coming years it is expected that new increased requirements will take place for reducing NOX and SOX emissions and requirements concerning energy efficiency and emission of ballast water. Thus it is expected that the demand for green maritime technological solutions will increase. Many Danish maritime equipment producers are key suppliers in this area.</p>		
0.2	Water projects	There are no water projects in Denmark		Eurostat (2010)
1. Maritime transport				
1.1	Deep-sea shipping	<p>Data for DSS were considered in the view of Eurostat Glossary definition: “Deep sea shipping refers to the maritime transport of goods on intercontinental routes, crossing oceans; as opposed to short sea shipping over relatively short distances.” Even though Denmark has the 9th largest fleet in the world, deep-sea shipping represents only 0,79% of the total EU-22 coastal Member States cargo shipping and 9% of the national total in 2010 (12% in 2011). The largest shipping company of the world is Danish: Maersk Line. It is heavily engaged in DSS (and only to a less extent in SSS). Most important markets for deep-sea shipping are North America, Japan, East Asia and China (incl. Hong Kong). Deep-sea ports are Copenhagen, Frederiksværk and Kalundborg on Zealand, Lindø on Funen, Åbenrå, Haderslev, Kolding, Fredericia, Vejle, Frederikshavn, Esbjerg, Århus and Ålborg in Jutland. There are no Panamax ports in Denmark, with the exception of Århus, which is a post-Panamax port.</p>	<p>Full time employment dropped by 40% from 2008 to 2010, while the number of enterprises decreased by 42%. This can be explained by a combination of factors, recession and fuel price increases among others.</p>	<p>Eurostat (2011) UNCTAG (2011) Danmarks Statistik (2010)</p>
1.2	Short-sea shipping (incl. Ro-Ro)	<p>Data for SSS were considered in the view of Eurostat Glossary definition: “ Short sea shipping is the maritime transport of goods over relatively short distances. In the context of EU transport statistics it is defined as maritime transport of goods between ports in the EU-27 [...] and ports situated in geographical Europe.” Short-sea shipping represents 2% of the total EU-22 coastal Member States cargo shipping and 87% of the national total in 2010 (91% in 2011). Liquid and dry bulk goods dominate in the total gross weight of the goods, transported to/from the main Danish ports. Since 2009 there has been an increase (ca. 8% per year) in the weight of dry bulk goods handled, but at the same time a decrease of liquid bulk goods has been observed. Denmark has 131 cargo ports and none of them is handling more than 25 million tonnes per year. The split between inwards/outwards goods is 53:47. The most important ports are Fredericia, Århus, Åbenrå, Rødby and Copenhagen.</p>	<p>In 2009 the gross weight of transported cargo dropped by 15%, but in 2010 there was an increase of 2,6% with further increase of 1,4% in 2011.</p>	<p>Eurostat (2011) Danmarks Statistik (2010)</p>
1.3	Passenger ferry services	<p>Passenger ferry transport in terms of total embarked/disembarked passengers is 11,9% of the EU-22 total. There are around 50 ferry routes in Denmark facilitating the connection across the country. Only a small share of the ferries are entirely passenger ferries, the vast</p>	<p>Since the year 2007 the number of passengers dropped by 15%. In 2011, 30.580 thousand passengers were embarked/disembarked.</p>	<p>Eurostat (2011) Danmarks Statistik (2010)</p>

		majority is transporting goods and vehicles as well.		
1.4	Inland waterway transport	Inland waterway transport does not exist in Denmark.		Eurostat (2010) Statistics in Focus (2012)
2. Food, nutrition, health and ecosystem services				
2.1	Fish for human consumption	<p>This MEA plays an important role in the Danish economy. Production of fish for human consumption in 2010 was 53,9% of the total fish production. From 2008-2010 catches declined due to a combination of factors such as recession, fuel price increase and decreasing number of vessels among others. The main species caught are Atlantic mackerel, herring and Atlantic cod. The total quota volume for fish intended for human consumption increased by 47% to 237 thousand tonnes in 2012.</p> <p>The Danish fish processing sector (GVA of EUR 269,3 million in 2010) plays an important role in the country's economy. The main groups of species processed are whitefish and flatfish, herring and mackerel, shrimps and mussels, as well as salmonids. The main product presentation forms are fresh and frozen fillets, smoked, salted and dried fish, preserved and canned fish.</p>	<p>96% of fishing enterprises own a single vessel. 4% own 2 to 5 vessels. From 2008-2010 GVA increased by 4%. Employment in the sector from 2008-2010 dropped by 24%. This relates to the fact the quotas for fish species intended for human consumption have been reducing on average by 30% a year. In 2010 the number of fish processing enterprises was 110 employing over 2.900 people.</p>	<p>Eurostat (2010) STECF, (2012, The Annual 2012 Report on the EU Fishing Fleet) Institute for Food and Resource Economy (2013)</p>
2.2	Fish for animal feeding	<p>Denmark is the largest of the EU industrial fishing nations and is responsible for up to 69% of the total EU fish catches intended for animal feed. In 2011 Danish export of industrial fish, fishmeal and fish oil to EU constituted 30,2% in terms of volume and 10,5% in terms of value of the total national fish export. The production of fish for animal feeding can on average reach 50% of the total fish production. Main species caught are sand eel, Norway pout, blue whiting and sprat in the North Sea, sprat in the Skagerrak/Kattegat, and sprat in the Baltic Sea. In total for 2011 there were 70 fishing quotas of which 10 were for industrial species. The utilisation of these quotas has generally been at a high level of around 80%.</p>	<p>From 2008-2010 GVA increased by 50% and employment increased by 16%, as the quotas for industrial fish were a lot higher than for the fish for human consumption. For 2010 the figures were 669 and 200 thousand tonnes respectively.</p>	<p>Eurostat (2010) STECF, (2012, The Annual 2012 Report on the EU Fishing Fleet) Institute for Food and Resource Economy (2013)</p>
2.3	Marine aquaculture	<p>Rainbow trout (steelhead) is the main species farmed in Denmark and constitutes almost 90% of the total production. 74% of the production is land-based (ponds, raceways and recirculation systems) and 26% represents sea cage farm production. Production of blue mussels on long lines is a relatively new sector, introduced in 2006 and since that time hasn't had positive net profits. Almost 100% of the mussel farming is located in the Limfjord (Northern Jutland) and the North Sea.</p>	<p>Small enterprises (less than 5 employees) prevail in the sector. 88% of the employees are men. The total income from cage farming has been growing since 2008 and in 2010 reached EUR 46,7 million. In 2010 the number of sea cage farms was 17, belonging to 6 enterprises. In the same year, there were 17 mussel farms distributed between 12 enterprises. The total mussel aquaculture income in 2010 dropped by 50% compared to 2008 and reached EUR 0,7 million.</p>	<p>Danmarks Statistik (2010), Danish AgriFish Agency (2010)</p>
2.4	Blue biotechnology	<p>Denmark is currently the only Baltic Sea Region country with a national Blue Biotech Strategy in place. In 2010, the Ministry of Food, Agriculture and Fisheries published the report 'Sea - a Utilised resource', in which six priorities for development of marine biotechnology are set: 1. Increased exploitation of marine biomass, 2. New farming operations, 3. Healthy diet, 4. Discovery of new compounds, materials and biological activities, 5. Extraction of valuable biochemical components, and 6. Biofilm – from ships over the food industry to the interior of the human body.</p>	<p>So far there is no socio-economic impact of this MEA.</p>	<p>Ministry of Food, Agriculture and Fisheries (2010)</p>

2.5	Agriculture on saline soils	Agriculture on saline soils does not exist in Denmark.		Joint Research Center, European Soil Portal (2013)
3. Energy and raw materials				
3.1	Offshore oil and gas	Denmark was the first country to discover oil in the North Sea and today is the only oil-exporting country in the EU. After 40 years' production, the Danish sector of the North Sea can be described as a mature area with a primary focus on optimizing current production and maintaining existing installations. The exploration for new oil and gas fields continues and investments are still being made in new oil and gas production installations. There are 19 producing fields in Denmark, of which 15 are operated by Maersk Oil, 3 by Dong Energy and one by Hess. Maersk Oil produces 85% of the total oil and gas extraction in Denmark.	From 2008-2010 GVA dropped by 27,2% while employment in the sector grew by 22,3% and number of enterprises dropped from 57 to 44. Oil production in 2011 totalled 12,8 million m ³ , a 9,8% decline compared to 2010 as it was expected, because the majority of fields have already produced the bulk of the anticipated recoverable oil. The offshore production of natural gas totalled 6,5 billion Nm ³ in 2011, of which 5,6 billion Nm ³ of gas were exported offshore for sale, a 21% decline compared to 2010.	Energistyrelsen (2012) Eurostat (2010)
3.2	Offshore wind	Since 1970 Denmark has been a pioneering country in developing technologies for wind power. Nowadays Denmark is the country with the highest penetration of wind power in electricity consumption (18%) and according to European Wind Energy Association offshore wind park capacity represents 22% of the country's total wind power capacity. In Denmark, a distinction is made between near-shore wind farms and large-scale offshore wind farms. The near-shore parks consists of farms of up to 200 MW located between 4 and 20 km from the coast, while large-scale farms are located approximately 15 km from the coast and consists of parks of at least 400 MW. At the end of 2012 the capacity of installed offshore wind parks was 921 MW.	Compared to 2008 GVA increased by 21,9% in 2010. In the same period the number of employees decreased by 2,9%.	Eurostat (2010) Energistyrelsen (2012) EWEA (2012)
3.3	Ocean renewable energy	Production of renewable energy in Denmark is based on such sources as wind, wood, renewable waste, straw, biogas and heat pumps. Ocean renewable energy is not yet present in Denmark, although there are already 6 enterprises testing 5 different concepts of wave energy production. Some projects exploring the use of marine biomass for energy production are also taking place.	DKK 25 million (EUR 3,37 million) is budgeted for installations and demonstration of wave power projects in the period of 2014-2015.	Energistyrelsen (2013)
3.4	Carbon capture and storage	The method of CO ₂ injection into oil fields in the North Sea has not yet been introduced but investigations are being carried out to determine the viability of such a project. These matters can be addressed when more experience with this technology becomes available, at the earliest in the years leading up to 2020. This sector has a good potential, however, no industrial production is taking place yet.		Energistyrelsen (2012)
3.5	Aggregates mining (sand, gravel, etc.)	Danish offshore mining mainly consists of extracting gravel and sand from the Baltic and North seas, as well as from Kattegat and Skagerrak. The production has become more important in recent years not only meeting domestic demand, but also as an export to Germany and other Scandinavian countries.	Within the period from 2008 to 2010, GVA increased by 1,2%, employment by 30,6% and the number of enterprises almost doubled and reached 23.	Eurostat (2010)
3.6	Marine minerals mining	There is no mining for minerals in general and marine minerals mining in particular.		Danmarks Statistik (2012)
3.7	Securing fresh water supply (desalination)	The Danish drinking water supply is based entirely on groundwater therefore desalination does not take place.		Ministry of Environment (2005)
4. Leisure, working and living				
4.1	Coastal tourism	Due to its geographic location, well-	The majority of tourists are Danes.	Eurostat (2010)

		maintained nature reserves and relatively mild climate Denmark has always been an attractive tourist destination. Most tourism in the country is coastal and it plays an important role in the Danish economy as well as in the daily life of coastal communities. Due to financial crisis, over the past several years coastal tourism has been declining. However since 2010 the sector has started to recover. There are several national programmes for the development of the sector.	In 2010 their number of overnight stays was 30,9 million, followed by 13,3 million for German, 3,5 million for Norwegian and 2,7 million for Swedish tourists.	Danmarks Statistik (2010)
4.2	Yachting and marinas	There are over 700 marinas in Denmark, of which 320 are with depths over 1,25 m and berths places available. As of January 2010 the number of leisure boats in these marinas was over 57.000, of which 57% were sailboats and 43% motorboats.	In terms of overnight stays in marinas the total number in 2010 was 1,04 million and represented an 8% decrease compared to 2008. The major share all these years belonged to Danes – 52%. Out of all foreign overnight stays Germans represent over 60%.	FLID - Danish Marinas Union (2011) Danmarks Statistik (2010)
4.3	Cruise tourism	There are no cruise companies in Denmark, however the country is an attractive tourist destination - cruise tourism represents 24% of the country's total marine passenger transport. Ports for cruise ships are Copenhagen, Århus, Ålborg, Kalundborg and Rønne. In 2012 there were 428 cruise ships calling in Danish ports, of which 357 (84%) were calling at the port of Copenhagen.	Income derives from offering services and products (furniture and design included) to shipyards and shipping companies specialised in the cruise industry. Within the period of 2008-2010 GVA increased by 45%, while employment dropped by 15% and number of enterprises by 7%.	Eurostat (2010), Danmarks Statistik (2012)
5. Coastal protection				
5.1 – 5.2	Protection against flooding and erosion	In Denmark, in general the landowners are responsible for protecting their land against flooding and erosion. Consequently, it is the owner of the property who must request permission to establish coastal protection and pay the costs in connection with the construction, operation and maintenance. However, there are a few places in Denmark where the protection of the coast is considered to be of national importance and where the government participates in the construction and operation of coastal protection. Coastal protection schemes are often found to be conflicting between various economic, natural, and recreational interests. The Danish Coastal Authority therefore launched a national coastal protection strategy in 2011 on Integrated Coastal Zone Management. The purpose of the strategy is to increase the quality of the Danish coasts and provide more attractive coasts for the benefit of everyone. 99% of Danish drinking water as well as water for irrigation come from the underground wells. Only in a few areas like small islands and low coasts seawater intrusion represents a problem.	All expenditures in 2012 took place in the west coast of Jutland and amounted to EUR 20,2 million. Public expenditure dropped by 14,5% within the period of 2008-2010. There are 12.364 breakwaters, 7.669 slope protection units and 2.455 dikes registered in Denmark. All fresh water control is done at municipal level. There are 98 municipalities in Denmark issuing permits for water extraction and making water tests.	Eurostat (2010) Danish Coastal Authority (2012) Danish Nature Agency (2013)
5.3	Protection of habitats	Denmark takes an active part in the international efforts to safeguard biodiversity through different international agreements (including the 1992 UN Convention on Biological Diversity etc.) and implementing respective EU directives and regulations. The 252 Danish Natura 2000 areas cover 8,3% of the Danish land area and 17,7% of the Danish seas. For each area there is a Natura 2000 plan, which forms the overall framework for the area's administration and management. Habitat areas cover a total area of approx. 19.300 km ² , of which terrestrial areas are about 3.150 km ² and marine areas are approx. 16.150 km ² .	Public expenditure increased by 35,5% and employment by 56,6% within 2008-2010.	Eurostat (2010) Danish Nature Agency (2013) Ministry of Food, Agriculture and Fisheries (2007)

		Protection of habitats is becoming increasingly important from year to year.		
6. Maritime monitoring and surveillance				
6.1	Traceability and security of goods supply chains	Traceability and security of goods and supply chains in Denmark is a joint responsibility of the Police and Tax Office, with support from Danish Navy and Air Force. There are two centres for maritime surveillance in Denmark: Maritime Surveillance Centre North, located in North Jutland, and Maritime Surveillance Centre South, located on Bornholm. Both centres are manned around the clock.		Admiral Danish Fleet (2013)
6.2	Prevent and protect against illegal movement of people and goods	This MEA is also the responsibility of the Police and Tax Office. The Minister of Justice, who is the chief police authority, exercises his powers through the National Commissioner of Police and the Commissioners of the police districts. The police districts carry out the practical border control of the Danish borders under the supervision and responsibility of the Danish National Police. The Admiral Danish Navy is an integrated part of prevention and protection against illegal movement of people and goods. Support to the police is given on a regular basis, and help to the tax office is given when naval units at sea or ashore observe events that indicate illegal traffic, for example traffic of people or goods landing directly on the coast or transferred between ships at sea.	The police in Denmark constitute one national force, employed directly by the State. There, are approximately 11.000 police officials in Denmark (12 police districts). Altogether, there are approximately 14.000 employees in the police service.	Frontex (2012) Ministry of Defence (2013)
6.3	Environmental monitoring	The Danish Ministry of Environment is responsible for public management of water resources and the marine environment. Monitoring is carried out within the framework of the National Surveillance Program NOVANA, Sub-program "Sea and Fjords. DTU Aqua, under the Ministry of Food, Agriculture and Fisheries contributes to the joint European monitoring of the status and development of fish and shellfish stocks. Marine environment monitoring, regulation of ship-based pollution, offshore activities are administered by the Danish Nature Agency. According to the Marine Environment Protection Act, all civilian ships and civil aircraft shall report to the Admiral Danish Fleet if they see oil or other pollutants at sea. The marine environment is also monitored by the Air Force aircrafts flying 450 hours a year. The aircrafts are equipped with Side Looking Airborne Radar, which can take images of large sea areas. Denmark also receives around 650 satellite images a year from the European Maritime Safety Agency. The marine environment is not monitored systematically with environmental ships. Monitoring of the sea by ships is carried out only when the Defence forces and other government ships sail in Danish waters for maritime surveillance or sail in joint operations with the police.	In 2010 there were 4.578 people employed in the environmental protection sector, representing 0,6% of the total public sector. Compared to 2008 it was a 2% drop, reflecting budget cuts.	Danmarks Statistik (2010) Ministry of Defence (2013) Danish Nature Agency (2013)

3. Breakdown of maritime economic activities at regional level (NUTS 2) and selection of most relevant region(s) for the study

With regard to the Baltic Sea two Baltic regions, Hovedstaden and Sjælland were considered. According to the methodology used to score the maritime role of the coastal NUTS-2 regions in Denmark based on the water transport (number of units), coastal tourism (bed places in coastal NUTS 3), fishing (gross tonnage) and aquaculture sectors (production in 1.000 tonnes), the Region of Sjælland (Region Zealand) is the highest ranked in the Baltic Sea Region and is analysed below in Tables 3 and 4 (See Annex Denmark for all coastal NUTS-2 regions' rankings).

Table 3 - Overview of relevant maritime economic activities for the Region of Sjælland

Maritime economic activity		GVA (EUR, billion)	Employment (*1000)	Number of enterprises	Further indicators	Source & Reference year
0. Other sectors						
0.1	Shipbuilding (excl. leisure boats) and ship repair	0,05	0,82	60		Eurostat (2010) Danmarks Statistik (2010)
0.2	Water projects	0	0	0		Eurostat (2010) Danmarks Statistik (2010)
1. Maritime transport						
1.1	Deep-sea shipping	0,06	0,23	10		Eurostat (2010) Danmarks Statistik (2010)
1.2	Short-sea shipping (incl. Ro-Ro)	0,62	2,34	103		Eurostat (2010) Danmarks Statistik (2010)
1.3	Passenger ferry services	0,20	0,75	17		Eurostat (2010) Danmarks Statistik (2010)
1.4	Inland waterway transport	0	0	0		Eurostat, Statistics in Focus (2012)
2. Food, nutrition, health and ecosystem services						
2.1	Fish for human consumption	0,18	2,49	N/A		Eurostat (2010) Danmarks Statistik (2010).
2.2	Fish for animal feeding	0,03	0,39	N/A		Eurostat (2010) Danmarks Statistik (2010)
2.3	Marine aquaculture	0,0023	0,04	N/A		Eurostat (2010) Danmarks Statistik (2010)
2.4	Blue biotechnology	0	0	0		Ministry of Food, Agriculture and Fisheries (2010)
2.5	Agriculture on saline soils	0	0	0		Joint Research Center, European Soil Portal (2013)
3. Energy and raw materials						
3.1	Offshore oil and gas	0	0	0		Energistyrelsen (2012) Eurostat (2010)
3.2	Offshore wind	0,02	0,08	10		Eurostat (2010)
3.3	Ocean renewable energy	0	0	0		Energistyrelsen (2011)
3.4	Carbon capture and storage	0	0	0		Energistyrelsen (2012)
3.5	Aggregates mining (sand, gravel, etc.)	0,0023	0,02	5		Eurostat (2010)
3.6	Marine minerals mining	0	0	0		Danmarks Statistik (2012)
3.7	Securing fresh water supply (desalination)	0	0	0		Ministry of Environment (2005)
4. Leisure, working and living						
4.1	Coastal tourism	0,16	4,48	345		Eurostat (2010)
4.2	Yachting and marinas	0,0037	0,05	6		Eurostat (2010)
4.3	Cruise tourism	0,07	0,26	6		Eurostat (2010)
5. Coastal protection						
5.1 – 5.2	Coastal protection	0,0037	0,0168	N/A		Eurostat (2010)
5.3	Protection of habitats	0,03	0,15	N/A		Eurostat (2010), Danmark Statistik (2010)

6. Maritime monitoring and surveillance						
6.1	Traceability and security of goods supply chains	0,0024	0.08	0.4		Danmarks Statistik (2010). Public expenditure for Defence and Police: 1,59% applied to define the maritime share, then 40% applied as the share of this MEA.
6.2	Prevent and protect against illegal movement of people and goods	0,0035	0,11	0.6		Danmarks Statistik (2010). Public expenditure for Defence and Police: 1,59% applied to define the maritime share, then 60% applied as the share of this MEA.
6.3	Environmental monitoring	0,03	0,12			Danmarks Statistik (2010) Figures for "Waste and waste water management, pollution abatement" sector were taken into account, and 50% applied as it is considered that this is the share of the activities carried out in big cities.

Table 4 - Overview of relevant maritime economic activities for Region Sjælland

Maritime economic activity		Overview	Socio economic indicators	Source & Reference year
0. Other sectors				
0.1	Shipbuilding (excl. leisure boats) and ship repair	There is no shipbuilding taking place in the region, only repair and maintenance. The major share of these activities takes place in bigger ports such as Kalundborg, Rødby and Gedser among others.		The Danish Ports Association (2013)
0.2	Water projects	Does not exist		Eurostat (2010), Danmarks Statistik (2010)
1. Maritime transport and shipbuilding				
1.1	Deep-sea shipping	The only deep water port in the region is located in the city of Kalundborg. Around 70% of the total cargo handled in the port belongs to Denmark's largest oil refinery Statoil Refining Denmark A/S, which has its own harbour.	In 2010 the total cargo handled in the port of Kalundborg was 10.062 thousand tonnes, of which 6.978 (69%) was handled by Statoil refinery.	Eurostat (2011)
1.2	Short-sea shipping (incl. Ro-Ro)	There are around 22 cargo ports in the region. The largest ones are Kalundborg, Køge, Rødby and Gedser. In 2011 the share of goods handled in Kalundborg port was 3,5% and in Rødby port 8% of the total weight of goods handled in Danish ports.	In 2010 the total cargo handled in the region's ports was 19.364 thousand tonnes, representing 29% of the country's total.	Eurostat (2010)
1.3	Passenger ferry services	Around 18 ports in Region Sjælland are handling passengers. The largest ones are Rødby, Sjællands Odde, and Gedser. The ratio between embarked and disembarked passengers in Sjælland is 50:50. In 2011 the number of passengers embarked/disembarked in the Rødby port was 15% of the country's total, for Sjællands Odde and Gedser it was 4,6% and 3,3% respectively.	In 2010 there were 11,8 million passengers embarked/disembarked in the region, representing 28,4% of the country's total. Since 2008 there is a constant decrease in the number of passengers embarked/disembarked, on average 4-5% a year. Mainly this decrease happened on the routes Rødby–Puttgarden and Gedser–Rostock, both connecting Denmark and Germany, as during the crisis fewer passengers were travelling to and from	Eurostat (2010, 2011)

			Germany.	
1.4	Inland waterway transport	Does not exist		Eurostat (2010) Statistics in Focus (2012)
2. Food, nutrition, health and ecosystem services				
2.1	Fish for human consumption	The largest port for fish landings in the region is Odde, located on Sjællands Odde peninsula in the north-west of Zealand. Along with Danish vessels, landings by Swedish, German, Lithuanian, Finnish, Estonian and Latvian vessels also take place.	In 2010 landings of fish for human consumption in the ports of the Region Sjælland amounted to 12.638 tonnes and represented 1,19% of the total landings in Danish ports. The share of landings from the Baltic Sea basin in Region Sjælland was 9% of the total landings from the Baltic Sea basin. In 2012 these landings grew by 4% in comparison to 2010.	Danmarks Statistik (2012) Danish AgriFish Agency (2012)
2.2	Fish for animal feeding	Major landings of industrial fish take place in the ports of Odde (Sjællands Odde peninsula) and Rødvig (south-east of Zealand). Along with Danish vessels, landings by Swedish, German and Polish vessels also take place.	In 2010 landings of fish for animal feeding in the ports of Region Sjælland were around 4.400 tonnes and represented 3% of the total landings in Danish harbours. In the same year landings from the Baltic Sea basin in Region Sjælland represented 3% of the total landings from the Baltic Sea basin. In 2012 these landings dropped by 40%.	Danmarks Statistik (2012) Danish AgriFish Agency (2012)
2.3	Marine aquaculture	In Region Sjælland there are seven enterprises farming rainbow trout in sea cages and one enterprise farming mussels.	In 2011, the total production in Region Sjælland was 1.400 tonnes, which represents 12,9% of the national total sea cage production and 3,52% of the national total aquaculture production.	Danish AgriFish Agency (2012)
2.4	Blue biotechnology	Does not exist		Ministry of Food, Agriculture and Fisheries (2010)
2.5	Agriculture on saline soils	Does not exist		Joint Research Center, European Soil Portal (2013)
3. Energy and raw materials				
3.1	Offshore oil and gas	All offshore oil and gas exploration takes place in the North Sea and does not relate to the region of Sjælland.		Energistyrelsen (2012)
3.2	Offshore wind	There are three wind parks in the region: Vindeby (11 turbines, 5 MW, 1991), Nysted (72 turbines, 165 MW, 2003) and Rødsand II (90 turbines, 207 MW, 2010).		Energistyrelsen (2013)
3.3	Ocean renewable energy	One project on wave energy is currently carried out in Nakskov harbour on the island of Lolland.		Energistyrelsen (2013)
3.4	Carbon capture and storage	Does not exist		Energistyrelsen (2012)
3.5	Aggregates mining (sand, gravel, etc.)	Major mining areas for sand, gravel and stone are located in the harbours of Faxe and Køge.	311 thousand m ³ of aggregates were landed in the region in 2012, which represents 3% of the national total marine aggregates mining.	Naturstyrelsen (2013) Danmarks Statistik (2012)
3.6	Marine minerals mining	Does not exist		Danmarks Statistik (2012)
3.7	Securing fresh water supply (desalination)	Does not exist		Ministry of Environment (2005)
4. Leisure, working and living				
4.1	Coastal tourism	Region Sjælland is an attractive tourist destination due to its location, good infrastructure and beautiful nature. Most popular destinations are Lolland-Falster, island of Møn.	Number of overnight stays in the region was 4,26 million in 2010, representing 9,58% of the country's total.	Danmarks Statistik (2010)
4.2	Yachting and marinas	There are around 40 major marinas in Region Sjælland accommodating both	In 2010 the number of overnight stays in marinas	FLID - Danish Marinas Union

		Danish and foreign tourists. The majority of foreign tourists come from Germany, Norway, Sweden and the Netherlands.	was 0,16 million, representing 15% of the country's total. Compared to 2008 there was 14% decrease.	(2011) Danmarks Statistik (2010)
4.3	Cruise tourism	The port for cruise ships is Kalundborg. Major destinations are countries of the Baltic Sea region, Norway, Russia.	In 2012 the number of cruise ship calls to the port was 12, which is almost double compared to 2008.	Danmarks Statistik (2013)
5. Coastal protection				
5.1 – 5.2	Protection against flooding and erosion	Flat coasts prevail in Region Sjælland. The coast of Isefjord and almost 60% of the Lolland-Falster coast are fouled/overgrown with vegetation; rocky coasts are in the north-west and the island of Møn. Protection is carried out by municipalities and landowners with breakwaters, dikes and slope protection units.		Danish Coastal Authority (2013)
5.3	Protection of habitats	The state of Denmark is taking action on reducing nitrogen and phosphorus emissions into vulnerable estuaries, coasts and lakes. One of the instruments is establishing wetlands – lakes, marshes and wet meadows, which will also create new habitats. Currently there are 3 wetland projects carried out in Region Sjælland: 2 south of Zealand and 1 on the island of Lolland. The establishment of wetlands is carried out in close cooperation between the state, municipalities and landowners.		Eurostat (2010) Danish Nature Agency (2013). Ministry of Food, Agriculture and Fisheries (2007)
6. Maritime monitoring and surveillance				
6.1	Traceability and security of goods supply chains	The major activities on traceability and security of goods supply chains are concentrated around the major ports of Kalundborg, Køge, Rødby and Gedser among others. Traceability and security are ensured by security systems in the ports as well as by inspection tours made on a random basis by tax and police officers and defence forces.		Admiral Danish Fleet (2013)
6.2	Prevent and protect against illegal movement of people and goods	The ports of Kalundborg, Køge, Rødby and Gedse, among others, are the areas where major activities on preventing and protecting against illegal movement of people and goods take place. The protection is ensured by security systems in the ports as well as by inspection tours made on a random basis by tax and police offices and defence forces. International cooperation of the Danish police in the region takes place within the framework of the organisation Task Force on Organized Crime in the Baltic Sea Region.		The Danish Police (2013)
6.3	Environmental monitoring	Environmental monitoring activities in Region Sjælland are carried out as part of the national environmental monitoring programme.		Danish Nature Agency (2013)

4. List of the 7 largest, fastest growing and with most future potential marine and maritime economic activities

4.1 Ranking order of the 7 largest marine and maritime economic activities

The seven largest MEAs, listed in Table 7, were chosen based on a score calculated on the basis of the GVA and the number of persons employed by the sector, using 2010 data (for all MEA scores see Annex Denmark).

Table 5 - Ranking order of the 7 largest maritime economic activities in Denmark at NUTS-0 level

Rank	Maritime economic activity	GVA (billion EUR)	Employment (*1000)	Score
1	Offshore oil and gas*	6,10	2,66	31,83
2	Short-sea shipping (incl. Ro-Ro)	2,72	10,19	18,7
3	Coastal tourism	0,69	19,46	13,18
4	Fish for human consumption	0,76	10,84	9,23
5	Passenger ferry services	0,87	3,27	5,99
6	Shipbuilding (excl. leisure boats) and ship repair	0,21	3,58	2,84
7	Protection of habitats	0,29	1,35	2,13
7	Cruise tourism	0,31	1,15	2,13

* Offshore oil and gas is a North Sea based maritime activity and is thus excluded from the list of 7 fastest growing MEAs for the Baltic Sea

4.2 Ranking order of the 7 fastest growing marine and maritime economic activities over the 3 past years

The seven fastest growing MEAs, listed in Table 8, were chosen on the basis of scores calculated using the compound annual growth rate for GVA and number of persons employed over the period 2008-2010 (for all MEA scores see Annex Denmark).

Table 6 - Ranking order of the 7 fastest growing maritime economic activities in Denmark at NUTS-0 level

Rank	Maritime economic activity	GVA (CAGR)	Employment (CAGR)	Score
1	Protection of habitats	16,32	24,33	20,33
2	Fish for animal feeding	22,38	7,52	14,95
3	Marine aquaculture	39,28	-11,93	13,68
4	Aggregates mining	0,59	14,29	7,44
5	Cruise tourism	20,47	-7,56	6,46
6	Passenger ferry services	16,78	-10,39	3,19
7	Short-sea shipping (incl. Ro-Ro)	5,06 ²	-0,73	2,17

4.3 Ranking order of the marine and maritime economic activities with most future potential for the Baltic Sea Region

The six MEAs with most future potential with view to the Baltic Sea Region, listed in Table 9, are based on scores assigned to each MEA by expert views for the six following indicators: innovativeness, competitiveness, employment, policy relevance, spill-over effects and sustainability (for all MEA scores see Annex Denmark).

Table 7 - Ranking order of the maritime activities with most future potential in Denmark at NUTS-0 level (with view to the Baltic Sea Region)³

Rank	Maritime economic activity	Score
1-2	Short-sea shipping (incl. Ro-Ro)	+++++
1-2	Offshore wind	+++++
3-6	Passenger ferry services	++++
3-6	Fish for human consumption	++++
3-6	Marine aquaculture	++++
3-6	Coastal tourism	++++

5. Growth scenarios for 6 of the most relevant and promising marine and maritime economic activities

Table 8 - Sets of top-7 maritime economic activities ranking in order of size/growth/scores in the Baltic Sea Region

Top-7 current size	Top-7 recent growth	Top most future potential
Short-sea shipping (incl. Ro-Ro)	Protection of habitats	Short-sea shipping (incl. Ro-Ro)
Coastal tourism	Fish for animal feeding	Passenger ferry services
Fish for human consumption	Marine aquaculture	Fish for human consumption
Passenger ferry services	Aggregates mining	Marine aquaculture
Shipbuilding (excl. leisure boats) and ship repair	Cruise tourism	Offshore wind
Protection of habitats	Short-sea shipping (incl. Ro-Ro)	Coastal tourism
Cruise tourism	Passenger ferry services	

² The CAGR for GVA of SSS is calculated for 2008 – 2011 and based on Danmarks Statistics as the data was labelled confidential in Eurostat

³ Only 6 MEAs are ranked with the highest scores. Following these, five other MEAs received the next score of +++.

Table 9 - 6 most relevant and promising marine and maritime economic activities

6 most relevant and promising maritime economic activities
Short-sea shipping (incl. Ro-Ro)
Passenger ferry services
Fish for human consumption
Marine aquaculture
Offshore wind
Coastal tourism

The following criteria were applied for subsequent selection of the 6 most promising MEAs:

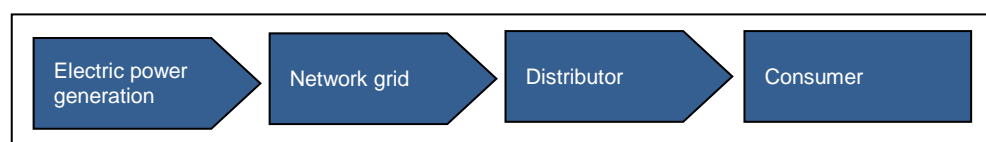
- Short-sea shipping: the activity was selected as one of the most promising in Denmark because it has good potential in socio-economic terms as well as in terms of its sustainability and competitiveness. Moreover the activity is one of the largest and fastest growing.
- Passenger ferry services: the activity is one of the most promising because it has good potential in socio-economic terms as well as in terms of innovative development towards being more environmentally friendly. This activity is also one of the largest and fastest growing in Denmark due to the country's geographic location and shape (391 inhabited islands).
- Fish for human consumption: the activity was chosen as one of the most promising in the country due to its competitiveness, growing sustainability, good opportunities for employment and innovativeness especially in the advanced, export-oriented processing sector. Besides, the activity is one of the biggest in Denmark.
- Marine aquaculture: the activity is one of the most promising because of its sustainability, competitiveness, employment potential and innovativeness. The activity is one of the fastest growing in Denmark.
- Offshore wind: the activity was chosen as one of the most promising due to its high competitiveness, high level of innovativeness and sustainability as well as capability of knowledge transfer and good potential for employment growth. Offshore wind is also one of the most promising sectors in Denmark in the view of the strategic plan to make the country independent from fossil fuels by 2050.
- Coastal tourism was selected as one of the most promising activities in Denmark due to its huge potential in terms of employment, sustainability and competitiveness, especially in the coastal zones. Furthermore the sector is one of the biggest in the country.

5.1 Description of the nature of each of the 6 maritime economic activities and value chains

Offshore wind

Denmark is the country with the longest experience in the offshore wind energy sector, establishing the first farm in 1991 and a significant amount of installed capacity. The industry has developed through innovative thinking and experience, which have helped create core competencies in production, design and installation of wind turbines that are known worldwide. To date, Danish companies have installed more than 90% of the world's offshore wind turbines. With its know-how, Denmark expects to remain the dominant player in the offshore wind turbine market for years to come. According to the Danish Energy Agency, in 2011 the number of offshore turbines in Denmark was 405 (9% of the total number of turbines), generating 12,2 PJ, which represents 36,4% of the national total energy production by wind turbines. Most of the turbines are over 2.000 MW capacity. Out of 12 existing offshore wind parks, 6 are located in the Baltic Sea area, 3 in the North Sea and 3 in Kattegat.

Value chain

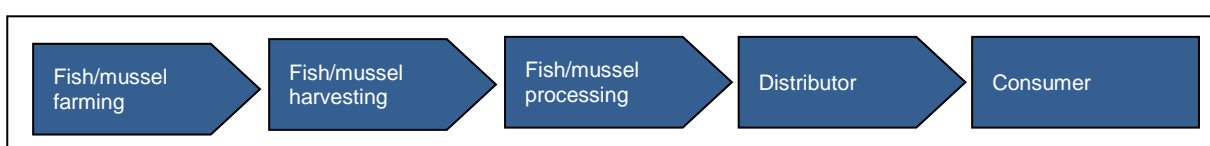


Marine aquaculture

The main marine aquaculture species produced in Denmark are rainbow trout and blue mussel. Only 26% of trout production is sea cage farmed. In 2011 there were 19 enterprises, which owned 257 cages with 226 thousand m² of total area and which produced 10.853 tonnes of trout (28% of the total national aquaculture production). 70% of the farming takes place in the Baltic Sea as the salinity of the water is low and fits trout farming very well.

Blue mussel production on long lines farming was introduced in 2006 and so far the volumes have not been very high. In 2011 the production was 541 tonnes, produced by 45 enterprises (2% of the total national aquaculture production) in an area of 4.028 m². Most of the production takes place in the Nordjylland and Midtjylland regions (North Sea, Skagerrak, Kattegat, Limfjord) as the salinity of the water is higher than in the Baltic Sea. In spite of still low volumes, mussel farming has good potential as environmentally friendly farming.

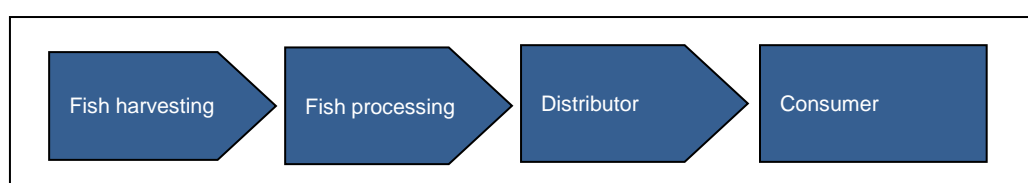
Value chain



Fish for human consumption

The Danish fisheries are regulated on the basis of 31 quota species distributed on 24 different quota waters for fishing. In total for 2011 there were 70 quotas of which 60 related to species intended for human consumption. The Danish fishery for human consumption consists of pelagic fish (mainly herring and mackerel) and demersal white fish (cod, hake, haddock, whiting, saithe), flatfish (sole, plaice, flounder), lobster and deep water prawns. The share of catches for human consumption is over 50% of the total catches. In terms of GVA generated by this MEA (excluding aquaculture), in 2010 the split between fishing and fish processing was 50:50 and employment in the fish processing reached 71% of the total employment in this MEA. In 2009 there were 123 enterprises in the Danish fish processing sector, of which 119 processed fish for human consumption. Denmark is a net exporter of fish (annual exports can reach up to 90%) with Germany, Norway and Italy among its largest customers. In 2011 the biggest shares of the total Danish export to the EU were for unprocessed fish (38% by volume and 35,4% by value) and preserved/canned fish (16,6% by volume and 25,7% by value).

Value chain

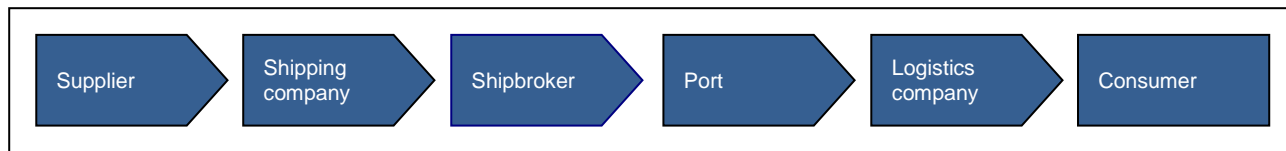


Short sea shipping (incl. Ro-Ro)

Denmark is one of the five largest shipping nations in the world based on owned and operated tonnage. Short-sea shipping plays an important role both in the country's economy and daily life. Denmark comprises 391 inhabited islands; for the smaller ones supplies by sea (including daily goods) are vital and subsidised by local communities. The most important ports are Aarhus, Esbjerg, Fredericia, Grenå and Hirtshals in Jutland, Fåbogr on Funen, Copenhagen and Kalundbord on Zealand and Rønne on Bornholm. The main types of goods shipped to national ports by national traffic are ferry goods (live stock and other provisions, consumer goods, equipment and other industrial supplies etc.), coal, mineral oil, crude oil, aggregates, lime and agricultural products. On the international level, the most transported are ferry

goods, crude oil and mineral oil. Major destinations are Sweden, Germany, Norway, United Kingdom and The Netherlands.

Value chain

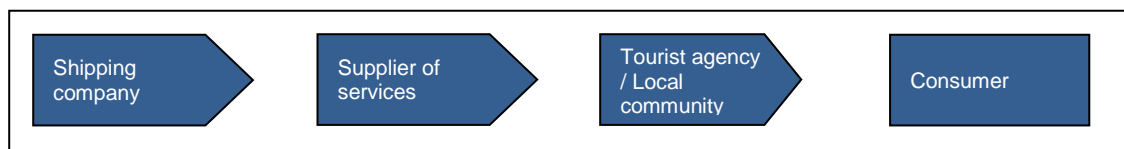


Passenger ferry services

Due to Denmark’s geographical location and shape, along with short-sea shipping, passenger ferry services are also a very important economic sector for the country. There are around 50 ferry routes in Denmark. In terms of passengers embarked/disembarked the main domestic routes are (1000 passengers, data 2012): Esbjerg-Fanø (1.636), Sjællands Odde–Aarhus (1.425), Branden–Fur (718), Sjællands Odde–Ebeltoft (613) and Tårs–Spodsbjerg (461).

The busiest routes, in general, are the short ones connecting smaller islands with bigger islands, bringing people to work and children to school. Domestic passenger ferry services can be divided into state-contracted (19%), community-contracted (36%) and commercial (45%), with percentages based on the total number of passengers on domestic routes in 2008. The state-contracted are longer routes between bigger islands (e.g. Rønne-Køge), while the local communities operate and subsidise shorter trips between smaller islands. Commercial routes cover both domestic and international destinations (1000 passengers, data 2012): Sweden (10.510), Germany (7.807), Norway (6.000), United Kingdom (87), Faroe Islands (55) and Poland (26).

Value chain

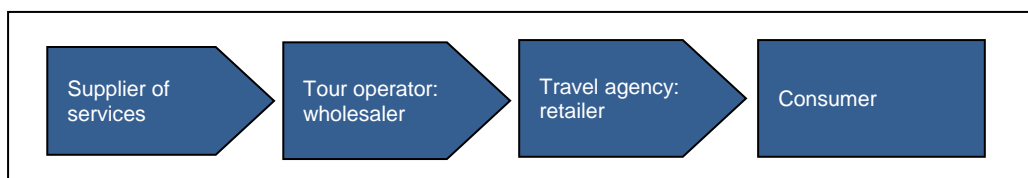


Coastal tourism

Since all of Denmark’s regions are coastal areas, all tourism in Denmark is coastal. In 2011 overnight stays of Danish and foreign tourists reached 43,6 million. In 2011 the number of collective tourist accommodation establishments was 1.119, which represents 0,25% of the total number of such establishments in the EU-22 coastal regions. There were 21.000 employees involved in the accommodation sector, which is 0,96% of the total EU-22 coastal regions. The split between Danish and foreign tourists in the same year was 50:50. Germans accounted for 37% of foreigners, Norwegians and Swedish tourists 5% and 3% respectively.

In terms of its structure, coastal tourism can be described as beach related activities, non-beach related activities and boating.

Value chain



5.2 Description of economic and infrastructural scenario

Offshore wind

Offshore wind turbines have huge potential in Denmark as the country is surrounded by the sea and because there is a limited number of locations available onshore. The sector is growing in Denmark. In spite of a small decline in 2009, the situation changed with the launch of the new offshore wind park Horns Rev 2 (209 MW) in 2010. In 2011 the growth in production was 25,2%. In October 2012 another new park, Rødsand II (270 MW), was launched bringing the total offshore capacity to 868 MW. In 2013, when the Anholt park (400 MW) is expected, the total installed offshore capacity will reach 1268 MW.

In February 2011 a new Energy Strategy 2050 was adopted. Following this strategy, by 2020 50% of the electricity consumption will come from wind power (compared to 28% today). This means that the current capacity will be expanded with 2000 MW of wind power before 2020. Of this, 1500 MW will come from offshore wind farms. It is already planned to open two big farms by 2020 – Horns Rev 3 (400MW), west of South Jutland in the North Sea, and Kriegers Flak (600MW), east of Zealand in the Baltic Sea, with Kriegers Flak becoming Denmark's most powerful installation.

Growth in the sector also presents good employment opportunities in terms of installation and servicing of offshore wind turbines. Likewise, the production of installation ships and equipment for establishing offshore wind farms is a market with growth potential for Denmark.

Main players: DONG Energy, E.ON and Vestas as the producer of wind turbines, Esvagt as offshore rescue and support vessel operator, Maersk Supply Service – installation of power cables, KEM-Offshore Aps – for administration and management of personnel and equipment for companies related to construction work at sea and for the offshore wind industry.

Marine aquaculture

Since 2008 Danish mariculture has made a considerable step forward, with a 7-fold increase in produced volumes. This is tied to the general trend of producing more species of high value. In the case of rainbow trout, not only the fish is exported but also eggs for hatcheries (e.g. to Japan). Employment in the sector within the period of 2008-2010 decreased by c.a. 17%. One of the reasons is that older traditional farms with low skilled labour are leaving the sector and more advanced farms are employing highly skilled workers with higher salaries. The labour efficiency (gross value added per full time employee) has increased by c.a. 42%.

So far marine cage farming is the only segment able to raise production between 2008 and 2010. This trend will continue since there is high potential in sea farming. Its development is supported by national strategies and substantially financed by both national and EU funds. Future sustainable growth will be driven by innovation, knowledge and technology as well as optimisation of the industry's raw materials base and improvement of the value added. The opportunities for marine farming are also in optimising location of the facilities in areas with good current conditions. Development of sea farming will also create very good circumstances for the aquaculture equipment sector.

Main players: Bisserup Havbrug, Karrebaek Havbrug, Aquapri A/S, HOC, Asnaes Fiskeopdraet A/S, Groensund Havbrug.

Fish for human consumption

The financial crisis affected the Danish fishing sector and as a result, during 2008-2010 fish landing volumes for human consumption dropped by 15%, while their value decreased by 11%. However, in the same period gross value added for the processing sector remained on the same level while employment dropped by 40%, as the general trends in the sector are: manufacturing of products with high added value; innovative and highly efficient processing technologies which demand fewer, but better skilled, employees; general high production costs in Denmark, limited availability of labour force due to the size of the country and outsourcing of production (e.g. Lithuania, Poland, Germany).

Yet, since 2011 positive dynamics can be observed: volumes increased by 4% reaching 173.221 thousand tonnes and the value rose by 19% reaching 1,85 billion Danish kroner (ca. EUR 248,7 million). Preliminary statistics for 2012 show that this growth is maintained and that the sector continues to be a substantial contributor to the national value added. Furthermore, the Danish fish processing sector, which on average generates EUR 272 million in GVA per year, is developing in terms of advanced technologies, sustainability and high value-added products. The Integrated Maritime Policy 2010-2013 together with the Operational Programme for the Development of Danish Fisheries and Aquaculture Sectors 2007-2013 highlight the importance of the sector and its further development. At the national level, strong efforts are being made to improve the efficiency of the fishing fleet and the sustainability of the fisheries, to ensure the effectiveness of port infrastructure and to support the development of the fish processing industry in both environmentally and economically sustainable directions, through innovative activities and investments in technology and product development, as well as market development.

There are no main players in the fishing sector as the majority of Danish fishing companies own one vessel only, while Amanda Seafood A/S, Espersen A/S, Royal Greenland A/S, Uhrenholt A/S, Larsen Danish Seafood A/S are among main players in the fish processing sector.

Short-sea shipping (incl. Ro-Ro)

In spite of a 15% drop in gross weight of transported goods in 2009, caused by the financial crisis, between 2010-2011 the situation improved. Total gross weight in 2011 grew by 4% compared to 2009 and reached 67.748 thousand tonnes. In the same period transportation of liquid bulk goods increased by 16% and the tonnage of goods transported by Ro-Ro vessels grew by 8%. Growth of the goods throughput in major Danish ports is as follows: Århus (10%), Åbenrå (34%), Copenhagen (14%) and Rønne (16%) among others. Throughput of goods in international traffic in major Danish ports in 2011 increased by 2% compared to 2009. Major destinations with increased gross weight of goods were Estonia (6%), Germany (9%), UK (37%), Poland (47%), The Netherlands (49%) and Belgium (64%). Short-sea shipping in Denmark has good potential for growth due to increasing of trade with the Baltic States and Poland, growth of the offshore energy sector and the increase of agricultural products export.

Main players: DFDS, Color Line, Stena, Skandline

Passenger ferry services

Between 2008-2011 the number of passengers on domestic ferry routes dropped by 6% and totalled 9.348 thousand passengers embarked/disembarked in 2011. At the same time international ferry traffic experienced a 15% drop (22.395 thousand passengers embarked/disembarked in 2011). A major share of this drop belongs to the Elsinor-Helsingborg route. Due to the short distance between Sweden and Denmark and the higher wages in Denmark a lot of Swedes have been working in Denmark while still living in Sweden. With the financial crisis and not very good situation in the Danish labour market the number of Swedish commuters dropped by 25% (3.319 thousand passengers). Another reason is that international tourism has been decreasing and due to the financial crisis people do not travel abroad as much as they used to. Despite the drop in the number of passengers, gross value added in the period of 2008-2010 increased by 37% and this trend continues in 2011.

It is expected that opening a fixed link between Rødby – Puttgarden (Fehmarn belt) by 2021 will bring a decrease of passengers, however the ferry route will not be completely closed. On the other hand the popularity of the other route to Germany, Gedser-Rostock has been growing over the past years and this trend will continue in the future. Besides, new ferry routes have been opened in recent years both domestic (e.g. Sjællands Odde - Aarhus) and international (e.g. Hirtshals – Larvik, Hirtshals – Stavanger – Bergen) and the number of passengers on these routes keeps growing.

Yet, at the end of 2012 – beginning of 2013 an increase in the total number of passengers can be observed and several growth drivers can be pointed to. First of all, the sector is investing into building new faster ferries for long distance routes (trips over 1 hour) as well as into environmentally friendly small ferries operating on short routes (ca. 15 minutes). Another factor is the strong price competition between ferry

lines and the bridges over the Great Belt and Oresund (and Fehmarn belt in the future). In addition, the tourism sector is growing in Denmark giving a good opportunity for growth in passenger ferry services.

An overall favouring factor for passenger ferries is that compared to other means of transportation ferry routes are the easiest to establish when needed as the infrastructure is already there.

Main players: DFDS, Color Line, Stena, Skandline, HH Ferries

Coastal tourism

Due to the global financial crisis, coastal tourism in Denmark experienced a decline. Within the period of 2008-2010 employment in the sector fell by roughly 5%. The number of overnight stays by foreign tourists went down but was at some point compensated by the increase of overnight stays by Danish tourists. However, starting in 2010 the sector began to recover, showing a 10% increase in employment, a 9% increase in overnight stays and an 8% increase in the number of hotels. Coastal tourism remains a very important economic sector for Denmark and there are massive efforts both on national and on regional levels to boost this industry. A strategic plan for the development of the coastal tourism is in place and "Visit Denmark", an organisation promoting Denmark as tourist destination, is active and visible. The potential for growth is seen through development of new tourist themes, based on national and regional strongholds, innovation in tourism, increase of transport capacity, new branding architecture, development of competences and skills among others.

Main players: VisitNordjylland, Midtjysk Turisme, Syddansk Turisme, Østdansk Turisme, Wonderful Copenhagen, Destination Bornholm.

5.3 Regulatory environment of the maritime economic activities

Offshore wind

- Law about promotion of renewable energy: <https://www.retsinformation.dk/Forms/R0710.aspx?id=122961>. The purpose of this law is to promote the production of energy using renewable sources in accordance with climatic, environmental and socio-economic factors in order to reduce dependence on fossil fuels, secure the supply and reduce emissions of CO₂ and other greenhouse gases.

Marine aquaculture

- Fisheries law: <https://www.retsinformation.dk/Forms/r0710.aspx?id=121218>. (See Fish for human consumption)
- Order on establishment and operation of mariculture: <https://www.retsinformation.dk/Forms/R0710.aspx?id=77045>
- Green Growth Agreement: http://www.fvm.dk/Files/Filer/Publikationer/Grn_Vkst-aftale_final.pdf

Fish for human consumption

- Fisheries law: <https://www.retsinformation.dk/Forms/r0710.aspx?id=121218>. The purpose of the law is to ensure, through management, the protection and rehabilitation of the living resources of salt and fresh water and the protection of other animals and plants, to ensure a sustainable basis for commercial fishing and related industries and provision of recreational fishing. The law applies to fishing in saltwater and freshwater, as well as to farming.
- Food act: <https://www.retsinformation.dk/Forms/R0710.aspx?id=145361>
- Port Law: <https://www.retsinformation.dk/Forms/R0710.aspx?id=141663> (See Short-sea shipping)

Short -sea shipping (incl. Ro-Ro)

- Port Law: <https://www.retsinformation.dk/Forms/R0710.aspx?id=141663>. Applies to the ports used for commercial handling of goods, vehicles, people and fish landings; sets the rules to implement or apply international conventions and EU regulations, directives and decisions about protection of port areas.
- DIS Law: <https://www.retsinformation.dk/Forms/r0710.aspx?id=84441>. The law about Danish International Ships Register sets rules and conditions under which internationally operating ships can fly Danish flag.
- Danish Merchant Marine Act: <http://www.dma.dk/SiteCollectionDocuments/Legislation/Acts/2010/LBK-856-01072010-s%C3%B8loven.pdf>. Establishes rules under which a ship can be considered Danish and fly Danish flag. The Act also concerns social security and protects employed seafarers.
- Danish Seamen's Act: <http://www.dma.dk/SiteCollectionDocuments/Legislation/Acts/2005/LBK742-18072005-s%C3%B8mandsloven-%C3%A6ndret%20547-08062006-1563-20122006-349-18042007-511-17062008-493-12052010.pdf>. Establishes rights and duties of the seamen.
- Ferry Law: <https://www.retsinformation.dk/Forms/r0710.aspx?id=121290>. Ensures efficient satisfaction of the society's needs for ferry services.

Passenger ferry services

- Port Law: <https://www.retsinformation.dk/Forms/R0710.aspx?id=141663> (See Short-sea shipping)
- DIS Law: <https://www.retsinformation.dk/Forms/r0710.aspx?id=84441>. (See Short-sea shipping)
- Danish Merchant Marine Act: <http://www.dma.dk/SiteCollectionDocuments/Legislation/Acts/2010/LBK-856-01072010-s%C3%B8loven.pdf>. (See Short-sea shipping)
- Danish Seamen's Act: <http://www.dma.dk/SiteCollectionDocuments/Legislation/Acts/2005/LBK742-18072005-s%C3%B8mandsloven-%C3%A6ndret%20547-08062006-1563-20122006-349-18042007-511-17062008-493-12052010.pdf>. Establishes rights and duties of the seamen.
- Ferry Law: <https://www.retsinformation.dk/Forms/r0710.aspx?id=121290>. Ensures efficient satisfaction of the society's needs for ferry services.

Coastal tourism

- Law about Visitdenmark: <https://www.retsinformation.dk/Forms/r0710.aspx?id=132200>. The law establishes Visitdenmark as Denmark's national tourism organisation for promotion of Denmark as a tourist destination, thus contributing to economic growth in the Danish tourism industry.

6. Growth drivers and barriers to growth for the 6 most promising marine and maritime economic activities

Table 10 - Strengths and weaknesses analysis of most promising maritime economic activities

Offshore wind

(Benchmark instance: Denmark)

	Drivers for Growth		Barriers for Growth	
	from SWOT analysis	from Benchmark analysis	from SWOT analysis	from Benchmark analysis
Maritime research	Danish knowledge institutes rank highest internationally in terms of the number of publications on offshore wind.			
Development and innovation	Denmark is the country with the longest experience in the offshore wind energy		Innovations are needed to adjust the vessels for operation in deep waters.	

	sector. Offshore Renewables Centre (LORC) is the official Danish national competence and innovation centre for the Danish offshore industry.			
Access to finance	Fixed feed-in tariff, guaranteeing a fixed price of the local retail price. Refund from energy taxes. Pension funds to invest in wind energies and turbines.		Resource mobilisation (availability of financial resources of competencies and expertise) is moderate. Increased levels of investments will be necessary for new wind farms and incentives for technology development (through R&D and demonstration), grid improvements and integration. Lack of investors to invest in future wind turbines with larger capacity and larger wind power plants.	
Smart infrastructure	Varying electricity production of wind turbines (cross-border connections from Denmark to Norway, Sweden and Germany). Smart Grid-Intelligent energy system (in development).			
Maritime clusters	Energiklyngecentre Sjælland (Energy Cluster Centre Zealand), Offshore Centre Denmark		Development of clusters around the ports should be necessary.	
Education, needs in training and skills	Highly skilled blue-collar sector. Denmark is world leader in academic and polytechnic training programs, relevant for the offshore wind field. Danish Offshore Renewables Centre (LORC) has facilities for educating people dealing with offshore wind. LORC has developed a knowledge centre to distribute information on offshore turbines and new technologies. Offshore wind is an attractive, well-paid field.		Lack of certain engineers/competencies. Market formation processes are very weak, almost non-existent in Denmark. Denmark expects a generation gap when current professionals will have to retire, and there will be either too few new experts, or they will have little practical experience.	
Maritime spatial planning			No specific legislation for offshore wind. Conflict of interests between environmental protection, industrial and service sectors. The Danish Government has created a Committee for Future Offshore Wind Turbine Locations, which identifies the most suitable areas for offshore wind farms. The Danish Energy Agency (involving other relevant authorities such as the Danish Nature Agency) is the authority responsible for the planning and erection of offshore wind turbines.	
Integrated local development	Local cooperatives have emerged to take an important place in the			

	generation of offshore wind.			
Public engagement	Municipalities play a key role in planning and public engagement.			

Marine aquaculture

(Benchmark instance: Greece)

	Drivers for Growth		Barriers for Growth	
	from SWOT analysis	from Benchmark analysis	from SWOT analysis	from Benchmark analysis
Maritime research	SME's participation in EU-funded research programmes.	DTU Aqua (National Institute of Aquatic Resources) is national competence centre. Significant number of research programmes focused on aquaculture.	Insufficient communication between research and farmers.	
Development and innovation	Leading position in fish feed production. Innovative equipment sector, especially in recirculation technologies.		Slow development. Strict environmental rules.	
Access to finance	Funding available through EFF on par with Danish public aid		Limited private financing. Difficult access to credit and loans.	
Smart infrastructure		High level of ICT. Advanced recirculation aquaculture sector. Good access roads.	Difficult access to finance	
Maritime clusters	Well-established and developed associations as a good pre-condition for the maritime cluster			No clusters related to marine aquaculture
Education, needs in training and skills	Good standards for education on academic level		Rather low level of basic education	
Maritime spatial planning	The Danish Nature Agency under the Ministry of Environment is responsible for spatial planning. Legislation on spatial planning is in place.		Conflict of interests between environmental protection, industrial and service sectors. Image problems with regard to environmental issues.	No clear line regarding the integration of aquaculture in maritime spatial planning
Integrated local development	Generally good communication between aquaculture sector, trade and consumer organisations, retailers, tourism sector, as well as general public.		Difficult communication between local authorities and farmers	
Public engagement	Danish Export Association, Danish Aquaculture Association, Danish Mussel Farming Association among others are strong advocates.	Broad involvement of the Danish AgriFish Agency and the Danish Nature Agency. Industry recognised as strategic sector.		Red tape

Fish for human consumption

(Benchmark instance: The Shetland Islands)

	Drivers for Growth		Barriers for Growth	
	from SWOT analysis	from Benchmark analysis	from SWOT analysis	from Benchmark analysis
Maritime research	SME's participation in EU-funded research programmes.	Long tradition and high level of maritime research. DTU Aqua (National Institute of Aquatic Resources) is national competence centre. In the fishing sector research activities are focused on technologies and management; in the post-harvest sector in product	Insufficient communication between research and industry	

		safety and technology.		
Development and innovation	Traditionally not very high level of development and innovation in the fishing sector, however very innovative post-harvest sector in terms of equipment and product development.		Danish consumers are very conservative in their diet, so product development and innovation for the domestic market is somewhat limited.	
Access to finance	Funding available through EFF on par with Danish public aid. Financing for fishing and fish processing sectors is available.		Limited private financing. Difficult access to credit and loans.	
Smart infrastructure		High level of ICT. Generally good port facilities. Good logistics infrastructure.	Difficult access to finance	
Maritime clusters	Well-established and developed associations as a good pre-condition for the maritime cluster on the national level.		No clusters related to fish for human consumption on the national level.	
Education, needs in training and skills	Good standards for education on academic level; training courses and programmes available for both fishing and processing sectors.		Rather low level of basic education for both fishing and processing sectors. No training available in sales sector.	
Maritime spatial planning	The Danish Nature Agency under the Ministry of Environment is responsible for spatial planning. Legislation on spatial planning is in place.		Conflict of interests between environmental protection, industrial and service sectors	
Integrated local development	Good cooperation between fishermen, ports, research institutions, trade and consumer organisations, the retail sector, as well as the general public.			The aquaculture sector is better financially supported than capture fisheries.
Public engagement		Broad involvement of the Danish AgriFish Agency and the Danish Nature Agency. The Danish Export Association, the Danish Fishermen's Association and the Danish Seafood Association are strong advocates.		

Short-sea shipping (incl. Ro-Ro)

(Benchmark instance: The Netherlands)

	Drivers for Growth		Barriers for Growth	
	from SWOT analysis	from Benchmark analysis	from SWOT analysis	from Benchmark analysis
Maritime research		Extensive involvement and experience in maritime research. Universities, R&D institutions, centres and initiative groups involved in maritime research.		Reduced funding due to the economic crisis
Development and innovation		Innovation is promoted through a multitude of means.	Strong competition from Asian market	
Access to finance	Generally good availability of funds			Somewhat difficult access to loans and shipbuilding credits
Smart infrastructure		Well-developed general infrastructures (energy, telecommunications, etc.). Modern operating environment. Advanced transportation and logistics concepts.		High cost of infrastructure maintenance

Maritime clusters		Two well-developed maritime clusters with high quality products and services	Access to financing is difficult	
Education, needs in training and skills		Academically strong education system and wide range of relevant skills. Wide range of maritime schools and colleges, as well as Svendborg International Maritime Academy are offering short and long term education.		Lack of public awareness about the good education and career opportunities leads to problems with attracting a sufficient number of participants. High cost of salaries and social security contributions.
Maritime spatial planning		The European integrated policy concept has been incorporated in policy.		Conflicting policy goals
Integrated local development		Long tradition in integrated policies. Good cooperation on regional and municipal levels.		Reduced public funding
Public engagement	Danish Maritime Authority under the Ministry of Business and Growth with responsibility for operations, safety, employment and policy issues among others.	Modern and non-intrusive		Budgetary restrictions

Passenger ferry services

(Benchmark Instance: Greece)

	Drivers for Growth		Barriers for Growth	
	from SWOT analysis	from Benchmark analysis	from SWOT analysis	from Benchmark analysis
Maritime research		Extensive involvement and experience in maritime research. Universities, R&D institutions, centres and initiative groups involved in maritime research.		Reduced funding due to the economic crisis
Development and innovation		Innovation is promoted through a multitude of means.	Growing competition from Central and Eastern Europe	
Access to finance	Generally good availability of funds. Financial support through the Danish Ministry of Transportation. For smaller islands passenger ferry services are subsidised by local communities.			Difficult access to financing and loans. Limited availability of funds in the local communities.
Smart infrastructure		Well-developed general infrastructures (energy, telecommunications, etc.). Modern operating environment.		High cost of infrastructure maintenance
Maritime clusters	Two well-developed maritime clusters		Access to financing is difficult	
Education, needs in training and skills		Academically strong education system and wide range of relevant skills. Wide range of maritime schools and colleges, as well as Svendborg International Maritime Academy are offering short and long term education.	Lack of public awareness about good education and career opportunities leads to problems with attracting sufficient number of entrants. High cost of salaries and social security contributions.	
Maritime spatial planning		The European integrated policy concept has been incorporated in policy.		Conflict of interests
Integrated local development	Long tradition in integrated policies. Good cooperation on regional and municipal levels.		Lack of public transportation at some destinations	
Public		Danish Ministry of		Budgetary restrictions

engagement		Transportation responsible for planning and monitoring. Danish Maritime Authority under the Ministry of Business and Growth with responsibility for operations, safety, employment and policy issues among others.		
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Coastal tourism

(Benchmark instance: Sardinia)

	Drivers for Growth		Barriers for Growth	
	from SWOT analysis	from Benchmark analysis	from SWOT analysis	from Benchmark analysis
Maritime research				No maritime research linked to coastal tourism
Development and innovation		Environmental support policies; business support policies. Denmark's New Tourism Strategy fosters development and innovation in coastal tourism.	Level of innovation is not very high	
Access to finance		Good public funding. Co-funding from the private sector.	Funding from private sector has been decreasing due to the financial crisis.	
Smart infrastructure		Good overall level of country infrastructure - roads, railway, airports and seaways. Good general infrastructures (energy, telecommunications, etc.).	Airports account primarily for outbound tourism.	Public transportation to the coastal destinations is poorly developed. Motorways do not directly serve holidays destinations.
Maritime clusters			No clusters related to coastal tourism	
Education, needs in training and skills		Good standard of education at a national level. Universities, business academies and schools provide both short and long term education.	Insufficient level of employees' education in remote coastal areas in terms of hosting, language, IT and financial skills.	
Maritime spatial planning		The Danish Nature Agency is responsible for spatial planning. At least four laws/acts cover spatial planning.	Conflict between economic interests	
Integrated local development		Generally good level of coastal area development	Many of the SMEs are family-run, mainly concentrating on their daily tasks - too locally oriented and self-centred	High environmental pressure in some areas
Public engagement		Visit Denmark promotes Denmark as a tourist destination and is publicly funded. Similar organisations in each region promote their regions. Conservation groups, universities and consultants are frequently involved in projects related to tourism.	Regional media are used relatively little to keep the public informed	

7. List of existing clusters

In April 2013 the Ministry of Science, Innovation and Higher Education adopted the Strategy for Denmark's Cluster Policy. The overall objective of the strategy is for cluster establishment and cluster development to promote enterprise competitiveness, export growth, investment promotion, employment and productivity

in Danish businesses, via innovation, innovative solutions to society's problems and research and competence development.

There are cluster organisations located in every part of Denmark. The Danish regions are working on second-generation development strategies, focusing on growth and job creation through the use of cluster organisations. The regions are giving priority to the most significant regional clusters, many of which have main activities that go beyond the regional borders. Every year, more than 6.000 Danish enterprises participate in activities launched by local, regional or national cluster and network organisations. More than 80% are small and medium-size enterprises.

There are around 75 clusters in Denmark, five of which are analysed at both national and regional level.

NATIONAL LEVEL

Det Blå Danmark (The Blue Denmark) consists of a number of companies that deal directly or indirectly with shipping and shipping-related activities. There are around 80.000 people employed with The Blue Denmark, which is 2,8% of the total employment in Denmark. The Blue Denmark's gross value added corresponds to ca. 7,5% of the total GVA for Denmark and the production value is up to 10% of the total production in Denmark. Export of the Blue Denmark's production amounts to 70%. The sectors with the largest levels of employment in the cluster are "Maritime equipment" and "Supporting businesses related to transportation" both taking a quarter of the total employment in The Blue Denmark. The Government published the Growth Plan for the Blue Denmark in December 2012, outlining that Denmark shall become Europe's maritime centre, that green solutions are the future of The Blue Denmark and that the growth of the cluster shall be supported by strong Danish competences.

Europas Maritime Udviklingscenter (Maritime Development Centre of Europe) is a member of the European Network of Maritime Clusters and a professional group actively promoting development in the maritime industry and ensuring a good level of knowledge exchange across the industry. There are over 130 members of the cluster representing ship-owners and operators, shipyards and equipment manufacturers, ports, research and educational institutions, public authorities, service and consultancy firms, finance and insurance companies, maritime communications and media, among others.

Offshore Centre Denmark (Offshoreenergy.dk) is Denmark's national knowledge and innovation network for the offshore sector. The cluster is a member-based non-profit organisation with the overall purpose of gathering the offshore sector's players, strengthening the sector and collaborating on the challenges of the future through a joint effort. Through development projects and networking initiatives, Offshoreenergy.dk ensures that exchange of knowledge and experience between companies takes place so it can reinforce and make visible their competences. The cluster includes more than 275 members that represent all parts of the supply chain in the offshore sector from consultancy, design, production, installation, surveillance and maintenance to relevant public authorities and educational establishments. Offshore Centre Denmark is divided into 2 divisions of equal importance: Oil & Gas and Renewables. Core activities of the cluster include: facilitation of networking activities between businesses, and between businesses and universities, management of technical and industry-wide development projects, knowledge sharing activities including conferences, B2B events and promotion of the Danish offshore sector from an international perspective and funding facilitation.

REGIONAL LEVEL

Energiklyngecenter Sjælland (Energy Cluster Zealand) is a professional organisation whose members are the 17 municipalities of Region Sjælland. The region has signed the European "Covenant of Mayors", according to which the municipalities pledge to reduce CO₂ emission by at least 20% by 2020. The work of the cluster is aimed at helping the members and Region Sjælland create green growth and business missions, ensure knowledge and experience exchange, increase CO₂ savings and foster synergy and interdisciplinary cooperation.

Konsumfisk (Edible Fish) is a collaboration between three ports in the west coast of Denmark's regions Midtjylland – Thyborøn, Thorsminde and Hvide Sande, aiming at promoting fresh fish as well as the

development of the fish consumption sector. Cluster activities are focused on business development and marketing along with promotion of high quality at every link of the value chain. The cluster has 7 members and over 1.000 people employed, which is substantial for the West Coast. The core businesses in Konsumfisk are Thyborøn Harbour, Hvide Sande Harbour, Thorsminde Harbour, Thyborøn Harbour Fishermen's Association, Southwest Jutland Fishermen's Association, Fishermen's Future A/S - Hvide Sande and Danske Fiskeauktioner A/S (Danish Fish Auctions). The two fishermen's associations together represent over 400 commercial fishermen and have branches at each harbour; Danske Fiskeauktioner A/S helps to bind the three harbours together. Apart from the core businesses, the three harbours' service companies and buyers are important players in each harbour.

Table 11 - List and analysis of clusters

Cluster	Member State(s)	MEAs covered	Status	Strengths	Weaknesses
NATIONAL					
Det Blå Danmark (The Blue Denmark)	Denmark	Deep-sea shipping Short-sea shipping	Mature	Maritime cluster with leading international companies and a good network between authorities, business and manufacturers. Strong export-oriented economic activities. Strong members.	Difficult access to financing and capital. Limited research and development and cooperation across research.
Europas Maritime Udviklingscenter (Maritime Development Centre of Europe) http://www.maritimecenter.dk/	Denmark EU	Deep sea shipping Short-sea shipping Offshore oil and gas Offshore wind	Mature	Well-established, interacts with maritime clusters in the EU (Member of European Network of Maritime Clusters) Strong members	Competition between members of the cluster (which can also be beneficial)
Offshore Centre Danmark http://www.offshoreenergy.dk/ The official national knowledge centre and innovation network for the Danish offshore industry	Denmark	Offshore wind Blue energy Offshore oil and gas	Mature	Well established on the national level Professional fundraising organisation Strong members	Competition between members of the cluster
REGIONAL					
Energiklyngecenter Sjælland (Energy Cluster Centre Zealand) http://www.energiklyngecenter.dk/en/index.html Commercial association with 14 municipalities as members	Region Sjælland (Baltic Sea)	Offshore wind	Mature	Well established on the regional level Strong members	Difficult access to financing and capital
Konsumfisk (Edible Fish) www.konsumfisk.dk	Mittdjylland (North Sea)	Fish for human consumption	Mature	Present venture capital, good use of public system, swift communication in the value chain, development-oriented, advanced technologies, own consultants	Poor self-marketing, fringe area challenge, not enough focus on fishermen, difficulties in attracting knowledge

8. Analysis of maritime strategies at regional and national level, as well as those under preparation and their links with Smart Specialisation Strategies

Maritime Strategies

The **Integrated Maritime Strategy (2010-2013)**, adopted in 2010 by the Danish Government, contributes to support Fish for human consumption, Offshore wind, Short sea shipping, Passenger ferry services and Coastal tourism MEAs.

Fish for human consumption and Marine aquaculture are supported by the **Operational Programme for the Development of the Danish Fisheries and Aquaculture Sectors (2007-2013)**, adopted in 2007.

Offshore wind is supported by the **Energy Strategy 2050 – from coal, oil and gas to green energy (2011-2050)**, adopted by the Danish Government in 2011, which sets targets to make Denmark independent of fossil fuels by 2050.

Denmark's **New Tourism Strategy (2009-2015)**, adopted in 2008 and which has for main objective the development of a competitive tourism sector through innovations, naturally supports the Coastal tourism MEA.

The **Action Plan "Denmark at Work. Plan for Growth in the Blue Denmark"**, adopted by the Danish Government in 2012, is to create the foundation for utilising the potentials for growth and employment within Short-sea shipping, Passenger ferry services and Offshore wind sectors.

Table 12. Policies/interventions towards maritime economic activities, their objectives and links to the most relevant and promising maritime economic activities (see Table 13 for links between most relevant and promising maritime economic activities and blue growth focus areas and objectives)

Level	Strategies	Objectives	Most relevant and promising maritime economic activities
National	Operational programme for the Development of the Danish Fisheries and Aquaculture Sectors (2007-2013)	Create opportunities for low cost and high value-added products in the context of sustainable fisheries. Cooperation in value chain for market information, customer requirements and product development increase with regard to what Danish fisheries sector can deliver, and what the customers want. Ensure that fisheries and aquaculture sectors' impact on the environment is minimised within the framework of overall societal priorities.	Fish for human consumption
			Marine aquaculture
National	Energy Strategy 2050 – from coal, oil and gas to green energy (2011-2050)	Make Denmark independent from fossil fuels by 2050. In the period up to 2020, reduce by 33% (compared to 2009) the use of fossil fuels and increase the use of renewable energy by 33%	Offshore wind
National	An Integrated Maritime Strategy (2010-2013)	Excellent growth potential for the maritime industries. Reduced greenhouse gas emissions and air pollution. Protection of the marine environment and the coastal zone. Enhanced safety at sea. Coordination of initiatives in the maritime field	Fish for human consumption
			Offshore wind
			Coastal tourism
			Short-sea shipping (incl. Ro-Ro)
National	Denmark's New Tourism (2009-2015)	Innovation in value chains. Framework conditions for innovation. Innovation in marketing/branding.	Passenger ferry services
National	Action Plan "Denmark at Work. Plan for Growth in the Blue Denmark" (2012-	Denmark should be the maritime centre of Europe. Green solutions are the future for the Blue Denmark. Growth in the maritime cluster should be supported by strong Danish competences	Short-sea shipping Passenger ferry services Offshore wind

Table 13 – Most relevant and promising maritime economic activities and ties to blue growth focus areas (top) / Blue growth focus areas and objectives

Most relevant and promising maritime economic activities	Blue growth focus area
Short-sea shipping (incl. Ro-Ro)	Maritime, coastal and cruise tourism
Passenger ferry services	Maritime, coastal and cruise tourism
Fish for human consumption	Blue technology

	Maritime, coastal and cruise tourism
Marine aquaculture	Aquaculture
	Blue technology
Offshore wind	Blue energy
	Blue technology
Coastal tourism	Maritime, coastal and cruise tourism
Blue growth objectives	
Blue energy:	Enhance the efficiency of harvesting the European energy resources Minimise land-use requirements of the power sector Reduce the European greenhouse gas emissions
Aquaculture:	Contribution to an overall improvement in human diet and more quality merchandise Diversification of coastal communities activities Preservation of fish stock sustainable aquaculture Promote aquaculture based on binding strategic guideline, multiannual national strategic plans and the exchange of best practices
Maritime, coastal and cruise tourism:	Healthy environment Increase the growth potential of activities Increase the attractiveness of coastal areas
Marine and mineral resources:	Advances in technology Security of supply
Blue technology:	Provider of mass-market products High added value specialised products

Smart Specialisation Strategies

Denmark already has sub-elements that meet the preliminary conditions concerning smart specialisation. Among others, these elements are found in the growth forums, the regional growth and development strategies, the national innovation strategy and the recommendations of growth teams. The cluster strategy also contributes to supporting smart specialisation.

Two out of five Danish regions - Midtjylland and Nordjylland - are registered in the S3 platform, thus recognising its high potential. According to the Danish Business Authority there is a plan to arrange for a workshop (no timeline given yet) concerned with the development of Smart Specialisation Strategies for Denmark by April 2014.

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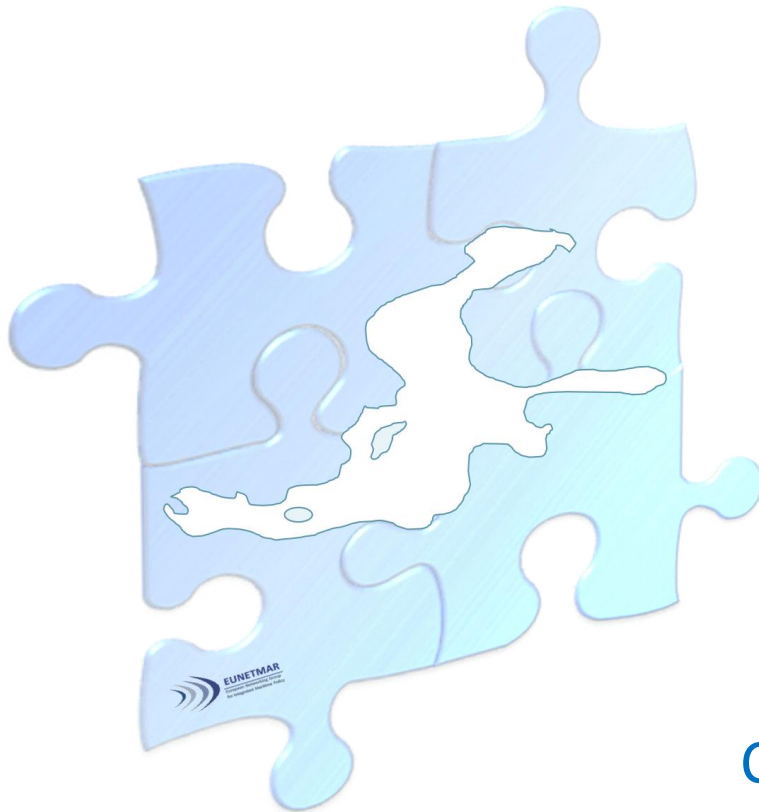
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STUDY ON BLUE GROWTH, MARITIME POLICY AND EU STRATEGY FOR THE BALTIC SEA REGION



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DENMARK

DECEMBER 2013

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1. Selection of the most important regions

Table 5 - Definition of the maritime economic dimension for coastal NUTS 2

	Water transport (number of persons employed) <i>1000 persons</i>	Coastal tourism (bed places in coastal NUTS 3) <i>units</i>	Fishing (Gross Tonnage)	Aquaculture (GVA)
Hovedstaten	186	72.312	5.911,10	0
Sjælland	28	49.657	2.245,18	6.709

Syddanmark	95	124.352	9.330,67	1.335
Midtjylland	59	78.645	27.176,07	1.788
Nordjylland	56	82.688	22.333,25	0
TOTAL	424	407.654	66.996,27	9.832

Table 6 - Ranking order of coastal NUTS 2

	Water transport	Coastal tourism	Fishing	Aquaculture	TOTAL
Nordjylland	1,32	2,03	3,33	0	6,68
Hovedstaden	4,39	1,77	0,88	0	7,04
Syddanmark	2,24	3,05	1,39	1,36	8,04
Sjælland	0,66	1,22	0,34	6,82	9,04
Midtjylland	1,39	1,93	4,06	1,82	9,20

Note: Score is assigned dividing each regional value by the national total (also including landlocked regions) * 10

2. 7 Largest maritime economic activities: indicative size of all activities

Maritime economic activity		GVA (EUR, billion)	Employment (*1000)	Score	Source & Reference year
0. Other sectors					
0.1	Shipbuilding (excl. leisure boats) and ship repair	0,21	3,58	2,84	Eurostat (2010)
0.2	Water projects	0	0	0	Eurostat (2010)
1. Maritime transport					
1.1	Deep-sea shipping	0,27	1,01	1,86	Eurostat (2010) Danmarks Statistik (2010)
1.2	Short-sea shipping (incl. Ro-Ro)	2,72	10,19	18,7	Eurostat (2010) Danmarks Statistik (2010)
1.3	Passenger ferry services	0,87	3,27	5,99	Eurostat (2010) Danmarks Statistik (2010)
1.4	Inland waterway transport	0	0	0	Eurostat (2010) Statistics in Focus (2012)
2. Food, nutrition, health and ecosystem services					
2.1	Fish for human consumption	0,76	10,84	9,23	Eurostat (2010). NACE 47.11 is confidential. Fishing is between 8-22% in other Baltic countries, so an estimated share of 15% was used for Denmark.
2.2	Fish for animal feeding	0,12	1,71	1,46	Eurostat (2010)
2.3	Marine aquaculture	0,01	0,19	0,15	The Economic Performance of the EU Aquaculture Sector – 2012 exercise (STECF-13-03)
2.4	Blue biotechnology	0	0	0	
2.5	Agriculture on saline soils	0	0	0	Joint Research Centre, European Soil Format (2013)
3. Energy and raw materials					
3.1	Offshore oil and gas	6,10	2,66	31,83	Eurostat (2010)
3.2	Offshore wind	0,07	0,33	0,52	Eurostat (2010)
3.3	Ocean renewable energy	0	0	0	Energistyrelsen (2012)
3.4	Carbon capture and storage	0	0	0	Energistyrelsen (2012)
3.5	Aggregates mining (sand, gravel, etc.)	0,01	0,10	0,10	Eurostat (2010)
3.6	Marine minerals mining	0	0	0	Energistyrelsen (2011)
3.7	Securing fresh water supply (desalination)	0	0	0	Ministry of Environment (2005)
4. Leisure, working and living					

4.1	Coastal tourism	0,69	19,46	13,18	Eurostat (2010)
4.2	Yachting and marinas	0,016	0,225	0,19	Eurostat (2010)
4.3	Cruise tourism	0,31	1,15	2,13	Eurostat (2010)
5. Coastal protection					
5.1 – 5.2	Coastal protection	0,015	0,07	0,11	Eurostat (2010)
5.3	Protection of habitats	0,29	1,35	2,13	Eurostat (2010) Danmarks Statistik (2010) Employment taken from Danmarks Statistik for Environment. Per cent calculated based on Eurostat data for total environment vs. protection of biodiversity
6. Maritime monitoring and surveillance					
6.1	Traceability and security of goods supply chains	0,0103	0,26	0,18	Danmarks Statistik (2010)
6.2	Prevent and protect against illegal movement of people and goods	0,0154	0,39	0,27	Danmarks Statistik (2010)
6.3	Environmental monitoring	0,11	0,51	0,81	Danmarks Statistik (2010)

3. 7 Fastest growing maritime economic activities: relative growth of all activities

Maritime economic activity		GVA (CAGR, %)	Employment (CAGR, %)	Score	Source & Reference year
0. Other sectors					
0.1	Shipbuilding (excl. leisure boats) and ship repair	-10,94	-13,04	-11,99	Eurostat (2010)
0.2	Water projects	N/A	N/A	N/A	Eurostat (2010)
1. Maritime transport					
1.1	Deep-sea shipping	0,84	-22,62	-10,89	Eurostat (2010) Danmarks Statistik (2010)
1.2	Short-sea shipping (incl. Ro-Ro)	5,06 ⁴	-0,73	2,17	Eurostat (2010) Danmarks Statistik (2011)
1.3	Passenger ferry services	16,78	-10,39	3,19	Eurostat (2010) Danmarks Statistik (2010)
1.4	Inland waterway transport	N/A	N/A	N/A	Eurostat (2010) Statistics in Focus (2012)
2. Food, nutrition, health and ecosystem services					
2.1	Fish for human consumption	2,12	-8,67	-3,28	Eurostat (2010)
2.2	Fish for animal feeding	22,38	7,52	14,95	Eurostat (2010)
2.3	Marine aquaculture	39,28	-11,93	13,68	The Economic Performance of the EU Aquaculture Sector – 2012 exercise (STECF-13-03)
2.4	Blue biotechnology	N/A	N/A	N/A	
2.5	Agriculture on saline soils	N/A	N/A	N/A	Joint Research Centre, European Soil Format (2013)
3. Energy and raw materials					
3.1	Offshore oil and gas	-14,65	11,06	-1,80	Eurostat (2010)
3.2	Offshore wind	8,91	-3,99	2,46	Eurostat (2010)

⁴ The CAGR für GVA is calculated for 2008 – 2011 and based on Danmarks Statistics as the data was labelled confidential in Eurostat

3.3	Ocean renewable energy	N/A	N/A	N/A	Energistyrelsen (2012)
3.4	Carbon capture and storage	N/A	N/A	N/A	Energistyrelsen (2012)
3.5	Aggregates mining (sand, gravel, etc.)	0,59	14,29	7,44	Eurostat (2010)
3.6	Marine minerals mining	N/A	N/A	N/A	Energistyrelsen (2011)
3.7	Securing fresh water supply (desalination)	N/A	N/A	N/A	Ministry of Environment (2005)
4. Leisure, working and living					
4.1	Coastal tourism	-9,88	-10,84	-10,36	Eurostat (2010)
4.2	Yachting and marinas	-24,81	-24,81	-24,81	Eurostat (2010) Same number as GVA was taken as percentage from employment
4.3	Cruise tourism	20,47	-7,56	6,46	Eurostat (2010)
5. Coastal protection					
5.1	Coastal protection	-7,54	-1,21	-4,38	Eurostat (2010)
5.2					
5.3	Protection of habitats	16,32	24,34	20,33	Eurostat (2010), Danmarks Statistik (2010)
6. Maritime monitoring and surveillance					
6.1	Traceability and security of goods supply chains	2,00	1,92	1,96	Danmarks Statistik (2010)
6.2	Prevent and protect against illegal movement of people and goods	1,66	1,91	1,79	Danmarks Statistik (2010)
6.3	Environmental monitoring	-9,31	-3,32	-6,32	Danmarks Statistik (2010)

4. 7 maritime economic activities with most future potential: indicators for all activities

INDICATOR	DEFINITION / GUIDING QUESTIONS
Innovativeness	To what extent is the given MEA driven by constant improvements and innovation? Are there significant investments currently or foreseen in the near future in R&D for this MEA in the MS?
Competitiveness	This indicator assesses the position of a given MEA of a MS in the EU/international market. Furthermore, competitiveness is assessed also by comparing the activity of a given country to the same activities of other countries in the same area/sea basin.
Employment	Will the given MEA generate new jobs in the near future? Is the given MEA labour or technology intensive? Does it generate qualified jobs and/or attractive, long-term employment for the given regional labour force?
Policy relevance	Is the given MEA addressed by current or upcoming policy initiatives or regulatory activities in the given MS, especially taking into account EU 2020 ambitions? To what extent is the given MEA influenced by these developments?
Spill-over effects (Environmental)	What impact does the given MEA have on other (including non-maritime) economic activities within the MS?
Sustainability	To what extent is the given MEA in the respective MS influenced by current or upcoming environmental regulation or depends on a good status of the environment? Does the sector have the necessary adaptive capacity?

Maritime Economic Activity		Innovativeness	Competitiveness	Employment	Policy relevance	Spill-over effects	Sustainability	Overall score
0. Other sectors	0.1 Shipbuilding (excl. leisure boats) and ship repair	+	+	-	-	-	-	0
	0.2 Water projects	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1. Maritime transport	1.1 Deep-sea shipping	+	+	-	+	0	+	+++
	1.2 Short-sea shipping (incl. Ro-Ro)	+	+	0	+	+	+	++++
	1.3 Passenger ferry services	+	+	-	+	+	+	++++
	1.4 Inland waterway transport	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2. Food, nutrition, health and eco-system services	2.1 Fish for human consumption	+	+	-	+	+	+	++++
	2.2 Fish for animal feeding	+	+	+	+	0	-	+++
	2.3 Marine aquaculture	+	+	-	+	+	+	++++
	2.4 Blue Biotechnology	+	0	0	0	0	+	++
	2.5 Agriculture on saline soils	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3. Energy and raw	3.1 Offshore oil and gas	+	+	-	?	0	-	0

materials	3.2 Offshore wind	+	+	+	+	0	+	+++++
	3.3 Ocean renewable energy (wave, tidal, OTEC, thermal, biofuels, etc.)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.4 Carbon capture and storage	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.5 Aggregates mining (sand, gravel, etc.)	+	+	+	+	0	-	+++
	3.6 Marine minerals mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3.7 Securing fresh water supply (desalination)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4. Leisure, working and living	4.1 Coastal tourism	+	+	+	-	+	+	++++
	4.2 Yachting and marinas	+	+	0	-	+	0	++
	4.3 Cruise tourism	-	+	?	0	+	0	+
5. Coastal protection	5.1 Coastal protection	-	0	?	+	+	+	++
	5.3 Protection of habitats	+	-	+	+	0	+	+++
6. Maritime monitoring and surveillance	6.1 Traceability and security of goods supply chains	+	0	-	+	0	0	+
	6.2 Prevent and protect against illegal movement of people and goods	+	0	-	+	0	0	+
	6.3 Environmental monitoring	+	0	0	+	0	+	+++

5. Maritime strategies

Title of the official document	Level	Responsible body	Maritime strategy concerned	Kind of strategy document / Publishing date	URL
Operational programme for the Development of the Danish Fisheries and Aquaculture Sectors (2007-2013)	National	Ministry of Food, Agriculture and Fisheries, Directorate for Food, Fisheries and Agri Business	Development and strengthening of the fishery and aquaculture sectors	December 2007	http://2.naturerhverv.fvm.dk/Files/File/Fiskeri/Udvikling_af_fiskeri/FiskeriUdvikling0713/Microsoft_Word_-_OP_EFF_DK_Final.pdf
Energy Strategy 2050 – from coal, oil and gas to green energy (2011-2050)	National	Ministry of Climate, Energy and Construction, Danish Energy Agency	Transition to fossil fuel independence. Increase of wind power electricity. Efficient utilisation of biomass	February 2011	http://www.ens.dk/sites/ens.dk/files/dokumenter/publikationer/downloads/energy_strategy_2050.pdf
An Integrated Maritime Strategy (2010-2013)	National	Danish Government, Ministry of Economic and Business Affairs, Danish Maritime Agency	Growth of maritime industries. Protection of the marine environment and coastal zone	June 2010	http://www.dma.dk/sitecollectiondocuments/publikationer/sfs-samlet-maritim-strategi_3uk.pdf
Denmark's New Tourism (2009-2015)	National	Danish Regions	Development of sustainable and competitive tourism sector	September 2008	http://www.e-pages.dk/regioner/27/