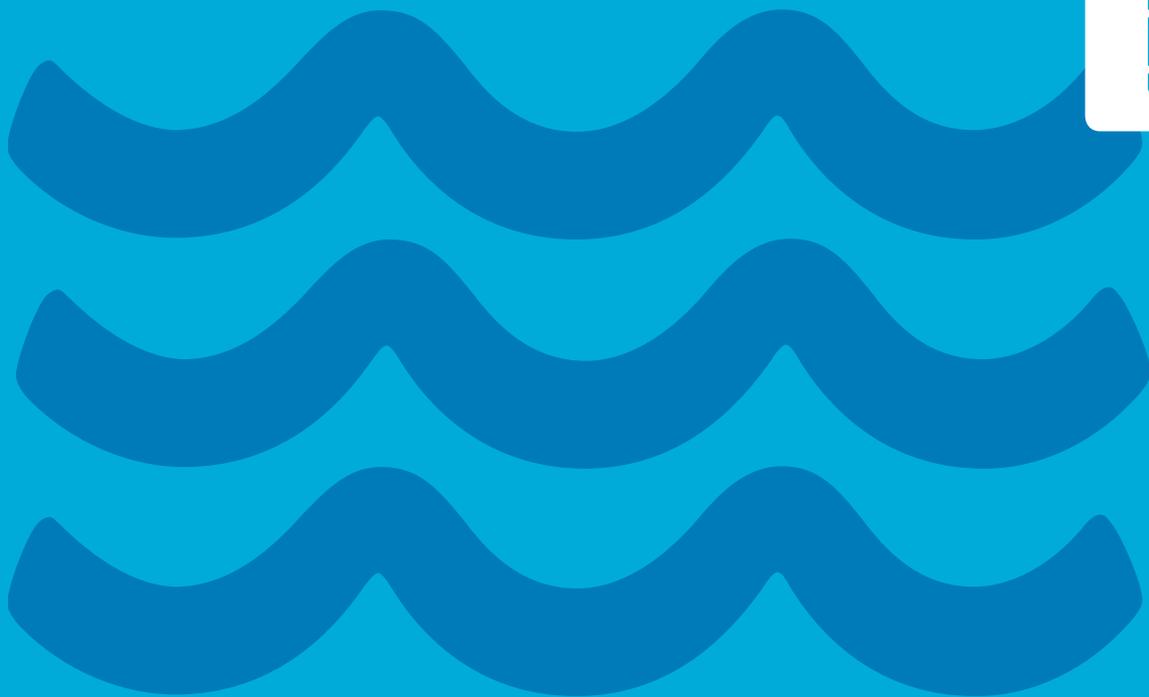


**Economic
description of the
Dutch North Sea**

and Coast:

2005, 2010, 2014



**Economic
description of the
Dutch North Sea
and Coast:
2005, 2010, 2014**

Explanation of symbols

Empty cell	Figure not applicable
.	Figure is unknown, insufficiently reliable or confidential
*	Provisional figure
**	Revised provisional figure
2014–2015	2014 to 2015 inclusive
2014/2015	Average for 2014 to 2015 inclusive
2014/'15	Crop year, financial year, school year, etc., beginning in 2014 and ending in 2015
2012/'13–2014/'15	Crop year, financial year, etc., 2012/'13 to 2014/'15 inclusive

Due to rounding, some totals may not correspond to the sum of the separate figures.

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Executive Summary

This study is carried out by Statistics Netherlands in the context of the European Marine Strategy Framework Directive, which requires social and economic analysis of the use of the marine environment. In this study an economic valuation of activities related to the Dutch Continental Shelf (DCS) is presented for the years 2005, 2010 and 2014. The following activities at sea are included in this study: sea shipping, oil and gas production, fishing, sand extraction and off-shore wind energy production. Activities on land are also included. These relate to economic activities in seaports and in the coastal area of the North Sea. For the coastal area, hotels and restaurants, retail trade, recreational and cultural and sporting activities and fisheries have been selected. Double counting of fisheries as both an activity on land and on sea is corrected for when totals are analysed. In seaports, the focus is on the following sectors; manufacturing; transport storage and communication; and wholesale and construction. In these sectors, proximity or accessibility to the North Sea is a critical factor. For all sectors on land and on sea, figures are presented and analysed for production (current prices), intermediate consumption (current prices), value added (both in current and constant prices at the 2010 level), the number of employed persons (FTE), number of employees (FTE) and the total compensation of employees.

The results show several interesting trends/patterns, a few of which are summarised here:

- The most important macro-economic trend over the period is the recession caused by the financial crisis. This effect is most pronounced in the activities at sea (circa 5% reduction in gross value added between 2005 and 2010) and in the data for the seaports (circa 6% reduction). However, the effect is relatively less pronounced for the activities in the coastal area.
- The trends in Dutch seaports are generally characterised by a decline in manufacturing and an increase in "Transport, storage and communications" sector. Whether the economic activity in the port has increased or decreased depends frequently on whether growth in the "Transport, storage and communications" sector has been able to compensate for the decline in manufacturing.
- The contribution of the port of Rotterdam to the North Sea Economy is greater than all other ports combined, and is almost as large as all other ports plus the coastal area.
- Employment growth in the North Sea economy has been largest in the "recreational, cultural and sporting activities" sector (36% growth between 2005 and 2014).
- The activities on sea show a general trend whereby those sectors which contribute most to value added tend to contribute less to employment.

The above elements of this study constitute updates on previous versions of the report. This study expands on previous reports in two ways. Firstly, an attempt is made to compare the relative importance of marine economy between countries using data from Eurostat. It is found that only limited insight can be gained from Eurostat data. Secondly, this report considers the possibility to study much more specific sectors which are of particular relevance to the marine economy, as determined by OSPAR (Oslo-Paris Convention for the Protection of the Marine Environment of the North-East Atlantic). It is found that for some sectors, it is indeed possible to produce statistics which describe the sector, but for others, this is not the case. Where possible, the statistics are produced.

1.

Introduction

This study has been financed by the Dutch Ministry for Infrastructure and the Environment in the context of the Marine Strategy Framework Directive (Directive 2008/56/EC of the European Parliament and of the Council, 17 June 2008). Article 8 of the Directive stipulates that member states must undertake an economic analysis of the use of their marine waters. This report provides data on the economic use of marine waters for the Netherlands. Specifically, this report considers economic activities on the Dutch Continental Shelf (DCS), which is the area of the North Sea where the Netherlands has exclusive rights. Further, this report also includes economic activities on land in the coastal area and in ports.

This study updates and extends the data and analysis from the Statistics Netherlands report prepared by Statistics Netherlands (2014a). In that study, results were presented for 2005, 2008, 2010 and 2011. In this study, results are presented for the years 2005, 2010 and 2014. As such, the base year is retained and the series is extended. The years 2005 and 2010 are calculated again because of the revision of the national accounts. Periodically, Statistics Netherlands performs a series of updates and improvements to the national accounts, with the aim of calculating statistics according to the most recent international guidelines which accurately represent the Dutch economy. Such changes are applied to several previous years of data. A revision has taken place since the previous study and therefore these results must be recalculated. Although pre- and post- revision results are not compared in this study, for the interested reader, a short description of the reasons for deviation between pre- and post-revisions is included in Appendix 1.

Both this study and the previous Statistics Netherlands study build on the methodological basis of Brouwer et al. (2005) and Statistics Netherlands (2010a). This methodology, known as NAMWARiB (National Accounting Matrix including River Basins) is adapted for analysis of the seaports and the coastal area. The method is also presented and described as the Marine Water Accounts approach in the European guidance document on economic and social analyses for the Marine Strategy Framework Directive (European Commission, 2010). According to the evaluation¹⁾ performed in 2013 by the Working Group for Economic and Social Assessment, most member states have used or plan to use this Water Accounts approach to perform the economic analysis of their marine waters.

The results of this report will be used as input for the economic section in the update of the Marine Strategy Framework Directive Part 1, The Initial Assessment. That section is expected to be similar to Section 2.3.1 in the Marine Strategy for the Netherlands part of the North Sea 2012–2020, Part 1.

This report begins by defining the system boundaries in Chapter 2 and proceeds to present the method in Chapter 3. The study employs two distinct methods: one for activities in the coastal area and one for activities at sea. Both are explained in this chapter along with the definitions and boundaries of the study. The results are presented first at the most aggregated level in Chapter 4. This entails considering “The Dutch North Sea economy” as a whole. Results are presented in terms of value added, production value, intermediate consumption, employment and compensation of employees. Value

¹⁾ <https://circabc.europa.eu/sd/a/0798b73f-e806-4614-bdf7-b4e1afddaeb6/Final%20version%20of%20Evaluation%20of%20lessons%20learned%20from%20the%20socioeconomic%20analyses%20for%20the%20EU%20MSFD.doc>

added is presented in constant prices (base year 2010) and in current prices. The report then proceeds to provide more detail by considering the constituent parts of the Dutch North Sea economy. Chapter 5 considers the activities on land. These are firstly, the activities in the coastal area, and secondly, the activities in seaports. In Chapter 5, the results are disaggregated to specific sectors in order to provide more detail. Chapter 6 considers activities at sea. Chapter 7 evaluates the results and provides conclusions and recommendations for future research.

2.

System

boundaries and

definitions

National accounts

The main data source used in this study are the Dutch national accounts. All activities on land are determined purely from the national accounts. For activities on sea, the national accounts data are complemented by data from various other sources. The system of national accounts provides a quantitative overview of the economic activity in a country as well as its economic relations with the rest of the world. At the core of the national accounts is a number of important economic indicators such as gross domestic product (GDP) and national income. The main benefit of using figures from the national accounts is that all variables are linked together in a consistent way. Consistent definitions which underlie the system facilitate comparability both between sectors and over time. International comparability is also guaranteed because all concepts and definitions are based on international guidelines provided by the United Nations, the European Union and other international organisations. The international standards are documented in the United Nations System of National Accounts (UN et al., 2008) and the European System of Accounts (Eurostat, 2010).

The national accounts have been revised in 2014 in order to adhere to the new international methodological guidelines (ESA2010). Revisions of the national accounts are conducted on a regular basis. International guidelines facilitate comparison between national economies and provide a safeguard that structural economic developments are measured consistently. Statistics Netherlands used the revision to conduct a source revision and a methodological revision simultaneously. Hence, the level of the indicators is re-evaluated and made consistent with the new data sources. The revision is based on one verification year, which was 2010 in the revision of 2014. As a result, new estimates for the macro-economic indicators have become available for the whole time-series. However, the revised figures for the years before 2010 are only available at an aggregated NACE-level. Hence, an additional division-key, based on the economic structure of 2010, has to be used to determine the figures of some specific branches for 2005.

From the national accounts the following indicators are derived for the economic description of the Dutch North Sea and coast:

- *Number of employees*. The number of individuals who are employed under contract and who receives wage as compensation. This excludes self-employed individuals.
- *Compensation of employees*. The total remuneration paid by employers to their employees where employee is defined as above.
- *Number of employed persons*. All persons who are working for a business unit or private household residing in the Netherlands. Crucially, this includes self-employed persons while "number of employees" does not.
- *Production*. The value of all goods produced for sale, including unsold goods, and all receipts for services rendered.
- *Intermediate consumption*. All goods and services used in the production process regardless the date of purchase. This includes for example fuel, raw materials, semi-manufactured goods, communication services, cleansing services and audits by accountants.
- *Gross Value Added (GVA)*. The difference between production and intermediate consumption in current prices (nominal terms value added). In the text often referred to as GVA.
- *Gross Value Added (GVA) 2010 prices*. Value added adjusted for inflation, with 2010 as base year. In the text often referred to as GVA in constant prices (real terms value added).

Geographical boundaries

This study considers activities on land which relate to the Dutch North Sea and activities which occur on the Dutch North Sea itself. The measurement of activities of Dutch companies on the North Sea in this study is limited to the Dutch part of the Continental Shelf. The DCS is the part of the North Sea, adjoining the Dutch coast, where the Netherlands claims exclusive rights to mineral resources. This Dutch part of the continental shelf in the North Sea is also regarded as part of the economic territory. Figure 3.1 shows a map of the DCS. While the Wadden Sea is in fact part of the DCS, it is not part of the North Sea and therefore excluded from this analysis. In terms of policy, the Wadden Sea falls under the remit of the Water Framework Directive, not the Marine Strategy Framework Directive.

3.1 The Dutch Continental Shelf as defined in this study (excluding the Wadden Sea)



In addition to the activities at sea, this study considers activities on land. Activities on land are divided into activities in the coastal area and at seaports. The geographical boundary of the seaport areas is mostly based on information provided by the relevant Port Authorities. A seaport is thus defined as the area under the jurisdiction of the Port Authority.

The coastal area has been defined as an **one kilometre wide strip** of land behind the Dutch North Sea coastline together with the entire Dutch Frisian Islands (Waddeneilanden). This is the same definition of the coastal area that has been used in the previous versions of this study. The decision to use a one kilometre wide strip is

a pragmatic decision based on topography and geography of economic activity in the Netherlands. The coastal strip was put not directly behind the shoreline but behind the beach and sand dunes, because the latter area includes little economic activity. The beach and sand dunes were located using a land use map; all dry natural terrain bordering the North Sea has been defined as beach and sand dunes. Appendix 3 shows a map of the location of the beach and sand dunes as well as the coastal strip including the Dutch Frisian Islands¹⁾.

The decision to use a one kilometre wide strip is a trade-off between a desire to fully represent the Dutch North Sea economy while at the same time, wishing to not take economic activity into account which is not considered to be part of the Dutch North Sea economy. An important example in this trade-off is the economic activity in the city of The Hague and the seaside resort of Scheveningen, which is part of the same agglomeration. Hotels in Scheveningen can easily be considered as part of the North Sea economy. However, hotels further in land receive guests who visit The Hague for a wide variety of purposes unrelated to the proximity of The Hague to the North Sea. The choice of a 1km wide strip in this case, aims to ensure that as much of the relevant economy activity is included as possible, without also including irrelevant activity.

Sectors

This study considers specific sectors for the activities on land. Sectors are chosen which have a strong and clear link to the North Sea in order to produce a fair estimate of the coastal economy. The selected sectors are different for the coastal area and seaports.

Coastal area:

- Hotels and restaurants
- Retail trade
- Recreational, cultural and sporting activities
- Fisheries²⁾

Seaports:

- Manufacturing
- Wholesale Trade
- Construction (excl. the construction of buildings)³⁾
- Transport, storage and communication

Residents

An important concept in the national accounts is the resident principle. An institutional unit is said to be resident within the economic territory of a country if it maintains a centre of predominant economic interest in that territory. GDP is an aggregate measure of production by all resident units. However, some of this production may occur abroad

¹⁾ This study applies a more narrow definition of the coastal zone than some other studies do. See for example Eurostat (2011), Regional yearbook 2011, Ch.13. A more narrow definition applied in this study because parts of the NUTS-3 regions along the coast are not always directly dependent on the North Sea (for example the centre of The Hague).

²⁾ Fisheries will also be counted as an activity at sea. In the totals of the North Sea economy are corrected for double counting. This sector does not include economic activities surrounding recreational angling.

³⁾ Construction is included because this includes installations for ships and for on- and offshore facilities. Since these businesses are located in the area of interest, construction companies are included even though the port location may be a less critical factor than for some manufacturing or transport companies.

and as a result production in the national accounts differs from the sum of all production that takes place within the geographic boundaries of the national economy. All figures in this report represent only activities of resident companies and employees. For example fishing vessels, registered outside the Netherlands, active on the DCS are not included in the estimates of the Dutch production of fisheries in this study, nor are Dutch fisheries active outside the DCS.

3.

Method

3.1 Activities on land

The method used for estimating economic key figures for the areas of interest is based on the NAMWARI^{B1}) method used by Statistics Netherlands to calculate the economic figures for different subriver basins (Brouwer et al., 2005; Statistics Netherlands, 2010). NAMWARI^B provides information about the interactions between the physical water system and the economy at a national and sub-river basin scale. The regional economic accounts are the most geographically detailed national accounting data available at Statistics Netherlands. These accounts present the national accounts at the level of the NUTS-3 region, which are used as the basis for this study.

In order to produce results for seaports and the coastal strip it is however necessary to use a "division key" in addition to the regional figures. The division keys are used to inform how much of the regional economy can be allocated to the coastal area or the seaports. They are deduced from the data of the business register. The business register contains, in general terms, all the businesses in the Netherlands. Of the many variables in the business register, two are particularly useful in this study. Firstly the postcode of the business²⁾ and the second is the number of employees. The method is to select the businesses within seaports or the coastal area by their postcode. It is then possible to calculate the number of employed persons for both the coastal area and seaports. From the regional accounts, total number of employed persons per region is known. The division key for the coastal area (or seaport) is thus the number of employed persons in the coastal area (or seaport) divided by the number of employed persons in the whole region. This division key can then be applied to the regional economic accounts to obtain economic indicators relevant for the coastal area and seaports. Hence, an economic indicator for a seaport is the indicator for the region in which the seaport is, multiplied by the division key.

In order to apply the above method, it is first necessary to know which postcodes correspond to the different areas. This was achieved first by delimitating the coastal areas and the seaports in purely spatial terms (basically, drawing a line on a map). This was done on the basis of input from the harbour authorities and topography as explained in section 3.1. The map of these boundaries was then overlaid onto a map of postcode areas. All postcode areas which lie fully in the areas of interest (seaports and the coastal strip) are used in the analysis in their entirety. Many postcodes however fall only partially inside the areas of interest. There are two possible ways of dealing with this;

- **Scenario A.** Calculate the share of the postcode which falls into the area of interest and use this share to adjust the number of employed persons. Use the adjusted number of employed persons for the division key.
- **Scenario B.** If a postcode falls partially within the area of interest then use the total number of employed persons within the postcode for the division key.

To fully understand the distinction between scenario A and scenario B, let us consider an example. In region Y there are four postcodes of which only two are located in the

¹⁾ For more information: <http://www.helpdeskwater.nl/onderwerpen/wetgeving-beleid/nationaal/economische-aspecten/namwa/>

²⁾ Specifically the postcode of the "Local business unit". This is the most disaggregated unit in the business register. One business may have multiple offices for example. Each office is a local business unit.

coastal area. For postcode A, 90% of the surface area of this postcode is located in the coastal area. For postcode B, 10% of the surface area is located in the coastal area. The company register provides that in postcode A, 200 persons are employed in sector X. In postcode B, 500 persons are employed in sector X. There are therefore 230 employed persons allocated to this part of the total coastal area ($90\% \cdot 200 + 10\% \cdot 500 = 230$). The company register also shows that in the total region Y, 1500 persons are employed in sector X. This means that 15.3% ($230/1500$) of the economic key figures of this region (production, added value, employees, compensation of employees) are allocated to the coastal area in scenario A. The total figures per sector for each region are provided by the regional accounts. For scenario B this figure is larger because complete postcodes are included. The result for scenario B is thus 700 employees ($200 + 500$). This means that 46.6% ($700/1500$) of the economic key figures of region Y (production, added value, employees, compensation of employees) are allocated to the coastal area in scenario B.

The choice for scenario A or B is made on a case-by-case basis. In principal, scenario A is considered to be methodologically superior, however, the desire to account for as much relevant economic activity as possible requires that the choice be predominantly determined by the geography of economic activity surrounding the specific area of interest. For example, if a seaport is entirely surrounded by a natural area then scenario B is preferred because there is no economic activity adjacent to the port which can be incorrectly counted as economic activity in the port by using the entire postcode. Continuing the port example, if a port is surrounded by an office park containing financial services sectors, it is prudent to employ scenario B to minimise the effect of the financial services companies which occupy a postcode which partially falls into the port area. Case-by-case decisions for scenario A and B are explained in Appendix 5. Figures on production for both scenarios are provided per area of interest in Appendix 6 to 9.

The exception to the use of scenario A or scenario B is the method for the Port of Rotterdam and the port of IJmuiden. In defining the port, area maps published by the Port Authority³⁾ were used. Appendix 8 shows the production level per sector and per scenario in the port of Rotterdam. Analysis of the data shows that, although production is located in the defined area of the port, the employees are in some cases registered at office locations in the centre of Rotterdam. Since production is allocated based upon postcodes of the companies where employment is registered, production is also virtually shifted to the centre of Rotterdam. This statistical problem exists for all ports and the coastal area, but is most prominent in the Port of Rotterdam. The activities of a few large companies are very influential on the port as a whole. Missing a couple of these companies, because the registered location differs from the production site, results in a substantial error. To correct for this statistical problem the total economic figure for the whole NUTS-3 region (Rijnmond) is included for selected sectors, namely:

- Manufacture of petroleum products; cokes, and nuclear fuel
- Manufacture of basic chemicals and man-made fibres
- Transport on water
- Supporting transport activities

For IJmuiden, a similar correction was made using the IJmond NUTS-3 region. However, in this case, only the sector "manufacture of basic metals" for the whole NUTS-3 region was used.

³⁾ <http://www.portofrotterdam.com/en/shipping/port-map/pages/default.aspx>

3.2 Activities at sea

The method for producing figures for the activities at sea varies depending on the specific activity in question. Where possible internally available data are used and where needed this is complemented by external data. The approach generally relies on obtaining suitable division keys to disaggregate the economic statistics. The specific methodology per activity at sea is described in this section.

Oil and gas extraction

With the exception of the number of employees and employed persons, the figures are based on the regional module of the national accounts. The number of employees are based on data on offshore exposure hours (Appendix 2) provided by the State Supervision of Mines (SSM) in response to figures published in the first version of this study in 2010⁴⁾. In calculating the number of employees (FTE) the assumption was made that one full time employee works 1,600 hours per year on average. Offshore exposure hours of companies and contractors include companies in the sectors "Crude petroleum and natural gas production" and "Supporting Crude petroleum and natural gas production" as well as other sectors supplying goods and services to the oil and gas sector (caterers, suppliers of installations, etc.). In order to make a distinction between the core industry and suppliers, the number of employees (FTE) in mining and quarrying from national accounts has been used as a starting point. The figures on onshore and offshore exposure hours allow a geographical distribution between the DCS and activities on land. Compensation of employees has been adjusted to the calculated level of employees by multiplying the average compensation per employee of the relevant sector from the national accounts with the calculated employment level.

Fisheries

Macro-economic figures for the entire fishing sector (NACE⁵⁾) are obtained from the Dutch National Accounts. It remains then to obtain appropriate division keys in order to allocate a percentage of the Dutch fishing sector to the DCS. This is achieved in two steps. The first step is to divide the Dutch fishing sector into Dutch waters and non-Dutch waters. This is based on data from the "Compendium voor de leefomgeving"⁶⁾, which shows

⁴⁾ Because this study makes use of SSM data in order to calculate data on employment, data on employment in this study is not fully consistent with data in the regional accounts.

⁵⁾ A sector refers to a group of companies or organisations that produce similar goods or services. NACE is the acronym used to designate the various statistical classifications of economic activities developed in the European Union (Eurostat, website). NACE provides the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics. Statistics produced on the basis of NACE are comparable at European and, in general, at world level. The use of NACE is mandatory within the European Statistical System. One NACE code is assigned to each unit recorded in statistical business registers, according to its principal economic activity. The principal activity is the activity which contributes most to the value added of the unit.

A unit may perform one or more economic activities described in one or more categories of NACE. The principal activity of a statistical unit is the activity which contributes most to the total value added of that unit.

⁶⁾ <http://www.clo.nl/indicatoren/nl1266-ontwikkeling-opbrengst-nederlandse-visserij?i=33-110>

how much fishing occurred in Dutch waters for the years 2000 to 2012. A portion of the NACE code fisheries can thus be allocated to Dutch waters for 2005 and 2010. For 2014, a figure is extrapolated using a best-fit trend line determined by uni-variate least squares regression.

An additional division key is used for the proportion of fishing in Dutch waters which occurs on the DCS (to allow the exclusion of the Waddenzee and Dutch waters in the Caribbean). For this division key, data are only available for the years 2001, 2002 and 2003. Hence, an average ratio across the three years is used for the division key. The use of such old data reduces however the certainty in the results. If this study is repeated in future years, Wageningen Economic Research can provide accurate statistics on the number of fishing hours spent on the DCS. Preferably, division keys are based on revenue statistics, but because fishing hours data are up to date, it may be considered a preferable basis for a division key than dated revenue data.

Sea shipping

The National Accounts provide macro-economic figures for the Dutch sea shipping sector. Macro-economic data for the sector represent all international and national activities of Dutch sea shipping companies (residents). The residence principle refers to the centre of economic interest of the operators of vessels. The total national figure is used for the valuation of the DCS, because the international accessibility matters and not so much the DCS itself.

Hydraulic engineering

The hydraulic engineering sector contains the following activities: the construction of dykes, shipping channels and ports, dredging works and land reclamation reinforce beaches and waterfronts of rivers and canals. In this report the methodology in the previous report is adopted. This methodology involves firstly splitting hydraulic engineering from the broader sector 'civil engineering'. The next step requires the allocation of a part of hydraulic engineering to sand and gravel extraction. Finally, figures for sand and gravel extraction activities need to be allocated geographically to the DCS. Financial statistics on both hydraulic engineering and civil engineering are available for 2005, 2010 and 2014 (www.statline.cbs.nl). These financial data contain revenue statistics which can be used as a division key. Specifically, the share of hydraulic engineering in the net revenue of civil engineering sector is used to divide the National Accounts data on civil engineering into hydraulic engineering and other civil engineering (see table 3.4; data for value added and production).

The second step requires isolating sand and gravel extraction from the sector hydraulic engineering. In the previous studies this was found to not be possible. Results were therefore presented on the total hydraulic engineering sector. In chapter 6, we follow this convention by presenting figures for the total hydraulic engineering sector. However, in chapter 9 of this report we present and analyse an alternative methodology which succeeds in isolating sand and gravel extraction from the hydraulic engineering sector.

Offshore wind energy

The estimations of the economic indicators of offshore wind energy are based on the amount of energy produced by wind turbines on the DCS. The corresponding economic figures are calculated by combining the physical energy production with price information on energy, figures on product-based SDE+⁷⁾ subsidies and information on maintenance and operational costs. For more information see the publication *'Economische Indicatoren Energiegerelateerde Activiteiten 2016' (in Dutch)*⁸⁾. In this way, the resulting figures refer purely to the production of wind energy and in no way to the production and installation of the turbines and related infrastructure.

The wind energy sector is interesting due to the degree to which it receives government subsidy. It is standard practise in the National Accounts to record financial values at basis prices. Basic prices are essentially the income received per unit of output. Accordingly, the value of the subsidy is included in the production value. Any similar subsidies which are received by other sectors are in this way treated consistently. More information on subsidies can be found here: www.rvo.nl/subsidies-regelingen/sde/windenergie-op-zee.

⁷⁾ Stimulation of Sustainable Energy Production (SDE+) subsidy.

⁸⁾ For an English version, see an older edition of the economic radar on the Sustainable energy sector (Statistics Netherlands, 2014).

4.

Summary

results for the Dutch

North Sea Economy

To begin summary results are presented in table 4.1, which gives a picture of the role of the Dutch North Sea Economy in the Dutch economy.

4.1 Contribution of the North Sea economy to the total economy

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
North sea economy	165	8,465	187	71,350	47,637	22,972	23,828
Total economy	5,735	264,776	6,711	1,005,072	518,669	486,403	526,633
Share of total economy	2.9%	3.2%	2.8%	7.1%	9.2%	4.7%	4.5%
2010							
North sea economy	165	9,416	186	84,553	62,215	22,339	22,339
Total economy	5,955	310,471	7,056	1,178,924	611,167	567,757	567,757
Share of total economy	2.8%	3%	2.6%	7.2%	10.2%	3.9%	3.9%
2014							
North sea economy	164	10,433	188	94,322	71,971	22,351	22,299
Total economy	5,774	327,963	6,953	1,267,298	669,884	597,414	585,561
Share of total economy	2.8%	3.2%	2.7%	7.4%	10.7%	3.7%	3.8%

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

The results show that the size of the Dutch North Sea economy expressed in value added at constant prices accounted for 3.8% of the Dutch economy in 2014, while in 2005 it was 4.5%. The Dutch economy as a whole grew by 11% between 2005 and 2014. The North Sea economy on the other hand declined by almost 6% over the same period.

Regarding the other indicators, production and intermediate consumption of the North Sea economy have increased both in relative and absolute terms between 2005 and 2014. Production has increased by 33% and its contribution to the whole economy has gone up from 7.1% in 2005 to 7.4% in 2014. While production has increased by 33%, intermediate consumption increased even more (51% in the same period). This leads to a reduction in value added which indicates increasing pressure on profitability. As will be shown later, this reduction in value added mainly results from reductions in value added in the seaports, which constitute a large share of the North Sea economy.

The Dutch North Sea economy consists of activities on land (seaports and coastal area) and activities at sea. Table 4.2 shows that activities on land constitute a large share of the Dutch North Sea economy. This is particularly the case for production, intermediate consumption and employment, but less so for GVA. As will be shown later, one of the main reasons that activities at sea perform particularly well in terms of GVA is the profitability of oil and gas sector.

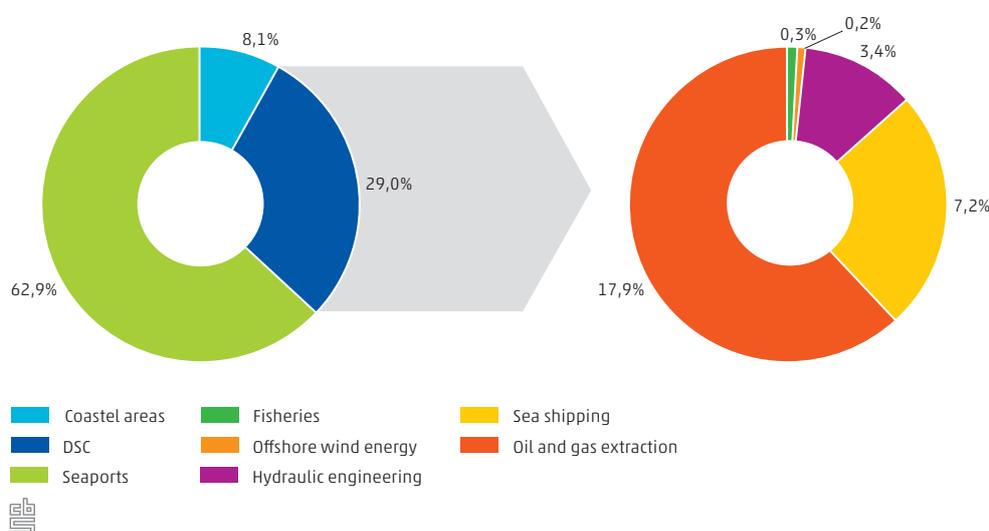
4.2 Summary of the economic key figures for activities at sea and on land (selected sectors)

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Activities on land	151	7,512	169	59,102	41,721	16,641	17,000
Activities at sea	14	953	18	12,248	5,917	6,331	6,828
Total North Sea economy	165	8,465	187	71,350	47,637	22,972	23,828
2010							
Activities on land	148	8,157	166	72,001	56,162	15,839	15,839
Activities at sea	17	1,260	20	12,552	6,052	6,500	6,500
Total North Sea economy	165	9,416	186	84,553	62,215	22,339	22,339
2014							
Activities on land	145	8,813	165	80,576	64,700	15,875	16,278
Activities at sea	19	1,621	23	13,746	7,271	6,475	6,020
Total North Sea economy	164	10,433	188	94,322	71,971	22,351	22,299

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

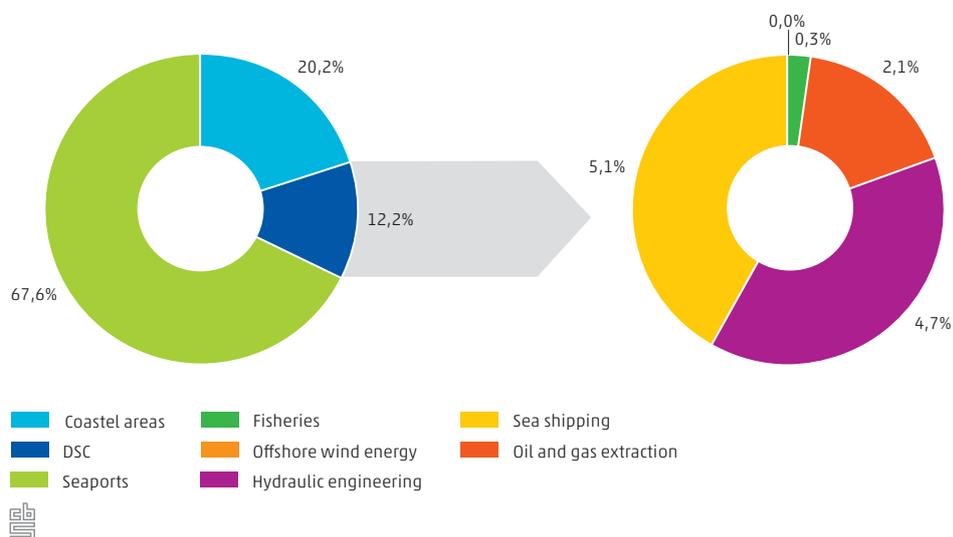
The Dutch North Sea economy can be further split into its constituent parts in order to reveal the contributions of the different activities on land and at sea, see figure 4.1. Seaports not only account for the majority of activities on land, but also for the majority of the Dutch North Sea economy (62,9%). Activities in the coastal area account for only 8.1% of the Dutch North Sea economy. This figure very much depends on the delineation of the coastal area. In this study a 1 km wide strip is used, and some large cities were excluded. If for example the coastal NUTS-3 regions were used to delineate the coastal area then, as demonstrated in Appendix 11, the size of the economy of the coastal zone would increase greatly. Activities at sea (DCS) account for 29% and consists of 5 different activities, see the right-sided circle. Oil and gas extraction and sea shipping contribute most to the GVA of the activities at sea. Especially the dominance of oil and gas extraction, with relatively high GVA and relatively limited employment, explains why activities at sea account for a disproportionate share of GVA of the North Sea economy in 2014.

4.1 Share in total GVA of different activities on or related to the DCS (2014)



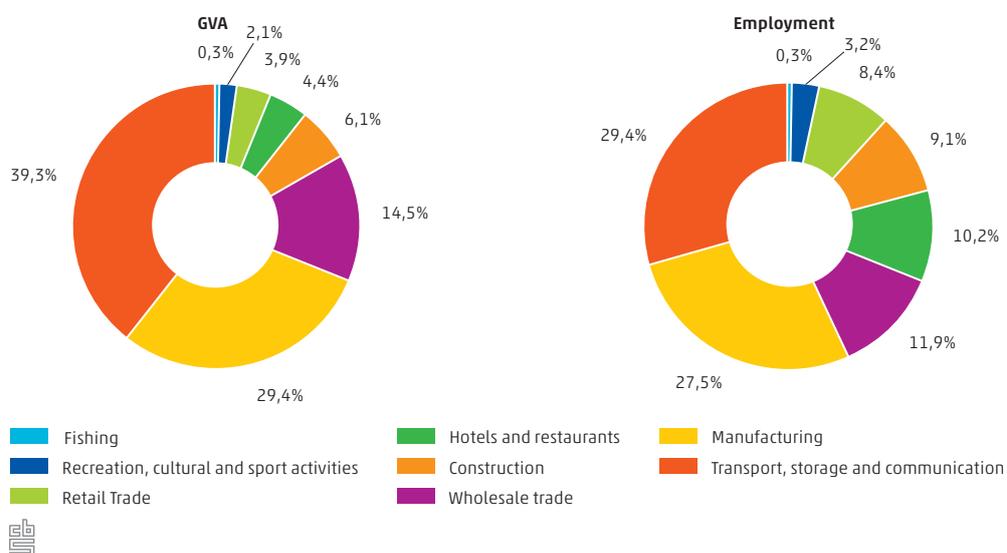
The North Sea economy can also be analysed as a whole in terms of employment. The Dutch North Sea economy contributed for 2.7% to the total Dutch employment in 2014, see table 2.3. Figure 4.2 shows that this employment is dominated by the seaports (67.6%) followed by coastal areas (20.2%). Within the activities on the DCS, sea shipping and hydraulic engineering provide the most employment. Oil and gas extraction provides relatively little employment compared to their GVA.

4.2 Share in total employment of different activities on or related to the DCS (2014)



Comparing figures 4.1 and 4.2 shows that sectors with high contributions to the GVA of the Dutch North Sea economy are not necessarily the sectors which contribute the most in terms of employment. Figure 4.3 compares the contributions of the sectors to GVA and employment in the coastal area and in seaports. Retail trade and hotels and restaurants provide relatively more jobs than GVA. This is due to the labour intensive nature of these sectors. At the opposite end of the spectrum is the "transport, storage and communications" sector, which provides relatively few jobs proportional to its GVA.

4.3 Share in total employment and GVA of relevant sectors on land (2014)



5.

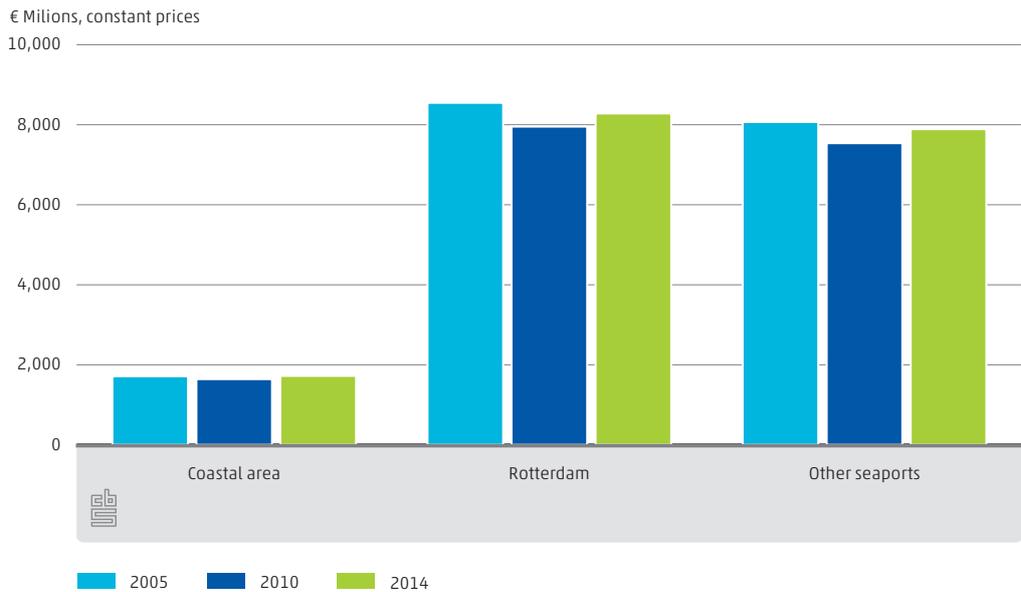
Activities

on land

5.1 Key results

This section presents the key results regarding the activities on land of the Dutch North Sea economy. The first thing to note is the economic dominance of the port of Rotterdam. Figure 5.1 shows that the contribution of the economic value of the economic sectors in the port of Rotterdam to the Dutch North Sea economy is larger than that of all other seaports combined and almost as large as all other seaports combined plus the coastal area.

5.1 GVA over time for the activities on land



In general a reduction in GVA is noticeable in 2010, which could be linked to the financial crisis. GVA did not yet reach its 2005 level by 2014. The variation over the years in the coastal area is less pronounced than in the seaports. Between 2005 and 2010 GVA was merely stagnant in the coastal area, and showed a marginal increase in 2014. Hence, it seems that the sectors in the coastal area were more resistant to economic downturns than the sectors in the seaports. The figures on employment in table 5.1 show a similar trend. The number of employed persons in the coastal area has increased between 2005 and 2014, while the number of employed persons in the port of Rotterdam had not yet reached its 2005 level by 2014.

5.1 Key figures activities on land

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Coastal area	27	781	35	2,838	1,335	1,506	1,715
Rotterdam	63	3,580	67	39,487	30,389	8,501	8,548
Other seaports	70	3,621	77	21,150	13,058	7,962	8,067
Total	160	7,982	179	63,475	44,782	17,969	18,330
2010							
Coastal area	27	891	36	3,101	1,459	1,642	1,642
Rotterdam	59	3,775	63	47,873	39,920	7,953	7,953
Other seaports	69	3,971	76	25,281	17,741	7,539	7,539
Total	155	8,637	175	76,254	59,120	17,134	17,134
2014							
Coastal area	29	1,005	38	3,477	1,603	1,874	1,723
Rotterdam	60	4,189	64	57,634	50,200	7,434	8,282
Other seaports	65	4,165	72	24,608	16,490	8,118	7,889
Total	153	9,359	174	85,719	68,293	17,426	17,893

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

5.2 Key indicators of the relevant sectors in the North Sea coastal area

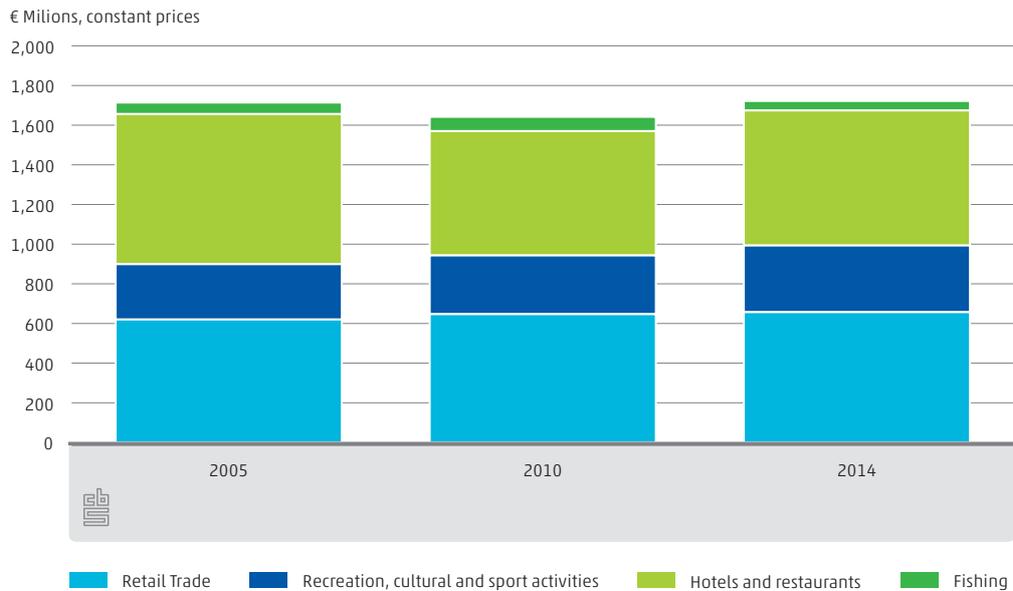
	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Fishing	0	12	1	103	46	57	58
Hotels and restaurants	12	310	16	1,315	700	615	757
Recreation, culture and sport	3	125	4	482	236	246	279
Retail Trade	12	334	15	938	353	587	620
Total	27	781	35	2,838	1,335	1,506	1,715
2010							
Fishing	0	14	1	130	58	72	72
Hotels and restaurants	12	350	16	1,367	740	627	627
Recreation, culture and sport	3	145	5	553	257	296	296
Retail Trade	12	382	15	1,051	404	647	647
Total	27	891	36	3,101	1,459	1,642	1,642
2014							
Fishing	0	17	1	108	50	58	48
Hotels and restaurants	13	413	18	1,593	832	761	681
Recreation, culture and sport	3	168	6	677	308	369	336
Retail Trade	12	407	15	1,099	413	686	657
Total	29	1,005	38	3,477	1,603	1,874	1,723

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

5.2 North Sea coastal area

The economic figures of the coastal area are presented in table 5.2. The coastal area economy grew by 4.9% between 2005 and 2014, while the economy of the Netherlands as a whole grew by 11%. This is predominantly due to a decline in the hotels and restaurants sector and the relatively slow growth in the retail trade.

5.2 GVA in constant prices in the coastal area for the relevant sectors



Let us firstly analyse GVA as shown in figure 5.2. The results show different developments over time depending on the sector. For example, fisheries shows a peak in GVA in 2010 and a severe decline in 2014 which caused GVA in 2014 to be below even its 2005 level. A similar trend can be seen for the fishing activity at sea in chapter 6.3, where the trend is discussed in more detail. The two sectors which show the highest growth in terms of value added (constant prices) are "recreational, cultural and sporting activities" and "retail trade". The growth in value added in these sectors is also mirrored in positive trends in the other indicators (see table 5.2). Overall, the growth in these sectors has led to an overall growth of GVA (constant prices) in the coastal area. Hotels and restaurants suffered from a decline in GVA (constant prices) between 2005 and 2010, presumably in connection with the recession. Weather in a given year can also affect these results. Hotels and restaurants is also the largest sector in the coastal area, especially in terms of production and intermediate consumption. This sector therefore has a disproportionate effect on the results for the coastal area.

One aspect of table 5.2 which immediately stands out is the number of people employed in the "Recreation, culture and sport" which showed a 75% increase from 2005 to 2014. Compensation shows a similar increase. By calculating the compensation per employed person, a rough indication can be gained of the sector which provides on average the highest paid jobs. This shows that the "Recreation, cultural and sporting activities" provides relatively higher paid jobs than other sectors and indicates that the fastest growing sector is also the one that provides the highest paid jobs.

The following step is to consider the contribution that the North Sea economy makes to the economy of the NUTS-3 regions which are coastal. To do so, it is useful to take a stepwise approach. The North Sea economy is determined by selecting given sectors in a specific area. It is therefore firstly helpful to get an impression of the effect of selecting the specific sectors before analysing both the effects of selecting a specific sectors and a specific area. In doing so, it is found that the selected sectors account approximately 10% of real terms GVA in 2014 and approximately 18% of the employed persons in the coastal area. In other words, approximately 90% of the economic activity in the coastal area is not part of the Dutch North Sea economy and approximately 82% of the FTEs in the coastal area are not associated with the Dutch North Sea Economy.

Given this understanding of the significance of the selected sectors in the coastal area, the significance of the selected sectors within the coastal area can be analysed in terms of the sum of the economies of NUTS-3 regions along the coast. This provides insight into the effect of proximity to the North Sea for economy of the larger coastal region. To do so, the indicators per NUTS-3 are presented in Appendix 11. Of the 52 NUTS-3 regions in the Netherlands, there are 13 coastal NUTS-3 regions. All sectors are included in the NUTS-3 totals. Table 5.3 therefore compares the economy of the relevant sectors in the coastal area to the whole economy of all the NUTS-3 regions along the Dutch coastline.

5.3 The contribution of the relevant sectors in the coastal area to the economy of the NUTS-3 coastal regions

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
	%						
2005	1.6	1.0	1.9	1.0	0.9	1.1	1.1
2010	1.6	1.0	1.8	0.9	0.8	1.0	1.0
2014	1.6	1.1	2.0	1.0	0.8	1.1	1.0

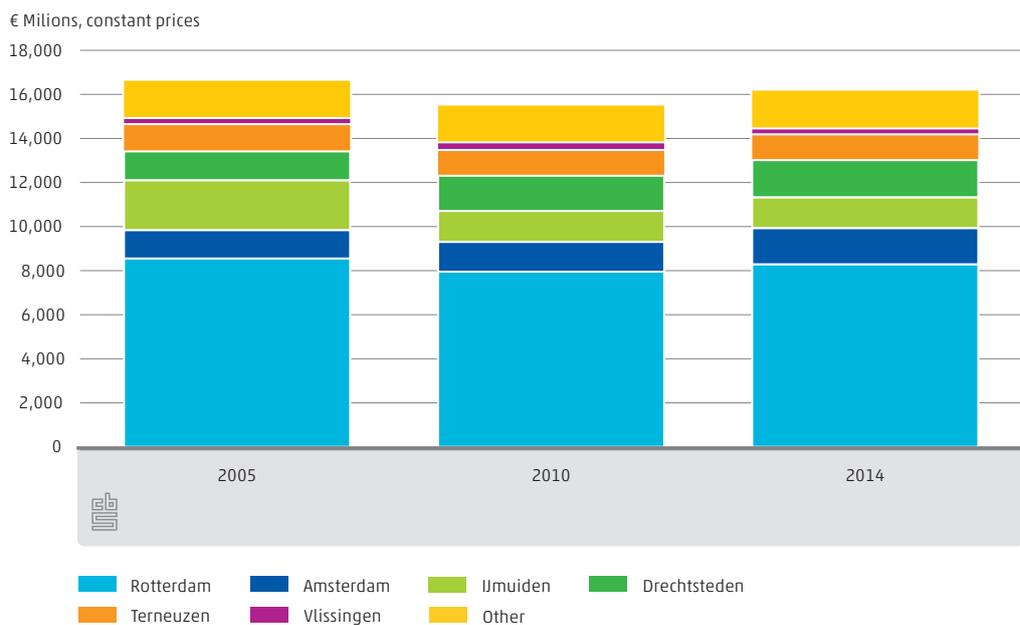
Source: CBS.

Table 5.3 shows that the coastal economy (consisting of the relevant sectors in the 1km wide strip) account for only a small percentage of the economy of NUTS-3 regions along the coast. This is partly due to the selection of sectors and partly due to the selection of businesses within the 1km wide strip. The results show that the definition of the coastal area is strict in that it excludes the vast majority of economic activity. Above it was demonstrated that the selected sectors account approximately 10% of real terms GVA in 2014 of all sectors in the coastal zone. Table 5.3 demonstrates that the coastal zone accounts for 1% of the NUTS-3 coastal regions. A useful rule of thumb for the Dutch North Sea economy can therefore be provided, namely that approximately 10% of all economic activity in a NUTS-3 region takes place in the coastal area and approximately 10% of the economic activity in the coastal zone is part of the North Sea Economy. This rule of thumb obviously excludes activities in seaports.

5.3 Seaports

Chapter 5.1 already showed that the seaports contribute greatly to the Dutch North Sea economy. This section provides a more detailed analyse of the seaports. Figure 5.3 displays GVA over time per seaport and figure 5.4 displays GVA over time per sector. As figure 5.3 clearly shows, the seaports contribute to various degrees to the total GVA of seaports, with the port of Rotterdam as the largest contributor and Vlissingen the smallest.

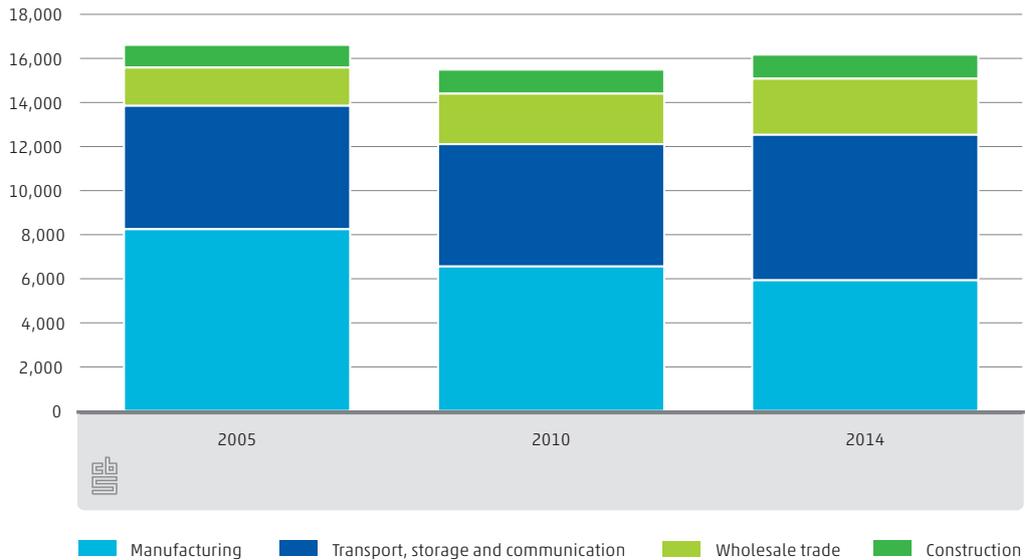
5.3 GVA in constant prices per seaport



The reduction in total value added between 2005 and 2010 can be attributed mostly to a decline in the manufacturing sector. This decline in manufacturing has continued between 2010 and 2014. However, between 2010 and 2014, growth in “Transport, storage and communication” (and to a lesser extent, wholesale trade) has led to an overall 5% growth in GVA created in seaports. Generally, those seaports which have experienced a higher GVA growth, have done so due to the growth of GVA in the “transport, storage and communication” sectors. Decline in the manufacturing sector is generally the cause of slower or negative growth in seaports. Amsterdam and Vlissingen are prime examples of the importance of the manufacturing and the transport, storage and communication sectors. Figure 5.5 depicts the development of GVA over time for both the port of Vlissingen and Amsterdam. Amsterdam shows the largest increase in GVA between 2010 and 2014, whereas Vlissingen shows the largest contraction. Amsterdam benefited from the increase in wholesale trade which is proportionally much smaller than in Vlissingen.

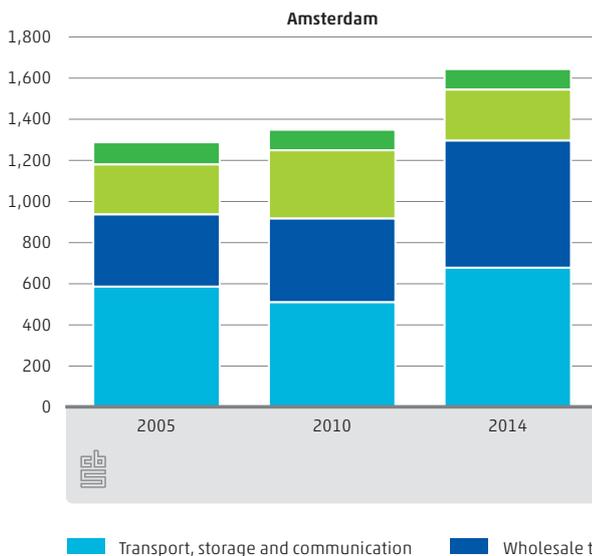
5.4 GVA in constant prices per sector

€ Millions, constant prices

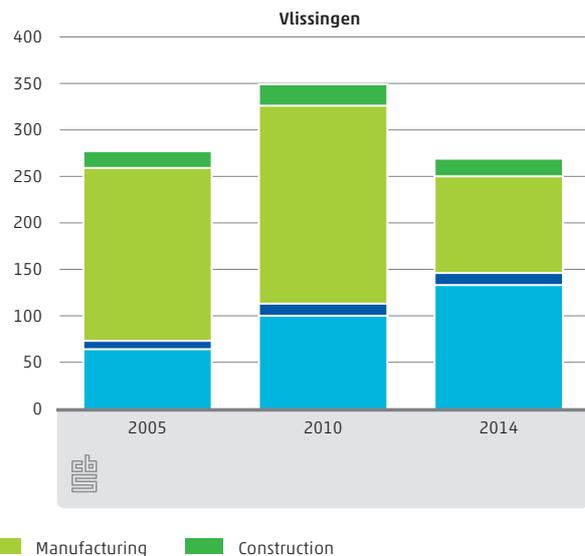


5.5 Value added created in the seaport of Amsterdam and Vlissingen

€ Millions, constant prices



€ Millions, constant prices



Differences to the Port Monitor (Haven monitor)

Since 2004 the Port Monitor (Haven monitor) is published annually. The Port Monitor includes economic figures on seaports. The objective of the Port Monitor overlaps partially with the objective of our study on seaports in the Netherlands. Both studies present figures on employment and value added in the seaports, but results differ substantially. In this textbox a brief explanation of the differences between the Port Monitor (RebelGroup Advisory et al., 2009) and the figures presented for seaports in this study is provided.

The estimate of total (direct) value added for all seaports in this study is smaller than the value added estimated in the Port Monitor. The largest part of the difference is explained by different geographical boundaries. In this study seaports are limited to industrial areas surrounding these ports only. In many cases maps provided by port authorities have been used in determining the boundaries. The Port Monitor in multiple cases, e.g. Rotterdam and Amsterdam, includes complete municipalities in setting their boundaries. The geographical boundaries set in the Port Monitor are much broader than the boundaries set in this study. Scheveningen is also included as a seaport in the Ports Monitor. The economic activities in Scheveningen are included in the coastal area in this study. Another difference is the sectors selected. Some examples are given: Fisheries are included in the figures of the Port Monitor. In this study this sector is not labelled relevant in the sea ports (already covered by activities at sea). The figures of this study include more different construction sector classes than the Port Monitor does. Waste processing activities in seaports are included in the Port Monitor while these activities are not included in this study. A third difference is calculation of direct transport activities. In this study direct transport activities are estimated like all other sectors based on location. The Port Monitor makes use of data on transport performances.

Port of Rotterdam

The port of Rotterdam is Europe's largest port for (trans)shipment of goods. Not only is Rotterdam the largest port (in terms of value added) in the Netherlands, it also has the highest labour productivity of all Dutch ports. Production per employed person in 2014 was just short of €900,000. For the Dutch economy as a whole, the figure was €150,000 and for the total of all seaports except Rotterdam, the figure is circa €350,000. Seaports are thus in general terms very productive per unit of labour and Rotterdam is the most productive of the seaports. Increased automation¹⁾ may be a factor which contributes to the high labour productivity of Rotterdam.

Despite Rotterdam's dominant position and high labour productivity, the effect of the recession is still visible in the data. This is seen in the reduction in real terms value added and employment between 2005 and 2010, which had not yet reached 2005 levels by 2014. In terms of the different sectors, Rotterdam illustrates the general pattern seen for the seaports in the previous section. Notable is the particularly steep decline in manufacturing between 2005 and 2014 (31% real terms reduction in value added) for which moderate growth in other sectors has failed to compensate. However, despite the reduction in value added, the manufacturing sector has only contracted slightly in terms of number of employed persons, which indicates that the contraction in GVA may be more closely linked to a decline in profitability than a decline in throughput.

¹⁾ See <https://www.portofrotterdam.com/en/cargo-industry/50-years-of-containers/the-robot-is-coming>

5.4 Key indicators for selected sectors in the Port of Rotterdam

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Construction	4	198	5	894	568	326	383
Manufacturing	17	1 181	18	27 443	23 255	3 583	3 541
Transport, storage and communication	37	1 960	39	10 069	5 989	4 083	4 087
Wholesale trade	5	241	5	1 082	577	509	537
Total	63	3 580	67	39 487	30 389	8 501	8 548
2010							
Construction	5	274	6	1 203	773	430	430
Manufacturing	17	1 318	17	36 038	33 232	2 807	2 807
Transport, storage and communication	32	1 862	33	9 252	5 264	3 988	3 988
Wholesale trade	6	322	6	1 379	651	728	728
Total	59	3 775	63	47 873	39 920	7 953	7 953
2014							
Construction	5	270	6	1 229	808	422	428
Manufacturing	16	1 451	17	44 182	42 752	1 430	2 465
Transport, storage and communication	34	2 157	36	10 879	6 029	4 851	4 649
Wholesale trade	5	311	5	1 343	611	732	740
Total	60	4 189	64	57 634	50 200	7 434	8 282

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000.

Port of Amsterdam

The port of Amsterdam is the second largest port in the Netherlands for the (trans) shipment of goods and is also highly diversified in terms of economic activity (see appendix 9). The map²⁾ published on the internet by the Port Authority was used to define the area. The results for the selection of sectors are shown in table 5.5.

The economy of the port of Amsterdam has increased significantly between 2005 and 2014. The sectors "transport, storage and communication" and "wholesale trade" have driven this growth, which was sufficient to compensate for the decline in manufacturing. The production and intermediate consumption in the manufacturing sector fell by around 50% between 2010 and 2014.

Besides value added, the employment and compensation figures also provide a similar indication regarding economic activity. In both the "transport, storage and communication" sector and the wholesale trade sector employment and compensation increase, while employment and compensation show a decline for the manufacturing sector.

²⁾ <http://www.portofamsterdam.nl/havenkaart>

5.5 Key indicators for selected sectors in the Port of Amsterdam

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Construction	1	60	2	270	178	92	108
Manufacturing	2	121	3	1,507	1,259	246	243
Transport, storage and communication	5	255	6	1,177	593	586	586
Wholesale trade	2	140	3	602	270	332	351
Total	11	576	13	3,556	2,299	1,256	1,287
2010							
Construction	1	61	2	293	193	100	100
Manufacturing	2	137	3	2,447	2,115	332	332
Transport, storage and communication	4	253	5	1,103	593	510	510
Wholesale trade	3	175	3	745	338	407	407
Total	11	627	12	4,588	3,239	1,349	1,349
2014							
Construction	1	60	2	290	194	95	100
Manufacturing	2	126	2	1,254	1,000	254	248
Transport, storage and communication	5	312	5	1,605	923	682	678
Wholesale trade	4	246	4	1,075	464	611	618
Total	11	743	13	4,223	2,581	1,642	1,643

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

IJmuiden

Close to the North Sea, along the canal that connects Amsterdam to the sea, there is a cluster of ports and industrial areas including the cities of IJmuiden, Beverwijk and Velsen-Noord. The definition of this area is based on the location of ports for the (trans) shipment of goods and the adjoining industrial areas. Production of steel is the biggest sector in this area (basic metal industry).

This cluster of ports and industrial areas shows a strong presence of manufacturing. As mentioned in Chapter 3, in order to include the steel producer in this port completely, the figure for 'Manufacturing of basic metals' has been set equal to the total regional figure for the IJmond NUTS-3 region. All steel producers in the area rely on the seaport to a significant extent.

The manufacturing sector is the most important in terms of all indicators in the port of IJmuiden. The manufacturing has however declined between 2005 and 2010 and shows only marginal growth between 2010 and 2014. Because manufacturing is the predominant sector in IJmuiden, this decline and limited growth determines the broader picture for the port as a whole. The developments in the "transport, storage and communication" sector in IJmuiden are different to those in other ports due to the significant reduction in GVA experienced over the period. In summary, IJmuiden shows a significant decline between 2005 and 2014.

5.6 Key indicators for selected sectors in the Port of IJmuiden

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Construction	1	28	1	129	79	50	59
Manufacturing	12	728	13	4,198	2,124	2,020	1,996
Transport, storage and communication	1	44	1	260	138	123	123
Wholesale trade	1	40	1	129	52	77	81
Total	15	840	16	4,716	2,393	2,269	2,259
2010							
Construction	1	32	1	151	99	52	52
Manufacturing	12	685	12	4,512	3,409	1,103	1,103
Transport, storage and communication	1	59	1	264	142	123	123
Wholesale trade	1	66	1	213	86	127	127
Total	15	841	15	5,141	3,736	1,405	1,405
2014							
Construction	1	31	1	157	103	54	56
Manufacturing	11	711	11	4,230	3,078	1,152	1,133
Transport, storage and communication	1	50	1	269	150	119	115
Wholesale trade	1	47	1	152	61	91	92
Total	13	839	14	4,808	3,392	1,416	1,396

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

5.7 Key indicators for selected sectors in the port of Drechtsteden

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Construction	3	164	4	633	407	226	266
Manufacturing	6	273	7	1,425	931	494	489
Transport, storage and communication	2	81	2	324	188	137	137
Wholesale trade	5	241	6	695	291	404	426
Total	17	760	18	3,077	1,816	1,261	1,318
2010							
Construction	3	176	4	796	519	277	277
Manufacturing	6	312	6	1,696	1,174	522	522
Transport, storage and communication	2	115	2	528	310	218	218
Wholesale trade	6	309	6	968	387	581	581
Total	17	911	19	3,988	2,390	1,598	1,598
2014							
Construction	3	168	4	795	528	266	268
Manufacturing	6	328	6	1,887	1,374	513	514
Transport, storage and communication	2	112	2	509	292	218	204
Wholesale trade	6	366	7	1,142	441	701	709
Total	17	974	18	4,333	2,635	1,698	1,695

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

Port of Drechtsteden

This port consists of eight spatially distinct ports in the vicinity of the city of Dordrecht. The area is identified using "Case study Inland ports of Drechtsteden" (TNO, 2004) and Google Maps. The small ports are surrounded by land which is used for diverse economic activities. The results for the economic key figures for the relevant selected sectors are presented in table 5.7.

Drechtsteden is an unusual seaport because it has managed to sustain real terms growth in GVA for both the period 2005 to 2010 and 2010 to 2014. It has achieved this mainly through increasing production in the wholesale trade sector, and by suffering only slight declines in the manufacturing and construction sectors. Also unusual is the decline in the "transport, storage and communication" sector. While this decline is only slight, Drechtsteden along with IJmuiden is the only seaports for which this sector has not grown.

5.8 Key indicators for selected sectors in the port of Vlissingen

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Construction	0	10	0	45	29	15	18
Manufacturing	2	119	2	769	579	188	186
Transport, storage and communication	1	33	1	133	69	63	63
Wholesale trade	0	4	0	14	6	8	9
Total	3	168	3	960	683	275	276
2010							
Construction	0	14	0	67	44	23	23
Manufacturing	2	125	2	904	691	213	213
Transport, storage and communication	1	45	1	201	101	99	99
Wholesale trade	0	7	0	22	9	13	13
Total	3	191	3	1,194	846	348	348
2014							
Construction	0	11	0	55	37	19	19
Manufacturing	1	82	1	410	300	110	104
Transport, storage and communication	1	60	1	270	128	141	132
Wholesale trade	0	7	0	22	9	13	13
Total	2	160	3	757	474	283	268

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

Port of Vlissingen

In spatially delineating the port of Vlissingen, information of the 'Port Authority, Zeeland Seaports³⁾' has been used. Zeeland Seaports is the port authority for both the port of Vlissingen and the port of Terneuzen. The port of Terneuzen is discussed separately in the next section. The results are shown in table 5.8.

³⁾ <http://www.zeelandseaports.nl/en/the-port/accessibility/port-maps.htm>

Figure 5.5. already showed the economy of the port of Vlissingen, in comparison with the port of Amsterdam. It displayed the standard pattern of a decline in manufacturing and an increase in the “transport, storage and communication” sector. In the cases of Vlissingen, the increase in “transport, storage and communication” has failed to compensate for the decline in manufacturing.

Port of Terneuzen

Terneuzen is located near to Vlissingen; both ports are managed by Zeeland Seaports. The port area of Terneuzen is spread along the Ghent–Terneuzen Canal and the Western Scheldt. The port of Terneuzen is economically important principally due to the presence of larger chemical companies. For the relevant sectors the results are presented in table 5.12.

Terneuzen displays the familiar pattern of a reduction in GVA for manufacturing and an increase in “transport, storage and communication”. This has led to a decline only between 2005 and 2010 because between 2010 and 2014 the decline in manufacturing (and wholesale trade) has been perfectly offset by increases in “transport, storage and communication” and construction. Interestingly, Terneuzen is the only port that shows growth in the construction sector over both 2005-2010 and 2010-2014. For the port as a whole though, there has had been a decline in real terms GVA, which seems to be norm for the smaller seaports.

5.9 Key indicators for selected sectors in the port of Terneuzen

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Construction	1	45	1	223	143	80	94
Manufacturing	6	391	7	3,073	2,161	899	888
Transport, storage and communication	2	61	2	292	162	131	131
Wholesale trade	1	39	1	143	68	75	79
Total	10	536	11	3,730	2,534	1,184	1,192
2010							
Construction	1	59	1	266	170	95	95
Manufacturing	6	373	6	3,431	2,618	812	812
Transport, storage and communication	1	67	1	365	226	139	139
Wholesale trade	1	44	1	152	74	79	79
Total	9	543	10	4,214	3,089	1,125	1,125
2014							
Construction	1	70	2	317	203	114	118
Manufacturing	5	382	5	2,871	1,991	879	747
Transport, storage and communication	1	85	2	457	256	201	193
Wholesale trade	1	38	1	129	62	68	67
Total	8	576	9	3,774	2,512	1,262	1,125

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

Other seaports

The "other" seaports are located predominantly in the north of The Netherlands; Den Helder (main harbour for the Royal Navy of the Netherlands⁴⁾), Harlingen, Eemshaven and Delfzijl. The port of Moerdijk is located in the south of the Netherlands (close to the port of Drechtsteden) and is also included in 'other seaports'. The port of Moerdijk has the largest production of the 'other seaports', closely followed by Delfzijl. Moerdijk is known for the presence of companies in the "manufacture of basic chemicals and man-made fibres" sector. The port of Eemshaven has the smallest production figure of the selection.

5.10 Key indicators for selected sectors in 5 smaller Dutch ports

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Construction	1	55	2	249	162	87	102
Manufacturing	7	373	7	3,181	2,205	918	907
Transport, storage and communication	4	188	4	1,272	797	473	473
Wholesale trade	3	126	3	409	169	240	253
Total	14	742	16	5,111	3,332	1,718	1,736
2010							
Construction	1	70	2	323	211	113	113
Manufacturing	6	386	6	3,790	3,021	769	769
Transport, storage and communication	4	223	4	1,390	918	472	472
Wholesale trade	3	179	4	652	292	360	360
Total	15	858	16	6,156	4,442	1,714	1,714
2014							
Construction	1	62	2	290	190	100	102
Manufacturing	6	407	6	4,066	3,273	793	720
Transport, storage and communication	4	253	4	1,812	1,196	616	630
Wholesale trade	3	151	3	546	237	309	310
Total	13	873	15	6,714	4,897	1,817	1,762

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

⁴⁾ The number of employees working in the Royal Navy in Den Helder cannot be published because of confidentiality. All employees working in the sector 'defence' are registered centrally in The Hague in the company register of Statistics Netherlands.

6.

Activities at sea

The economic activities taking place on the DCS by Dutch resident companies are described in this chapter. It includes the extraction of oil and gas, fisheries, sea shipping, hydraulic engineering and the production of offshore wind energy. The next section presents an overview of all activities at sea together (i.e. key results), followed by a more detailed description of the different activities.

6.1 Key results

Chapter 4 presented that activities at sea accounted for just over 1% of the Dutch economy in 2005 and just under 1% in 2014.

6.1 Value added in constant prices for the activities at sea

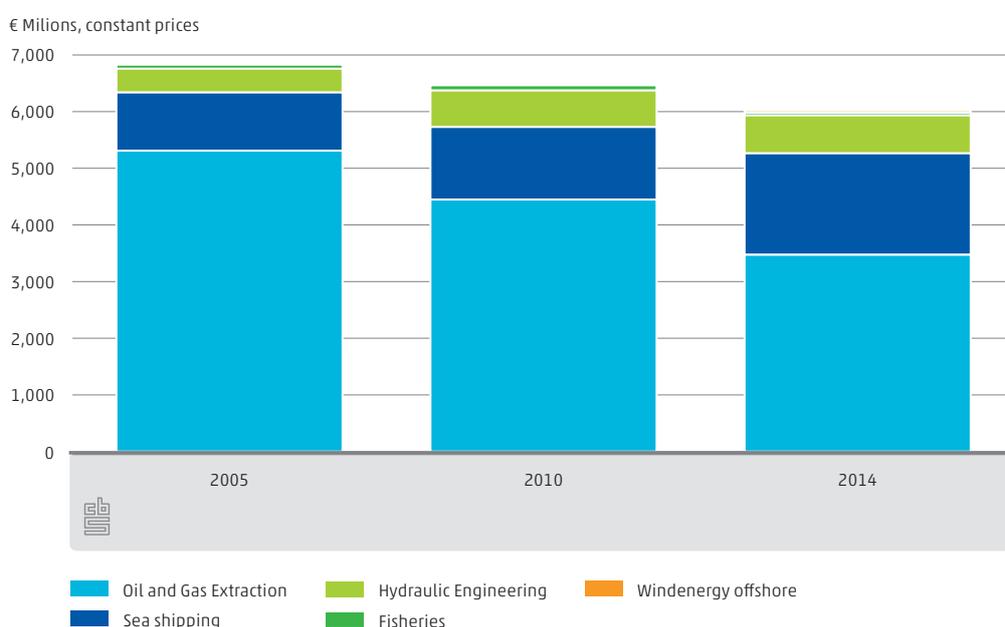


Figure 6.1 shows that the size of the North Sea economy in terms of the activities at sea has shrunk in real terms between 2005 and 2014. In 2014, value added was €6 billion, which constitutes a 12% reduction from the 2005 total of €6.8 billion. The above figure shows that this reduction stems mainly from reductions in value added from the Oil and Gas Extraction sector (which includes exploration activities). This is due to the combined effect of a drop in production over the period as well as inflationary pressure. In nominal terms, the DCS Oil and Gas sector expanded between 2005 and 2010, buoyed by a cold winter in 2010, which increased demand and gas prices. However, due to inflation in the sector between 2005 and 2010, this nominal expansion translated into a contraction in real terms. Inflation between 2010 and 2014 converted a 10% contraction in nominal terms into a 20% contraction in real terms. The hydraulic engineering and sea shipping sectors grew in real terms during this period, but this growth has not been sufficient to compensate for the real terms contraction in the Oil and Gas sector.

6.1 Economic key figures of the oil and gas extraction on the DCS

	2005	2010	2014
Number of employees	3.0	2.8	4.0
Compensation of employees	301	328	520
Number of employed persons	3.0	2.9	4.0
Production	5,451	5,298	5,077
Intermediate consumption	1,111	851	1,074
GVA	4,340	4,447	4,003
GVA (2010 prices)	5,310	4,447	3,473

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

6.2 Oil and gas extraction

The Netherlands has significant reserves of natural gas as well as some smaller oil deposits. Since their discovery, these stocks have been exploited to meet demand in the Dutch economy and to facilitate exports to foreign countries, thus contributing to the Dutch balance of payments. Extraction of natural gas and oil contributes significantly to GDP and to economic growth. Over the last twenty years, the benefits arising from oil and gas extraction, contributed on average 3% to total revenue of the Dutch Government.

On the DCS some oil but mainly natural gas is extracted. The value of production, intermediate consumption and value added of these activities is published annually in the Dutch Regional Accounts. In the regional accounts, an 'extra-territorial region' is defined, which comprises the territorial waters, the Dutch part of the continental shelf in the North Sea and the so-called territorial enclaves situated abroad (Dutch embassies, consulates, military bases, etc.)¹⁾. For oil and gas extraction, only the DCS is relevant. Table 6.1 shows key economic figures for oil and gas extraction on the DSC.

Compensation of employees and the number of employees display a large increase between 2010 and 2014. There are several possible reasons for such an increase. These include large projects such as the construction or decommissioning of oil platforms. Another possible explanation is the discovery of new reserves in the Dutch North Sea in 2013. Activities surrounding the discovery and surveying of new reserves are included within these accounts.

¹⁾ The Dutch national accounts refer to the economic territory of the Kingdom of the Netherlands in Europe. The Dutch section of the continental shelf in the North Sea is also regarded as a part of that economic territory. The economies of the countries of the Kingdom of the Netherlands outside Europe (Curaçao, Sint Maarten and Aruba) are not described in the Dutch national accounts. The islands Bonaire, Sint Eustatius and Saba are indeed part of the Netherlands but are also not included in the national accounts.

6.3 Fisheries

Unlike the extraction of oil and gas, the Dutch Regional Accounts do not provide figures specifically for other relevant activities on the DCS. In the regional accounts economic activities are generally allocated to the registered address of the companies on land. Oil and gas extraction is thus an exception. For fisheries, economic activities are allocated to the ports where the fishing vessels are registered.

The fishing sector in the Netherlands consists of cutter fisheries, large-scale high sea fisheries, mussel farming and aquaculture. Mussel farming and aquaculture do not take place on the DCS. For mussel farming, there is a relationship with the North Sea because the sea provides salt water. Mussels are generally harvested from either the Wadden Sea or the Oosterschelde, thus outside the geographical boundaries of this study.

6.2 Economic key figures of the (Dutch) fisheries

	DCS			Total Netherlands		
	2005	2010	2014	2005	2010	2014
Number of employees	0.3	0.3	0.3	1.2	1.0	1.1
Compensation of employees	13	16	14	55	50	59
Number of employed persons	0.7	0.8	0.6	3.0	2.5	2.5
Production	131	168	108	540	531	450
Intermediate consumption	52	75	50	215	238	209
Value added	79	92	58	325	293	241
Value added (2010 prices)	72	92	48	296	293	201

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

The results are presented in table 6.2. For purposes of comparison the table includes figures for the entire Dutch fishing sector. This shows that the Dutch fishing industry is much larger than just the DCS fishery. Dutch vessels are active outside of Dutch waters both within and outside of the North Sea. Further, fisheries in other geographical areas, such as those exploited off the west coast of Africa, involve different fish species and different production technologies. Therefore, the Dutch DCS fishery is not representative of the Dutch fishing sector in its entirety.

For the DCS, the trend is complicated by the fact that 2010 was an abnormally good year for fishing on the DCS. This is due to higher prices for sole and prawns in 2010. This price of sole is particularly influential for the success of DCS fisheries because, along with plaice, it constitutes the most important commercial species. To identify trends, it is better to compare 2005 to 2014. Such a comparison shows an industry which is declining on all measures except for the number of employees and compensation. This indicates that the number of self-employed has declined over the period and that the profitability of the sector is under pressure.

Fisheries by non- residents on the DCS

Other nations also fish on the DCS alongside Dutch companies. The value of these activities is not included in the previous estimates because foreign activities do not contribute to Dutch GDP. It is not possible to give an estimation of the portion of economic activity of other nations on the DCS. It is however, possible to give an indication based on the proportion of Dutch versus foreign activity using data available for the two ICES (International Council for the Exploration of the Seas) areas in which the DCS is located (IVb and IVc). These ICES areas run across the continental shelves of several other nations as shown in figure 6.1.

6.2 ICES areas that overlap with the Dutch Continental Shelf



Source: http://nl.wikipedia.org/wiki/Nederlandse_Exclusieve_Economische_Zone adapted by Statistics Netherlands for ICES areas.

Table 6.3 shows the share of the Dutch fisheries in the relevant ICES areas. In area IVc, of which the DCS overlaps about half its surface, the share of Dutch fisheries in tonnes caught is about 50% which is considerably larger than in area IVb. Area IVb is mainly fished by Danish fishing vessels.

6.3 Catch by Dutch Vessels and total tonnes caught in relevant ICES areas

	2005	2010	2014
NL			
ICES IVB	42	28	56
ICES IVC	65	53	50
Total			
ICES IVB	602	686	760
ICES IVC	128	127	107
NL/Total			
ICES IVB	7%	4%	7%
ICES IVC	51%	41%	47%
IVB and IVC	15%	10%	11%

Tonnes x 1,000.
Source: www.ices.dk.

The value of production depends on the species caught and the price per tonne, but the tonnes caught are indicative for the share of the Dutch fisheries (residents) on the DCS.

6.4 Sea Shipping

The North Sea is important for marine traffic and its shipping lanes are among the busiest in the world. Though inland vessels may sometimes use the DCS, sea shipping is the most relevant sector. Sea shipping includes the transport of both cargo and passengers.

The vessels of the Dutch operators may fly the flag of another territory. The ownership of the vessels operated by Dutch residents can therefore be with a foreign company. Ships operated by foreign sea shipping companies use the DCS for transport to and from Dutch seaports as well as simply sailing through. The value of these activities is not included in the economic figures as foreign activities do not contribute to Dutch GDP.

Unlike the sea shipping and oil and gas sectors, the total national figure is used for the valuation of the DCS, rather than splitting the sector into its DC and none-DCS components. This is because the DCS provides the international accessibility which facilitates the entire Dutch sea shipping sector.

6.4 Economic key figures of the (Dutch) sea shipping sector

	2005	2010	2014
Number of employees	5.8	6.9	7.3
Compensation of employees	368	482	546
Number of employed persons	9.1	9.1	9.5
Production	5,524	5,035	6,099
Intermediate consumption	3,936	3,754	4,483
GVA	1,588	1,281	1,616
GVA (2010 prices)	1,027	1,281	1,790

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

Table 6.4 presents the figures for the shipping sector. Decreases in GVA, production and intermediate consumption in 2010 can be attributed to reduced global demand, and the concordant reduction in goods shipped, in connection with the financial crisis. However, between 2010 and 2014, GVA in the sea shipping sector grew by 39% (real terms), which is considerably greater than the growth in GVA for the Netherlands as a whole, which was 3.1%.

6.5 Hydraulic engineering

The sector hydraulic engineering includes the construction of dykes, shipping channels and ports, dredging works and land reclamation to reinforce beaches and waterfronts of rivers and canals. Table 6.5. presents the estimated figures for hydraulic engineering. It illustrates a clear increase over the years for all indicators, also for value added in constant prices which implies a real economic growth.

6.5 Economic key figures of Hydraulic engineering by Dutch companies

	2005	2010	2014
Number of employees	4.9	6.9	8
Compensation of employees	271	431	538
Number of employed persons	5.3	7.6	8.8
Production	1,142	1,962	2,382
Intermediate consumption	817	1,318	1,618
GVA	325	644	764
GVA (2010 prices)	420	644	670

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

6.6 Offshore wind energy

The Netherlands has been using the DCS for the generation of wind energy since 2006. In 2014, 748 kWh of electricity was produced by offshore wind farms (Statistics Netherlands, StatLine, January 2017). This equals 13 percent of the total national production of wind energy, a bit less compared to the 17 percent in 2010.

One might expect that the economic key figures, presented in table 6.6, would increase over time because the production of offshore wind energy has increased from 679 kWh in 2010 to 748 kWh in 2014. However, the corresponding electricity prices and product-based SDE subsidies have decreased which resulted in a decrease in the production value. Also, the decrease in prices explains the increase in real terms GVA. One should also note that the exploitation (i.e. production) of wind energy includes operation and maintenance activities, but it does not include activities relating to the manufacture, transport or construction of wind turbines and the associated infrastructure.

Wind energy production (i.e. during the exploitation phase) is relatively labour extensive. The number of employed persons only includes those who are directly involved with the operation and maintenance of the turbines. Both the small size of this activity and the capital intensive nature of the activity explain why this activity does not contribute much to employment once offshore wind farms are operational.

6.6 Economic key figures of the production of offshore wind energy.¹⁾

	2005	2010	2014
Compensation of employees	-	2.2	2
Number of employed persons	-	0.04	0.04
Production	-	90	80
Intermediate consumption	-	55	45
GVA	-	35	35
GVA (2010 prices)	-	35	39

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

¹⁾ No data is available on the number of employees for this sector. In the previous version of this report, it was assumed that the number of employees is equal to the number of employed persons.

7.

International

comparison

The previous sections have provided data and analyses to give insight into the Dutch North Sea Economy. In this section, it is attempted to use readily available data in order to compare the importance of the "maritime economy" of the OSPAR countries. In this section we consider the following countries: Belgium, Denmark, France, Germany, Iceland, Ireland, The Netherlands, Norway, Portugal, Spain, Sweden and United Kingdom. In order to do so, readily available data from Eurostat (the EU statistics service) will be considered. Two OSPAR countries; Switzerland and Iceland, do not contribute data to Eurostat because they are not EU countries. Because there are no Eurostat data available for these countries, they are not included in the analysis. Further, while Luxembourg is an OSPAR nation, it has no coast and as such it is excluded from the analysis. Norway is not a member of the EU, but has contributed some data to Eurostat.

Eurostat does not provide the same level of detail as the data which is available internally to Statistics Netherlands. The principal shortcoming of Eurostat data in this context is the lack of data at both sector and NUTS-3 level. This means that it is not possible to select given sectors for given spatial areas as is done in this study. Further, because Statistics Netherlands does not have access to the micro-data of other countries, it is not possible to make selections based on postcode data as has been done in this study. An additional shortcoming is that Eurostat provides in certain cases fewer indicators than are available internally to Statistics Netherlands. These issues combined mean that any attempts to compare the importance of maritime economies of OSPAR countries will suffer from several shortcomings. In this section, it is attempted to make such comparison. Shortcomings of the results are discussed and suggest some possible ways to obtain more accurate insights into the relative importance of maritime economies are suggested.

7.1 Method

The following data are available on Eurostat (with the Eurostat filename in brackets)

- GDP at current market prices by NUTS-3 regions (nama_10r_2gdp)
- A list of maritime regions (mare_demo)

Maritime regions are defined by Eurostat as NUTS-3 regions which meet at least one of the following criteria:

- The region has a sea border
- The region has more than half of its population within 50 km from the sea
- The region is Hamburg¹⁾

The most recent year for which the data are complete is 2013. Therefore data are obtained for the years 2005, 2010 and 2013. The first step in the data preparation is to select the appropriate OSPAR countries. The second step was to sum the data per maritime region to the level of the country. Thereafter, a selection was made for the Eurostat defined maritime regions.

¹⁾ The German NUTS3-region of Hamburg does not correspond to the above 2 criteria but has been added to the list of EU coastal regions by Eurostat due to its strong maritime influence.

7.2 Results

The results are shown in table 7.1.

7.1 The percentage of GDP generated in maritime regions for selected OSPAR countries

	2005	2010	2013
Denmark	96%	97%	97%
Ireland	96%	97%	97%
Sweden	84%	84%	84%
Norway ¹⁾	NA	NA	74%
Finland	69%	70%	70%
Spain	58%	57%	54%
The Netherlands	53%	53%	53%
The United Kingdom	39%	38%	38%
Belgium	33%	33%	33%
France	31%	30%	30%
Portugal ²⁾	33%	33%	20%
Germany	9%	9%	8%

Source: CBS.

¹⁾ No data are available for Norway for 2005 and 2010.

²⁾ The number of regions for which data is available increases in Portugal in 2013. This results in a lower percentage in 2013.

Table 7.1 shows some results that are to be expected. For example, percentage of national GDP generated in the maritime regions is the lowest in Germany. This is expected because Germany has a very small coastline. Countries with relatively longer coastlines come higher up the list. These are often islands (such as Ireland) or long, thin coastal countries such as Norway. Portugal is also a long thin country but the NUTS-3 regions in Portugal only spread a short distance in land, whereas those in Norway frequently spread from the coast to the border with Sweden. The United Kingdom is also an island, but it is larger than Ireland, it has an industrial heartland to which the maritime NUTS-3 regions do not extend, and finally, London is not part of a maritime region. NUTS-3 regions are defined mostly according to pre-existing administrative borders with countries. The extent to which NUTS-3 regions are appropriate for analysing the maritime economy therefore varies.

Table 7.1 shows that just about 50% of GDP is produced within maritime regions. Table 4.1 gives the percentage of GVA which is generated by the Dutch North Sea economy as about 4%. This difference occurs because the maritime regions include a larger spatial area and because all economic sectors are included in the analysis of maritime regions. The difference may also occur due to the difference between GDP and GVA, which in turn depends on the magnitude and sign of the difference between product related taxes and product related subsidies.

The question is then what these results can tell us about the relative importance of the maritime economy. Problematically, the inclusion of all economic activity within the maritime regions means that, for example, practically all economic activity in Ireland is included in the maritime economy because the centres of government, finance and industry (Dublin and Cork) both are located within the maritime regions, and all but one Irish region is a maritime region.

Without being able to select sectors which are relevant for the maritime economy (as has been done for the Dutch North Sea economy), presenting figures as above predominantly gives insight into the distribution of economic activity within the topography of a nation. Thus, if a nation has a lot of coastline and the centres of finance, government and industry are located close to that coastline, then the results will represent that. There is unfortunately only a very weak link between the above figures and the extent to which proximity to the sea drives the economic importance of maritime regions.

The most promising avenue to achieve a comparison between the economic importance of the maritime economies for OSPAR nations would seem to be to have all the individual countries perform analyses similar to the one carried out in Chapters 1 through 7 of this study. If methodological coordination is sufficient then these results should be comparable.

An alternative approach is to be more flexible with the indicators which are used. The indicators explored in this section are those which are used in the national accounts. Other indicators of economic activity may also be able to provide useful insights and allow comparison between countries. The following data sources may be of use:

- Gross inland wind energy consumption (file name: nrg_107a);
 - Fishing statistics including;
 - Total catches in tonnes (filename: fish_ca_main);
- Aquaculture production in tonnes (filenames: fish_aq_q and fish_aq2a);
- Maritime transport in goods in tonnes (filename: mar_go);

The drawback of this data is that it does not facilitate comparison to other sectors. It is for example not possible to make inferences regarding the relative importance of the fishing and maritime transport sectors by comparing catches and shipping tonnage. However, because the data are Eurostat data, it is consistent such that comparisons can be made between countries and over time.

8.

**Feasibility of the
use of OSPAR sectors**

The Oslo-Paris (OSPAR) Convention for the Protection of the Marine Environment of the North-East Atlantic is a legislative instrument regulating international cooperation on environmental protection in the North-East Atlantic. The work carried out under the convention is managed by the OSPAR commission. The first Economic and Social Analysis (ESA) report for the OSPAR region has been published in 2011 to help coordinate ESA analysis across the OSPAR region. The figures published by Statistics Netherlands in the report 'economic description of the North Sea for the Netherlands' (Statistics Netherlands, 2014) served as input for the Dutch social and economic analyses of the use of the North Sea, which were subsequently used in the ESA for the OSPAR region.

The following economic activities are identified as sectors of which most countries can collect data: Commercial Sea Fisheries, Tourism and Recreation, Ports and Shipping, Aquaculture, Oil and Gas, Renewable Energy, and Aggregate Extraction. Most of these activities are already described in the previous chapters of this report, like commercial sea fisheries, ports and shipping and oil and gas. Some are described but more specification is desired; tourism and recreation, renewable energy and aggregate extraction. Lastly, aquaculture has not been presented at all yet. Besides OSPAR ESA report, the Blue Growth Strategy¹⁾ also emphasizes specific sectors. In many cases, these sectors parallel the OSPAR sectors or are not relevant for the Netherlands. However, two Blue Growth sector, namely marine biotechnology and Ocean Energy and Seabed mining are sectors which may be relevant for the Netherlands, and for which more specification is desired. Producing statistics according to OSPAR or Blue Growth sectors increases the usability and international comparability of the data. This chapter will therefore consider the following sectors;

- Aquaculture (OSPAR)
- Sand and gravel extraction (OSPAR)
- Tourism and recreation (OSPAR)
- Ocean energy and seabed mining (Blue growth)
- Marine biotechnology (Blue growth).

For each sector, the feasibility of producing statistics to describe these sectors is investigated. This investigation takes into account the availability of data, the best available methodology, and whether the best available methodology results in statistics which are of sufficient quality. Where possible, figures are presented for the years 2010 and 2014. Presenting figures is not possible because the data for 2005 are aggregated at a higher level since the revision.

8.1 Aquaculture

Aquaculture plays only a minor role in the Dutch economy. The aquaculture sector in the Netherlands can be divided into two sub-sectors: shellfish culture and finfish culture. Shellfish culture takes place in the estuarine waters in the southwest Netherlands and in the shallow Wadden Sea in the north of the country. The farming of finfish for consumption purposes takes mainly place in heated recirculation aquaculture systems,

¹⁾ https://ec.europa.eu/maritimeaffairs/policy/blue_growth_en

plus some outdoor rainbow trout farms. The fish farms are spread over the whole country and can be found in all provinces with a slight concentration in the southern provinces.

Methodology and analysis

Aquaculture is part of the economic activity NACE 03 - Fishing. Figures on production, intermediate consumption and value added of fishing can therefore be drawn from the National Accounts. In order to allocate a share of NACE 03 to aquaculture, internally available Statistics Netherlands data are used relating to production value for finfish aquaculture (inland fish farming) and the production value of shellfish aquaculture (estuarine). The data on production value acts as a division key to divide all of the indicators. Ideally, different division keys for each of the indicators would be used. Production value is a highly appropriate division key for production, but a less appropriate division key for value added, and an even less appropriate division key for number of employees. However, it is still judged to be possible to employ this division key to produce statistics for the aquaculture sector as a whole. Importantly, these statistics do not refer to economic activity on the DCS because, to the best knowledge of the authors, there is no aquaculture activity taking place on the DCS. The statistics refer to the aquaculture sector as a whole, which includes both inland finfish aquaculture and estuarine shellfish aquaculture. It has not been possible to find suitable division keys to separate the aquaculture industry into finfish and shellfish aquaculture.

Table 8.1 shows the economic key figures of aquaculture in the Netherlands for 2010 and 2014. Aquaculture contributes for 29% to the fishing sector in 2014, which is slightly more than in 2010 (26%). See Chapter 6.3. for the economic figures of the total fishing sector. The number of employed persons has increased over the years and so did the compensation of employees. The production value and value added however decreased between 2010 and 2014. This trend results from the trend in the total fisheries sector, which showed higher GVA (2010 prices) in 2010 than in 2005 or 2014. This shows that these results are best considered as indicators of the magnitude of the aquaculture sector, and that they are less suitable for determining trends.

8.1 Economic key figures finfish and shellfish aquaculture

	2010	2014
Number of employees	0.3	0.3
Compensation of employees	12.9	17.4
Number of employed persons	0.6	0.7
Production	136.5	133.0
Intermediate consumption	61.2	61.8
GVA	75.3	71.2
GVA (2010 prices)	75.3	59.4

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

8.2 Sand and gravel extraction

Sand and gravel are not only collected from the mainland, but also from the North Sea. They are often used for land reclamation such as the extension of Rotterdam harbour, for the protection of the coast (e.g. in sand engines²⁾), for maintaining shipping channels on the DCS and as fill sand for infrastructure projects. In Chapter 6 dredging and land reclamation has already been addressed as part of "hydraulic engineering and civil engineering". This section considers the feasibility of identifying only marine sand and gravel extraction, as opposed to considering the broader hydraulic engineering and civil engineering in which the activity of land reclamation and dredging takes place.

Methodology and analysis

The method is based on that outlined in a report by Ecorys (2013b). Sand and gravel extraction (including marine aggregates) are part of both NACE 081 (quarrying of stone, sand and clay and NACE 099 (support activities for other mining and quarrying). It is therefore required to split both NACE 081 and NACE 099 into their constituent marine and non-marine parts and then sum the marine elements. The share of the specific activities from the aggregated NACE can be drawn from the Statistics Netherlands business statistics. Data from UEPG (European Aggregates Association) can be used to allocate the data from NACE 081 and 099 between marine and non-marine. The UEPG publishes data on aggregates production, both marine aggregates and sand and gravel production³⁾. Under the assumption that GVA and employment per unit of production are the same on- and offshore, the ratio can be used to calculate GVA and employment for the marine aggregates.

Table 8.2 shows the estimated economic figures of sand and gravel extraction on the DCS. These figures are much smaller than the figures published under hydraulic engineering. This because it only considers of the extraction of marine sand and gravel extraction, while hydraulic engineering includes more labour intensive and economically high-value activities.

8.2 Economic key figures marine gravel and sand extraction.

	2010	2014
Number of employees	0.3	0.3
Compensation of employees	19.5	21.9
Number of employed persons	0.3	0.3
Production	138.1	132.6
Intermediate consumption	77.7	78.1
GVA	60.5	54.5
GVA (2010 prices)	60.5	51.9

Source: CBS.
Employment figures x 1,000 FTE, monetary values x €1,000,000.

²⁾ <http://www.dezandmotor.nl/en/>

³⁾ <http://www.uepg.eu/statistics/estimates-of-production-data/data-2014>

8.3 Tourism and recreation

Given the importance of tourism and recreation in the economy of the Netherlands, and likewise in many other countries, a harmonised system of Tourism Satellite Accounts (TSA) has been developed (2008 Tourism Satellite Account: Recommended Methodological Framework). It uses the same concepts, definitions and classification as national accounts and it is the internationally recognised framework for measuring tourist activity and the importance of tourism to national economies. The definition of the tourism and recreation industry in the TSA is broad, and includes activities such as air travel relating to tourism.

The question at hand is the feasibility of presenting figures on tourism and recreation which is related to the Dutch North Sea. A similar question has been posed by Portugal. Portugal has developed a special Satellite Account for the Sea, which includes economic activities that take place at sea and others that are not taking place at sea but depend on it, including marine natural capital and non-tradable services of marine ecosystems (OSPAR ICG-ESA, 2017). Recreation, sports, culture and tourism is one of the estimated activities of the Portuguese ocean economy. It contributes for 35,5% to the total GVA at the ocean economy. It includes activities related to boating and coastal tourism, of which the figures are based on the Tourism Satellite Account among other sources.

Statistics Netherlands produces a National Tourism Satellite Account but it does not produce a Satellite Account for the Sea. It is therefore not possible to directly apply the Portuguese method using available Dutch statistics. In this section we do not explore the possibility to create a satellite account for the sea. Instead we consider the possibility to derive an estimate of the tourism and recreation related to the Dutch North Sea using existing accounts and data.

The Dutch Tourism Account has a time series from 2010 onwards. The main sources used are the Continuous Holiday Survey, Continuous Leisure Survey, Statistics Incoming Tourism and Continuous Business Travel Survey, and the national accounts (Statistics Netherlands, 2014b). The tourism accounts comprise the activities of persons traveling to and staying in places outside their usual environment for leisure, business travel and other activities not related to activities that are remunerated from the place visited. Importantly, this includes the activities of Dutch residents in the Netherlands with respect to tourism in other countries. For example travel agent services, travel in the Netherlands and travel outside of the Netherlands via Dutch transport providers. More than half of the expenditure on tourism and recreation in the Netherlands occurs in the context of Dutch residents engaging in tourism in the Netherlands (Statistics Netherlands, 2014b).

In order to obtain estimates for the tourism and recreation related to the North sea, it is necessary to obtain suitable division keys which can allocate a share of the Tourism Account to the Dutch coastal area (incl. the ports). The aim being to isolate the activities of travelling within and engaging in tourism activities within the Dutch coastal area. There are two statistics within the tourism accounts to which division keys could be applied, namely employment and GVA. The best possible approach to division keys would be to take the shares of employment and GVA occurring in the coastal area and the seaports to the total Dutch economy. This would be done per economic activity.

The feasibility of doing so depends on whether the application of these division keys to Tourism Accounts will produce meaningful statistics. To answer this question, the assumption behind the application of the division key needs to be evaluated. Specifically, the application of the division key relies on the assumption that the share of the tourism and recreation within a sector is uniformly spread throughout the country. This is problematic because many touristic and recreational activities are concentrated in specific parts of the country. Therefore the touristic share of an economic sector is likely to be bigger in one area than in another.

Despite the drawbacks of this assumption, an estimation of GVA and employment has been made for the tourism and recreation in the North Sea economy, based on the proposed methodology. Due to confidentiality and the experimental status of the estimation, the results cannot be published on a more detailed sector level. Relatively big contributors to the tourism sector in the north sea economy are expected to be 'Accommodation; food and beverage service activities', 'Travel agency', 'Tour operator reservation services and related activities' and 'Sports activities and amusement and recreation activities'. Air transport is also an important aspect of tourism, while there are no airports in the coastal area. Additionally, Amsterdam, which falls outside of the coastal area is very dominant in terms of foreign tourism. For these reasons, the results are biased towards overestimation. The results should therefore be considered as a rough estimation which is biased towards overestimation. The results are presented in Table 8.3. This has been a first attempt to estimate figures on tourism and recreation based on the tourism satellite accounts for a specific region in the Netherlands. More research is desired to improve the estimation.

8.3 Economic key figures tourism and recreation

	Employed persons		Value added	
	2010	2014	2010	2014
North sea tourism and recreation	30	36	1 897	2 654
Total tourism and recreation	338	365	17 300	21 200
Share	9%	10%	11%	13%

Source: CBS.

Employment figures x 1,000 FTE, monetary values x €1,000,000.

Ocean energy and seabed mining

Ocean energy is still in the development phase in the Netherlands. There are some pilots, but ocean energy is not yet being produced on a commercial scale (with the possible exception of a scheme in the province of Zeeland). Hence, it is not feasible to estimate an economic figure on this. Regarding seabed mining, there are a few companies to publish figures while guaranteeing the privacy of these businesses. The best available estimate is that there are only two companies⁴⁾ involved in this.

Marine biotechnology

According to the OECD, marine biotechnology is the transformation of raw materials by biotechnological processes. It is the application of science and technology to living

⁴⁾ <http://dekennisvannu.nl/site/artikel/Schatten-in-de-diepzee/7030>

organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services. According to a report by OECD it is difficult to extract any meaningful information from the available data, as most of the firms involved in the marine biotechnology sector are included either in a category which encompasses all research and development in natural sciences and engineering or are part from a larger sector (pharmaceuticals, cosmetics, industrial chemistry). Most estimations have been based on a selection of businesses⁵⁾.

It is therefore not possible to allocate a portion of national accounts to the marine biotechnology industry, as has been the general approach in this study. It may however be possible to adopt a micro-data approach. This would entail firstly acquiring a list of businesses involved in the marine biotechnology sector along with estimates of the share at which those business generate revenue through the provision of marine-biotechnological goods and services. The feasibility of producing such as list would depend predominantly on the ability to identify such businesses and obtain information on their marine-biotechnology share. Statistics Netherlands could then link the list of businesses to the General Business Registry. This would facilitate estimations of the revenue of the marine biotechnology sector, and possibly other indicators, depending on if the businesses in question are included in the Production Statistics⁶⁾. The extent to which this is feasible would depend on the number of business identified as active in this sector.

⁵⁾ <http://www.oecd.org/sti/biotech/keybiotechnologyindicators.htm>

⁶⁾ <https://www.cbs.nl/en-gb/our-services/methods/surveys/korte-onderzoeksbeschrijvingen/production-statistics>

9.

Evaluation of

methodology and

recommendations

9.1 Activities on land and at sea

There are a number of strengths and weaknesses in the methodology employed in this report. In this chapter, these strengths and weaknesses are discussed, with a particular focus on ways to address the weaknesses and strengthen the methodology.

The figures presented in this report are based on figures from the national accounts or the regional accounts. The national or regional figures are recalculated to specific geographical areas: the Dutch Continental Shelf, the selected seaports or the coastal area. An important strength of this study comes from using data from the national accounts. This means that the concepts and definitions used are consistent and based on international definitions. Other advantages are that the data sources are produced annually and that time series are available. Since data are published per sector, it is possible to analyse the economic structure of the areas of interest.

Part of the methodology used in the economic analysis for river basins (Brouwer et al., 2005) is adopted in this study to analyse the seaports and the coastal area. An advantage is that different types of areas are estimated in a similar way. A drawback of this methodology is that it allocates production to the location where employees are recorded in the 'company register' of Statistics Netherlands. When the 'administrative location' differs from the actual production site, the results may not be precise. Especially for seaports, where large companies with multiple locations are present, this is likely to result in underestimating the economic value generated in this region for these economic activities. This problem is partly solved by allocating total figures for the larger region (NUTS-3) to a seaport for some relevant sectors. This methodological problem is less substantial for the river basin analysis because these geographical areas are much larger.

For the estimates of economic activities on the DCS (activities at sea) the starting point for the analysis is always the data of the National accounts. As a second step, several different sources were used in order to allocate the activities (national data) to different geographical areas (source for allocation differs per activity). The figures for production of wind power on the DCS are based on readily available Statistics Netherlands statistics. For fisheries, external sources were used to allocate the national figures to the DCS. For the number of employees in the offshore oil and gas extraction data supplied by State Supervision of Mines were used. The figures on production, intermediate consumption and value added in this sector were taken from the Regional accounts of the Netherlands.

The following methodological weakness relates to the use of external data for the fisheries sector. Although the fisheries sector appears to constitute a relatively small share of the Dutch North Sea economy, it is still important to ensure that it is accurately represented. To achieve this, Wageningen Economic Research can derive up to date division keys to split the fisheries sector between the DCS other areas using spatial data on fishing time. This would be more accurate than the current division keys, which are based on older data.

In general, it is difficult to capture all economic activity related to the Dutch North Sea economy in the statistics. For example, we have not been able to isolate the economic

activities surrounding the construction of wind turbines at sea. It is also important to maintain awareness of new economic activities which may be included in the analysis in the future. Current developments in the port of Eemshaven and the port of Rotterdam include the construction of power plants. These sites are supplied by means of transport over water. In addition, the sea provides a direct access to cooling water. This activity could be depended upon a port location. Methodological issues were the main reason for excluding this sector as a relevant sector so far. If this activity becomes more prominent in the future in sea ports, it is recommended to examine the feasibility of an alternative methodology in order to compile statistics for these relevant activities.

9.2 Comparing OSPAR countries and using OSPAR sectors

This study has also attempted to make an international comparison of the importance of the North Sea for between OSPAR countries on the basis of Eurostat data. Although it is possible to make some superficial comparisons, the unavailability of statistics per sector per NUTS-3 region significantly hampers attempts to make meaningful comparisons about the relative importance of the maritime economy. The best course of action would be to compare studies such as this one which are produced by other OSPAR countries and to, as far as is practical, ensure that the methodology is consistent between countries. Alternatively, other indicators, such as tonnes shipped by sea or tonnes of fish caught may be useful indicators.

The analysis of the feasibility of presenting data for the OSPAR sectors has resulted in statistics presented for three sectors: sand and gravel extraction, aquaculture and tourism and recreation. Due to the lack of aquaculture on the Dutch North Sea, the aquaculture figures are only of marginal relevance. Should aquaculture become a more important industry on the North Sea, then efforts can be made to produce statistics for this part of the aquaculture industry. The method for sand and gravel extraction seems to be an improvement on the method described in Chapter 3 and used in Chapter 6.5. It is therefore recommended to consider employing this method in future versions of this report. The figures for tourism and recreation are experimental and constitute an overestimation of the tourism and recreation sector in relation to the North Sea. More research is required to determine the extent to which the results are overestimations, to consider ways to correct this bias, and to evaluate the possibility to create a "Satellite Account for the Sea" as has been carried out in Portugal. The latter would likely be a time consuming endeavour.

There have been no statistics presented for marine biotechnology or for ocean energy and seabed mining. For marine biotechnology, an approach is required which would combine data from marine biotechnology businesses themselves and Statistics Netherlands micro-data. Such research is time consuming and therefore has been implemented as part of this project. For ocean energy and seabed mining, it is currently not possible for Statistics Netherlands produce statistics on this sector due to the very small number of business involved, and the concordant problems with data privacy.

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Port of Eemshaven: <http://www.eemshaven.com>

Port of Vlissingen: <http://www.zeeland-seaports.com>

European Commission: http://ec.europa.eu/environment/water/marine/index_en.htm

Helpdesk water/NAMWA: <https://www.helpdeskwater.nl/onderwerpen/wetgeving-beleid/nationaal/economische-aspecten/namwa/>

Appendix 1:

Reasons for deviations between pre- and post-revision results

There are several reasons for the differences between the pre- and post-revision results. Statistics Netherlands collects over time a large set of ways to improve the national accounts and then applies these improvements in one go. When this is done, the improvements are also applied to previous year's data in order to provide a consistent time series. These changes included:

- Changes to the source data. A central source of data for the national accounts are the production statistics, which are constructed from a sample of businesses. Business may be added or removed from the production statistics.
- Changes to the categorisation of businesses. The sector classification of business may be improved. For example, the popular Dutch restaurant chain La Place was categorised in retail due to its association with department store V&D. La Place has been now been placed in the appropriate NACE category for restaurants.
- The registration of trade margins. Only trade margins and not totals are included in the accounts. Consider a supply chain where freshly extracted crude oil is sold to a trader who then sells it the refinery. Previously, the total value of the purchase and sale of the oil by the trader was included in the accounts. In the revised data, only the difference between the purchase and sale price is included.

Appendix 2

Exposure hours for companies and contractors in crude petroleum and natural gas production and support activities

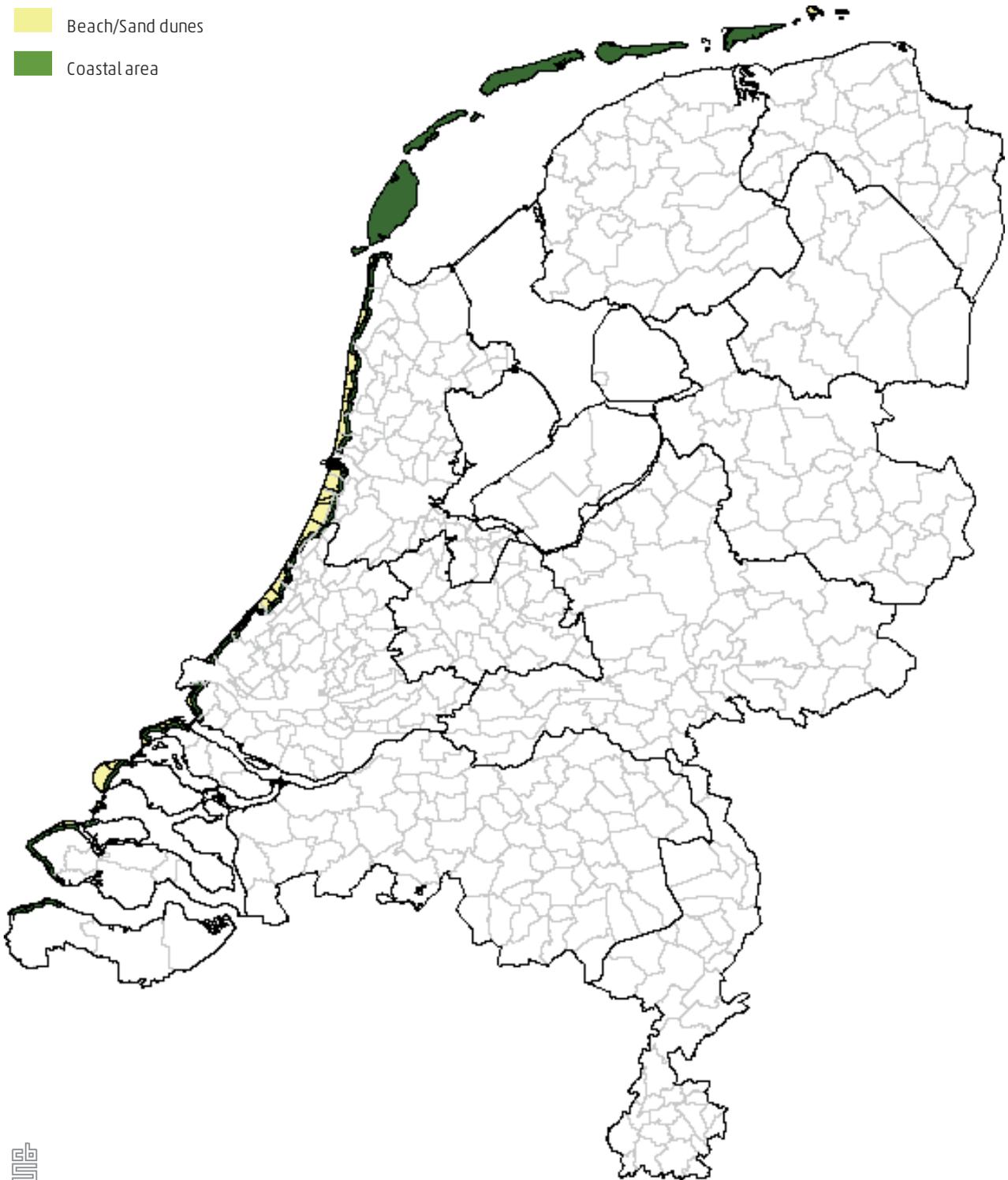
	2005	2010	2014
ONSHORE			
Exposure hours Company	2,417,609	2,289,623	3,489,622
Exposure hours Contractors	3,851,575	5,649,990	6,433,127
Total exposure hours	6,269,184	7,939,613	9,922,750
OFFSHORE			
Exposure hours Company	1,019,814	980,746	2,162,963
Exposure hours Contractors	5,258,791	5,731,817	7,580,467
Total exposure hours	6,278,605	6,712,563	9,743,430
Total general exposure hours	12,547,789	14,652,176	19,666,180

Source: State Supervision of Mines.

Appendix 3

Map of the coastal area

- Beach/Sand dunes
- Coastal area



Appendix 4

Map of the selected seaports

■ Seaports



Appendix 5

Selected scenarios

Area of Interest	Selected scenario	Explanation
Coastal area	B	The one kilometre wide strip used to define the coastal area is a pragmatic decision based on topography and geography of economic activity in the Netherlands. As the partition of a postal code can be disputed, the more flexible scenario B is chosen.
Seaports		
Rotterdam	A	The area of interest has been increased by including more postal codes than only the port itself. Hence, the stricter scenario A is preferred, whereby a portion of the economic activity in the relevant postal area is included in the totals.
Amsterdam	A	Scenario A is preferred because of the intensive economic use of the area surrounding the port for diverse economic activities.
IJmuiden cluster	A	Because the most important sector 'basic metal' has already been fully included, the downsides of choosing scenario A are negated.
Drechtsteden	A	Since this port consists of a few small geographical areas within an urbanised region, scenario A is preferred. This scenario may result in a better estimate for postal codes which are included for a small part in the port.
Vlissingen	B	Option B is preferred because the port of Vlissingen is surrounded by agricultural land. This suggests that including all the activity in the relevant postcodes in the best way to represent economic activity in the relevant port sectors.
Terneuzen	B	Two of the three main port areas are predominantly surrounded by non-urban land. Therefore, like the port of Vlissingen scenario B is preferred.
Other seaports		
Eemshaven	B	For all five seaports discussed in this section scenario B is preferred over A. For small ports areas the share of the surface area of the port in the postal codes concerned is generally small. In scenario A this results in the allocation of a small share of the companies located in the postal code to the seaport.
Harlingen	B	
Moerdijk	B	
Delfzijl	B	
Den Helder	B	

Appendix 6

6.1 Port of IJmuiden

	Production (x €1,000,000)	
	Scenario A	Scenario B
2005		
Manufacturing	4,198	4,484
Wholesale trade	129	278
Transport, storage and communication	260	472
Construction	129	325
Financial and business activities	298	709
Other sectors	180	640
Total	5,194	6,908
2010		
Manufacturing	4,512	4,809
Wholesale trade	213	395
Transport, storage and communication	264	459
Construction	151	412
Financial and business activities	334	819
Other sectors	516	1,058
Total	5,991	7,951
2014		
Manufacturing	4,230	4,516
Wholesale trade	152	359
Transport, storage and communication	269	582
Construction	157	378
Financial and business activities	428	899
Other sectors	300	792
Total	5,536	7,526

6.2 Port of Drechtsteden

	Production (x €1,000,000)	
	Scenario A	Scenario B
2005		
Manufacturing	1 425	3 062
Wholesale trade	695	1 225
Transport, storage and communication	324	665
Construction	633	1 466
Financial and business activities	492	1 280
Other sectors	278	1 273
Total	3 848	8 970
2010		
Manufacturing	1 696	3 793
Wholesale trade	968	1 633
Transport, storage and communication	528	990
Construction	796	1 866
Financial and business activities	534	1 447
Other sectors	308	1 527
Total	4 830	11 255
2014		
Manufacturing	1 887	4 279
Wholesale trade	1 142	1 876
Transport, storage and communication	509	1 083
Construction	795	2 032
Financial and business activities	577	1 658
Other sectors	318	1 583
Total	5 227	12 511

6.3 Port of Vlissingen

	Production (x €1,000,000)	
	Scenario A	Scenario B
2005		
Manufacturing	343	769
Wholesale trade	6	14
Transport, storage and communication	61	133
Construction	19	45
Financial and business activities	14	30
Other sectors	9	19
Total	453	1,008
2010		
Manufacturing	406	904
Wholesale trade	9	22
Transport, storage and communication	93	201
Construction	29	67
Financial and business activities	17	39
Other sectors	27	67
Total	582	1,301
2014		
Manufacturing	213	410
Wholesale trade	10	22
Transport, storage and communication	122	270
Construction	23	55
Financial and business activities	15	33
Other sectors	60	130
Total	443	920

6.4 Port of Terneuzen

	Production (x €1,000,000)	
	Scenario A	Scenario B
2005		
Manufacturing	750	3 073
Wholesale trade	62	143
Transport, storage and communication	115	292
Construction	68	223
Financial and business activities	153	345
Other sectors	189	413
Total	1 338	4 488
2010		
Manufacturing	817	3 431
Wholesale trade	48	152
Transport, storage and communication	143	365
Construction	91	266
Financial and business activities	206	441
Other sectors	208	500
Total	1 512	5 154
2014		
Manufacturing	710	2 871
Wholesale trade	52	129
Transport, storage and communication	187	457
Construction	117	317
Financial and business activities	199	446
Other sectors	211	502
Total	1 476	4 722

6.5 Port of Moerdijk and northern seaports

	Production (x €1,000,000)	
	Scenario A	Scenario B
2005		
Moerdijk	1,599	3,693
Delfzijl	464	1,991
Harlingen	291	1,278
Den Helder	330	712
Eemshaven	114	306
Total	3,541	9,225
2010		
Moerdijk	1,872	4,456
Delfzijl	513	2,150
Harlingen	258	1,246
Den Helder	305	670
Eemshaven	163	405
Total	3,110	8,927
2014		
Moerdijk	2,055	4,765
Delfzijl	524	2,412
Harlingen	467	1,764
Den Helder	343	771
Eemshaven	76	252
Total	3,464	9,964

Appendix 7

Production in the coastal area

		Production (x €1,000,000)					
Industry - aggregated	Industry - detailed	Scenario A			Scenario B		
		2005	2010	2014	2005	2010	2014
A Agriculture, forestry and fishing		411.6			1,063.6		
	01 Agriculture		377.1	376.7		1,054.0	1,106.3
	02 Forestry and logging		0.8	1.7		2.1	4.3
	03 Fishing and aquaculture		89.5	83.1		129.6	107.6
B Mining and quarrying	B Mining and quarrying	x	x	x	x	x	x
C Manufacturing		762.5			1,992.3		
	10-12 Manufacture of food and beverages		259.1	293.1		667.8	752.7
	13-15 Man. of textile-, leatherproducts		14.1	13.3		22.1	19.3
	16 Manufacture of wood products		7.5	10.8		21.2	30.0
	17 Manufacture of paper		x	x		x	x
	18 Printing and reproduction		18.1	15.1		70.6	54.8
	19 Manufacture of coke and petroleum		x	x		x	x
	20 Manufacture of chemicals		57.0	46.1		32.0	53.2
	21 Manufacture of pharmaceuticals		107.6	100.8		143.5	134.1
	22 Manufacture rubber, plastic products		11.0	16.1		33.0	40.3
	23 Manufacture of building materials		11.7	21.8		28.0	46.9
	24 Manufacture of basic metals		x	x		x	x
	25 Manufacture of metal products		89.0	90.4		255.7	256.7
	26 Manufacture of electronic products		6.0	5.9		24.0	17.5
	27 Manufacture of electric equipment		21.9	45.8		26.4	74.6
	28 Manufacture of machinery n.e.c.		41.0	55.2		119.9	166.2
	29 Manufacture of cars and trailers		5.0	1.9		27.6	20.2
	30 Manufacture of other transport		101.7	126.4		423.8	490.9
	31-32 Man. of furniture and other prods.		30.3	59.1		93.6	197.6
	33 Repair and installation of machinery		48.4	71.1		54.2	83.8
D-E Electricity, gas and water supply and waste management		123.9			190.2		
	35 Electricity and gas supply		22.5	30.8		59.1	48.4
	36 Water collection and distribution		x	x		x	x
	37-39 Sewerage and waste treatment		31.1	50.4		53.6	96.8
F Construction	F Construction	799.0	844.3	914.2	1,747.0	1,788.9	1,808.0
G Wholesale and retail trade		1,174.2	1,300.9	1,339.1	2,620.0	2,823.0	2,971.8
	45 Sale and repair of motor vehicles		127.1	121.7		318.3	302.7
	46 Wholesale trade (no motor vehicles)		570.0	605.3		1,453.4	1,570.1
	47 Retail trade (not in motor vehicles)		603.9	612.1		1,051.3	1,099.0

Production in the coastal area (end)

Production (x €1,000,000)

Industry - aggregated	Industry - detailed	Scenario A			Scenario B		
		2005	2010	2014	2005	2010	2014
H Transportation and storage		636.3	600.3	632.8	988.9	967.9	972.8
	49 Land transport		216.0	252.9		454.6	537.9
	50 Water transport		246.0	256.9		271.6	232.3
	51 Air transport		1.7	1.1		2.4	1.3
	52 Warehousing, services for transport		90.8	100.9		134.6	137.8
	53 Postal and courier activities		x	x		x	x
I Accommodation and food serving	I Accommodation and food serving	949.2	977.9	1,144.9	1,315.3	1,367.0	1,593.2
J Information and communication		274.3			722.3		
	58 Publishing		59.0	40.1		89.0	80.1
	59-60 Movies, TV and radio		21.3	20.7		37.2	36.1
	61 Telecommunications		23.2	62.6		35.7	96.7
	62-63 IT- and information services		173.2	194.2		341.7	392.9
K Financial institutions		933.8	2,613.7	2,565.3	1,777.1	4,883.9	4,487.0
	64 Financial institutions, no insurance		731.7	788.1		1,275.4	1,328.5
	65 Insurance and pension funding		x	x		x	x
	66 Other financial services		70.1	75.8		140.4	149.0
L Renting, buying, selling real estate	68 Renting, buying, selling real estate	1,364.9	1,716.3	1,680.6	2,605.5	3,087.5	2,966.2
M Other specialised business services		1,228.9			3,090.4		
	69-70 Legal and management consultancy		875.0	1,248.3		2,131.9	3,097.6
	71 Architects, technical services etc.		147.2	143.0		401.2	302.8
	72 Research and development		142.0	186.2		201.3	252.6
	73 Advertising and market research		85.4	77.4		150.9	141.6
	74-75 Other specialised services		72.6	95.1		142.4	192.4
N Renting and other business support		393.7			993.0		
	77 Renting and leasing of tangible goods		83.5	88.4		184.5	201.1
	78 Employment activities		167.4	281.5		393.3	455.4
	79 Travel agencies, tour operators etc		104.2	118.7		365.8	415.2
	80-82 Security, other business services		99.9	120.2		365.7	354.1
O Public administration and services	84 Public administration and services	1,792.4	1,042.1	2,374.7	2,836.9	3,137.2	4,352.8
P Education	85 Education	526.3	382.2	568.7	757.0	760.2	1,160.1
Q Health and social work activities		857.2			1,517.9		
	86 Human health activities		510.1	562.5		940.5	1,106.3
	87-88 Care and social work		540.7	677.5		909.8	1,239.7
R Culture, sports and recreation		314.0			481.6		
	90-92 Arts, culture and lotteries		230.6	282.8		323.0	406.7
	93 Sports and recreation		143.1	153.9		229.9	270.4
S Other service activities		156.7			367.3		
	94 Membership organisations		96.7	64.8		199.1	162.0
	95 Repair computers and consumergoods		8.1	10.8		16.2	21.6
	96 Other personal services		88.3	90.7		169.0	174.3
T Activities of households	T Activities of households	x	x	x	x	x	x
Total		12,742.2	12,936.3	15,682.8	25,120.3	26,929.7	30,706.3

Appendix 8

Production in the Port of Rotterdam

		Production (x €1,000,000)					
Industry - aggregated	Industry - detailed	Scenario A			Scenario B		
		2005	2010	2014	2005	2010	2014
A Agriculture, forestry and fishing		23.6			236.5		
	01 Agriculture			32.0	30.9		348.3
	02 Forestry and logging						315.6
	03 Fishing and aquaculture			x	x		x
B Mining and quarrying	B Mining and quarrying	140.5		51.9	94.7	210.9	88.5
C Manufacturing		27,442.5				28,115.8	
	10-12 Manufacture of food and beverages			666.3	747.9		895.6
	13-15 Man. of textile-, leatherproducts			12.6	9.2		20.0
	16 Manufacture of wood products			7.6	9.3		10.6
	17 Manufacture of paper			x	x		x
	18 Printing and reproduction			15.8	12.9		34.0
	19 Manufacture of coke and petroleum						34.0
	20 Manufacture of chemicals			24,704.1	30,748.1		24,704.1
	21 Manufacture of pharmaceuticals			9,071.7	11,031.3		9,071.7
	22 Manufacture rubber, plastic products			x	x		x
	23 Manufacture of building materials			5.4	3.9		10.7
	24 Manufacture of basic metals			91.0	97.0		124.3
	25 Manufacture of metal products			x	x		x
	26 Manufacture of electronic products			233.6	216.5		357.4
	27 Manufacture of electric equipment			x	x		x
	28 Manufacture of machinery n.e.c.			340.5	518.6		459.0
	29 Manufacture of cars and trailers			29.3	18.1		40.7
	30 Manufacture of other transport			85.7	19.1		98.7
	31-32 Man. of furniture and other prods.			25.7	152.2		62.8
	33 Repair and installation of machinery			483.9	409.5		599.7
D-E Electricity, gas and water supply and waste management		986.1				1,063.5	
	35 Electricity and gas supply			588.1	482.9		656.3
	36 Water collection and distribution			x	x		x
	37-39 Sewerage and waste treatment			288.1	286.7		338.9
F Construction	F Construction	893.6	1,202.8	1,229.3	1,503.5	2,068.8	2,090.4
G Wholesale and retail trade		3,205.5				4,018.8	
	45 Sale and repair of motor vehicles			125.0	108.7		294.9
	46 Wholesale trade (no motor vehicles)			1,254.1	1,234.2		1,979.2
	47 Retail trade (not in motor vehicles)			2,424.4	2,425.2		2,428.7
							2,431.0

Production in the Port of Rotterdam (end)

		Production (x €1,000,000)					
		Scenario A			Scenario B		
Industry - aggregated	Industry - detailed	2005	2010	2014	2005	2010	2014
H Transportation and storage		10,017.1			10,435.0		
	49 Land transport		503.0	627.8		900.2	1,057.4
	50 Water transport		2,665.2	3,144.9		2,665.6	3,145.6
	51 Air transport		x	x		x	x
	52 Warehousing, services for transport		5,948.9	6,975.4		5,959.0	6,992.2
	53 Postal and courier activities		x	x		x	x
I Accommodation and food serving	I Accommodation and food serving	76.0	88.6	92.9	208.3	212.8	235.4
J Information and communication		92.0			199.5		
	58 Publishing		11.9	7.2		25.0	14.8
	59–60 Movies, TV and radio		17.9	13.7		31.6	27.6
	61 Telecommunications		52.5	45.0		106.1	99.6
	62–63 IT- and information services		60.5	70.6		117.0	158.8
K Financial institutions		126.9			344.1		
	64 Financial institutions, no insurance		185.6	148.3		414.5	347.4
	65 Insurance and pension funding		1.3	1.5		2.1	3.7
	66 Other financial services		16.8	11.6		35.3	26.7
L Renting, buying, selling real estate	68 Renting, buying, selling real estate	162.1	213.5	231.3	550.7	742.6	954.4
M Other specialised business services		448.5			801.8		
	69–70 Legal and management consultancy		403.4	318.3		606.8	548.5
	71 Architects, technical services etc.		267.6	987.5		438.5	1,102.3
	72 Research and development		x	x		x	x
	73 Advertising and market research		45.2	35.2		105.0	92.2
	74–75 Other specialised services		20.8	26.1		46.0	64.6
N Renting and other business support		320.7			626.7		
	77 Renting and leasing of tangible goods		26.3	173.7		46.8	247.6
	78 Employment activities		175.0	210.3		379.3	533.9
	79 Travel agencies, tour operators etc		10.0	12.4		44.9	39.2
	80–82 Security, other business services		301.6	329.6		498.8	520.8
O Public administration and services	84 Public administration and services	1,836.5	146.9	785.3	2,138.9	602.1	1,721.3
P Education	85 Education	286.3	114.6	245.2	412.1	306.6	507.4
Q Health and social work activities		100.8			431.1		
	86 Human health activities		x	x		x	x
	87–88 Care and social work		45.2	94.9		207.6	348.0
R Culture, sports and recreation		32.3			89.9		
	90–92 Arts, culture and lotteries		39.2	37.6		99.9	99.3
	93 Sports and recreation		10.1	12.6		42.5	60.6
S Other service activities		60.4			185.9		
	94 Membership organisations		21.7	21.3		55.5	50.6
	95 Repair computers and consumergoods		0.8	0.9		3.4	4.8
	96 Other personal services		14.3	15.8		56.2	63.8
T Activities of households	T Activities of households	x	x	x	x	x	x
Total		46,251.4	53,649.7	65,509.3	51,572.8	60,198.8	73,360.5

Appendix 9

Production in the Port of Amsterdam

Industry - aggregated	Industry - detailed	Production (x €1,000,000)					
		Scenario A			Scenario B		
		2005	2010	2014	2005	2010	2014
A Agriculture, forestry and fishing		x			x		
	01 Agriculture		0,0	0,2		2,7	3,7
	02 Forestry and logging						
	03 Fishing and aquaculture	x	x		x	x	
B Mining and quarrying	B Mining and quarrying	37,2	39,7	45,0	41,9	40,4	46,3
C Manufacturing		1 507,2			5 026,4		
	10-12 Manufacture of food and beverages		263,0	255,2		1 230,0	1 316,3
	13-15 Man. of textile-, leatherproducts		9,1	5,3		23,9	20,1
	16 Manufacture of wood products		3,4	3,8		11,7	13,7
	17 Manufacture of paper	x	x		x	x	
	18 Printing and reproduction		34,9	21,9		222,4	125,2
	19 Manufacture of coke and petroleum	x	x		x	x	
	20 Manufacture of chemicals		185,4	309,0		367,4	536,9
	21 Manufacture of pharmaceuticals	x	x		x	x	
	22 Manufacture rubber, plastic products		15,7	39,7		55,7	106,1
	23 Manufacture of building materials		43,1	29,8		55,2	54,8
	24 Manufacture of basic metals	x	x		x	x	
	25 Manufacture of metal products		23,7	23,8		165,6	190,4
	26 Manufacture of electronic products		1 743,1	430,8		11 369,6	2 883,5
	27 Manufacture of electric equipment	x	x		x	x	
	28 Manufacture of machinery n.e.c.		75,8	78,4		124,0	206,1
	29 Manufacture of cars and trailers	x	x		x	x	
	30 Manufacture of other transport		3,0	4,6		56,8	45,2
	31-32 Man. of furniture and other prods.		25,2	13,9		121,3	67,5
	33 Repair and installation of machinery		19,5	31,2		114,8	128,0
D-E Electricity, gas and water supply and waste management		23,8			88,8		
	35 Electricity and gas supply	x	x		x	x	
	36 Water collection and distribution	x	x		x	x	
	37-39 Sewerage and waste treatment		108,3	627,8		210,4	870,6
F Construction	F Construction	269,7	292,7	289,6	1 056,1	1 118,0	1 285,6
G Wholesale and retail trade		633,9			2 169,3		
	45 Sale and repair of motor vehicles		109,8	80,7		276,3	245,9
	46 Wholesale trade (no motor vehicles)		635,6	994,2		1 813,1	2 255,5
	47 Retail trade (not in motor vehicles)		37,8	52,7		269,3	369,9

Production in the Port of Amsterdam (end)

		Production (x €1,000,000)					
		Scenario A			Scenario B		
Industry - aggregated	Industry - detailed	2005	2010	2014	2005	2010	2014
H Transportation and storage		854,7			1 368,3		
	49 Land transport		185,2	105,9		737,0	430,3
	50 Water transport		167,9	302,1		255,1	450,4
	51 Air transport	x	x		x	x	
	52 Warehousing, services for transport		382,3	474,9		625,5	763,9
	53 Postal and courier activities		48,1	70,2		116,3	150,1
I Accommodation and food serving	I Accommodation and food serving	35,8	39,1	52,1	112,3	131,1	192,0
J Information and communication		771,8			1 927,1		
	58 Publishing		140,7	141,3		688,4	646,6
	59–60 Movies, TV and radio		31,6	42,5		122,9	124,9
	61 Telecommunications		136,2	255,2		761,3	1 346,0
	62–63 IT- and information services		129,7	218,1		469,6	700,5
K Financial institutions		251,6			1 384,9		
	64 Financial institutions, no insurance		97,3	118,4		478,2	373,7
	65 Insurance and pension funding		159,7	139,8		874,6	691,2
	66 Other financial services		10,9	8,0		52,9	37,4
L Renting, buying, selling real estate	68 Renting, buying, selling real estate	305,1	167,7	196,2	657,9	634,4	815,7
M Other specialised business services		479,7			1 264,1		
	69–70 Legal and management consultancy		211,4	339,9		676,3	1 396,5
	71 Architects, technical services etc.		48,6	49,8		159,0	136,9
	72 Research and development	x	x		x	x	
	73 Advertising and market research		153,7	169,9		328,2	360,0
	74–75 Other specialised services		50,9	45,9		138,5	113,4
N Renting and other business support		133,9			549,4		
	77 Renting and leasing of tangible goods		65,7	30,5		223,1	160,2
	78 Employment activities		84,5	74,5		249,8	234,9
	79 Travel agencies, tour operators etc		71,5	175,4		158,8	353,1
	80–82 Security, other business services		100,8	125,0		442,9	514,2
O Public administration and services	84 Public administration and services	x	x	x	x	x	
P Education	85 Education	11,0	28,6	31,4	104,4	155,7	167,8
Q Health and social work activities		40,0			248,2		
	86 Human health activities		57,3	54,3		287,9	352,2
	87–88 Care and social work	x	x		x	x	
R Culture, sports and recreation		48,2			110,6		
	90–92 Arts, culture and lotteries		58,3	59,0		117,6	126,7
	93 Sports and recreation		7,8	13,3		26,2	38,5
S Other service activities		37,7			111,4		
	94 Membership organisations		28,4	57,8		71,4	115,2
	95 Repair computers and consumer goods		0,5	2,2		1,3	6,4
	96 Other personal services		9,5	8,0		39,2	44,1
T Activities of households	T Activities of households	x	x	x	x	x	
Total		5 900,1	7 520,6	8 761,7	18 457,9	30 981,5	26 423,6

Appendix 10

Summary of the results for selected activities on the DCS, in seaports and in the coastal

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Seaports (excl. seashipping)	124.6	6,743	134.0	56,367	40,432	15,192	15,343
Coastal areas (excl. fishing)	26.3	769	34.7	2,735	1,289	1,449	1,657
Total activities on land	151.0	7,512	168.7	59,102	41,721	16,641	17,000
Oil and gas extraction	3.0	301	3.0	5,451	1,111	4,340	5,310
Fisheries	0.3	13	0.7	131	52	79	72
Offshore wind energy	-	-	-	-	-	-	-
Hydraulic engineering	4.9	271	5.3	1,142	817	325	420
Sea shipping	5.8	368	9.1	5,524	3,936	1,588	1,027
Total activities at sea	14.0	953.1	18.2	12,248.0	5,916.6	6,331.4	6,828.3
The North Sea economy	164.9	8,465.0	186.9	71,350.1	47,637.2	22,972.4	23,828.2
2010							
Seaports (excl. seashipping)	120.8	7,280	130.2	69,030	54,761	14,268	14,268
Coastal areas (excl. fishing)	26.9	877	35.8	2,971	1,401	1,570	1,570
Total activities on land	147.7	8,157	166.1	72,001	56,162	15,839	15,839
Oil and gas extraction	2.8	328	2.9	5,298	851	4,447	4,447
Fisheries	0.3	14	0.6	108	50	58	48
Offshore wind energy	-	2	0.0	90	55	35	35
Hydraulic engineering	6.9	431	7.6	1,962	1,318	644	644
Sea shipping	6.9	482	9.1	5,035	3,754	1,281	1,281
Total activities at sea	16.9	1,258.0	20.2	12,493.0	6,027.6	6,465.4	6,455.7
The North Sea economy	164.6	9,414.7	186.3	84,494.1	62,190.0	22,304.1	22,294.5
2014							
Seaports (excl. seashipping)	116.4	7,824	126.8	77,206	63,147	14,059	14,604
Coastal areas (excl. fishing)	28.2	988	38.0	3,369	1,553	1,816	1,674
Total activities on land	144.7	8,813	164.7	80,576	64,700	15,875	16,278
Oil and gas extraction	4.0	520	4.0	5,077	1,074	4,003	3,473
Fisheries	0.3	16	0.8	168	75	92	92
Offshore wind energy	-	2	0.0	80	45	35	39
Hydraulic engineering	8.0	538	8.8	2,382	1,618	764	670
Sea shipping	7.3	546	9.5	6,099	4,483	1,616	1,790
Total activities at sea	19.5	1,622.4	23.1	13,805.2	7,295.5	6,509.7	6,064.5
The North Sea economy	164.2	10,435.1	187.8	94,381.0	71,995.8	22,385.2	22,342.6

Employment figures x 1,000 FTE, monetary values x €1,000,000

Appendix 11

Key indicators for the coastal NUTS-3 regions

	Employees	Compensation	Employed persons	Production	Intermediate consumption	GVA	GVA 2010 prices
2005							
Rest of Groningen	132	5,964	155	27,047	10,829	16,218	18,473
North Friesland	90	4,006	114	14,587	7,343	7,244	8,014
Kop van North Holland	95	4,269	122	14,411	7,000	7,412	8,043
Alkmaar and surroundings	66	2,925	80	10,182	5,013	5,169	5,664
IJmond	55	2,628	65	11,013	5,351	5,661	5,964
Haarlem agglomeration	65	2,955	79	9,915	4,486	5,429	5,881
Leiden and Bollenstreek	127	5,745	149	18,607	8,621	9,986	10,827
Greater The Hague (Excl. Zoetermeer)	285	13,997	322	44,723	20,935	23,788	26,029
Delft and Westland	87	3,828	102	13,364	6,430	6,934	7,455
Rijnmond	473	22,467	525	102,774	60,407	42,367	45,698
Rest of Greater Rijnmond	37	1,628	49	6,351	3,350	3,002	3,195
Zeeuws-Vlaanderen	32	1,471	41	6,973	4,074	2,899	3,041
Rest of Zeeland	74	3,184	92	11,811	6,414	5,396	5,843
Total	1,619	75,067	1,895	291,758	150,253	141,505	154,127
2010							
Rest of Groningen	134	6,803	158	35,045	12,960	22,085	22,085
North Friesland	89	4,510	113	16,509	8,142	8,367	8,367
Kop van North Holland	95	4,744	124	16,467	8,233	8,234	8,234
Alkmaar and surroundings	70	3,551	85	11,963	5,741	6,221	6,221
IJmond	56	2,893	68	12,399	7,292	5,107	5,107
Haarlem agglomeration	65	3,287	80	10,987	5,105	5,882	5,882
Leiden and Bollenstreek	131	6,754	156	21,958	10,275	11,684	11,684
Greater The Hague (Excl. Zoetermeer)	293	15,994	337	49,881	22,571	27,310	27,310
Delft and Westland	89	4,379	103	14,863	7,113	7,750	7,750
Rijnmond	494	26,374	557	123,687	76,002	47,685	47,685
Rest of Greater Rijnmond	45	2,228	59	8,841	4,670	4,170	4,170
Zeeuws-Vlaanderen	31	1,598	39	7,950	4,883	3,067	3,067
Rest of Zeeland	77	3,834	97	15,283	8,300	6,983	6,983
Total	1,668	86,949	1,978	345,832	181,287	164,545	164,545
2014							
Rest of Groningen	130	7,199	157	36,330	14,001	22,330	20,721
North Friesland	81	4,496	107	16,886	8,269	8,617	8,203
Kop van North Holland	92	4,951	122	17,535	8,870	8,665	8,529
Alkmaar and surroundings	67	3,673	83	12,452	5,877	6,576	6,351
IJmond	56	3,193	68	12,447	6,973	5,474	5,354
Haarlem agglomeration	60	3,301	77	10,717	5,082	5,635	5,483
Leiden and Bollenstreek	126	7,195	153	23,384	11,149	12,234	12,030
Greater The Hague (Excl. Zoetermeer)	270	15,991	318	49,738	22,824	26,914	26,177
Delft and Westland	90	4,872	106	16,350	7,812	8,539	8,476
Rijnmond	466	27,162	535	135,402	87,277	48,126	48,272
Rest of Greater Rijnmond	45	2,415	59	9,899	5,316	4,582	4,529
Zeeuws-Vlaanderen	30	1,670	38	7,675	4,413	3,263	3,106
Rest of Zeeland	75	4,015	96	15,466	8,334	7,131	7,027
Total	1,589	90,132	1,920	364,283	196,197	168,087	164,259

Employment figures x 1,000 FTE, monetary values x €1,000,000

Appendix 12: Glossary

Employed persons: are all persons who are working for a business unit or private household residing in the Netherlands. Employed persons include all persons who:

- have a paid job for at least one hour a week.
- perform a job of which the payment is withheld from registration of tax and/or social insurance authorities, while the work itself is legal.
- are temporarily not working (due to illness, bad weather, etc.), but who continue to receive their remuneration.
- have taken a temporarily unpaid leave.

Employed persons may either be employees or self-employed.

Employee: Resident or non-resident who is employed under contract and who receives wage as compensation. This excludes self-employed individuals. Managing directors of limited companies are considered to be employees.

Self-employed: individual that earns his/her income by performing labour on his/her own (company, profession) or who cooperate in the business of their family. The latter are not counted as self-employed if there is an employment contract

Compensation of employees: The total remuneration paid by employers to their employees in return for work done. Even if they are actually withheld by the employer and paid directly to tax authorities, social security schemes and pension schemes Compensation of employees is distinguished between wages and salaries and employers' social contributions.

Full-time equivalent job: Labour input in full-time equivalent jobs is calculated by expressing all jobs (be it full-time, part-time or flexible) to full-time equivalents. The full-time equivalent is obtained by dividing the annual contractual hours of the job by the annual contractual hours considered full-time (in the same branch of industry). Two half-time jobs thus add up to one full-time equivalent. For self-employed (mostly not included in the figures in this paper) the full-time equivalent is the quotient of the usual weekly work hours of that job and the average weekly work hours of self-employed with 37 or more normal weekly hours (in the same branch of industry).

Production / Output: The value of all goods produced for sale, including unsold goods, and all receipts for services rendered.

Intermediate consumption: All goods and services used up in the production process in the accounting period, regardless the date of purchase. This includes for example fuel, raw materials, semi manufactured goods, communication services, cleansing services and audits by accountants.

Value added: The difference between output and intermediate consumption.

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