Statistics Netherlands

National Accounts

P.O.Box 24500
2490 HA Den Haag
The Netherlands

Economic description of the North Sea for the Netherlands

Joram Vuik and Maarten van Rossum

Remarks:
The views expressed in this paper are those of the authors and do not necessarily reflect the policies of Statistics Netherlands.

Project number: *208893*
BPA number: *2010-17-KNR*
Date: *December 1, 2010*

ECONOMIC DESCRIPTION OF THE NORTH SEA FOR THE NETHERLANDS

Summary: In this study an economic valuation of activities related to the Dutch Continental Shelf (DCS) is presented for the years 1995, 2000 and 2007. Economic activities in seaports and in the coastal zone of the North Sea are also included. The reason for this study is the European Marine Strategy Framework Directive, which requires social and economic analysis for the use of the marine environment. The applied valuation method covers all activities of Dutch companies based on the 'resident principle' of the national accounts. Figures on production, intermediate consumption and value added are presented for the different relevant industries. In addition, also the number of employees and the compensation of employees are presented.

Activities on sea include the following industries: oil and gas extraction, fisheries, sea shipping, and sand extraction. Since 2006 harvesting of wind power became also a relevant activity. Measured in production and value added, oil and gas extraction is by far the most important activity on the DCS.

To measure economic impact on land in areas which are related to the North Sea, relevant industries are selected in specific seaports and the coastal zone. For the coastal zone Hotels and restaurants, Fisheries, Retail trade and Recreational, cultural and sporting activities have been selected. In seaports Manufacture, Transport, Trade and Construction have been selected as relevant industries. In these industries, proximity or accessibility to the North Sea is a critical location factor.

Measured in production and value added, manufacturing in sea ports is the most important economic activity. Labour intensity in manufacturing is low compared to the industries selected in the coastal zone. The total number of persons employed in selected areas (sum of coastal zone and seaports) decreased slightly while total number of persons employed grew in the Netherlands. Value added of relevant industries in the areas of interest grew similar to the Dutch economy between 1995 and 2007.

Keywords: North Sea, economic key figures, Dutch Continental Shelf, Seaport, Coastal economy, Port of Rotterdam, Port of Amsterdam, NAMWA, Marine Strategy Framework Directive, Fisheries, Oil and Gas extraction

Contents

1. Introduction

This study valuates the economic activities of Dutch companies on the Dutch Continental Shelf (DCS), which is part of the North Sea. Besides the activities taking place on sea, also activities taking place on land in areas related to the North Sea are included. These areas on land are a selection of seaports in Netherlands and the coastal zone. This study is motivated by the European Union's Marine Strategy Framework Directive. The economic valuation presented will facilitate the social and economic analysis of the use of the marine environment of the DCS and the evaluation of proposed or effective measurements.

> *"The aim of the European Union's ambitious Marine Strategy Framework Directive (adopted in June 2008) is to protect more effectively the marine environment across Europe. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Marine Strategy Framework Directive constitutes the vital environmental component of the Union's future maritime policy, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment." ……. "Each Member State must draw up a programme of cost-effective measures. Prior to any new measure an impact assessment which contains a detailed cost-benefit analysis of the proposed measures is required".*
>
> European Commission, 2010

Statistics Netherlands (CBS) executes this study in commission of the Ministry of Infrastructure and Environment, more specifically the Water Service of the Directorate General of Public Works and Water Management (Rijkswaterstaat). The assignment to analyse the economic activities of the North Sea follows from a study executed on the economic description of river basins for the Netherlands (The Netherlands is spatially divided in seven river basins in this particular study) (Brouwer et al., 2005; Statistics Netherlands, 2010a). The economic figures for the river basins are used to evaluate measurements of the Water Framework Directive from the European Union.

Part of the methodology used in the river basin analysis (Brouwer et al., 2005; Statistics Netherlands, 2010a) is adopted in this paper for the valuation of seaports and the Coastal zone. This NAMWArib methodology is internationally coordinated.

A coherent description of economic activities related to the North Sea has been made for three reference years, namely 1995, 2000 and 2007. The economic figures presented in this paper include the variables production, intermediate consumption and value added. Also, two variables related to labour are presented: the number of

employees and compensation of employees[1]. All figures are in current prices, meaning that price inflation is included.

Before the valuation of economic activities in quantitative terms is presented, a short description of the main source used in this study, the Dutch National Accounts, is provided in chapter 2. This chapter also discusses the geographical boundaries used in this study. In chapter 3 the activities on sea are discussed. These activities include oil and gas extraction, shipping, fishing, the harvest of wind energy and the extraction of sand (dredging). The fourth chapter deals with the activities on land related to the North Sea, particularly in seaports and along the North Sea coast. In chapter 5 the conclusions from this study are presented. Recommendations for future research are also included in this section.

[1] Compensation of employees include wages paid to employees and the contribution paid by an employer for social security and pension schemes (Annex H Glossary)

2. System boundaries and definitions

The main data source used in this study is the Dutch National Accounts (Statistics Netherlands, 2010b). The system of national accounts shows a quantitative overview of the economic process of a country and its economic relations with the rest of the world. The core in the national accounts is a number of important economic indicators such as gross domestic product (GDP) and national income. Benefits of using figures from the national accounts are that all variables are linked together in a consistent way. The quality is improved because the definitions that underlie the system make it possible to confront different statistics. Also international comparability is an advantage because 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 (SNA) and the European System of Accounts (ESA).

Geographical boundaries

The North Sea is located on the European continental Shelf and bordered by by Great Brittan in the west and by Belgium, the Netherlands, Germany, Denmark and Norway in the East.

The measurement of activities of Dutch companies on the North Sea in this study is limited to the Dutch part of the Continental Shelf (DCS). 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 2.1 shows a map of the DCS.

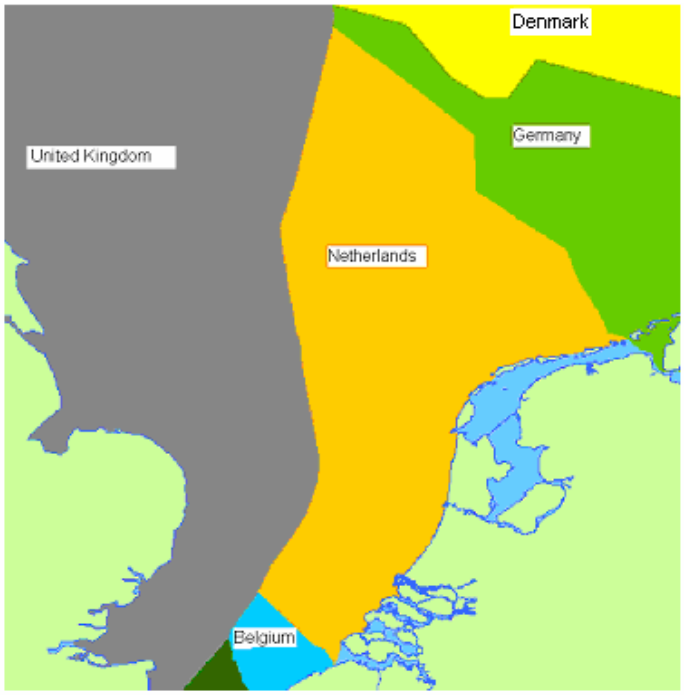

Figure 2.1: Map of the Dutch Continental Shelf

The Wadden Sea, located in the North of the Netherlands, is not included in the figures. The Netherland has included the Wadden Sea under the Water Framework Directive and not under the Marine Strategy Framework Directive relevant for this study.

The geographical boundaries for activities in the coastal zone are discussed in Chapter 4. The geographical boundary of the seaport areas are mostly based on information provided by the relevant Port Authorities and these are discussed in more detail in chapter 4. Activities related to the seaports located outside the defined areas are not included

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 (2008 SNA). GDP is an aggregate measure of production by all resident units. However, some of this production may occur abroad 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 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.

Employees

The figure on employment, the number of employees is measured in full time equivalents, excluding self-employed persons. The number of self-employed persons differs strongly between industries. In agriculture, forestry and fishing there are many self employed persons while in manufacturing there are almost none. In annex F detailed figures for some relevant industries are shown for the national economy to give an impression of the extent of this omission and the implications for the interpretation of the results.

3. Activities on sea

In this section economic activities taking place on the DCS by resident companies are described. This includes the extraction of oil and gas, fisheries, shipping, the extraction of sand and more recently the production of energy from wind.

3.1 Oil and gas extraction

The Netherlands has significant subsoil quantities of natural gas as well as some smaller oil deposits. Since the discovery of these stocks in the nineteen fifties and sixties they have been exploited to meet demand of users in the Dutch economy and to facilitate exports to foreign countries. Extraction of natural gas and oil contributes significantly to Gross Domestic Product and to economic growth. Over the last

twenty years, the benefits arising from oil and gas extraction, contributed on average 3 percent to total revenue of the Dutch Government. The share in revenues increased from 1.5 percent in 1999 to 3.9 percent in 2009 with a peak of 5.3 percent in 2008 (Environmental accounts of the Netherlands 2009, 2010).

A part of the subsoil energy resources is located beneath the DSC. On January first 2008 the share of the DCS, Wadden Sea exclusive, in the total Dutch gas reserve is 14%, the share in the oil reserve is 35% (Oil and gas in the Netherlands annual report 2007[2], Ministry of Economic Affairs and TNO).

On the DCS 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 (Statistics Netherlands). 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.). For oil and gas extraction, only the DCS is relevant. Table 3.1 shows the economic key figures for oil and gas extraction on the DSC.

Table 3.1: Economic key figures of the oil and gas extraction on the Dutch Continental Shelf

		1995	2000	2005	2007
DCS	Number of employees (x 1,000 fte)	0.5	0.5	0.5	0.8
	Compensation of employees (x €1,000,000)	37	39	45	79
	Production (x €1,000,000)	2692	4306	5673	7644
	Intermediate consumption (x €1,000,000)	580	993	1477	1777
	Value added (x €1,000,000)	2112	3313	4196	5866

The number of employees includes only employees on offshore facilities. The State Supervision of Mines provides this figure to Statistics Netherlands. The production figure of the national accounts is allocated geographically in the regional accounts on the basis of the quantities produces. The quantities produced are published annually by the Ministry of Economic Affairs and TNO (Oil and gas in the Netherlands).

3.2 Fisheries

Unlike the extraction of oil and gas, the Dutch Regional accounts do not provide figures 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 an exception). For fisheries, economic activities are allocated to the harbours where the fishing vessels are registered.

[2] Olie en gas in Nederland Jaarverslag Opsporing en Winning 2007

Macro economic figures for the fishing industry[3] are obtained from the Dutch national accounts. The fishing industry in the Netherlands consists of Cutter fisheries, Large-scale High sea fisheries, mussel farming and aquaculture. The last two activities do not take place on the DSC. For mussel farming, there is a relationship with the North Sea since 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.

The Agricultural Economics Research Institute (LEI, Compendium voor de leefomgeving, 2006) has published figures for the Dutch fishing industry indicating yields on the DCS for 2001, 2002 and 2003. In current prices for these years, the share of turnover generated on the DSC in the total national turnover is on average 21.6%. This average share of 21.6% is used to allocate the macro-economic figures of the Dutch fishing industry to the DCS. This results in the economic figures in table 3.2 representing the relevance of the DSC for Dutch Fisheries.

Table 3.2: Economic key figures of the (Dutch) fisheries on the Dutch Continental Shelf

		1995	2000	2005	2007*
Total NL	Number of employees (x 1,000 fte)	2.2	1.5	1.1	1.0
	Compensation of employees (x €1,000,000)	93	84	63	64
	Production (x €1,000,000)	471	511	472	524
	Intermediate consumption (x €1,000,000)	191	245	277	317
	Value added (x €1,000,000)	280	266	195	207
DCS	Number of employees (x 1,000 fte)	0.5	0.3	0.2	0.2
	Compensation of employees (x €1,000,000)	20	18	14	14
	Production (x €1,000,000)	102	111	102	113
	Intermediate consumption (x €1,000,000)	41	53	60	69
	Value added (x €1,000,000)	61	58	42	45

3.3 Sea shipping

The North Sea is important for marine traffic and its shipping lanes are among the busiest in the world. International shipping companies navigate the Dutch Continental Shelf intensively. Only the movements of Dutch resident ships on the DCS are considered relevant for this study. The presented figures only represent the relevance of the DSC for Dutch sea shipping.

[3] An industry refers to a group of companies or organisations that produce similar goods or services.

The National Accounts provide macro-economic figures for the Dutch sea shipping industry. Though inland vessels may sometimes use the DCS, sea shipping is the most relevant industry. Macro-economic data for the industry sea shipping represent all international and national activities of Dutch sea shipping companies (residents). In order to allocate part of the total figure to DCS the distance travelled could be used. Since these figures are not directly available, CO_2 emissions were used as an approximation for the distance travelled. These CO_2 emissions depend on fuel consumption, which depends on for instance the distance travelled, speed travelled and intensity of navigation. Internal data sources of Statistics Netherlands, for the purpose of emission registration, show that in 2001 and 2004 CO_2 emissions by Dutch sea ships on the DCS were on average 3.2% of the total emissions emitted by this industry. By using this percentage to allocate production and other economic indicators the economic variables presented in table 3.3 can be calculated. The presented figures represent the relevance of the DSC for Dutch sea shipping.

Table 3.3: Economic key figures of the (Dutch) sea shipping industry on the Dutch Continental Shelf

		1995	2000	2005	2007*
Total NL	Number of employees (x 1,000 fte)	6.5	6.8	5.9	5.9
	Compensation of employees (x €1,000,000)	274	303	326	357
	Production (x €1,000,000)	2626	3689	4913	4588
	Intermediate consumption (x €1,000,000)	1996	2762	3576	3380
	Value added (x €1,000,000)	630	927	1337	1208
DCS	Number of employees (x 1,000 fte)	0.2	0.2	0.2	0.2
	Compensation of employees (x €1,000,000)	8	9	10	11
	Production (x €1,000,000)	81	113	151	141
	Intermediate consumption (x €1,000,000)	61	85	110	104
	Value added (x €1,000,000)	19	29	41	37

Arguments can be made against this estimate and in favour of including sea shipping as a memorandum (P.M.) activity or to include the national figures for this industry. The main argument is the conceptual difference with other activities on the DCS. The production value in sea shipping is generated by transporting predominantly goods between different global seaports. Considering the DCS exclusively may be considered irrelevant, because the international accessibility matters and not so much the DCS itself. An other arguments is that Sea shipping companies located in the sea port areas (Chapter 4) are also included in the estimates of relevant activities on land. This results in a partial overlap. This overlap may result in an error in the sum of the estimates for the selected activities.

To allow future analysis of the economic activities on the DCS and their environmental impact it is decided to included the estimate made for Sea shipping, regardless the limitations of the estimate.

3.4 Sand extraction

Sand is collected from the sea floor of the North Sea. This sand is used for land reclamation and the protection of the coast as well as for fill sand for (infrastructural) projects. These activities can be defined as dredging activities. Also maintaining shipping channels on the DCS is a purpose of this activity. Dredging activities on the DCS are included in the industry 'construction', more specifically 'hydraulic engineering'. Besides dredging, this industry includes for example construction of bridges and dams. Data on hydraulic engineering are rare, in the Dutch national accounts this industry is included in the much broader industry 'civil engineering'.

In order to specify dredging on the DCS requires multiple steps. Firstly, hydraulic engineering needs to be specified. The next step requires the allocation of a part of hydraulic engineering to dredging. Finally, figures for dredging activities need to be allocated geographically to the DCS. Dutch dredging companies are very active in different geographical areas, both nationally and internationally.

Financial statistics on both hydraulic engineering and civil engineering are available for 2006, 2007 and 2008 (Statline, Statistics Netherlands). For these years the share of hydraulic engineering in the net revenue of civil engineering industry is 5.4 percent. This percentage is used to allocate figures for civil engineering in the National Accounts to hydraulic engineering (see table 3.4; data for value added and production). For all figures presented the share of hydraulic engineering is assumed to be equal to the share in production. Since only three years are available, a constant share is assumed over time.

Table 3.4: Economic key figures of Hydraulic engineering by Dutch companies.

		1995	2000	2005	2007*
Hydraulic engineering (NL)	Number of employees (x 1,000 fte)	3	3	3	3
	Compensation of employees (x €1,000,000)	91	124	140	151
	Production (x €1,000,000)	353	530	560	627
	Intermediate consumption (x €1,000,000)	230	358	389	441
	Value added (x €1,000,000)	123	172	171	186

The second step requires isolating dredging activities from the industry hydraulic engineering. No suitable indicators for this specification have been found so far. In addition, no suitable indicators for the geographical specification have been found. Sand extraction from the DCS is thereby only included Pro Memoria (P.M.) in this study. The lack of detailed information of dredging activities and the difficulty of isolating dredging activities from other hydraulic engineering activities and the geographical location of these activities motivate this decision.

In an earlier study (Voet, L. (Royal Haskoning), B. Budding (Rebel Group), 2008) of economic activities on the DCS, the extraction of sand was estimated based on financial statistics (Statistics Netherlands) of the industry 'sand and gravel extraction'. Figures on the quantities of sand produced/extracted on the North Sea

and prices estimated by experts are used for the geographically allocation of the national figures. The main argument for abandoning this approach is that the dredging companies active on the DCS are not included in the industry 'sand and gravel extraction', but rather in 'hydraulic engineering'.

3.5 Wind power

Due to the strong prevailing winds, countries surrounding the North Sea, particularly Germany and Denmark, have used these windy areas near the coast for the generation of wind power since the 1990s. In the Netherlands, wind power is harvested on the DCS since 2006. Statistics Netherlands have calculated production, intermediate consumption and value added. This calculation is based on the quantities of electricity produced by wind turbines on the DCS. In 2007 330 million KW h of electricity was produced by off shore wind farms (Statistics Netherlands, Statline, September 2010). This equals 9.5% of the national total production of wind energy. To calculate monetary figures from the quantities produced the relevant producer prices were used. The methodology used to calculate the economic variables for wind energy production is based upon a study of van Rossum and Kulig (2008).

Table 3.5: Economic key figures of the production of wind power on the Dutch Continental Shelf

		2007
TotalNL	Production (x €1,000,000)	218
	Intermediate consumption (x €1,000,000)	100
	Value added (x €1,000,000)	118
DCS	Production (x €1,000,000)	23
	Intermediate consumption (x €1,000,000)	13
	Value added (x €1,000,000)	11

No figures for the number employees or the compensation of employees are available. Wind energy production is labour extensive. Both the small size of this activity and the capital intensive nature of the activity explain why this activity will not contribute much to employment once off- shore wind farms are operational.

3.6 Activities of non- residents on the DCS

Alongside the activities of Dutch companies, also international companies use the DCS for e.g. fishing and shipping. The value of these activities is not included in the previous estimates because foreign activities do not contribute to Dutch GDP. In this section *indicative* figures for the share of Dutch and foreign share in the total industry of both fishing and sea shipping on the DSC are presented.

Fisheries

For monitoring the catch of fisheries and the stock of fish, the North Sea is divided in ICES[4] areas. Eurostat publishes the tonnes of fish caught per country. The DCS is included in two ICES areas. These areas, 4b and 4c, are shown in figure 3.1.

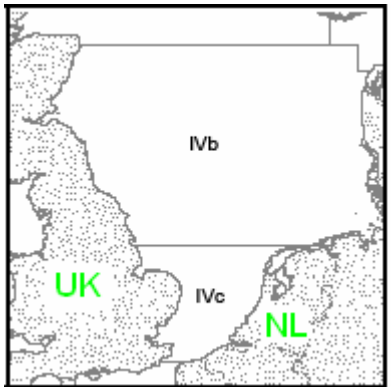

Figure 3.1: ICES areas that overlap with the Dutch Continental Shelf (Source: www.ICES.dk)

In the relevant ICES areas the share of the Dutch fisheries is shown table 3.6. In area 4c, of which the DCS overlaps about half its surface, the share of Dutch fisheries in the tonnes caught is much larger than in area 4b. Area 4b is mainly fished by Danish fishing vessels.

Table 3.6: Tonnes of fish (x 1,000) caught by Dutch Vessels and total tonnes caught in relevant ICES areas (source: Eurostat)

		1995	2000	2005	2007
NL	ICES 4B	83	68	42	41
	ICES 4C	102	74	65	59
Total	ICES 4B	1533	1194	649	508
	ICES 4C	176	172	131	117
NL/Total	ICES 4B	5%	6%	6%	8%
	ICES 4C	58%	43%	50%	50%
	Total	11%	10%	14%	16%

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.

Sea shipping

The share of domestic sea shipping vessels active on the DCS can be indicated by the share in the CO_2 emission of domestic ships on the DCS in total emissions emitted by this industry on the DCS (both domestic and foreign ships). Shipping under Dutch flag on the DCS contributes 9.4% in 2001 and 8.1% in 2004 to the CO_2 emissions of the shipping industry on the DCS. These percentages indicate that total

[4] International Council for the Exploration of the Sea.

sea shipping on the DCS is ten to twelve times the size of the figures presented for Dutch sea shipping on the DCS (table 3.3)

4. Activities on land

Both Seaports and coastal areas in the Netherlands have a strong economic link to the North Sea. Economic activities in these areas depend on access or proximity to the sea. In this chapter, the economic key figures of ports and in coastal areas are presented. Firstly, the methods used for calculating the economic figures are discussed. Next, the results for the North Sea coastal area are presented and the explicit choices made are described. The third section discusses the economic activities in five different Dutch seaports; Rotterdam, Amsterdam, IJmuiden, Vlissingen and the Port of Eemshaven. This chapter ends with a summary of the results for the activities on land.

4.1 Methodology

The method used for estimating economic key figures for the areas of interest is based on the NAMWARib[5] method that is used by Statistics Netherlands to calculate the economic figures for different subriver basins (Brouwer et al., 2005). NAMWARiB provides information about the interactions between the physical water system and the economy at a national and subriver basin scale.

For the purpose of geographical research, the Netherlands is divided into COROP regions. The Dutch regional accounts of Statistics Netherlands annually present economic key figures (Production, Value Added, etc) per COROP region. This study has the purpose to allocate these COROP figures to the relevant seaports and to the coastal area.

In constructing statistics for the areas of interest a register of companies is used. The company register provides information on individual companies: e.g. location (address), the number of employed persons and the type of industry (NACE class). Geographical data on the surface area are used for allocating the COROP figures to the areas of interest.

Two distinct methods (hereafter scenarios) for measuring the activities in the area of interest are presented in this study. The first scenario (A) limits the surface of the coastal area and ports (i.e. the areas of interest) to the predefined geographical boundaries. The location of these boundaries is described in the sections 4.2 and 4.3. The second scenario (B) shows the results of extending the areas of interest to complete zip code zones.

---

[5] For more information: http://www.helpdeskwater.nl/onderwerpen/water-ruimte/economische_aspecten/namwa/

Below the first scenario (*scenario A*) is described in four steps. The second scenario (*scenario B*) is similar but skips the second step. The second scenario allocates all zip codes containing both a coastal area[6] and a seaport entirely to the seaport.

1. Define the area of interest.
   Since there was no clear definition of a coastal area, a coastal area had to be defined. For the seaports, the maps published by port authorities on the internet were used as a guideline. The definition of the areas is presented in sections 4.2 and 4.3.

2. Calculate the share of the surface area of interest in the zipcode zones.
   The register of companies allows locating the companies in a 4-digit zip code. A full zip codes (6-digits) map is not available. To correct for zip codes being larger than the area of interest the surface areas (percentages) are used.

3. Allocate the key economic figures per COROP region to the areas of interest. All key figures were allocated using the data on the persons employed per company from the register.

4. Selection of relevant industries. The results in the next sections will underline the necessity of this action.

Scenario A assumes a proportional geographical distribution of economic activities within a zip code zone. In step 2 surface area is used to allocate the figures of a zip code to a particular portion of the zip code.

The second step assumes that labour productivity of the zip code areas in the areas of interest is equal to that of the COROP region containing the area of interest. Per zip code and per industry, all economic figures per employed person are equal[7]. Since the company register gives no specific information on the contracted hours of work for persons employed an equal part-time ratio is implicitly assumed as well for all zip codes in a particular COROP area.

The disadvantage of the methodology used is that the location where the employees are registered is not always equal to the place where production actually takes place (i.e. the production site). Many of the large companies have a production site in a sea port and an office located in the city centre or in a Business Park. Employees are sometimes registered in the city location only. Since production is allocated based upon the registered employees this results in an underestimation of production at the production site[8]. In addition, the valuation does not include forward and backward linkages with other industries or geographical areas.

---

[6] The coastal area and the seaports can overlap. To avoid double counting this geographical overlap is solved by allocating areas that indeed overlap to the seaports.

[7] Production per unit employment per industry is assumed equal for every zipcode in a particular COROP area

[8] This problem has been solved partially for the Rotterdam port by applying total COROP figures only for certain relevant industries. See paragraph 3.3.1 for more information.

The advantage of this method is continuity over time and consistency between different geographical areas. Under conditions, such as limited rearrangements in zip codes, developments in the areas of interest can be monitored over time. In addition, the same data sources were used for all geographical areas. Different geographical areas can be compared and summed. The Dutch regional accounts, which are used to construct the results, are based upon internationally coordinated definitions and concepts.

Allocating economic figures to the coastal zone (Example)

In region (COROP) Y there are four zipcodes of which only two are located in de coastal zone. For zipcode A 90 percent of the surface area of this zipcode is located in coastal zone. For zipcode B 10 percent of the surface area is located in the coastal zone. The company register provides that in zipcode A 200 persons are employed in industry X. In zipcode B 500 persons are employed in industry X. Allocated to this part of the total coastal zone (90 percent *200+10 percent*500= 230) are 230 employed persons.

The company register also provides that in the total region Y 1500 persons are employed in industry X. This means that 15.3 percent (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 industry for each region are provided by the regional accounts (Statistics, Netherlands).

For scenario B this figure is larger since complete zipcodes are included, (200+500), resulting in 700 employees. This means that 46.6 percent (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 provisional economic key figures per COROP area are available about twenty months after the end of the reference year. Final economic data per COROP area are available 3 years after the reference year. So far, all data for the year 2007 in this study are provisional.

For industries containing less then three companies in the areas of interest or that have only one company employing more than 75 percent of all employees in that industry, no figures are presented (because of confidentiality) To prevent publishing data for individual companies, these industries will be added to similar industries.

4.2 North Sea coastal area

The coastal area has been defined as a one kilometre wide strip of land after the Dutch North Sea coastline and includes the entire Dutch Frisian Islands. The coastal strip was put not directly behind the shoreline but behind the beach and sand dunes, since this area includes little or no 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. Annex A shows a map of the Netherlands

illustrating the location of the beach and sand dunes as well as the coastal strip including the Dutch Frisian Islands.

The estimate of the total production (all industries included) in the coastal area is heavily influenced by industries whose relationship to the North Sea is not obvious. The significance of the selection of industries is illustrated by the results shown in Annex C. Especially in the The Hague area, which is the third largest city of the Netherlands, the coastal and the urban economy merge. The Hague is the administrative capitol of the Netherlands and many government departments are located in The Hague. In the estimates for 2007 the The Hague area is responsible for 27% (scenario A) or 28 % (scenario B) of all the production in the coastal area.

An example to illustrate the situation is 'Defence activities'. In 1995 and 2000 there are no 'Defence activities' in the coastal area. In 2007 the coastal area, however, has a production of 604 million Euro in scenario A. This is an effect of the employees of the Ministry of Defence being registered in different zip code for 2007 that is part of the coastal zone. Obviously, these data should not be interpreted as real growth in the coastal economy. It should be interpreted as a result of an administrative change regarding a large organisation that has employees all around the Netherlands and even abroad (war zones/peacekeeping).

'Public administration and social security' and 'Health and social work activities' are also large sectors in the coastal economy according to the results in Annex C. Ministries, municipal institutions and healthcare located in The Hague are the main cause for this. Most of these issues can be solved by introducing the second criteria, besides the geographical boundaries, in estimating the coastal area: selection of industries that are relevant to the North Sea.

Narrowing down the industries of a coastal economy is a necessity for a fair estimate of the coastal economy. This selection is to some extent a subjective matter. The difficulty in selecting relevant industry is illustrated by the example below.

Real estate in the coastal zone (Example)

For real estate activities, the argument can be made that this industry is big in the coastal area because the coast is an attractive residential and business location. In this case, one could argument to include the real estate industry in the selection of the coastal economy. Analysis of the results for this industry clarifies that again the Hague area is important in the figure for the coastal zone. The proximity to the sea is not the only factor defining this area as an attractive location so are employment opportunities and urban facilities such as shops, restaurant and theatres. Therefore, it is sensible to exclude the real estate industry from the coastal economy.

Industries, for which proximity to the coastline is an important location factor, that are concentrated on the coast include:

- Hotels and restaurants
- Retail trade
- Recreational, cultural and sporting activities
- Fisheries

The last three columns of Annex C show the mean share in the total coastal and total National (NL) production over the three reference years (1995, 2000 and 2007). In the coastal zone the selected industries are responsible for a larger share of the production than in the Netherlands as a whole. E.g. Hotels and restaurants generate two percent of the total production of the Netherlands. Depending on the scenario for the coastal area this figure is eight percent (scenario A) or six percent (B).

For the coastal zone scenario B is preferred, because the one kilometre strip used in scenario A is somewhat arbitrary. Choosing scenario B (including the full surface of all zip codes along the coast) may however lead to an overestimation. An advantage of scenario B is that the assumption that economic intensity is spread out proportionally within a zip code is no longer relevant.

Table 4.1: Key indicators for selected industries in the coastal zone (scenario B)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Fishing	0.7	31.1	227.3	92.2	135.2
	Hotels and restaurants	9.0	173.0	676.0	354.1	322.0
	Recreational, cultural and sporting activities	2.7	87.7	347.2	204.9	142.2
	Retail trade and repair (excl. motor vehicles/cycles)	11.0	218.1	607.6	226.4	381.2
Total 1995		23.5	509.8	1858.2	877.6	980.6
2000	Fishing	0.6	31.5	267.0	128.0	139.0
	Hotels and restaurants	10.1	244.3	989.4	500.4	489.0
	Recreational, cultural and sporting activities	3.2	114.5	484.3	274.5	209.8
	Retail trade and repair (excl. motor vehicles/cycles)	11.4	268.2	743.1	284.5	458.6
Total 2000		25.2	658.5	2483.8	1187.4	1296.4
2007*	Fishing	0.4	23.6	270.7	168.9	101.8
	Hotels and restaurants	10.4	304.0	1265.7	640.4	625.3
	Recreational, cultural and sporting activities	2.7	124.9	540.5	321.7	218.7
	Retail trade and repair (excl. motor vehicles/cycles)	12.0	343.4	858.7	350.7	508.0
Total 2007*		25.4	795.8	2935.6	1481.7	1453.9

Table 4.1 provides estimates for the available key indicators for the coastal zone. 'Retail trade and repair' and 'Hotels and restaurants' are the most important industries. It is important to note that these industries are seasonal and the results partly depend on the weather in a specific year. The industry 'Fisheries' is the smallest of the selected industries. Part of the production in this industry overlaps with the production of fisheries in the chapter on activities on the sea (DCS). This overlap concerns only the activities on the DCS of fishing companies located in the selected coastal area.

4.3 Seaports

This study includes the individual figures of five ports in the Netherlands: Rotterdam, Amsterdam, IJmuiden (clustered with Velsen and Beverwijk), Vlissingen and Eemshaven. Some other seaports are not included in the valuation, for example Den Helder, Terneuzen and Moerdijk. The exclusion of these seaports is arbitrary, part of their economic activities will also have a direct relation to the North Sea. The selected seaports are shown on the map in Annex B.

4.3.1 Port of Rotterdam

The port of Rotterdam is Europe's largest port for (trans) shipment of goods. It is located between the North Sea coast and the city centre of Rotterdam along the Nieuwe Waterweg. In defining the port, area maps published by the Port Authority[9] were used. Annex D shows the production level per industry in the port of Rotterdam.

Analysis of the results shows that, although production is located in the defined area of the port, the employees are in some cases registered on office locations in the centre of Rotterdam. Since production (and other variables) is allocated based upon zip codes 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 in the coastal zone, but is most prominent for the Port of Rotterdam. The industries in this port are concentrated in a few large companies. Missing a couple of these companies, because the registered location differs from the production site, results in a substantial error. To correct this, both scenario A and B will include the total figure for the COROP region for some major industries. The larger region that includes the port of Rotterdam is called the 'Rijnmond' region. The Rijnmond figures were used for the following industries:

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

To make a similar correction for Electricity, gas and water supply is not fully justified. Only the production part of this industry has a direct relation with the port. These plants depend on supply by ship and use water for cooling. However, the distribution part of this industry does not have a direct relationship with the sea. Therefore this industry is not included in the valuation of the seaport. The power plants located in the port are ignored, because production cannot be distinguished from distribution in the regional economic figures.

[9] http://www.portofrotterdam.com/en/about_port/port_maps/port_area/index.jsp

In the reference years presented in Annex D the production of petroleum products shows extremely strong growth in production value. This growth is partly explained by increased prices. The production in current prices for 2007 is more than 400 percent larger than in 1995. In this period, producer prices for the domestic market grew 260 percent (Statline, Statistics Netherlands).

For the Port of Rotterdam the following industries are selected:

- Manufacturing
- Trade and repair
- Construction
- Transport

This selection is based on a less detailed division of industries than the selection of industries in the analysis of the coastal zone, because all underlying detailed industries can be included. Table 4.2 shows the key figures for the selected industries in the Rotterdam Port.

Construction is included, because this includes installations for ships and on 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.

Table 4.2: Key indicators for selected industries in the Port of Rotterdam (Scenario A)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	4	124	469	300	169
	Manufacturing	20	930	13,751	11,202	2,548
	Trade and repair	7	208	585	238	347
	Transport, storage and communication	30	1,083	4,793	2,788	2,006
Total 1995		61	2,345	19,598	14,528	5,070
2000	Construction	5	161	613	389	224
	Manufacturing	17	873	23,949	21,247	2,701
	Trade and repair	6	226	679	281	397
	Transport, storage and communication	30	1,301	6,245	3,681	2,564
Total 2000		58	2,561	31,486	25,599	5,886
2007*	Construction	5	241	848	513	335
	Manufacturing	16	1,137	42,229	37,360	4,869
	Trade and repair	6	289	1,208	620	588
	Transport, storage and communication	29	1,633	7,850	4,544	3,306
Total 2007*		57	3,301	52,135	43,037	9,098

Since the definition of the port and its industrial area is based on maps of the Port Authority, scenario A might be preferred in this case. In this scenario, the estimated figures are based on a stricter geographical definition. The most relevant industries have a large share (93 percent on average) in the production of the port. (Annex D).

The results in table 4.2 show that the industries located in the port and industrial area are not very labour-intensive. This is true especially for manufacture of petroleum products, cokes, and nuclear fuel. Production for this industry in the Rotterdam Port

was about 7 million euros per employee in 2007. For the total economy, this figure is 182 thousand euros per employee.

The scope of the figures for the port of Rotterdam is limited by the geographical location of business. The analysis does not include any linkages or spin offs with the Dutch economy outside the assigned location. Only companies registered in the port and their industrial areas are included. In other words it is a static approach of reality.

The economic impact of the seaport on other regions (Example)

Statistics published in the Port Monitor 2007 (RebelGroup Advisory et al. , 2009) list a figure of 89.840 employed persons in 2007 for the port of Rotterdam. The difference between this figure and the estimate presented in this study is predominantly found in the Transport industry. Our figure of 29 thousand employees for Transport activities is much lower than the 59 thousand employed persons in the figures in the Port Monitor.

This difference is partly explained by the fact that our figures exclude self-employed persons. However, this factor is relatively small (Annex F). Another explanation, probably more important, is that transport companies have a relation to the port though they are located elsewhere. This is especially important for the Transport industry. Unlike the Port Monitor, our figures do not include employment (nor production) of companies in the relevant industries when located outside the defined port area.

4.3.2 Amsterdam

The North Sea Canal connects the port of Amsterdam to the North Sea. It's the second largest port of the Netherlands for transhipment of goods. The map[10] published on the internet by the Port Authority was used to define the area. In Annex E production per industry is shown (all industries included)[11]. Unlike the Port of Rotterdam, concentration of production in only a few industries is smaller. Economic activities are more diverse in Port of Amsterdam. Industries like banking and other (financial) services, which are not usually located in a port or industrial area or dependent on supply/transport by water, cover a big share of the production. This indicates that the spatial separation of the relevant industrial industries is not strong in this region and selected zip codes.

[10] http://kaart.gha.nl/havenkaart/

[11] The production of some industries in Annex E can depend on the location on which the employees of a few large companies are registered. This explains the strong decrease of banking, insurance and pension funding in scenario B between 2000 and 2007. Banking is not selected as an industry with a strong relation to or dependency on a port location.

The same industries used in the port of Rotterdam are selected: 'Manufacturing', 'Trade and repair', 'Construction and Transport', 'Storage and communication'. The results for this selection of industries are shown in table 4.3 for scenario A. Scenario A is preferred, because the concerning zip codes are intensively used for less related economic activities.

Selected industries produce 65% percent of total production in the defined area in scenario A. For Rotterdam, this figure is 95% in scenario A. This means that the designed area for Rotterdam is more exclusive used by the selected industries.

Table 4.3: Key indicators for selected industries in the Port of Amsterdam (Scenario A)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	1	34	130	84	46
	Manufacturing	5	196	1,138	771	367
	Trade and repair	3	95	300	136	163
	Transport, storage and communication	4	149	572	254	319
Total 1995		13	474	2,140	1,245	895
2000	Construction	1	39	174	118	56
	Manufacturing	4	163	1,002	700	302
	Trade and repair	3	113	475	259	216
	Transport, storage and communication	4	166	675	360	316
Total 2000		12	482	2,326	1,436	890
2007*	Construction	1	44	218	148	70
	Manufacturing	4	200	1,504	1,078	426
	Trade and repair	2	140	616	296	320
	Transport, storage and communication	4	188	868	442	426
Total 2007*		11	572	3,206	1,964	1,243

4.3.3 Port of IJmuiden

Close to the North Sea, along the canal that connects Amsterdam to the sea, there is cluster of ports and industrial area's. This includes the cities of IJmuiden, Beverwijk and Velsen-Noord. The definition of this area is based on the location of ports for the transhipment of goods and the adjoining industrial areas. Production of steel is the biggest industry in this area. Since production is concentrated in a few companies, results are presented in less detailed industries (table 4.4).

Tabel 4.4: Production in the IJmuiden cluster

	Production Port of IJmuiden (cluster) (x €1,000,000)								
	Scenario A			Scenario B			Mean share		
Industy	1995	2000	2007*	1995	2000	2007*	A	B	NL
Manufacturing	2,380	2,692	4,346	2,544	2,929	4,604	80%	63%	27%
Trade and repair	112	176	234	294	416	516	4%	8%	11%
Transport, storage and communication	145	150	156	222	242	286	4%	5%	7%
Construction	83	94	136	226	258	360	3%	5%	7%
Financial and business activities	88	199	269	306	516	741	7%	10%	22%
Other Industries	58	84	456	284	392	926	1%	9%	26%
Total production	2,865	3,395	5,597	3,876	4,754	7,433	100%	100%	100%

This cluster of Ports and industrial areas shows a strong presence of manufacturing. In order to include the steel producer in this port completely, the figure for

'Manufacturing of basic metals' is equal to the total regional figure for the IJmond Corop. Since this correction was made in both scenarios, scenario A can be preferred. Scenario A limits the selected geographical area better.

When the same industries as in the Rotterdam and Amsterdam ports are selected this results in the figures presented in table 4.5. The power plant located in this port, using residual gasses from the manufacturing industry, is not included since the employees are registered on an other site of their company.

Table 4.5: Key indicators for selected industries in the IJmuiden cluster. (Scenario A)

Year	Industry	Number of employees (x 1,000)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	1	19	83	54	29
	Manufacturing	12	498	2,380	1,261	1,119
	Trade and repair	2	39	112	43	69
	Transport, storage and communication	1	51	145	67	78
Totaal 1995		16	607	2,720	1,424	1,296
2000	Construction	1	22	94	60	34
	Manufacturing	11	529	2,692	1,627	1,065
	Trade and repair	2	62	176	67	109
	Transport, storage and communication	1	46	150	72	79
Totaal 2000		15	659	3,112	1,825	1,287
2007P	Construction	1	29	136	84	52
	Manufacturing	10	758	4,346	2,908	1,438
	Trade and repair	2	84	234	92	142
	Transport, storage and communication	1	41	156	75	81
Totaal 2007P		14	911	4,873	3,159	1,714

4.3.4 Port of Vlissingen

In defining the location of this port information of the Port Authority, Zeeland Seaports[12], was used. Zeeland Seaport is the port Authority for both the port of Vlissingen and the port of Terneuzen. This last port is not included in the present study. The Terneuzen port is located further inland than the Vlissingen port and the concerning industrial areas are spatially fragmented. In value added the port of Terneuzen is bigger than the port in Vlissingen (Nijdam et al, 2010).

In the port of Vlissingen, production in Manufacture of basic chemicals and man-made fibres and Manufacture of basic metals are the most important industries. . The total production figure in the selected area is shown in table 4.6.

[12]http://www.zeeland-seaports.com/cms/publish/content/downloaddocument.asp?document_id=299 /downloaddocument.asp?document_id=299

Table 4.6: Production in the Port of Vlissingen

	Production Port of Vlissingen (x €1,000,000)								
	Scenario A			Scenario B			Mean share		
	1995	2000	2007*	1995	2000	2007*	A	B	NL
Manufacturing	599	894	589	665	1,006	1,406	80%	80%	27%
Transport, storage and communication	46	57	47	50	68	111	6%	6%	7%
Financial and business activities	46	38	10	62	52	20	4%	4%	22%
Construction	10	22	19	12	26	44	2%	2%	7%
Other Industries	36	91	89	42	106	212	8%	8%	37%
Total production	735	1,103	754	830	1,257	1,793	100%	100%	100%

Like the other ports the industries selected to define the port economy are: 'Manufacturing', 'Trade and repair', 'Construction and Transport', 'Storage and communication'. Scenario A shows a strong decrease in both the number of persons employed and production between 2000 and 2007. This is the result of a rearrangement in zip codes. Since this effect does not relate to an actual decrease in economic activity in the port area, scenario B should be preferred in this case.

.

Table 4.7: Key indicators for selected industries in the port of Vlissingen (Scenario B)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	0.1	3.4	11.6	6.9	4.7
	Manufacturing	2.8	100.1	664.6	478.6	185.9
	Trade and repair	0.1	3.7	10.3	3.9	6.4
	Transport, storage and communication	0.7	23.4	50.2	16.3	33.9
Total 1995		3.8	130.7	736.7	505.7	231.0
2000	Construction	0.2	7.2	26.2	16.0	10.1
	Manufacturing	2.5	116.0	1,005.6	786.8	218.8
	Trade and repair	0.2	4.7	14.0	5.6	8.4
	Transport, storage and communication	0.6	26.6	67.7	28.1	39.6
Total 2000		3.5	154.5	1,113.4	836.5	276.9
2007*	Construction	0.3	11.6	44.1	25.6	18.5
	Manufacturing	2.1	126.2	1,406.3	1,165.7	240.6
	Trade and repair	0.2	7.5	22.0	8.5	13.5
	Transport, storage and communication	0.7	31.6	110.6	50.1	60.5
Total 2007*		3.2	176.9	1,583.0	1,249.9	333.1

4.3.5 Port of Eemshaven

The defined location of this port is based on information available on the internet[13]. This is the smallest seaport of the selection, located in the north of the Netherlands. Unlike the other seaports, the economic key figures in table 4.8 are summed for the port area. The small number of companies located in the area does not allow a distinction per industry. In the reference years, the industry of Supporting transport activities was the most relevant industry. These figures are for the industries that are considered relevant for seaports in the valuation: Manufacturing, Trade and repair, Construction and Transport, storage and communication. For this port the estimates

[13] http://www.eemshaven.com/

in scenario B are preferred. For the selected industries, the economic activities in the port's zip codes take place in the defined area and in the direct surrounding.

Table 4.8: Key indicators for selected industries in the Port of Eemshaven (scenario B)

Construction Manufacturing Trade and repair Transport, storage and communication	Year	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
	1995	0.25	6.39	32.70	22.96	9.74
	2000	0.14	4.41	21.70	15.16	6.54
	2007*	0.12	5.52	25.32	14.70	10.62

4.4 Results for activities on land

In the reference period, the total number of employees (full time equivalent) for the activities in the predefined areas is gradually decreasing, as shown in table 4.9. This decrease in employment is explained by a decrease of employment in all of the selected seaports. The number of employees in the selected industries along the coastal area is rather stable. For the Netherlands the total number of employees grew from 5.0 million fulltime equivalents in 1995 to 5.7 million in 2000 and 5.9 million in 2007. The industries selected for seaports are not labour intensive and the decline in the number of employees can potentially be explained by technological developments (automation and mechanization). Compensation per employee is larger in industries selected for seaports than for the industries selected in the coastal zone.

Table 4.9: Key figures for activities on land in predefined areas (selected industries and preferred scenario).

Area of interest	Year	Number of employees (x 1,000)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
Rotterdam	1995	61.0	2,345	19,598	14,528	5,070
	2000	58.1	2,561	31,486	25,599	5,886
	2007*	56.6	3,301	52,135	43,037	9,098
Amsterdam	1995	12.7	474	2,140	1,245	895
	2000	11.6	482	2,326	1,436	890
	2007*	10.8	572	3,206	1,964	1,243
IJmuiden cluster	1995	15.5	607	2,720	1,424	1,296
	2000	14.9	659	3,112	1,825	1,287
	2007*	14.3	911	4,873	3,159	1,714
Vlissingen	1995	3.8	131	737	506	231
	2000	3.5	154	1,113	837	277
	2007*	3.2	177	1,583	1,250	333
Eemshaven	1995	0.2	6	33	23	10
	2000	0.1	4	22	15	7
	2007*	0.1	6	25	15	11
Total seaports	1995	93.2	3,563	25,227	17,725	7,501
	2000	88.3	3,860	38,059	29,712	8,347
	2007*	85.0	4,965	61,822	49,424	12,398
Coastal Zone	1995	23.5	510	1,858	878	981
	2000	25.2	658	2,484	1,187	1,296
	2007*	25.4	796	2,936	1,482	1,454
Total on land	1995	116.7	4,072	27,085	18,603	8,482
	2000	113.4	4,519	40,543	30,899	9,643
	2007*	110.4	5,761	64,758	50,906	13,852

The value added in current prices for the selected industries in the areas of interest is equal to 3.6% of the Dutch total value added in 1995. In 2000 this figure is equal to 3.0% and in 2007 it was equal to 3.2%. The share of production of the selected activities in the total production figure is larger. For 1995, 2000 and 2007 the share in production is equal to 5.3%, 5.5% and 6.5% respectively.

5. Conclusions and recommendations

Total production of economic activities on the Dutch Continental Shelf (activities on sea) and economic activities with a relation to the North Sea along the Coast and in seaports (activities on land) is grew from 5.2% to 5.6% and 6.7% of the total production in the Netherlands for 1995, 2000 and 2007[14] respectively. For value added the share of the areas of interest in total GDP is equal to 3.8% on average. This share is equal to 3.9% in 1995 and decreases to 3.5% in 2000. In 2007 the share in value added is equal to 3.9% again. It is important to note that estimates are only the result of a static economic analysis, thus backward and forward linkages to other industries and other geographical areas are not taken into account. In other words, all indirect activities that can be attributed to maritime activities, for example inland shipping or the supply activities related to providing hotels and restaurants with food, are not taken into account. In order to calculate the indirect activities input-output analyses could be used, but this is outside the scope of the present study.

Table 5.1 shows a summary of economic key figures for the relevant economic activities investigated in this study All figures are in current prices and therefore inflation is included.

[14] Figures for the activities on land in 2007 are provisional. This is indicated by an asterisk (2007*)

Table 5.1: Economic figures for activities on the DCS, seaports (Rotterdam, Amsterdam, IJmuiden, Vlissingen, Eemshaven) and the coastal zone.

			1995	2000	2005	2007*
DCS	Sea shipping	Number of employees (x 1,000 fte)	0.2	0.2	0.2	0.2
		Production (x €1,000,000)	81	113	151	141
		Value added (x €1,000,000)	19	29	41	37
	Fisheries	Number of employees (x 1,000 fte)	0.5	0.3	0.2	0.2
		Production (x €1,000,000)	102	111	102	113
		Value added (x €1,000,000)	61	58	42	45
	Oil and Gas extraction	Number of employees (x 1,000 fte)	0.5	0.5	0.5	0.8
		Production (x €1,000,000)	2,692	4,306	5,673	7,644
		Value added (x €1,000,000)	2,112	3,313	4,196	5,866
	Sand extraction	Number of employees (x 1,000 fte)	P.M.	P.M.	P.M.	P.M.
		Production (x €1,000,000)	P.M.	P.M.	P.M.	P.M.
		Value added (x €1,000,000)	P.M.	P.M.	P.M.	P.M.
	Wind energy	Number of employees (x 1,000 fte)	0	0	0	P.M.
		Production (x €1,000,000)	0	0	0	23
		Value added (x €1,000,000)	0	0	0	11
	Total	Number of employees (x 1,000 fte)	1.2	1.0	0.9	1.2
		Production (x €1,000,000)	2,875	4,530	5,926	7,922
		Value added (x €1,000,000)	2,192	3,399	4,279	5,959
Sea Ports		Number of employees (x 1,000)	93.2	88.3	N/A	85.0
		Production (x €1,000,000)	25,227	38,059	N/A	61,822
		Value added (x €1,000,000)	7,501	8,347	N/A	12,398
Coastal Zone		Number of employees (x 1,000)	23.5	25.2	N/A	25.4
		Production (x €1,000,000)	1,858	2,484	N/A	2,936
		Value added (x €1,000,000)	981	1,296	N/A	1,454
Total on land		Number of employees (x 1,000)	116.7	113.4	N/A	110.4
		Production (x €1,000,000)	27,085	40,543	N/A	64,758
		Value added (x €1,000,000)	8,482	9,643	N/A	13,852
Total DCS and on land		Number of employees (x 1,000)	117.9	114.5	N/A	111.6
		Production (x €1,000,000)	29,959	45,073	N/A	72,679
		Value added (x €1,000,000)	10,674	13,042	N/A	19,810

Value Added

Figure 5.1 shows the share of different activities in the total amount of value added generated by relevant industries in the areas of interest in 2007. The activities in the seaports have the largest share in total value added of the relevant activities. Extraction of oil and gas on the DCS also has a large share in total value added.

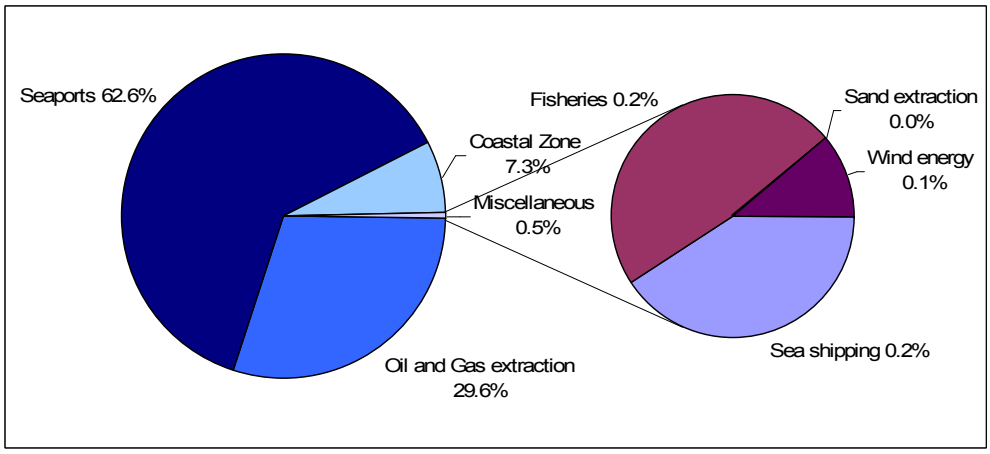

Figure 5.1 Share in total value added of different activities on or related to the DCS (2007).*

In the seaports selected, manufacturing generated the largest part of value added as shown in figure 5.2. For the three reference years used in this study manufacturing has a share between fifty and sixty percent of the estimated value added in seaports.

In manufacturing the most important activities are 'the manufacture of basic chemicals and man-made fibres' (Rotterdam), 'the manufacture of petroleum products' (Rotterdam) and 'the manufacture of basic metals' (IJmuiden).

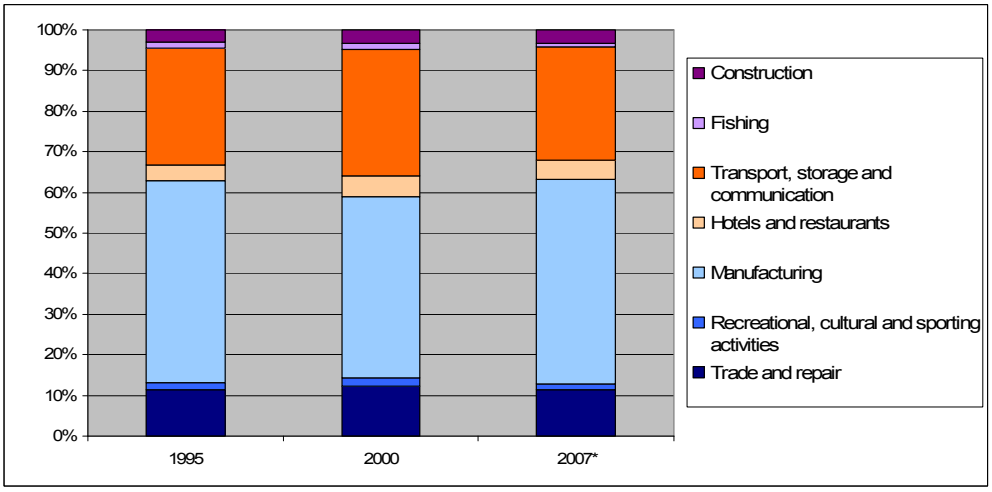

Figure 5.2 Share in value added of relevant industries in the selected seaports and coastal zone

Number of employees

The share of relevant activities in the estimated number of employees in 2007 is shown in Figure 5.3. Unlike the share in value added, extraction of oil and gas on the DCS is relatively small. This industry is characterised by low labour intensity. A large part of employment is generated by activities taking place in seaports and the coastal zone.

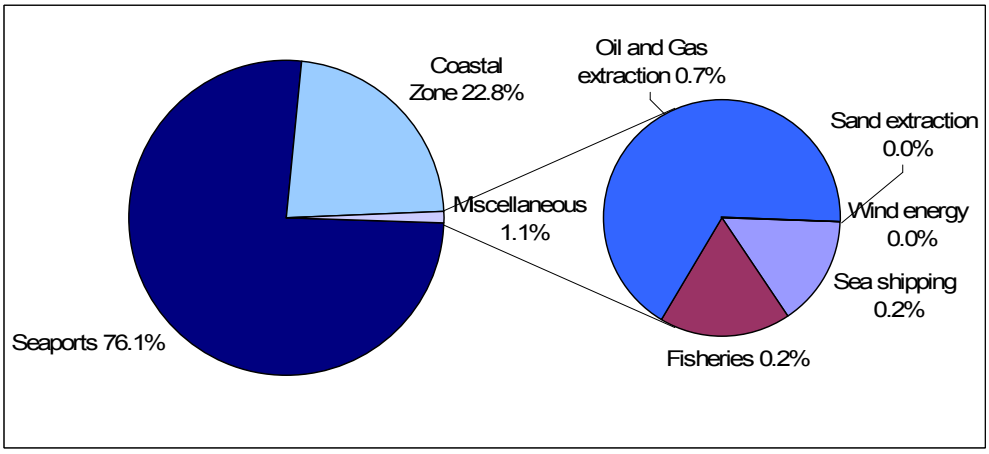

Figure 5.3 Share in total employment of different activities on or related to the DCS (2007).*

In figure 5.4 the share in the total employment is presented for the relevant industries selected for seaports and in the coastal zone. In 2007, the industry of 'transport, storage and communication' had the biggest share in the number of employees. The share of manufacturing declined in the reference period, while the share of the activities in the coastal zone (retail trade and hotels and restaurants) increased.

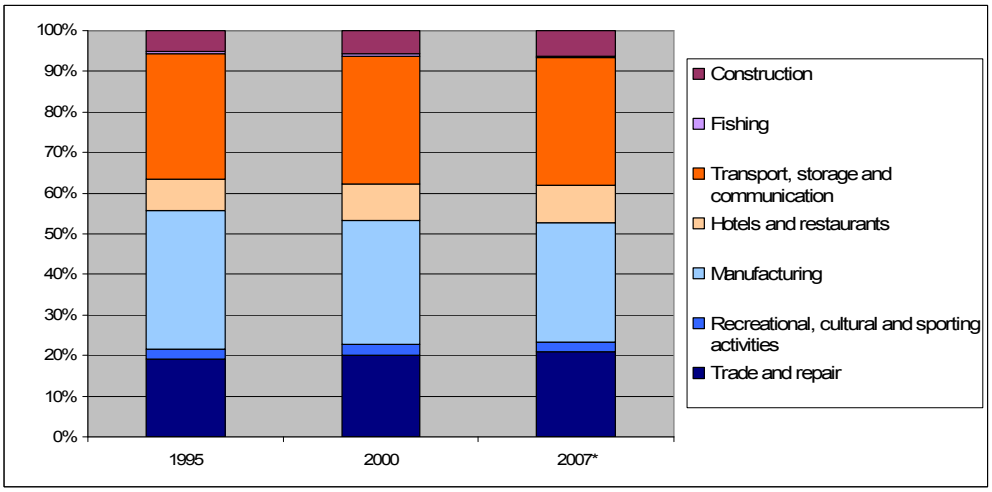

Figure 5.4 Share of the relevant industries in the employment in the selected seaports and coastal area

Development over time

Figure 5.5 shows the index for both the number of employees and value added generated by 'North Sea activities' and the macro economic figures for the Netherlands as a whole. Employment for the total of the selected activities shows a gradual decline, while the total number of employees for the Netherlands as a whole increased by 18 % in between 1995 and 2007 (full time equivalents).

Value added in current prices for selected activities on the DCS and in the area of interest on land grew similar to total Dutch economy. This figure depends heavily on both extraction of oil and gas on the DCS and the manufacture of petroleum products in the port of Rotterdam. These industries are characterised by strong price inflation in the period 1995-2007. Real economic growth, in volume changes, was considerably smaller.

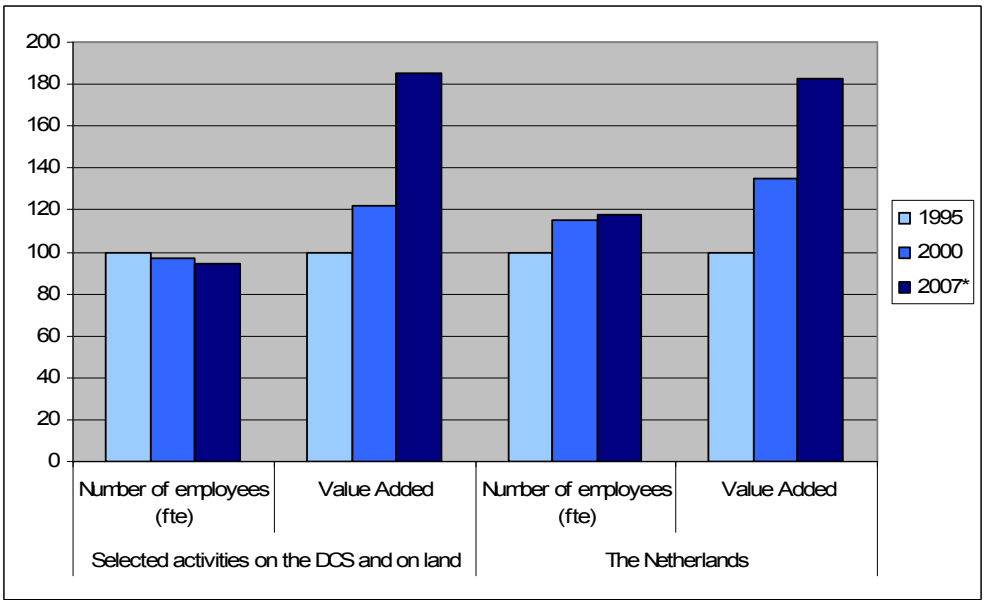

Figure 5.5 Index (1995=100) of employment and value added for selected industries related to the DCS and national figures for the Dutch economy

Evaluation of the methodology used

The figures presented in this paper are mostly based on figures from the national accounts or the regional accounts. The national or regional figures are partly allocated to specific geographical areas: the Dutch Continental Shelf, the selected sea ports or the coastal area. Using data from the national accounts means that the used concepts 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 industry, it is possible to analyse the economic structure of the areas of interest.

In estimating the economic activities on the DCS (activities on sea) the methodology used differs for each activity. For both extraction of oil and gas and the production of wind power figures for the DCS are completely based on readily available figures at Statistics Netherlands. For sea shipping and fisheries external sources were required to allow the allocation of the national figures to the DCS. The quality of the sources used is difficult to determine and the continuity is a problem. The figures on the revenues of fishing on the DCS ((LEI, compendium voor de leefomgeving, 2006) are published only for 2001, 2002 and 2003. The figures on emissions used to estimate economic figures for sea shipping on the DCS are available for only 2000 and 2004.

Part of the methodology used in the river basin analysis (Brouwer et al., 2005) is adopted in this study for the valuation of seaports and the coastal zone. 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 activities. This problem is partly solved by allocating total figures for the larger region (COROP) to a seaport for some relevant industries. This methodological problem is less substantial for the river basin analysis because these geographical areas are much larger.

Recommendations

The figures for seaports and the coastal zone include only businesses located within the geographical boundaries set. Backward and forward linkages to other areas or industries are not included in this study. Though the estimate of activities in the selected geographical areas may be precise, the strict geographical boundaries may not do justice to the full economic relevance of the selected seaports. Further study for linkages to other industries in other areas of the Netherlands is recommended.

The figures in this paper are based on a selection of seaports: Rotterdam, Amsterdam, Ijmuiden clustered with Beverwijk and Velsen, Vlissingen and Eemshaven. In future studies it is recommended to also include other seaports such as Terneuzen, Moerdijk, Delfzijl and Den Helder.

Another recommendation for future research is to examine alternative methods for estimating the economic activities in seaports. Internet sources on seaports may allow pinpointing relevant companies in seaports and allocating them manually and individually to the relevant port. An other alternative that may be applied to the coastal zone as well as to the seaports is using the LISA register. The company register (ABR) used in this study has 'the company' as an entity. The entity in the LISA register is the 'branch (of a company)'. Theoretically, the LISA register would provide more geographical detail. However, the LISA register may not cover some relevant industries, such as fisheries.

To allow for an integrated analysis of both the economy and the environment it is recommended to add data on air- and water pollution to the economic key figures. The Pollutant Release & Transfer Register, established by a collaboration of Dutch research institutes, provides information on emissions per industry and in case of large companies per individual company. For activities on the DCS, some data are already available. These figures (annex G provides some examples) include both Dutch and international companies and can not be directly related to the economic figures, which are based on the resident principle. For activities in seaports and in the coastal zone, the possibility to merge data on emissions and the economy should be explored.

In addition to the figures in current prices, figures in constant prices (excluding price inflation) could be calculated. These figures could be used to analyse 'real economic development' of relevant activities.

Unfortunately, a reliable estimate for the extraction of sand was not feasible. This activity is included in a broad industry, civil engineering. A suitable source to facilitate allocating part of the figures of civil engineering to the activity of interest

and the DCS is not available at this moment in time. Consulting the industry concerned is recommended before including the numbers for extraction of sand in the aggregates.

Annex A Map of the coastal area

	Beach/Sand dunes
	Coastal zone

Annex B Map of the selected sea ports

Annex C Production in the coastal area

			Production Coastal area (x €1,000,000)								
			Scenario A			Scenario B			Mean share		
Industry aggregated	Industry	Industry	1995	2000	2007*	1995	2000	2007*	A	B	NL
Agriculture	1	Arable farming	31	26	27	64	50	66	0%	0%	0%
	2	Horticulture	192	238	262	554	647	806	3%	4%	1%
	3	Live stock	56	50	40	94	89	76	1%	1%	1%
	4	Other agriculture	59	68	85	138	141	202	1%	1%	0%
	5	**Fishing**	**171**	**202**	**198**	**227**	**267**	**271**	**2%**	**2%**	**0%**
Mining/quarrying	6	Crude petroleum and natural gas production	X	X	X	X	X	X	X	X	2%
	7(incl 6)	Other mining and quarrying	10	17	15	20	24	22	0%	0%	0%
Manufacturing	8	Manufacture of food products, beverages and tobacco	192	487	1,170	344	645	1,692	6%	5%	6%
	9	Manufacture of textile and leather products	12	13	13	21	22	27	0%	0%	1%
	10	Manufacture of paper and paper products	X	X	X	X	X	X	X	X	1%
	11 (incl 10)	Publishing and printing	73	87	66	141	177	132	1%	1%	2%
	12	Manufacture of petroleum products; cokes, and nuclear fuel	X	X	X	X	X	X	X	X	2%
	13	Manufacture of basic chemicals and man-made fibres	X	X	X	X	X	X	X	X	3%
	14 (incl 12 and 13)	Manufacture of chemical products	48	97	107	79	155	226	1%	1%	1%
	15	Manufacture of rubber and plastic products	14	25	17	53	86	70	0%	0%	1%
	16	Manufacture of basic metals	X	X	X	X	X	X	X	X	1%
	17 (incl 16)	Manufacture of fabricated metal products	60	72	109	159	185	275	1%	1%	2%
	18	Manufacture of machinery and equipment n.e.c.	52	77	67	99	170	178	1%	1%	2%
	19	Manufacture of electrical and optical equipment	42	92	45	136	182	92	1%	1%	2%
	20	Manufacture of transport equipment	X	X	X	X	X	X	X	X	2%
	21 (incl 20)	Manufacture of wood and wood products	65	52	68	221	173	266	1%	1%	0%
	22	Manufacture of other non-metallic mineral products	4	15	38	15	35	43	0%	0%	1%
	23 (incl 24,25,26)	Other manufacturing	25	28	197	40	48	99	1%	0%	1%
	24	Recycling	X	X	X	X	X	X	X	X	0%
Electr/gas/water	25	Electricity and gas supply	X	X	X	X	X	X	X	X	3%
	26	Water supply	X	X	X	X	X	X	X	X	0%
Construction	27	Construction of buildings	229	314	465	410	566	927	4%	4%	4%
	28	Civil engineering	46	64	34	90	119	79	1%	1%	1%
	29	Building installation and completion	148	205	284	269	387	580	2%	2%	3%
Trade and repair	30	Trade and repair of motor vehicles/cycles	79	107	110	158	216	261	1%	1%	2%
	31	Wholesale trade (excl. motor vehicles/cycles)	300	420	440	548	765	1,266	4%	5%	6%
	32	**Retail trade and repair (excl. motor vehicles/cycles)**	**353**	**449**	**479**	**608**	**743**	**859**	**5%**	**4%**	**3%**
Hotels/rest	**33**	**Hotels and restaurants**	**470**	**694**	**866**	**676**	**989**	**1,266**	**8%**	**6%**	**2%**
Transport	34	Land transport	108	147	158	208	276	375	2%	2%	2%
	35	Water transport	59	123	123	115	242	194	1%	1%	1%
	36	Air transport	1	7	1	1	10	2	0%	0%	1%
	37 (incl 38)	Supporting transport activities	134	153	216	287	378	727	2%	3%	1%
	38	Post and telecommunications	X	X	X	X	X	X	X	X	2%
Financial/business	39 (incl 40)	Banking	155	275	294	343	624	593	3%	3%	3%
	40	Insurance and pension funding	X	X	X	X	X	X	X	X	2%
	41	Activities auxiliary to financial intermediation	41	70	80	84	147	235	1%	1%	1%
	42	Real estate activities	603	717	1,148	1,111	1,321	2,160	9%	9%	6%
	43	Renting of movables	32	58	67	61	103	128	1%	1%	1%
	44 (incl 45)	Computer and related activities	135	199	259	203	433	428	2%	2%	1%
	45	Research and development	X	X	X	X	X	X	X	X	0%
	46	Legal and economic activities	234	334	409	910	762	1,030	4%	6%	3%
	47	Architectural and engineering activities	64	131	142	161	463	401	1%	2%	1%
	48	Advertising	60	90	57	100	154	118	1%	1%	1%
	49	Activities of employment agencies	12	78	131	23	156	307	1%	1%	1%
	50	Other business activities	69	107	158	146	242	327	1%	1%	1%
General government	51 (incl 52)	Public administration and social security	1,130	884	996	1,620	1,465	1,915	12%	10%	5%
	52	Defence activities	X	X	X	X	X	X	X	X	1%
	53	Subsidized education	174	186	294	333	332	501	2%	2%	3%
Care/other services	54	Health and social work activities	538	673	808	987	1,076	1,547	8%	7%	5%
	55	Sewage and refuse disposal services	17	26	16	42	64	49	0%	0%	1%
	56	**Recreational, cultural and sporting activities**	**248**	**359**	**358**	**347**	**484**	**540**	**4%**	**3%**	**2%**
	57	Private households with employed persons	X	X	X	X	X	X	X	X	0%
	58 (incl 57)	Other service activities n.e.c.	70	138	183	155	390	479	1%	2%	1%
Total			6,616	8,655	11,098	12,402	16,003	21,836	100%	100%	100%

Annex D Production in the Port of Rotterdam

			Production Port of Rotterdam area (x €1,000,000)								
			Scenario A			Scenario B			Mean share		
Industry aggregate	Industry	Industry	1995	2000	2007*	1995	2000	2007*	A	B	NL
Agriculture	1	Arable farming	X	X	X	X	X	X	X	X	0%
	2 (incl 1)	Horticulture	10	16	16	153	213	272	0%	1%	1%
	3	Live stock	0	0	0	1	1	1	0%	0%	1%
	4 (incl 5)	Other agriculture	6	9	10	18	32	42	0%	0%	0%
	5	Fishing	X	X	X	X	X	X	X	X	0%
Mining/quarrying	6	Crude petroleum and natural gas production	X	X	X	X	X	X	X	X	2%
	7 (incl 6)	Other mining and quarrying	40	35	21	48	44	33	0%	0%	0%
Manufacturing	**8**	**Manufacture of food products, beverages and tobacco**	**223**	**280**	**466**	**394**	**523**	**639**	**1%**	**1%**	**6%**
	9	**Manufacture of textile and leather products**	**11**	**13**	**12**	**19**	**24**	**20**	**0%**	**0%**	**1%**
	10	**Manufacture of paper and paper products**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	11 (incl 10)	**Publishing and printing**	**84**	**64**	**65**	**119**	**106**	**101**	**0%**	**0%**	**2%**
	12	**Manufacture of petroleum products; cokes, and nuclear fuel**	**7,677**	**16,632**	**29,268**	**7,677**	**16,632**	**29,268**	**47%**	**42%**	**2%**
	13	**Manufacture of basic chemicals and man-made fibres**	**4,004**	**5,384**	**10,754**	**4,004**	**5,384**	**10,754**	**18%**	**16%**	**3%**
	14	**Manufacture of chemical products**	**782**	**573**	**443**	**829**	**646**	**491**	**2%**	**2%**	**1%**
	15	**Manufacture of rubber and plastic products**	**6**	**11**	**20**	**9**	**17**	**32**	**0%**	**0%**	**1%**
	16	**Manufacture of basic metals**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	17 (incl 16)	**Manufacture of fabricated metal products**	**123**	**172**	**230**	**200**	**282**	**365**	**1%**	**1%**	**2%**
	18	**Manufacture of machinery and equipment n.e.c.**	**178**	**209**	**402**	**235**	**286**	**504**	**1%**	**1%**	**2%**
	19	**Manufacture of electrical and optical equipment**	**131**	**108**	**153**	**205**	**169**	**270**	**0%**	**1%**	**2%**
	20	**Manufacture of transport equipment**	**355**	**321**	**217**	**385**	**374**	**252**	**1%**	**1%**	**2%**
	21	**Manufacture of wood and wood products**	**10**	**9**	**9**	**14**	**12**	**12**	**0%**	**0%**	**0%**
	22	**Manufacture of other non-metallic mineral products**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	23 (incl 22,24,25)	**Other manufacturing**	**166**	**171**	**240**	**205**	**215**	**343**	**1%**	**1%**	**1%**
	24	**Recycling**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**0%**
Electricity/gas/wate	25	Electricity and gas supply	X	X	X	X	X	X	X	X	3%
Construction	**27**	**Construction of buildings**	**196**	**205**	**192**	**360**	**380**	**404**	**1%**	**1%**	**4%**
	28	**Civil engineering**	**15**	**41**	**19**	**50**	**90**	**39**	**0%**	**0%**	**1%**
	29	**Building installation and completion**	**258**	**367**	**636**	**425**	**602**	**1,114**	**1%**	**2%**	**3%**
Trade and repair	**30**	**Trade and repair of motor vehicles/cycles**	**75**	**81**	**123**	**147**	**172**	**267**	**0%**	**1%**	**2%**
	31	**Wholesale trade (excl. motor vehicles/cycles)**	**402**	**517**	**1,002**	**610**	**809**	**1,510**	**2%**	**2%**	**6%**
	32	**Retail trade and repair (excl. motor vehicles/cycles)**	**108**	**81**	**83**	**271**	**252**	**303**	**0%**	**1%**	**3%**
Hotels/rest	33	Hotels and restaurants	33	55	64	76	126	147	0%	0%	2%
Transport	**34**	**Land transport**	**182**	**263**	**453**	**297**	**431**	**731**	**1%**	**1%**	**2%**
	35 (incl 36)	**Water transport**	**2,174**	**2,860**	**3,381**	**2,174**	**2,861**	**3,381**	**8%**	**8%**	**1%**
	36	**Air transport**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	37	**Supporting transport activities**	**2,405**	**3,059**	**3,889**	**2,406**	**3,064**	**3,902**	**9%**	**8%**	**1%**
	38	**Post and telecommunications**	**32**	**63**	**128**	**86**	**146**	**247**	**0%**	**0%**	**2%**
Financial/business	39	Banking	28	46	67	102	126	142	0%	0%	3%
	40	Insurance and pension funding	16	2	33	17	3	45	0%	0%	2%
	41	Activities auxiliary to financial intermediation	29	18	23	52	39	52	0%	0%	1%
	42	Real estate activities	96	101	168	309	323	378	0%	1%	6%
	43	Renting of movables	26	74	87	50	129	139	0%	0%	1%
	44 (incl 45)	Computer and related activities	25	54	96	36	93	172	0%	0%	1%
	45	Research and development	X	X	X	X	X	X	X	X	0%
	46	Legal and economic activities	49	70	170	103	151	297	0%	0%	3%
	47	Architectural and engineering activities	76	102	145	120	143	216	0%	0%	1%
	48	Advertising	20	30	37	44	60	77	0%	0%	1%
	49	Activities of employment agencies	22	81	148	34	131	276	0%	0%	1%
	50	Other business activities	189	358	541	244	431	664	1%	1%	1%
General governmer	51	Public administration and social security	25	51	565	111	171	1,757	0%	1%	5%
	53	Subsidized education	29	36	57	127	131	197	0%	0%	3%
Care/other serv	54	Health and social work activities	28	51	231	147	242	502	0%	1%	5%
	55	Sewage and refuse disposal services	186	427	563	220	493	719	1%	1%	1%
	56	Recreational, cultural and sporting activities	55	33	65	95	87	160	0%	0%	2%
	57	Private households with employed persons	0	0		0	0		0%	0%	0%
	58	Other service activities n.e.c.	25	23	44	71	85	100	0%	0%	1%
Total			20,612	33,160	55,336	23,297	36,731	61,335	100%	100%	100%

Annex E Production in the Port of Amsterdam

			Production Port of Amsterdam area (x €1,000,000)								
			Scenario A			Scenario B			Mean share		
Industry aggregate	Industry	Industry	1995	2000	2007*	1995	2000	2007*	A	B	NL
Agriculture	1	Arable farming	X	X	X	X	X	X	X	X	0%
	2	Horticulture	X	X	X	X	X	X	X	X	1%
	3 (incl 1 en 2)	Live stock	0	0	0	2	1	2	0%	0%	1%
	4	Other agriculture	0	0	2	2	2	9	0%	0%	0%
Mining/quarrying	6	Crude petroleum and natural gas production	X	X	X	X	X	X	X	X	2%
	7	Other mining and quarrying	X	X	X	X	X	X	X	X	0%
Manufacturing	**8 (incl 6, 7)**	**Manufacture of food products, beverages and tobacco**	**222**	**226**	**541**	**812**	**842**	**1,552**	**8%**	**9%**	**6%**
	9	**Manufacture of textile and leather products**	**10**	**16**	**20**	**29**	**40**	**28**	**0%**	**0%**	**1%**
	10	**Manufacture of paper and paper products**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	11 (incl 10)	**Publishing and printing**	**170**	**197**	**359**	**804**	**858**	**1,316**	**6%**	**9%**	**2%**
	12	**Manufacture of petroleum products; cokes, and nuclear fuel**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**2%**
	13	**Manufacture of basic chemicals and man-made fibres**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**3%**
	14 (incl 12, 13)	**Manufacture of chemical products**	**657**	**473**	**439**	**849**	**544**	**572**	**14%**	**6%**	**1%**
	15	**Manufacture of rubber and plastic products**	**1**	**12**	**18**	**26**	**54**	**49**	**0%**	**0%**	**1%**
	16	**Manufacture of basic metals**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	17 (incl 16)	**Manufacture of fabricated metal products**	**12**	**13**	**20**	**87**	**113**	**98**	**0%**	**1%**	**2%**
	18	**Manufacture of machinery and equipment n.e.c.**	**16**	**9**	**16**	**128**	**114**	**56**	**0%**	**1%**	**2%**
	19	**Manufacture of electrical and optical equipment**	**14**	**8**	**13**	**85**	**62**	**71**	**0%**	**1%**	**2%**
	20	**Manufacture of transport equipment**	**6**	**3**	**12**	**34**	**26**	**56**	**0%**	**0%**	**2%**
	21	**Manufacture of wood and wood products**	**1**	**1**	**3**	**46**	**32**	**8**	**0%**	**0%**	**0%**
	22	**Manufacture of other non-metallic mineral products**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	23 (incl 22,24)	**Other manufacturing**	**35**	**57**	**127**	**74**	**127**	**157**	**2%**	**1%**	**1%**
	24	**Recycling**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**0%**
Electricity/gas/wat	25	Electricity and gas supply	X	X	X	X	X	X	X	X	3%
	26	Water supply	X	X	X	X	X	X	X	X	0%
Construction	**27 (incl 25,26)**	**Construction of buildings**	**60**	**91**	**138**	**222**	**289**	**349**	**2%**	**3%**	**4%**
	28	**Civil engineering**	**70**	**84**	**86**	**310**	**403**	**370**	**2%**	**3%**	**1%**
	29	**Building installation and completion**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**3%**
Trade and repair	**30**	**Trade and repair of motor vehicles/cycles**	**79**	**70**	**30**	**140**	**213**	**134**	**2%**	**2%**	**2%**
	31 (incl 32)	**Wholesale trade (excl. motor vehicles/cycles)**	**221**	**404**	**586**	**865**	**1,544**	**1,853**	**10%**	**12%**	**6%**
	32	**Retail trade and repair (excl. motor vehicles/cycles)**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**3%**
Hotels/rest	33	Hotels and restaurants	17	19	27	49	76	92	1%	1%	2%
Transport	**34**	**Land transport**	**76**	**71**	**124**	**126**	**148**	**358**	**2%**	**2%**	**2%**
	35 (incl 36)	**Water transport**	**167**	**189**	**298**	**183**	**214**	**310**	**5%**	**2%**	**1%**
	36	**Air transport**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**1%**
	37	**Supporting transport activities**	**242**	**252**	**266**	**356**	**347**	**370**	**7%**	**3%**	**1%**
	38	**Post and telecommunications**	**88**	**164**	**180**	**402**	**611**	**970**	**4%**	**6%**	**2%**
Financial/business	39	Banking	X	X	X	X	X	X	X	X	3%
	40 (incl 39)	Insurance and pension funding	230	438	226	1,049	1,583	916	8%	11%	2%
	41	Activities auxiliary to financial intermediation	6	5	16	18	29	59	0%	0%	1%
	42	Real estate activities	123	225	598	270	484	1,186	7%	5%	6%
	43	Renting of movables	16	19	13	37	69	54	0%	0%	1%
	44	Computer and related activities	82	360	71	116	489	245	4%	2%	1%
	45	Research and development	1	3	8	7	6	32	0%	0%	0%
	46	Legal and economic activities	68	114	276	166	321	662	4%	3%	3%
	47	Architectural and engineering activities	15	20	31	42	68	74	1%	1%	1%
	48	Advertising	24	42	64	113	134	144	1%	1%	1%
	49	Activities of employment agencies	X	X	X	X	X	X	X	X	1%
	50 (incl 49)	Other business activities	67	120	158	324	594	716	3%	5%	1%
General governme	51	Public administration and social security	X	X	X	X	X	X	X	X	5%
	53 (incl 51)	Subsidized education	24	42	52	162	263	340	1%	2%	3%
Care/other service	54	Health and social work activities	59	58	31	279	302	233	1%	3%	5%
	55	Sewage and refuse disposal services	49	103	72	53	108	74	2%	1%	1%
	56	Recreational, cultural and sporting activities	23	42	64	57	110	188	1%	1%	2%
	58	Other service activities n.e.c.	18	25	26	61	65	80	1%	1%	1%
Total			2,970	3,971	5,010	8,383	11,281	13,783	100%	100%	100%

Annex F Number of employees and employed persons in the Netherlands.

1 000 full time eq.	Employed Persons	Employees	Percentage Selfemployed	Employed Persons	Employees	Percentage Selfemployed	Employed Persons	Employees	Percentage Selfemployed
	1995	1995	1995	2000	2000	2000	2007	2007	2007
Agriculture, forestry and fishing	*237*	*81*	*66%*	*239*	*89*	*63%*	*209*	*92*	*56%*
Mining and quarrying	*10*	*9*	*2%*	*9*	*9*	*2%*	*7*	*7*	*0%*
Manufacturing	*948*	*906*	*5%*	*952*	*912*	*4%*	*844*	*805*	*5%*
Manufacture of petroleum products; cokes, and nuclear fuel	7	7	*0%*	6	6	*0%*	6	6	*0%*
Manufacture of basic chemicals and man-made fibres	38	38	*0%*	32	32	*0%*	29	29	*0%*
Manufacture of basic metals	26	26	*0%*	25	25	*0%*	21	21	*0%*
Construction	*410*	*359*	*13%*	*472*	*404*	*14%*	*462*	*372*	*20%*
Wholesale trade (excl. motor vehicles/cycles)	394	341	*13%*	447	407	*9%*	443	405	*9%*
Retail trade and repair (excl. motor vehicles/cycles)	433	336	*22%*	480	389	*19%*	502	406	*19%*
Hotels and restaurants	181	135	*25%*	201	152	*24%*	203	153	*25%*
Transport, storage and communication	*367*	*340*	*8%*	*425*	*397*	*7%*	*407*	*377*	*7%*
Land transport	168	153	*9%*	182	168	*8%*	182	167	*8%*
Water transport	19	12	*39%*	20	13	*35%*	20	13	*35%*
Air transport	25	25	*0%*	30	30	*0%*	29	29	*0%*
Supporting transport activities	72	68	*5%*	82	78	*5%*	90	86	*4%*
Post and telecommunications	83	81	*2%*	111	108	*2%*	87	83	*5%*
Recreational, cultural and sporting activities	97	69	*29%*	118	86	*27%*	125	91	*27%*
Total all industries	*5,774*	*5,001*	*13%*	*6,534*	*5,750*	*12%*	*6,728*	*5,905*	*12%*

(Source: Labour Accounts, Statistics Netherlands)

Annex G Emissions to water by sea shipping and fisheries on the DCS

Source	Compound	1995 (kg)	2000 (kg)	2005 (kg)	2007 (kg)
Fishing vessels corrosion anodes DCS	Aluminium and compounds (as Al)	797	773	625	623
	Cadmium and Compounds (as Cd)	2	2	1	1
	Zinc and Compounds (as Zn)	3,664	3,554	2,870	2,864
Fishing vessels coatings DCS	Dithiocarbamate	5	7	32	34
	Copper and Compounds (als Cu)	1,489	1,476	1,577	1,599
	Organotin Compounds	727	663	33	0
	Organotin Compounds (as Sn)	291	265	13	0
	Seanine (Kathon)	5	7	32	34
	Tin and Compounds (as Sn)	291	265	13	0
	Tolylfluanid	5	7	32	34
	Tributyltin Compounds	727	663	33	0
	Zinc pyrithione	5	7	32	34
	Zinc and Compounds (as Zn)	2	3	14	15
Seashipping vessels corrosion anodes DCS	Aluminium and compounds (as Al)	8,469	8,091	8,303	8,266
	Cadmium and Compounds (as Cd)	48	45	47	46
	Zinc and Compounds (as Zn)	95,010	90,764	93,140	92,726
Seashipping vessels coatings DCS	Dithiocarbamate	58	83	286	429
	Copper and Compounds (als Cu)	18,718	18,274	21,516	23,370
	Organotin Compounds	9,132	8,211	4,634	1,887
	Organotin Compounds (as Sn)	3,653	3,284	1,854	755
	Seanine (Kathon)	58	83	286	429
	Tin and Compounds (as Sn)	3,653	3,284	1,854	755
	Tolylfluanid	58	83	286	429
	Tributyltin Compounds	9,132	8,211	4,634	1,887
	Zinc pyrithione	58	83	286	429
	Zinc and Compounds (as Zn)	26	37	127	190

Includes both Dutch and international vessels (Source: The Pollutant Release & Transfer Register)

Annex H 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.

Annex I References and Internet sources

RebelGroup Advisory mtbs /Buck Consultants International, 2009, *Economische betekenis van Nederlandse zeehavens; Tabellenboek Havenmonitor 2007.* Available in Dutch at: http://www.havenraad.nl/images/Havenmonitor%202007_tcm226-259784.pdf

Brouwer, R., S. Schenau, R. van der Veeren, 2005, *Integrated river basin accounting in the Netherlands and the European Water Framework Directive.* Available at : http://iospress.metapress.com/content/aqlb27drhnn243fn/

Nijdam M., van der Lugt L., van der Biessen B., 2010, *Havenmonitor 2008: De economische betekenis van Nederlandse zeehavens.* Available in Dutch at: http://www.havenraad.nl/images/Tabellenboek%20HM%202008%20finaal_tcm226-280856.pdf

Ministry of Economic Affairs, TNO (research institute), 2008, *OLIE EN GAS IN NEDERLAND Jaarverslag Opsporing en Winning 2007.* Available at: http://www.sodm.nl/Publicaties/Overige_Publicaties/Doelmatige_winning/Olie_en_gas_in_Nederland_Jaarverslag_opsporing_en_winning_2007

Statistics Netherlands, 2007, *National accounts of the Netherlands 2007.* Available at: http://www.cbs.nl/NR/rdonlyres/A27D2849-AEA1-47C8-8271-978CE9BEACA5/0/NationalaccountsoftheNetherlands2007New.pdf

Statistics Netherlands, 2010a, NAMWA2010, water in de Nationale rekeningen.

Statistics Netherlands, 2010b, The National accounts of the Netherlands

van Rossum, M. and Kulig, A. (2008). *Economic indicators for: resource management activities in the Dutch environmental goods and services sector*, Statistics Netherlands, The Hague. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/NL%20494%20EGSS.pdf

Voet, L. (Royal Haskoning), B. Budding (Rebel Group), 2008, Verkenning van economische en ruimtelijke ontwikkelingen op de Noordzee. Available in Dutch at: http://www.noordzeeloket.nl/Images/Verkenning%20van%20economische%20en%20ruimtelijke%20ontwikkelingen%20op%20de%20Noordzee%20(VERON)_tcm14-3836.pdf

Wissen van, L., *Het LISA, VVK Handelsregister en CBS Bedrijvenregister met elkaar vergeleken.* Available in Dutch at: http://ursi.eldoc.ub.rug.nl/FILES/root/ResRep/2004/306/306.pdf

Internet sources:

Statline: http://statline.cbs.nl/statweb/?LA=en

National Ports Council: http://www.havenraad.nl/english

Port of Rotterdam Authority: http://www.portofrotterdam.com/en

Port of Amsterdam: http://www.portofamsterdam.nl

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

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

Compendium voor de leefomgeving: http://www.compendiumvoordeleefomgeving.nl/

The Pollutant Release & Transfer Register: http://www.emissieregistratie.nl/

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

Helpdesk water/NAMWA: http://www.helpdeskwater.nl/onderwerpen/water-ruimte/economische_aspecten/namwa/