White Paper on Offshore Wind Energy

Partial review of the National Water Plan Holland Coast and area north of the Wadden Islands

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Partial Review of the National Water Plan in light of the designation of the Holland Coast area and the area north of the Wadden Islands for offshore wind energy

Contents

1. Introduction

1.1
What is this white paper about?

In the National Water Plan 2009-2015[1] and the Policy Document on the North Sea[2] (see inset text 1), it was announced that the cabinet intended to designate further wind energy areas outside the twelve-mile zone (the zone extending roughly 22 kilometres (km) from the shore) off the Holland coast and north of the Wadden Islands. Those areas are designated in this White Paper on Offshore Wind Energy. The white paper provides clarity for market players, the public and other tiers of government regarding the spatial development scope for offshore wind energy. The white paper is formally the 'Partial Review of the National Water Plan in light of the designation of the Holland Coast area and the area north of the Wadden Islands for offshore wind energy'. As that title implies, this white paper amends and supplements the National Water Plan and the Policy Document on the North Sea in various respects and should therefore be read in conjunction with those documents.

More specifically, 'designation' implies the precise definition of the areas within which offshore wind energy schemes are possible. The national government does not permit the creation of wind farms outside the designated areas. Within the designated wind energy areas, the government will permit only the construction of wind farms that comply with the wind farm legislation and regulations currently under development.

The White Paper on Offshore Wind Energy is concerned exclusively with the spatial designation of areas for wind energy. Hence, the White Paper does not specify how exactly the designated areas are to be organised. Such specification will take place at a later stage, when sites for the construction of new wind farms are

[1] Lower House, parliamentary year 2009–2010, 31 710, no. 12.
[2] Lower House, parliamentary year 2009–2010, 31 710, no. 12 (Appendix to National Water Plan 2009-2015).

allocated. The designated areas therefore define the overall space available for wind energy. Certain matters pertaining to the integration of wind farming with other functions and with the marine ecosystem remain to be resolved. Consequently, the space ultimately available for offshore wind energy may be less than is specified here. The resolution of the issues in question will yield the net space available for future wind farming.

1.2 Background

The National Water Plan and the associated Policy Document on the North Sea designated two specific wind energy areas. The areas in question were '*Borssele*' (344 km²) and '*IJmuiden Ver*' (1,170 km²). The two areas were chosen with a view to minimising the potential for conflicts with the interests of shipping, the marine ecosystem, oil and gas, defence and aviation. However, the remaining spatial issues associated with the previously designated areas provide the cabinet with insufficient certainty that a net area of at least 1,000 km² will remain for offshore wind energy. Moreover, cost-effective utilisation of offshore wind energy requires the creation of a substantial wind energy area closer to the coast. Furthermore, the cabinet wishes to achieve a spatial distribution of wind energy installations across the North Sea, which ensures optimal use of the wind front. In the National Water Plan, the cabinet accordingly identified two search areas: the Holland Coast area and the area north of the Wadden Islands (see Appendix 7). The National Water Plan defines the goal for the Holland Coast search area as the identification of space for one or more larger wind energy areas with a total surface area of 500 km², capable of accommodating 3,000 MW. The National Water Plan defines the area north of the Wadden Islands as a search area which should be the subject of a national interest assessment examining the possible redefinition or relocation of the existing military exercise area and the realisation of at least 1,000 MW of capacity before 2020 (165 km²). The area north of the Wadden Islands was selected partly in recognition of the need for distribution.

The National Water Plan and the Policy Document on the North Sea state that the designation of additional wind energy areas off the Holland coast and north of the Wadden Islands will be addressed in a supplement to the National Water Plan white paper.

Inset text 1 National Water Plan 2009-2015 and Policy Document on the North Sea

The National Water Plan 2009-2015 outlines the Netherlands' national water policy and the associated aspects of spatial policy. The National Water Plan reflects the nation's policy framework and was adopted by the cabinet in 2009. On the basis of the Water Act, where the spatial aspects are concerned, the National Water Plan is a white paper, as referred to in Section 2.3, subsection 2, of the Spatial Planning Act (Wro). The whole North Sea policy, including the spatial policy, also forms part of the National Water Plan. The Policy Document on the North Sea therefore forms part of the National Water Plan and should be read in conjunction with it. The Policy Document on the North Sea expands upon and explains the relevant policy choices and the realisation, as included in the body of the National Water Plan. The spatial plans for the Dutch sector of the North Sea are defined in the 'Spatial aspects' section of section 5 of the National Water Plan and the Framework Vision Map of the North Sea (see Appendix 5), with further detail provided in the Policy Document on the North Sea.

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In the National Water Plan and the Policy Document on the North Sea, the cabinet made a number of spatial reservations. The cabinet's aim is the most cost-effective possible realisation of an installed capacity of approximately 6,000 MW[3] by 2020 and the creation of a basis for further capacity expansion after 2020. In that context, the cabinet prefers an approach based on a small number of large wind energy areas. The total area should be larger than the 1,000 km^2 that is strictly necessary for realisation of the specified capacity (assuming 6 MW of capacity per km^2). The reason being that, in almost all areas, there are issues surrounding harmonisation with other activities and the marine ecosystem, which may prevent the entire area being usable for offshore wind energy. Furthermore, the cabinet wishes to retain the possibility of accommodating other innovative forms of renewable energy within the designated wind energy areas.

1.3 Relevance

The generation of electricity using wind turbines accounts for an increasing amount of space in the Netherlands and many other countries. The allocation of space to wind farms is therefore an issue that needs to be considered in a wider context.

All facets of modern society depend on an adequate energy supply. In view of the climate implications of fossil fuel use and the declining availability of fossil fuels, transition to a renewable energy economy is needed. It is clear that renewable energy is essential to our future. At the European level, the Netherlands has accepted the objective that, by 2020, 14 per cent of the energy it consumes should come from renewable sources.

1.3.1 Energy Agreement for Sustainable Growth

The Energy Agreement for Sustainable Growth[4] (referred to below as 'the Energy Agreement') commits the Netherlands to pursuing a 16 per cent renewable share of energy consumption by 2023. Achievement of the nation's renewable energy goals will require considerable policy commitment and investment in all forms of renewable energy. It has been agreed with the relevant stakeholders that 4,450 MW of offshore wind capacity will be operational by 2023. That implies that, from 2015, subsidies must be made available for a total of 3,450 MW of capacity, in addition to the wind farms already in existence and currently being prepared[5]. The time line for the 3,450 MW set out in the Energy Agreement[6] is as follows:

Date	Wind capacity (MW)	Total (MW)	Operational
2015	450	450	2019
2016	600	1,050	2020
2017	700	1,750	2021
2018	800	2,550	2022
2019	900	3,450	2023

[3] The objective was revised in line with the Energy Agreement for Sustainable Growth, concluded in September 2013.
[4] Lower House, parliamentary year 2012-2013, 30 196, no. 202 (Annex).
[5] Existing farms: Prinses Amalia Wind Farm and Egmond aan Zee Offshore Wind Farm; in preparation: Luchterduinen Wind Farm, Buitengaats and ZeeEnergie Gemini Wind Farms. The combined capacity of the wind farms in question is about 1,000 MW.
[6] In line with the Route Map (see 1.3.5), there will be further consultation with the stakeholders regarding the roll-out timetable.

The cabinet intends the capacity to be realised as cost-effectively as possible. Cost-effectiveness is one of the key parameters in the context of the national interest assessment and the European statutory obligations. The national interest assessment is to involve comparison of the 'Borssele' and 'IJmuiden Ver' areas designated in the National Water Plan and the associated Policy Document on the North Sea, the 'Holland Coast' area and the area 'North of the Wadden Islands' designated in this white paper, and any areas that may yet be designated within the twelve-mile zone (see 1.3.3).

1.3.2 Offshore wind farms

Two wind farms are currently sited in the Dutch sector of the North Sea: the Egmond aan Zee Offshore Wind Farm (OWEZ), located about 6 nautical miles (NM) (roughly 15 km) offshore of Egmond aan Zee, which has a capacity of 108 MW, and the Prinses Amalia Wind Farm, located 12 NM (roughly 22 km) offshore of IJmuiden, which has a capacity of 120 MW. The capacity per turbine at the two installations is, respectively, 3 MW and 2 MW. Permits have recently been given for construction of the Luchterduinen Wind Farm (capacity: 130 MW), to be located 12 NM off the coast of Schiermonnikoog, and the Buitengaats and ZeeEnergie Gemini Wind Farms (joint capacity: 600 MW), to be located roughly 34 NM (about 60 km) off the same coast. The two planned installations will have capacities of 3 MW and 4 MW per turbine, respectively.

Inset text 2 Designation of wind farms

The roll-out of offshore wind energy is taking place in several phases. The wind farms already in existence – Prinses Amalia Wind Farm and the Egmond aan Zee Offshore Wind Farm – were realised as part of phase 1.

In phase 2, private parties were invited to identify suitable sites in the North Sea and apply for permits. No geographical restrictions were applied, except insofar as wind farms could not be located in the twelve-mile zone, in shipping lanes or in certain other areas. In phase 2, twelve permits were issued in 2009. Of the twelve permits awarded, six are for projects in the Holland Coast area and three for projects in the area north of the Wadden Islands. Grants were awarded for three projects: the Luchterduinen Wind Farm off the Holland Coast and the Buitengaats and ZeeEnergie Gemini Wind Farms in the area north of the Wadden Islands.

During debate on the policy document on the Multi-year Infrastructure, Space and Transport Programme (MIRT) Water in December 2010, Van Veldhoven introduced a motion calling on the government to extend the validity of the phase 2 permits in question to 2020. The nine permits for which no grant had been awarded were otherwise due to expire in 2012. In its response to the Van Veldhoven motion on 31 January 2012, the cabinet indicated its intention to enable permission to build to be extended to 2020.[7] The matter of the existing permits was addressed in the letter to the Lower House regarding, amongst other topics, the Route Map for the realisation of offshore wind energy.

In the National Water Plan (page 212), a new approach was adopted for phase 3: areas were to be designated, within which wind farms could be built. No new wind farms are to be permitted in other areas. Within the designated wind energy areas, permission is available only for the construction of wind farms that comply with the offshore wind farm regulations currently under development.

[7] See also '*Beleidsregels intrekken watervergunningen windturbineparken in de exclusieve economische zone*' (Policy directive on the withdrawal of water permits for wind farms in the exclusive economic zone), Government Gazette no. 21981, 28 August 2013.

1.3.3 Twelve-mile zone feasibility study

Realisation of the ambition of 16 per cent renewable energy by 2023 at the lowest possible cost will necessitate the use of all available options. At the start of 2013, it was decided that, alongside preparation of the White Paper on Offshore Wind Energy, a feasibility study should be undertaken to establish whether space could also be made available for wind energy within the twelve-mile zone. That decision was based on the assumption that it would be cheaper to harness wind energy within the twelve-mile zone than beyond it. The feasibility study involved first determining whether there were any areas within the zone where wind energy might be accommodated – given the prior claims of other activities and the existing legislation – and whether any such areas appeared promising in terms of the likely cost and the scope for connection to the onshore electricity grid.

The Feasibility Study identified five possible areas for wind energy: one off *Ameland*, one off the North Holland coast, on off the South Holland coast, on off the *Maasvlakte* and one off the *Zeeland* coast. The study considered the impact of wind farm development on ecosystems, fishing, maritime radar, house prices and recreation and tourism. In addition, a Social Cost-Benefit Analysis was performed. In the context of that analysis, it was assumed that wind farms would be individually connected to the national grid, since it was not clear at the time whether an offshore grid was feasible.

In line with the undertakings made at the General Wind Energy Area Consultation Meeting of 24 April 2014 and the Collective General Energy Consultation Meeting of 26 June 2014, the cabinet wrote to the Lower House making a combined statement regarding the White Paper, the Feasibility Study and the Route Map for the Realisation of Offshore Wind Energy.[8] The letter included information about the findings of and follow-up to the Feasibility Study.

1.3.4 Route Map for the Realisation of Offshore Wind Energy

With a view to ensuring that the goal of 3,450 MW of offshore wind capacity is realised as cost-effectively as possible, a route map has been drawn up. As part of the route mapping exercise, a comparison was made of the '*Borssele*' and '*IJmuiden Ver*' areas designated in the National Water Plan, the 'Holland Coast' area and the area 'North of the Wadden Islands' designated in this white paper, and the areas under consideration within the twelve-mile zone (see 1.3.3).

In line with the undertakings made at the General Wind Energy Area Consultation Meeting of 24 April 2014 and the Collective General Energy Consultation Meeting of 26 June 2014 the cabinet wrote to the Lower House making a combined statement regarding the White Paper, the Feasibility Study and the Route Map for the Realisation of Offshore Wind Energ.[9] The letter included information about the route map and about the permits already issued.

1.4 Procedure

The partial review of the National Water Plan (Section 4.8 of the Water Act) is being prepared with Part 3.4 of the General Administrative Law Act (Section 4.1 of the Water Decree). Additional procedural rules based upon the Water Act, the Spatial Planning Act and the Environmental Management Act also apply. The proposed partial review of the National Water Plan was announced to the Lower House by a letter dated 12 February 2013[10] as provided for in Section 2.3, subsection 4, of the Spatial Planning Act (Wro).

Strategic Environmental Assessments ('planMERs') have separately been prepared for both the Holland Coast area and for the area north of the Wadden Islands. An Appropriate Assessment forms part of each Strategic

[8] Ministry of Economic Affairs, September 2014.
[9] See footnote 8.
[10] Lower House, parliamentary year 2012-2013, 33 561, no. 1.

Environmental Assessment (Section 19j, subsection 4, of the Nature Conservation Act 1998). The documents in question consider the suitability of the potential areas in relation to, for example, nature, landscape, recreation, archaeology, soil and water, climate, coastal safety and the various economic uses. A shipping risk analysis was also carried out for each of the Strategic Environmental Assessments. The findings of the research undertaken for the Strategic Environmental Assessments and the Appropriate Assessments were taken into account in decision-making regarding demarcation of the designated wind energy areas.

Scope and detail level

In accordance with Section 7.8 of the Environmental Management Act, advisers and other tiers of government were consulted regarding the scope and detail level of the Strategic Environmental Assessments. The governments of neighbouring countries (UK, Belgium, Denmark and Germany) were informed by letter about the proposed preparation of a white paper on offshore wind energy and were consulted in connection with its content (Section 7.9 of the Environmental Management Act and Article 4.4, clause 1d, of the Water Decree). The proposal was also discussed at the Infrastructure and Environment Consultation Meeting. A notice regarding the proposed preparation of a white paper was published on 2 April 2013 in the Government Gazette[11], de Volkskrant and various regional newspapers. In accordance with Section 7.9 of the Environmental Management Act, all interested parties had the opportunity to comment on the proposed preparation of the white paper. A total of thirty-nine commentaries were submitted. A response document was produced, setting out the cabinet's views on all the submitted comments. A copy of the response document was sent to each of the parties that submitted comments.

The Environmental Impact Reporting Committee ('the Committee') issued an advisory report on the scope and detail level of the Environmental Impact Reports on 4 June 2013.[12] In its advisory report, the Committee defined what it regarded as essential information for inclusion in the Strategic Environmental Assessments. The Committee's advisory report was taken into account in preparation of the Strategic Environmental Assessments.

Draft White Paper

On 20 December 2013, the cabinet adopted the draft White Paper[13]. Notice of the draft White Paper was duly published on 9 January 2014 in the Government Gazette[14], de Volkskrant and various regional newspapers. In accordance with Article 4.1, clause 1, in conjunction with Article 4.2 of the Water Decree, Part 3.4 of the General Administrative Law Act and Section 7.11, subsection 2, of the Environmental Management Act, the draft White Paper and the associated Environmental Impact Reports were open to public comment from 10 January to 20 February 2014, inclusive. In line with the procedure followed to define the scope and the detail level of the Strategic Environmental Assessments, the draft White Paper and the associated Strategic Environmental Assessments were also sent to the advisors and governmental bodies for comment. Moreover, in accordance with Section 7.38a, subsection 2a, of the Environmental Management Act, the draft White Paper and Environmental Impact Reports were made available to the governments of neighbouring countries (UK, Belgium, Denmark and Germany). During preparation the draft, detailed discussions were held with the UK and Germany. The draft White Paper was also discussed at the Infrastructure and Environment Consultation Meeting.
A total of fifty commentaries were submitted. The cabinet's views on the submitted comments were set out in a Memorandum of Reply which is appended to the finalised White Paper.

On 5 February 2014[15] the Lower House posed a number of factual questions regarding the draft White Paper. The Minister of Infrastructure and the Environment, also representing the Minister and State Secretary of Economic Affairs, wrote to the Lower House on 14 April 2014[16], answering the questions raised. The Lower

[11] Government Gazette no. 8764, 2 April 2013.
[12] Environmental Impact Reporting Committee, report number 2775–37.
[13] Lower House, parliamentary year 2013-2014, 33 561, no. 7.
[14] Government Gazette no. 129, 9 January 2014.
[15] Lower House, reference 33561-7/2014D03871.
[16] Lower House, parliamentary year 2013-2014, 33 561, no. 9.

House subsequently held general discussions with the two responsible ministers on 24 April 2014[17]. In response to questions from the Lower House, the Minister of Infrastructure and the Environment undertook to contact the Ministry of Defence again regarding the military exercise area close to the wind energy area north of the Wadden Islands. Thereafter, further discussions were held with the Province of Groningen and Groningen Seaports. During those discussions, it was re-confirmed that the exercise area could not be reduced in size any further or relocated, and that the southern boundary of the wind energy area north of the Wadden Islands could not therefore be redefined (see 3.3).
In the context of the General Meeting, it was additionally made known that the Lower House would be simultaneously informed about the related decisions regarding the Route Map for the Realisation of Offshore Wind Energy, the White Paper on Offshore Wind Energy and the Feasibility Study regarding Offshore Wind Energy within the Twelve-Mile Zone.

In accordance with Section 7.12 of the Environmental Management Act, the Committee was asked to advise regarding the Strategic Environmental Assessments, the associated Appropriate Assessments and the Shipping Risk Analyses. The Committee accordingly issued a provisional assessment report on 24 March 2014[18]. In its provisional assessment report, the Committee concluded that it did not have all the information necessary to reach a conclusion regarding the draft White Paper. The Strategic Environmental Assessments and the Appropriate Assessments were therefore supplemented to make good the omissions highlighted by the Committee and in line with the comments received.

On 3 July 2014, the Committee published its definitive assessment report.[19] In its report, the Committee stated that, even in their supplemented form, the Environmental Impact Reports had various shortcomings. The Committee considered the removal of those shortcomings to be essential for proper account of the environmental impact to be taken in decision-making relating to the White Paper. Hence, the supplemented Strategic Environmental Assessments and the supplemented Appropriate Assessments underwent further revision in light of the Committee's definitive report. In addition, an ecological assessment framework is currently being developed to gauge whether significant effects are to be expected.
The government will make use of the new framework when making spatial decisions regarding offshore wind energy. Furthermore, the assessment findings will serve as the starting point for the formulation of any conditions for the prevention of significant effects that need to be incorporated into the site assignment decisions. The cabinet believes that the provisions described above are sufficient to ensure that, in the realisation of offshore wind farms, appropriate steps are taken to prevent significant ecological impact.

In the formulation of this White Paper, account has been taken of the comments and advice received and of the revisions and supplements to the Strategic Environmental Assessments, the Appropriate Assessments and the other associated documentation. Where appropriate, the White Paper has also been revised accordingly. The Memorandum of Reply explains how the various documents have been revised in line with the Committee's advice and what considerations guided the revision process.

1.5 Follow-up

The definitive White Paper is available at *www.ruimtelijkeplannen.nl* (plan identification number NL.IMRO,0000.IMsv13WindOpZee-3000). The definitive White Paper's publication will also be announced in the Government Gazette, De Volkskrant (national newspaper) and various regional newspapers. The definitive White Paper and the supporting documents will be made available for perusal. In accordance with

[17] Lower House, parliamentary year 2013-2014, 33 612, no. 45 (General Wind Energy Area Consultation Meeting).
[18] Environmental Impact Reporting Committee, report number 2775-78.
[19] Environmental Impact Reporting Committee, report number 2775-96.

Section 7.38a, subsection 2b, of the Environmental Management Act, the definitive plan and the definitive Environmental Impact Reports were made available to the governments of neighbouring countries (UK, Belgium, Denmark and Germany). All those who submitted comments will be informed of the White Paper's adoption and its practical content. Appeal against adoption of the white paper will not be possible. All those who submitted comments will also be informed about the Memorandum of Reply.

The White Paper will additionally be presented to parliament (Section 2.3, subsection 5, of the Spatial Planning Act and Section 4.2 of the Water Act). Implementation of the White Paper will not start until at least eight weeks after its submission to parliament. If, within eight weeks of the White Paper's submission to parliament, either house of parliament or an authorised spokesperson for either house announces a wish for public consultation regarding the white paper's contents, implementation of the White Paper will not start until at least six months after its submission to parliament, or, if the public consultation is completed within six months, until the public consultation is complete. The minister, or another minister with relevant responsibility, will inform parliament in writing of the outcome of the consultations for the national spatial policy (Section 2.3, subsection 5, Spatial Planning Act).

1.6
Document structure and digitisation

Section 2 outlines the primary parameters for North Sea (spatial) policy, including the factors that influence determination of the space available for offshore wind energy. Consideration is given to the various issues that are significant in relation to determination of the space available for offshore wind energy. The areas to be designated – the Holland Coast area and the area north of the Wadden Islands – are addressed in section 3. In that context, consideration is given to delineation and the points requiring particular attention in connection with the realisation of each area. Section 4 identifies a number of general points requiring further specification. Finally, the key topics for further implementation of the White Paper are described in section 5.

The White Paper on Offshore Wind Energy is covered by the Practical Explanatory Guidelines on White Papers and is an 'area-related decision' in the sense of the Spatial Planning Information Model (IMRO). Hence, the structure of the White Paper on Offshore Wind Energy is object-based. Each 'object', as defined for the purpose of digitisation, has to be suitable for standalone reading. As a result, certain passages of this document appear in several sections.

The obligation for documents of this kind to be prepared for digital publication came into effect on 1 January 2010. The White Paper on Offshore Wind Energy is published on *www.ruimtelijkeplannen.nl*.

2. Policy

2.1 Introduction

The Dutch sector of the North Sea is one of the most intensively used seas in the world. It includes busy shipping lanes to and from Rotterdam, Antwerp, Zeebrugge, Amsterdam, Eemshaven/Delfzijl, as well as the international routes that run along our coast. Furthermore, oil and gas are extracted from beneath the North Sea and its waters are heavily fished and used for military exercises. The North Sea is additionally an important source of sand, which is extracted for the protection of the Dutch coast and for use in infrastructural and building construction. The Dutch North Sea also serves as a large recreational and tourist resource for Western Europe. Finally the North Sea is a very complex, open marine ecosystem. Its shallow, nutrient-rich waters are a nursery for fish and an important migration corridor and winter refuge for many species of bird. The Netherlands has international treaty obligations, obliging it to protect many of the North Sea's species and habitats.
The North Sea region has been intensively exploited by humans for millennia and the seabed is consequently a valuable source of archaeological knowledge about our past. The bed of the North Sea is scattered with historical shipwrecks, the traces of prehistoric settlement and the remains of early human relatives.

2.2 Policy for the North Sea

Given how busy the Dutch sector of the North Sea already is, finding space for new activities is not easy. Nevertheless, existing usage of the North Sea requires revision in connection with society's changing needs. Revision must reflect the need for sustainable economic development in balance with the marine ecosystem, the need to provide space for large-scale renewable energy production and the need to reserve sand extraction sites. Satisfaction of those needs must be compatible with continuation of the North Sea's

existing uses (National Water Plan, page 196). The Policy Document on the North Sea (subsection 2.10) identifies three central social development tasks for the North Sea (see also inset text 3):
1. General: sustainable (economic) development in balance with the marine ecosystem
2. Additional emphasis: reservation of sand extraction sites for coastal and flood protection purposes
3. Additional emphasis: space for large-scale renewable energy projects

The White Paper on Infrastructure and Space[20] (page 87) identifies the following national spatial tasks:
- To assure the efficient and safe passage of shipping on through routes;
- To maintain the coastal base and, in conjunction with the relevant provincial and local authorities, to implement the Delta Programme's sub-programmes for the Coastal and Wadden areas;
- To maintain and protect the Natura 2000 areas and the marine ecosystem;
- To ensure that the armed forces have sufficient scope for exercises;
- To retain a clear view of the horizon, from the coast to a distance of twelve nautical miles;
- To provide space for the primary pipeline network for the transport of (hazardous) substances;
- To designate areas for the extraction of sand for use in coastal reinforcement and flood protection;
- To designate areas for offshore wind farming, the extraction of oil and gas and the storage of CO_2;
- To protect the archaeological heritage (submerged settlements, shipwrecks and other archaeological sites).

Inset text 3 Social development tasks for the North Sea: policy choices

In connection with the three primary social development tasks, the National Water Plan 2009 - 2015 and the associated Policy Document on the North Sea (page 27) state that the following policy choices have been made.

Task 1. General: sustainable (economic) development in balance with the marine ecosystem
- The cabinet has chosen to pursue the sustainable, spatially efficient and safe use of the North Sea in balance with the marine ecosystem, as described in the Water Framework Directive, the Marine Strategy Framework Directive and the Birds and Habitats Directive. The objective is to protect and develop the marine ecosystem.
- In the context of the Common Fisheries Policy and in consultation with the Dutch fishing sector, nature conservation organisations and other EU member states, the aim is to pursue more sustainable fishing of the North Sea.
- Measures will be taken with a view to reducing pollution from shipping (merchant, fishing, offshore supply and leisure vessels).
- Views of the horizon from the coast are to remain unobstructed.
- In the coastal zone, space for recreation and certain forms of fishing should not be limited by permanent structures.
- Within the scope permitted by the applicable European framework directives, the Cabinet is to prioritise activities that are of national importance to the Netherlands:
  - Oil and gas extraction: as much natural gas and oil as possible are to be extracted from Dutch North Sea fields, with a view to fully utilising the potential of the reserves in question.

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[20] Dutch Parliament, parliamentary year 2011–2012, 32 660, no. 50.

  - CO_2 storage: sufficient space should be allowed for the storage of CO_2 in empty oil and gas fields and aquifers.
  - Maritime shipping: a system of routing measures, clearways and anchoring areas capable of accommodating shipping safely and efficiently is to be created.
  - Sand extraction and renewable energy: sufficient space is to be provided for sand extraction for coastal protection, flood risk management and the elevation of land levels.
  - Defence: sufficient dedicated areas are to be provided in the North Sea.
- Search areas are to be defined for two CO_2 storage pilot projects.
- The co-routing of cables and pipelines is to be promoted and the removal of redundant infrastructure is to be made compulsory.
- Assessment framework for activities in the North Sea: the assessment criteria applicable in the Dutch part of the North Sea will be made clear to existing and new users.

Task 2. Additional emphasis: reservation of sand extraction sites for coastal and flood protection purposes.

- Sand extraction and suppletion: sufficient space is to be provided for sand extraction for coastal protection, flood risk management and the elevation of land levels.
- Emphasis on sand extraction from depths greater than two metres, with a view to limiting the adverse impact of extraction and ensuring the availability of sand between the -20 metre contour and the twelve-mile zone for as long as possible.
- Sand suppletion: see National Water Plan, subsection 5.1 The coast (pages 133 - 141).

Task 3. Additional emphasis: space for large-scale renewable energy projects

- Space is to be provided for the realisation of 6,000 megawatts of wind energy generating capacity in the North Sea by 2020 (at least 1,000 km^2). In addition, the spatial parameters are to be created for the further (international) development of renewable energy after 2020.
- A search area is to be defined for an energy storage and production island.

Given the provisions of the National Water Plan (page 201), it follows that the cabinet should, in its spatial management, give priority to activities of national importance:

- Oil and gas extraction;
- CO_2 storage;
- Maritime shipping;
- Sand extraction and suppletion;
- Renewable (wind) energy;
- Defence.

In the areas designated for activities of national importance, other activities are permissible only insofar as they do not interfere with the activities of national importance. If various activities of national importance are undertaken in the same area, combined and spatially efficient use should be realised, insofar as that is possible without the first actor being disproportionately disadvantaged or inconvenienced. The harmonisation of activities of national importance is also governed by the parameters of the National Water Plan (page 212), the Policy Document on the North Sea (page 52; see also inset text 4) and this document.

Inset text 4 Parameters for offshore wind energy

The National Water Plan (page 212) and Policy Document on the North Sea (page 52) define the following parameters for wind energy:

- Realisation of wind farms phase 2 (not shown on the Framework Vision Map).
- Realisation of wind farms in the '*Borssele*' and '*IJmuiden*' wind energy areas and additional areas to be designated within the 'Holland Coast' search area and the search area 'north of the Wadden Islands'.
- Exclusion of shipping from wind farms, including a safety zone extending 500 metres from the farm perimeter.
- No permission to be given for offshore wind farms outside the designated wind energy areas and phase 2 permit areas.
- Within the designated wind energy areas, only the construction of wind farms that comply with the wind farm regulations currently under development is to be permitted (phase 3).

In the National Water Plan, the cabinet indicated that it regarded a small number of large wind energy areas preferable to a large number of small areas. The wind energy areas designated for phase 3 (see inset text 2) are to take the form of clusters, within which space will be made available in phases from 2015 for use by private developers. No permits will be given for the realisation of new wind farms outside the designated areas. The Policy Document on the North Sea (page 41) indicates that the envisaged 6,000 MW of generating capacity will require an area of at least 1,000 km^2. An area of that size is sufficient for roughly 1,200 wind turbines of 5 MW or 2,000 turbines of 3 MW.

The Holland Coast area and the area north of the Wadden Islands were selected using the points of departure set out in the Policy Document on the North Sea (page 41; see also inset text 5).

Inset text 5 Points of departure for the designation of wind energy areas

The spatial task for offshore wind energy has been detailed on the basis of the points of departure formulated in the National Water Plan and the associated Policy Document on the North Sea (page 41).

1. Priority development of economic activities of national importance for the Netherlands (shipping, oil and gas extraction, renewable (wind) energy, sand extraction and defence).
2. Efficient and safe use of the North Sea in balance with the marine ecosystem.

1 Spatial conflicts between different nationally important activities are to be minimised.
Points of departure:

- Cost-effective wind energy: 1) as close as possible to the coast and adjacent landing sites; 2) minimum size approximately 80 km^2 (400-500 MW); 3) dispersed siting with a view to making optimum use of the wind front.
- Sand extraction: wind energy areas to be designated outside the twelve-mile zone as far as possible, so that sand extraction can take place in the most cost-efficient locations (i.e. within the twelve-mile zone).

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- Safe and efficient shipping: In the designation of wind energy areas, provision is to be made for a safety zone of two nautical miles from the internationally (IMO-) defined shipping lanes, anchoring areas and nationally defined *clearways*. This point of departure reflects practical experience and the policy principles derived from the safe shipping risk analysis. At the detailed planning stage and in the light of practical experience, the application of this requirement may be adapted to particular circumstances.
- Oil and gas extraction: under the Mining Act, a safety zone of up to 500 metres around a platform may be required where appropriate. Platforms with helicopter pads require an obstacle-free area of five nautical miles to ensure safe helicopter traffic. At the detailed planning stage, the application of this requirement may be adapted to particular circumstances.
- Defence: areas designated for defence use are to be retained as far as possible. Certain forms of shared use may be possible, but shared use by fixed objects is excluded in principle for safety reasons.

2 Efficient and safe use in balance with the marine ecosystem. Points of departure:
- Natura 2000 areas and other areas of potential ecological value: in order to exclude possible significant effects, designated and prospective Natura 2000 areas are to be avoided. Other areas of potential ecological value, in which research is being conducted until 2012 in connection with Natura 2000 and KRM, are to be spared as far as possible.
- Efficient use of space: for reasons of wind energy cost-effectiveness and shipping safety, and with a view to maintaining an open sea, the dispersed siting of large wind energy areas is preferable to the creation of numerous smaller areas. This approach is intended to prevent littering of the sea.
- Perceptual impact: in order to retain a clear view of the horizon from the coast, the aim is that no wind energy areas should be realised in a zone extending twelve nautical miles from the coast.

2.3 New or supplementary policy

2.3.1 Installed capacity to be realised

As part of the policy of pursuing sustainable, clean and efficient energy generation, the number of offshore wind turbines is to be increased considerably. Off the coast of North Holland, there are currently two wind farms with an installed capacity totalling 228 MW: the *Egmond aan Zee* Offshore Wind Farm (OWEZ) and the Prinses Amalia Wind Farm. Construction of a further three wind farms – *Luchterduinen* (Holland Coast area), *Buitengaats* and *ZeeEnergie* (area north of the Wadden Islands) – is currently being prepared. In the Energy Agreement, the government and the stakeholders also agreed to have 4,450 MW of wind energy capacity operational by 2023. That implies supplementing the wind farms already in existence and under development by allocating space for a total of a further 3,450 MW in the period 2015 to 2019 (see 1.3.1).

The wind energy capacity has to be realised within the designated areas (see inset text 2). The total area of the designated areas – *Borssele*, *IJmuiden Ver*, Holland Coast and North of the Wadden Islands – is approximately 2,900 km². Assuming an average of 6 MW per km², that equates to a potential wind energy generating capacity of roughly 17,400 MW. In this context, two points are of particular importance:

1. The figure of 2,900 km² is the overall ('gross') available area. Certain matters pertaining to the integration of wind farming with other functions and with the marine ecosystem in the designated areas remain to be resolved. Consequently, when competing interests are balanced as part of the process of defining the sites for wind farm projects, some parts of the designated areas will not ultimately be used for offshore wind farming. Relevant considerations in that regard will include the need for obstacle-free zones around helicopter pads (e.g. on oil and gas platforms), the presence of undersea cables and pipelines, the need to allow space for birds and bats and the need for corridors for light shipping and recreational craft.
2. The target defined in the Energy Agreement does not reflect the ultimate objective for offshore wind energy, but the first aim in the continued growth of offshore wind energy after 2023 (see 2.4). The extent

to which further expansion of offshore wind energy will be required after 2023 currently remains unclear. However, any such expansion will be based on the principle that wind farms may be realised only within designated areas.

For reasons of efficiency, the cabinet's preference is for large, clustered wind farms. In order to attain the objective within the limited available space and financial resources, it may additionally be necessary to designate some smaller areas. The cabinet assumes a minimum capacity of 100 MW. In connection with the offshore wind energy legislation and regulations under development and the proposed rollout of offshore wind energy, the wish is to identify areas capable of accommodating (multiples of) 700 MW.

2.3.2 Shipping

The North Sea is one of the busiest seas in the world. In accordance with the Van Veldhoven motion[21] and in consultation with the direct stakeholders (wind installation permit-holders and the shipping sector), the Ministry of Infrastructure and the Environment has developed a proposal for revision of the shipping lanes off the Dutch coast. Revision is necessary to ensure the safety of shipping, to improve the accessibility of the main ports and to bring about more efficient use of the North Sea. The proposal was approved by the International Maritime Organization (IMO) in November 2012 and the revised shipping lanes became effective on 1 August 2013 (see: www.noordzee- loket.nl). The revised shipping lanes form the starting point for the designation of wind energy areas within the Holland Coast search area.

The Framework Vision Map (map 1) accompanying this white paper shows the revised shipping lanes, anchoring areas, precautionary areas and clearways.

The National Water Plan and the associated Policy Document on the North Sea state that wind energy area designation should adhere to the principle that no permanent construction is permissible within two nautical miles (NM) of a shipping lane. At the detailed planning stage, the application of this requirement may be adapted to particular circumstances. However, a zone of 500 metres should always be kept clear between a wind farm and a shipping lane. (The UNCLOS allows a coastal state to establish a safety zone of up to 500 metres around an installation, and the maximum 500-metre zone has been incorporated into Dutch law.)

Following adoption of the National Water Plan, ways of adapting the safety zone principles for application in the context of the North Sea were investigated in consultation with the shipping sector. This led to definition of a Framework for Defining Safe Separation Distances between Shipping Lanes and Offshore Wind Farms (appendix 6). The framework was adopted by the relevant directors on 9 July 2013 and approved by the Senior Interdepartmental North Sea Discussion Group on 24 September 2013.

The framework is intended as a means of establishing how much space is required between shipping routes and offshore wind farms for shipping to move safely and efficiently. In that context, much depends on the size of the standard ship. For the North Sea, the standard ship is 300 or 400 metres in length, depending on the route. On the shipping lanes serving Amsterdam, for example, the standard ship is 300 metres.

The most expansive manoeuvre that a ship needs to be able to make, and for which sufficient space must therefore be allowed, is the 'round turn'. A round turn requires six times the ship's length. For a round turn to starboard, an additional deviation of 0.3 NM is necessary before a ship can begin the turn, because the captain will always first attempt to avoid making a round turn. The total amount of space required to starboard is therefore 0.3 NM + 6 ship's lengths. A round turn to port can be initiated immediately. In addition, a safety zone is required, extending for a radius of 500 metres around a single object (e.g. a wind turbine). No shipping must be allowed to enter that zone. The required safe separation distances for shipping are therefore:

- For ships 400m in length: 1.87 NM to starboard and 1.57 NM to port;
- For ships 300m in length: 1.54 NM to starboard and 1.24 NM to port.

[21] Lower House, parliamentary year 2010–2011, 32 500 A, no. 52.

Where clearways (routes connecting formal shipping lanes) are concerned, the safe separation distances are incorporated into the width of the clearway. Where anchoring areas and precautionary areas are concerned, the same safe separation distances can be applied as in a traffic management system.

In view of the importance of early clarity regarding the distances to be applied in the designation of wind energy areas and the importance of providing a clear basis for international harmonisation, the assessment framework has been used in the definition of the wind energy areas designated in this White Paper. Use of the framework enables the definition of bespoke solutions, instead of the rigid application of a separation distance of 2 NM between shipping lanes and wind farms. Further application of The Framework Document will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea. In the context of developments for which permits have already been issued, the distances defined in the permit conditions remain valid.

2.3.3 Oil and gas extraction and CO_2 storage

Under the Mining Act, a safety zone of up to 500 metres around a platform may be required where appropriate. Neither shipping nor wind turbines are permitted within such a zone. The Policy Document on the North Sea states that platforms with helicopter pads require an obstacle-free area of five nautical miles (NM) to ensure safe helicopter traffic under all weather conditions. At the detailed planning stage, the application of this requirement may be adapted to particular circumstances. Previous experience demonstrates that adaptation is possible.

In this context, adaptation implies making special arrangements regarding the separation distances where necessary and possible, preferably following agreement between the Minister of Economic Affairs and the mining installation proprietor. Agreement regarding the adaptation of separation distances is to be sought before the size and position of a proposed wind farm are determined. Consideration is to be given not only to the presence of existing mining platforms, but also to possible future mining platforms and, where relevant, plans for CO_2 storage. In that context, the cabinet's aim will be to achieve the most efficient possible use of space at the production sites.

The Framework for Balancing the Needs of Mining and Offshore Wind Energy is to clarify how special arrangements are to be defined. The assessment framework will be of a largely procedural nature. The content elements and their weighting will be considered only at the point of application. In view of the variety of mining issues that may be relevant in relation to a particular wind farm site, the definition of special arrangements is the most responsible way to address them. As stated in the Integrated North Sea Management Plan 2015 (as revised in November 2011), the construction of a new wind farm may complicate any mining activities in the area, but will not make mineral extraction impossible. In the application of the assessment framework, effort will be made to minimise constraint of the relevant mining companies and wind farm project initiators.

The assessment framework is being drawn up in consultation with the oil and gas industry, the aviation industry and others. The findings of the latter investigation will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea.

2.3.4 Cables and pipelines

The Dutch Continental Shelf (NCP) accommodates roughly 4,800 kilometres of pipeline and 6,500 kilometres of cable, mostly in the southern sector. Roughly 3,200 km of the cabling is no longer in use. All undersea pipelines and power cables have safety zones extending 500 metres on each side. Within such a zone, no other seabed activities are permitted. Similarly, all active telecommunications cables have maintenance zones of 750 metres on each side.

When the laying of a cable or pipeline is planned, discussions are held with the project initiator with a view to realising parallel routing (co-routing) and preferably routing through areas from which sand has already been extracted (see Policy Document on the North Sea, page 36). Furthermore, the cabinet seeks to arrange for new cables and pipelines have to be co-routed with existing cables and pipelines in order to minimise the spatial requirements. Co-routing is desirable if the economic benefit of leaving more space available for

other uses, such as wind farming and sand extraction, outweighs the additional cost associated with co-routing (see Integrated North Sea Management Plan 2015, as revised in November 2011).

For reasons of spatial efficiency, safety zones and maintenance zones for telecommunications cables may be reduced where possible. The circumstances under which such zones may responsibly be reduced will be investigated in consultation with the relevant stakeholders.

If a cable or pipeline is withdrawn from service, the Water Act ordinarily requires the owner to remove it (within twenty-four months, where a cable is concerned). The Mining Act contains a similar requirement regarding the removal of disused cables and pipelines. The Integrated North Sea Management Plan 2015's assessment framework for activities that require permits is generally applicable as well.

2.3.5 Transnavigation and shared use

One of the points of departure set out in the National Water Plan (page 41) is that multiple use – involving the combination of, for example, sustainable fishing that does not disturb the seabed, marine aquaculture and recreation – should be permitted wherever possible. During the implementation phase, it became apparent that the conditions for shared use needed to be worked out in more detail, possibly leading to a review of the existing prohibition on vessels crossing areas designated for such activities.

The study Sailing and Fishing within Wind Farms was completed early in 2013. The study group included representatives of the Dutch Wind Energy Association (NWEA), the Royal Dutch Water Sports Association (KNWV), Sports Fishing Netherlands, the Fishermen's Association and VISned. Whether and, if so, how shared use might be realised when the size and position of wind farms are determined is currently being investigated. The findings of the latter investigation will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea.

2.3.6 Ecology

The spatial accommodation of offshore wind energy must be achieved in balance with the marine ecosystem (see inset text 5). A Strategic Environmental Assessment and an appropriate assessment have been prepared both for the Holland Coast area and for the area north of the Wadden Islands. The documents in question consider the suitability of the potential areas in terms of the implications of wind farming for nature, landscape, recreation, archaeology, soil and water, climate, coastal safety and the various other activities taking place (see 3.1).

In the designated areas, there are outstanding issues in terms of the harmonisation of wind energy with other activities and the marine ecosystem, whose resolution may reduce the space available for offshore wind energy.

The Strategic Environmental Assessments and Appropriate Assessments (together with the Environmental Impact Reports) consider the likelihood of significant negative ecological effects and advise on the use of mitigating measures. The Environmental Impact Reports indicate that significant negative effects resulting from designation of the Holland Coast and the area north of the Wadden Islands as wind energy areas can be prevented by ensuring that appropriate mitigating measures are taken and/or by applying certain conditions. That conclusion takes account of the cumulative effects of wind farming in the aforementioned areas and previously designated areas, other wind farming (e.g. outside Dutch territory) and other activities taking place in the North Sea. Whether and, if so, what measures are required depends on the detailed plans made for the designated areas. In the context of further decision-making regarding the actual installation and use of wind farms, ecologically appropriate conditions, measures or limitations will be defined in order to prevent significant negative effects.

The government is to develop an Ecology and Accumulation Framework, setting out the cumulative ecological impact and the mitigating measures to be taken. The purpose of the Framework will be to indicate how the cumulative ecological impact may be determined more effectively and more clearly. Use of the Framework will be compulsory when making decisions about the exploitation and limitation of future wind farms within the designated areas. The Framework will be used in the context of spatial decision-making regarding offshore wind energy, e.g. the future designation of wind energy areas and assignment of

development lots, to determine whether it is possible to exclude the possibility that a proposed offshore wind farm, either on its own or in combination with other wind farms and other activities, will have a significant impact on the ecology. If it appears that the project may have a significant impact, assignment of the lot will be made conditional upon certain requirements being met. In the most extreme cases, all further development at certain sites may be precluded. The expertise acquired in the development of the Framework Document will be used in future decision-making regarding the areas to be designated for offshore wind energy. The Framework will be developed in consultation with the relevant stakeholders (wind farm developers and environmental organisations). The Framework Document will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea.

Inset text 6 North Sea 2050 Area agenda

It is in the Netherlands' national interest that the North Sea is safe, clean, healthy and ecologically diverse. The North Sea is the scene of increasingly intensive activity and has great potential. Consequently, there is a need for intelligent cooperation and intelligent decision-making. In consultation with stakeholders such as nature organisations, shipping organisations, scientists, governments and children, the five key themes for the North Sea have been defined and set out in the North Sea 2050 Area Agenda. The North Sea 2050 Area Agenda links the future potential of the North Sea to present-day developments and challenges.
On 28 July 2014, the Minister of Infrastructure and the Environment, also acting on behalf of the Minister of and State Secretary for Economic Affairs, presented the North Sea 2050 Area Agenda (see *www.noordzeeloket.nl*) to the Lower House[22].

Five themes
The first theme, 'building with North Sea nature', is concerned primarily with a sustainable food supply from the sea and nature. The second theme is 'offshore energy transition'. Its focus is the implications of offshore energy generation for the use of space in the North Sea. The third theme is the 'multiple and multifunctional use of space': how the main North Sea activities, such as shipping, fishing, recreation and conservation of the most ecologically important areas can be appropriately combined. Theme number four is 'connecting land and sea', in connection with which the North Sea 2050 Area Agenda seeks to identify opportunities for interaction between onshore and offshore activities and projects. The fifth and final theme is 'accessibility and shipping', which covers safe and environmentally friendly shipping, the accessibility of the Netherlands' ports and the efficient movement of through-shipping.

International cooperation
Formulation of the North Sea 2050 Area Agenda involved consultation with the other countries bordering the North Sea regarding plans and anticipated developments. The consultations focused particularly on energy, ecology and shipping. The forthcoming European directive on maritime spatial planning will require closer international cooperation on planning matters and the inclusion of land-sea interactions in planning decisions. The Netherlands' coastal provinces also have a strong interest in cooperation on sustainable prosperity issues, tourism, inter-port links, energy and climate.

Use of export opportunities
The opportunities for exports are many and various. By way of example, the Area Agenda focuses particularly on energy generated offshore. Greater clarity is required regarding the prospects for renewable marine energy technologies, for Dutch energy supply and for short-term and long-term export opportunities.

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[22] Lower House, parliamentary year 2013–2014, 33 450, no. 24.

Children's Council
Led by the Missing Chapter Foundation, the Children's Council has written its own advisory report on the North Sea in 2050. Cooperation, decision-making, the formulation of clear agreements, rewards and telling the right story, are the main recommendations of the report. The Children's Council's recommendations will be taken into account in the further development of policy on the North Sea.

New Policy Document on the North Sea
During the year ahead, the following three policy elements will be defined in greater detail:
1. International North Sea strategy
2. Further study of developments in coastal regions and towns
3. Funding possibilities and role demarcation between government, the business community and knowledge centres, including the possible role of top sectors.

The long-term vision for the North Sea and the long-term research agenda are addressed in the draft of the new Policy Document on the North Sea, which is due for publication in December 2014 as part of the Second National Water Plan. It accordingly includes a detailed implementation agenda for the period 2016 to 2021.

2.4
Beyond 2023

This White Paper and the associated Strategic Environmental Assessments set out and review policies for allocating space to wind energy in the Holland Coast area and the area north of the Wadden Islands. By designating the aforementioned areas, in addition to those previously designated in the National Water Plan (Borssele and IJmuiden Ver) and those that may be designated within the twelve-mile zone (see 1.3.3), the cabinet is seeking to ensure that sufficient space is available to enable realisation of the 4,450 MW Energy Agreement objective at the lowest possible cost by 2023. However, 4,450 MW of installed capacity is not the ultimate target for the development of offshore wind energy. The extent to which further expansion of offshore wind energy will be required after 2023 depends on various factors:

- The competitiveness of renewable energy in relation to fossil energy;
- Developments in the cost price of offshore and onshore wind energy;
- Developments in the use of other renewable sources of energy, such as biomass, solar energy, geothermal energy, tidal energy and wave energy;
- The development of CO_2 storage (on the basis of pilot projects);
- EU renewable energy policy for the period after 2020. Following the publication of a green paper entitled 'A 2030 framework for climate and energy policies' (COM(2013)0169) in March 2013, the Commission proposed in its communication of 22 January 2014 entitled 'A policy framework for climate and energy in the period from 2020 to 2030' (COM(2014)0015) that the national binding targets for renewable energy should not be extended beyond 2020. Only at the EU level is a binding target to be set: 27 per cent of all energy consumption is to come from renewable sources. The Commission expects that binding national greenhouse gas emission objectives will promote growth in the energy sector. The change of direction has led to intensive discussions with the Council and the Parliament.[23]

In their coalition agreement, the VVD (Dutch Liberal Party) and the PvdA (Dutch Labour Party) state their support for the goal of the Roadmap 2050 (a fully sustainable energy supply). Under most scenarios, realisation of that goal will necessitate a sizeable expansion of both onshore and offshore wind energy (see Brakes Off!, an advisory report by the Council for the Environment and Infrastructure).

[23] Source: http://www.europarl.europa.eu/aboutparliament/nl/displayFtu.html?ftuId=FTU_5.7.4.html

3. Designation of wind energy areas

3.1 Selection of areas for the White Paper on Offshore Wind Energy

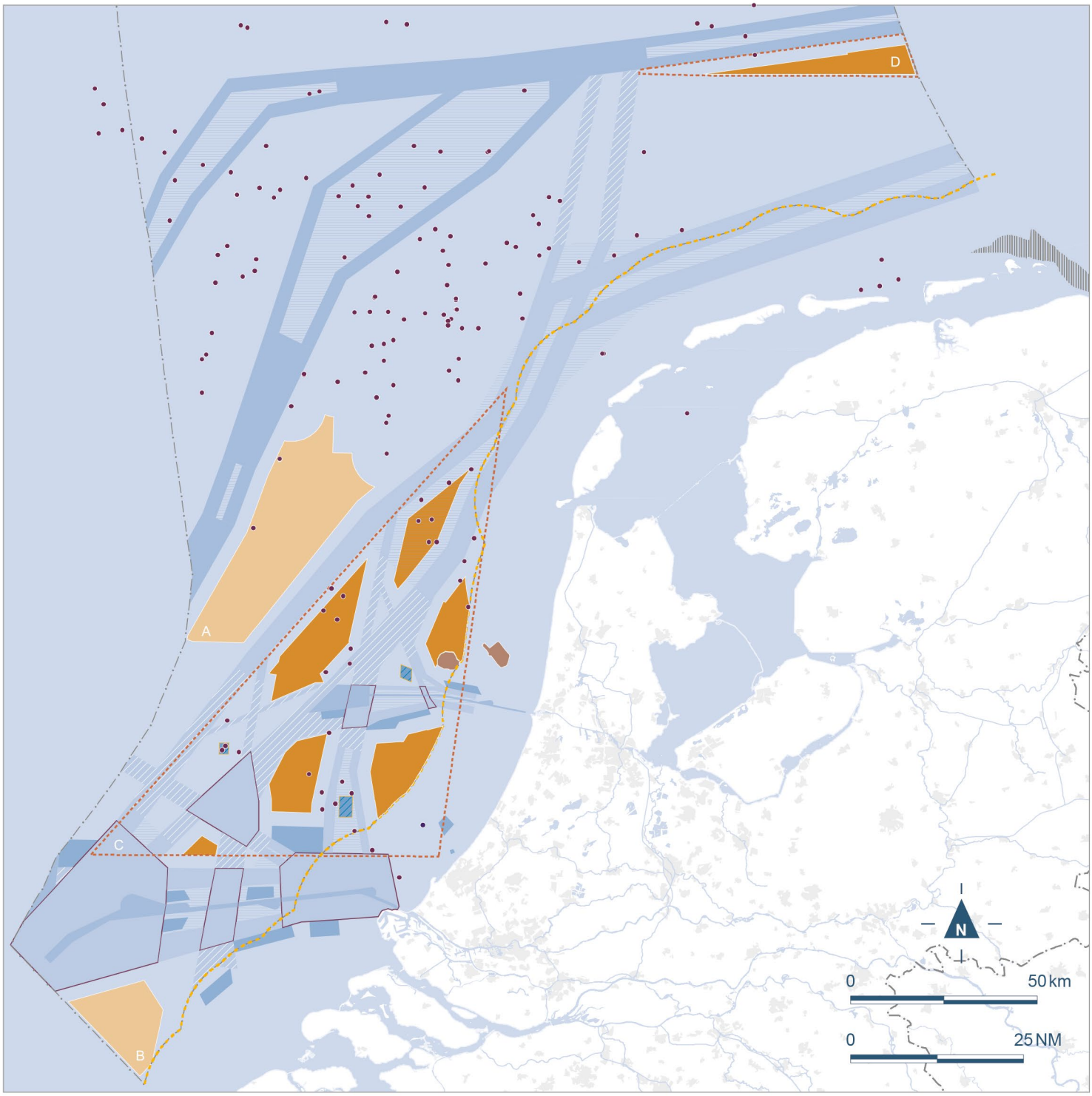
3.1.1 Introduction

On the basis of the points of departure described in section 2, the cabinet is designating the Holland Coast area and the area north of the Wadden Islands as areas suitable for large-scale wind energy exploitation. The areas in question are shown on Map 1. The designated areas lie outside the twelve-mile zone. In line with the National Water Plan and the Policy Document on the North Sea, the cabinet will not during the planning period approve the construction of any offshore wind farms outside the designated areas.

In the Strategic Environmental Assessments, three variants of each area are considered: a minimum variant, a maximum variant and a preferred variant. The minimum variant is defined on the basis of a separation distance of 2 NM between the wind energy area and all shipping lanes, as well as 5-NM exclusion zones around all oil and gas platforms. The maximum variant is based on a separation distance of 500 metres from the shipping routes and assumes that oil and gas fields will be exhausted by 2050, eliminating the need for helicopter safety zones around the platforms by that date. The preferred variant also assumes that oil and gas fields will be exhausted by 2050, eliminating the need for helicopter safety zones around the platforms by that date, but is based on safe separation distances between shipping routes and offshore wind farms defined using the assessment framework (see 2.3.2). The Strategic Environmental Assessments also take account of the cumulative impact of the areas to be designated, the areas previously designated and other activities in the North Sea. Existing wind farms, planned wind farms for which permits have already been granted and offshore wind farms at an advanced stage of planning and development on the territory of other countries (UK, Germany, Denmark and Belgium) were considered in the cumulative assessment as well.

The Strategic Environmental Assessment contains a qualitative impact assessment and an Appropriate Assessment for each area and each of the three variants (minimum, maximum and preferred). The nature and extent of the impact of offshore wind energy, as associated with each variant, are described in relation

Map 1 - White Paper map



Wind energy

- A IJmuiden Ver
- B Borssele
- C Holland Coast
- D North of the Wadden Islands

Existing wind farms

- Existing wind farms

Shipping

- Shipping lane
- Traffic separation zone
- *Clearways*
- Areas to be avoided
- Precautionary areas
- Anchoring area

Oil and gas extraction

- Production platform

Boundaries

- Dutch waters / EEZ
- Boundary of territorial waters (12-mile zone)
- Eems-Dollard Treaty Area

to nature, soil and water, coastal safety and climate (Planet), landscape, archaeology and recreation (People) and economic activities and the wider economy (Profit).

The contour of the preferred variant of each designated area lies between the contours of the minimum and maximum variant.

The environmental impact, broken down into the effects on People, Planet, Profit, is outlined below. The considerations that have influenced definition of the contour of each designated area is explained in, respectively, 3.2 Holland Coast and 3.3 Area north of the Wadden Islands. Various points specific to the ultimate realisation of each area are also set out. More general issues that require attention in the further development of offshore wind energy are identified in section 4 Implementation agenda. The focus points for further realisation set out in the White Paper need to be considered in conjunction with the Policy Document on the North Sea, 6.4.5 Implementation pathway. This White Paper describes the current status of the implementation pathway and provides additional information where appropriate.

3.1.2 *People*: landscape, archaeology and recreation

In all variants, the wind turbines are to be located at least 12 NM (roughly 22 km) from the shore. Generally speaking, the maximum distance at which a wind turbine is theoretically visible from the shore is about 19 NM (35 km), assuming a turbine tip height of 150 metres. Dutch coastal weather conditions are such that, over an average year, a turbine located 12 NM (roughly 22 km) from the shore will be visible on 19 per cent of the days. During the summer, such a turbine will be visible on roughly 31 per cent of days. For the Holland Coast area, the impact is assessed as negative in terms of visibility (see 3.2). In that area, the impact is also graded negative in terms of dominance. The dominance of wind farms is an expression of the proportion of the viewer's horizontal field of view that the wind farms occupy. The dominance of wind farms will be greatest for an observer standing on the shore at Zandvoort.
The designated area north of the Wadden Islands is roughly 60 km from the shore and will not therefore be visible from the Wadden Islands. Hence, the impact is assessed as neutral in terms of both visibility and dominance.

All plan variants are regarded as neutral in terms of their impact on the archaeology of the North Sea. There are many shipwrecks and prehistoric sites on the bed of the North Sea. However, it is possible to take account of such sites during wind farm construction and to position turbines accordingly. Detailed investigations geared to preventing negative impact will be undertaken during wind farm development.

The Strategic Environmental Assessment indicates that a negative impact may be expected on recreation, in particular sport fishing and recreational sailing. Under the preferred variants, such impact is expected to be very negative. The wind farm sites will not be accessible to vessels used for sport fishing or recreational sailing and circumnavigation will involve the use of busier routes. This matter will require attention later in the planning process, with a view to establishing whether there is scope for allowing vessels to cross wind farms and for shared use (see 2.3.5).

3.1.3 *Planet*: nature, soil and water, coastal safety and climate

For assessment of the impact on nature, distinction is made between the construction of wind farms and the subsequent presence of wind farms.

The most common way of providing a wind turbine with foundations is to drive monopiles into the seabed. The Strategic Environmental Assessment for the Holland Coast area indicates that, under all the plan variants, prolonged and frequent pile driving in the wind energy areas may be expected to have significant negative effects on marine mammals, particularly the porpoise (*Phocoena phocoena*), the common seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*). In the area north of the Wadden Islands, significant negative effects are expected on the porpoise. However, underwater noise from pile-driving is not expected to have any significant negative impact on seals, because the species in question normally remain close to the shore and thus a considerable distance from the area north of the Wadden Islands, which lies at least 60 km from the islands themselves.

The expected large-scale, simultaneous construction of wind farms may also seriously disturb the habitats of marine mammals and certain fish species. The migration patterns of marine mammals may be affected as well.

The attachment of conditions to pile-driving activities, such as requiring soft-start driving and the use of pingers/ADD, will not be sufficient to prevent significant negative impact occurring on a large scale. Such effects and the related cumulative effects may nevertheless be reduced by the use of low-noise foundation technologies (e.g. gravity-based foundations (GBF)), or by combining measures designed to mitigate the noise of pile driving: (I) restriction in time (pile driving between August and November), (II) restriction in space (restricting impact zones by imposing permit conditions or adapting the policies on the issue of permits), (III) use of noise dampening techniques and (IV) use of techniques to deter approach. If a combination of measures is used, the construction of wind farms will not have a significant impact on marine mammals. The Strategic Environmental Assessments also indicate that the subsequent presence of wind farms will not have a significant impact on marine mammals.

Significant negative impact on migrating birds, breeding birds and non-breeding birds can also be avoided, except in the Holland Coast area, where the colony of lesser black-backed gulls (Larus fuscus) on Texel is concerned. Under the maximum plan variant for the Holland Coast area, the rate of mortality in lesser black-backed gulls that is additional to the natural rate is expected to exceed 1 per cent. The possibility of significant negative impact cannot therefore be excluded at this stage. Where the Holland Coast area is concerned, significant negative impact on the lesser black-backed gull colony can be prevented by subtle adaptation of the development plans for the areas (see 3.2).

The various large wind energy areas in the UK zone and in the German Bight will increase the collision risk for migrating birds. Interference with the migration patterns of migrating birds is also possible. Significant negative cumulative impact on migrating birds and fish-eating birds can be prevented by employing mitigating measures and adopting the hands-on-the-tap principle (which involves the continuous adaptation of policy on the basis of outcomes and research findings). In the area north of the Wadden Islands, the possibility of significant cumulative negative impact on the colony of lesser black-backed gulls in the Wadden Sea cannot be excluded at this stage. However, any such cumulative impact on the Wadden Sea colony can be prevented by subtle adaptation of the development plans for the area (see 3.3).

In both the Holland Coast area and the area north of the Wadden Islands, the influence of wind turbines on natural processes is expected to be negligible. Wind turbines have no measurable influence on the tides or wave movements. Any impact on the seabed (excavation of cable trenches, erosion and sedimentation around foundations) is expected to be extremely localised and minor in relation to the normal soil processes associated with the tides and storms. For all plan variants, the impact on the soil is assessed as neutral.

To protect against erosion, wind turbines are protected with anodes, from which aluminium can dissolve into the seawater. The construction of wind farms would have no significant negative effect on water quality under any of the plan variants. Nor is the large-scale presence of wind farms expected to have any effect on coastal safety. However, under both the maximum variant and the preferred variant, the efficiency of wind farms may be negatively affected by one farm being in the wind shadow of another. In the Holland Coast area, it is also possible that, in both the maximum variant and the preferred variant, sand deposition will occur within the wind farms, while erosion takes place at the perimeters and that the wave climate is affected. Erosion is a potential threat to pipelines, insofar as it can lead to their exposure. Hence, the maximum and preferred variants are assessed as having a negative impact in relation to wind shadow, morphology and wave climate. The allocation of plots in the Holland Coast area will take account of the minimum safe distance between wind farms so that wind farms do not interfere with each other. The output of wind farms in the Holland Coast area may be reduced by being in the wind shadow of wind farms in the large wind energy areas within the UK zone. Direct mitigation of the impact on morphology and wave climate will not be possible, because of the great scale of the processes involved.

All the plan variants will contribute to the Dutch climate goal of reducing CO_2 emissions to 30 per cent below the 1990 level 2020. Wind farming in the Holland Coast area is expected to yield an annual CO_2 emission reduction of nearly 5 megatonnes (Mt) with the minimum variant and roughly 18 Mt/year with the maximum variant. The corresponding figures for the area north of the Wadden Islands are 2 Mt/year and 3 Mt/year.

3.1.4 *Profit*: Economic activities

In the Holland Coast area and the area north of the Wadden Islands, numerous economic activities take place, which require space. Fixed spatial requirements exist in relation to national and international shipping routes, helicopter safety zones around oil and gas platforms, safety zones beneath helicopter routes and military exercise areas. In addition, future oil and gas drilling (prospecting), fishing and sand extraction all have variable space requirements. The construction of wind farms has the effect of requiring more activities to be accommodated in the same (limited) space. That is seriously problematic at various locations.

The presence of wind farms will increase the risk of shipping accidents, both collisions between vessels and collisions involving a vessel hitting a wind turbine. Although the number of collisions between vessels is not expected to change significantly, the risk a vessel colliding with a wind turbine will increase. The areas have been designated by reference to the Framework for Defining Safe Separation Distances between Shipping Lanes and Offshore Wind Farms (see 2.3.2).

Negative spatial impact is expected on helicopter safety zones around the existing oil and gas platforms scattered through the wind energy areas and adjacent areas. Safety zones beneath the existing helicopter routes will be similarly affected. Use of the areas for wind farming is also likely to have a negative influence the spatial requirements of oil and gas extraction. In the long term (well beyond the White Paper planning horizon), the problems for the oil and gas industry disappear as the reserves are exhausted and the platforms are taken out of service. Moreover, technical innovation may in due course reduce certain spatial conflicts between wind energy areas and oil and gas prospecting.

Creation of the wind energy areas is not expected to have any impact either on beam trawling using vessels with engines of less than 300 horsepower or on otter trawling, because both types of fishing take place largely within the twelve-mile coastal zone. However, loss of fishing grounds and the need to circumnavigate wind farms are expected to have a negative impact on beam trawling using vessels with engines of larger than 300 horsepower, on pulse trawling, on shrimp fishing and on fly-shooting. That impact is assessed as considerable (under the minimum variant) to very considerable (under the maximum variant). In the area north of the Wadden Islands, such effects are expected to be slightly negative. Although the loss of fishing grounds can be partially offset by keeping wind energy areas open for fishing, not all forms of fishing are possible within wind farms. This matter will require attention later in the planning process, with a view to establishing whether there is scope for allowing vessels to cross wind farms and for shared use (see 2.3.5).

Wind farming in the Holland Coast area and the area north of the Wadden Islands will not affect the military exercise areas, since there is no spatial overlap. No impact is expected on mineral extraction, which takes place mainly between the 20-metre depth contour and the edge of the twelve-mile zone.

3.1.5 Conclusions of the Environmental Impact Reports

The Environmental Impact Reports show that the realisation of wind energy facilities need not adversely affect the marine ecosystem of the North Sea or the (protected) flora and fauna to which the sea is home. From the Appropriate Assessments, it is apparent that significant negative effects resulting from designation of the Holland Coast area and the area north of the Wadden Islands as wind energy areas can be prevented by taking mitigating measures and/or by imposing certain conditions. It is necessary to ensure that the construction of offshore wind farms does not have a significant negative impact on marine mammals and that the presence of wind farms does not have a significant negative impact on fish-eating and migrating birds.

In the designated areas, there are outstanding issues in terms of the harmonisation of wind energy with other activities and the marine ecosystem, whose resolution may reduce the space available for offshore wind energy. The resolution of such issues and the need to maintain a separation distance between wind farms will mean that the designated areas cannot be entirely used for wind farming. Decisions made later in the planning process – regarding the detailed design and operation of wind farms – will determine the actual effect on the environment and ecology. It is only at the detailed design stage that a clear picture will emerge of the exact location and dimensions of the wind turbines, and of the construction techniques and equipment to be used. The conditions, measures and restrictions necessary to prevent significant negative ecological impact will be defined later in the decision-making process.

3.2
Holland Coast area

This area is approximately 1,210 km².

The designated are[24] includes the areas covered by the 'phase-2 permits' that have already been granted[25] and the Prinses Amalia Wind Farm. Power can be brought ashore at various points in the grid, e.g. Beverwijk, Vijfhuizen and Wateringen. The final choice will be made as part of the further decision-making regarding the offshore grid (see 5.4). A significant amount of oil and gas extraction takes place within the area, and a great deal of shipping passes through it.

Delineation of the area

- The system of shipping lanes that came into use on 1 August 2013 (see 2.3.2) forms the basis for designation of the space for wind energy within the Holland Coast search area. The Holland Coast area has been designated by reference to the Assessment Framework for Defining Safe Separation Distances between Shipping Lanes and Offshore Wind Farms (see 2.3.2).
- Given the significance that proximity to the coast has for the cost-effectiveness of wind farming, the fact that all parts of the designated areas are at least 12 NM from the shore, the findings of the Environmental Impact Reports and the points of departure concerning perception set out in the National Water Plan and the Policy Document on the North Sea, there is on balance no reason to preclude the use of any part of the areas for wind energy on the grounds of visibility. Hence, the eastern boundary of the area will be formed by the boundary of the twelve-mile zone.

Size of the area

The designated area is larger than the search area defined in the National Water Plan and the Policy Document on the North Sea (3,000 MW / 500 km²), for the following reasons:

- It is assumed that the oil and gas fields will be exhausted some time between now and 2050, and that the need for helicopter safety zones will therefore become unnecessary during that period. It is also expected that special arrangements can be made regarding the safety zones required for existing and future mining installations. Since it is anticipated that sufficient space to accommodate wind farms can be found adjacent to existing oil and gas platforms by making special spatial arrangements (utilising opportunities within the 5-NM zone) or special temporal arrangements (commencing wind energy exploitation when oil or gas extraction ends), the space around such platforms has been included in the wind energy area. Otherwise, the space in question cannot be utilised on the basis of special arrangements, because the government does not permit the realisation of wind farms outside the designated areas (see 1.1).
- By maximising the available space, the position of future wind farms may be optimised.
- The designation of a larger area provides scope for the development of offshore wind energy in the future.
- In the Holland Coast area, there are outstanding issues in terms of the harmonisation of wind energy

[24] See Appendix 7 for details of the search assignment as defined in the Policy Document on the North Sea.

[25] In circumstances where part of a permit area overlaps with the shipping safety zone, the overlapping area will cease to be included once the permit has expired if the policy regulations on the withdrawal of water permits are applicable (see footnote 7).

with other activities and the marine ecosystem, whose resolution may reduce the space available for offshore wind energy.

Focus points for realisation

Various focus points specific to the further planning of the Holland Coast area are also set out below. More general issues that require attention in the further development of offshore wind energy are identified in section 4. The focus points identified here must be read in conjunction with the Policy Document on the North Sea, 6.4.5 Implementation pathway. This White Paper describes the current status of the implementation pathway and provides additional information where necessary for the implementation process.

Ecology

- For the protection of the lesser black-backed gull (*Larus fuscus*), special provisions have been made in respect of those parts of the northern Holland Coast area that lie within 50 km of the Texel gull colony:
  - An Appropriate Assessment pertaining to collisions with lesser black-backed gulls from the Texel breeding colony will be required in the context of further decision-making regarding any individual wind farm to be located in any part of the area to be designated that is less than 50 km from the Texel lesser black-backed gull colony. In that context, account should be taken of the additional mortality associated with the wind farms that have already been approved for this area or whose approval is under consideration, (i.e. 0.28 per cent). A further increase in mortality of 0.72 percentage points is therefore permissible before the maximum acceptable increase in mortality (1 per cent) is reached.
  - No further Appropriate Assessment pertaining to collisions with lesser black-backed gulls from the Texel breeding colony is required in the context of further decision-making regarding any individual wind farm to be located in that part of the area to be designated that is more than 50 km from the Texel lesser black-backed gull colony, because it has been determined that, even if that entire part of the search area were occupied by wind turbines (maximum accumulation), the possibility of significant effects may excluded in advance when 1 per cent is taken as the maximum acceptable increase in mortality.
- To the west of the Holland Coast area, there is an area of possible ecological value (Bruine Bank). The Bruine Bank is to be studied in greater detail, in the light of Natura 2000 and KRM.
- In the context of decision-making later in the planning process – regarding the detailed design and operation of wind farms – the conditions, measures and limitations necessary to prevent significant negative ecological impact will be defined. For definition of the precise usage and demarcation of future wind farm sites within the Holland Coast area, it will be necessary to undertake further research into the ecological impact. An Ecology and Accumulation Framework Document is currently being prepared (see 2.3.6). The extent to which additional conditions and/or restrictions should be applied to the realisation of wind farms in the Holland Coast area will be determined by reference to the Framework Document.

Perceptual impact

Wind farm sites within and beyond the twelve-mile zone are to be defined and laid out in a way that avoids the creation of a continuous line of turbines extending over a large distance. The best position and design for wind turbines at the inner edge of the twelve-mile zone may need to be determined on a case-by-case basis. When determining sites for wind farms close to the twelve-mile zone, account should also be taken of any wind farms located within the twelve-mile zone.

3.3
Area north of the Wadden Islands

This area is approximately 200 km².

The designated area[26] includes the areas covered by the 'phase-2 permits' that have already been granted[27]. Eemshaven is the obvious place for power from wind farms to be brought ashore. There is relatively little shipping in the area, average wind speeds are high and the area is a considerable distance from the coast. The designation of this area for wind energy will ensure the spatial distribution of wind energy and optimal use of the wind front.

Delineation of the area

- The area is bounded to the east by the border with Germany.
- The area is bounded to the north-west by a shipping lane. The area north of the Wadden Islands has been defined by reference to the Assessment Framework for Defining Safe Separation Distances between Shipping Lanes and Offshore Wind Farms (see 2.3.2).
- The area is bounded to the south by the military exercise area.
  The EHD-42 military airfield, directly south of the designated area north of the Wadden Islands, is used by Dutch and non-Dutch forces for flight and attack exercises by fighter aircraft. The speed of the aircraft and the range of the missiles used are such that the exercises require a great deal of space. For safety reasons, no permanent installations may be located within the exercise area. Not only are wind turbines excluded, but also installations for oil and gas extraction. The exercise area cannot be reduced in size, because insufficient space would then remain for the manoeuvres that need to be made. There is no scope for relocation of the exercise area within Dutch North Sea airspace or any immediately adjacent airspace.

Size of the area

The designated area is consistent with the search task defined in the National Water Plan and the Policy Document on the North Sea (1,000 MW / 165 km²).

- It is assumed that the oil and gas fields will be exhausted some time between now and 2050, and that the need for helicopter safety zones will therefore become unnecessary during that period. It is also expected that special arrangements can be made regarding the safety zones required for existing and future mining installations. Since it is anticipated that sufficient space to accommodate wind farms can be found adjacent to existing oil and gas platforms by making special spatial arrangements (utilising opportunities within the 5-NM zone) or special temporal arrangements (commencing wind energy exploitation when oil or gas extraction ends), the space around such platforms has been included in the wind energy area. Otherwise, the space in question cannot be utilised on the basis of special arrangements, because the government does not permit the realisation of wind farms outside the designated areas (see 1.1).
- By maximising the available space, the position of future wind farms may be optimised.
- The designation of a larger area provides scope for the development of offshore wind energy in the future.
- In the area north of the Wadden Islands, there are outstanding issues in terms of the harmonisation of wind energy with other activities and the marine ecosystem, whose resolution may reduce the space available for offshore wind energy.

[26] See Appendix 7 for details of the search assignment as defined in the Policy Document on the North Sea.

[27] In circumstances where part of a permit area overlaps with the shipping safety zone, the overlapping area will cease to be included once the permit has expired if the policy regulations on the withdrawal of water permits are applicable (see footnote 7).

Focus points for realisation

Various focus points specific to the further planning of the area north of the Wadden Islands are also set out below. More general issues that require attention in the further development of offshore wind energy are identified in section 4. The focus points identified here must be read in conjunction with the Policy Document on the North Sea, 6.4.5 Implementation pathway. This White Paper describes the current status of the implementation pathway and provides additional information where necessary for the implementation process.

Ecology

- For the protection of the lesser black-backed gull (*Larus fuscus*), special provisions[28] have been made in respect of those parts of the area north of the Wadden Islands that lie within 80 km of the Wadden Sea gull colony:
  - An Appropriate Assessment pertaining to collisions with lesser black-backed gulls from the Texel breeding colony will be required in the context of further decision-making regarding any individual wind farm to be located in any part of the area to be designated that is less than 80 km from the Wadden Sea lesser black-backed gull colony. In that context, account should be taken of the additional mortality associated with the (Gemini) wind farms that have already been approved for construction within 80 km of the Wadden Sea colony (i.e. 0.7 per cent).
    A further increase in mortality of 0.3 percentage points is therefore permissible before the maximum acceptable increase in mortality (1 per cent) is reached.
- In the Borkumse Stenen area there are reefs on the seabed, which are of ecological value. The Borkumse Stenen area does not lie within the designated area north of the Wadden Islands and its ecological value will not therefore be affected by wind farming in the latter area.
- In the context of decision-making later in the planning process – regarding the detailed design and operation of wind farms – the conditions, measures and limitations necessary to prevent significant negative ecological impact will be defined. For definition of the precise usage and demarcation of future wind farm sites within the area north of the Wadden Islands, it will be necessary to undertake further research into the ecological impact. An Ecology and Accumulation Framework Document is currently being prepared (see 2.3.6).
  The extent to which additional conditions and/or restrictions should be applied to the realisation of wind farms in the area north of the Wadden Islands will be determined by reference to the Framework Document.

Grid connection

With regard to the onshore electricity grid near Eemshaven, the following two points are significant:

- In the short term, there may be congestion in the northern part of the high-voltage grid. Although there are already plans to upgrade the grid, the additional capacity in the Eemshaven area will be required for two new coal-fired plants in the region, for which permits have already been granted. Considerable further investment (not possible before 2018) will be required before there is sufficient capacity to carry power from offshore wind energy installations. Increasing the capacity of the grid will cost approximately € 1.5 billion.
- Because power will have to be transmitted a considerable distance to users in the main conurbations, the capital cost will be very high, there will be sizeable transmission losses and the time needed to develop and approve plans will be substantial.

[28] The Wadden Sea colony may be affected by the phase-2 wind farms in the Holland Coast area and a number of German wind farms. At present, no data are available regarding the impact of the wind farms in question on the Wadden Sea colony, in terms of additional mortality. If such data become available following development of the wind farms, the plans for wind farming in the designated area will have to be adapted accordingly.

4. Implementation agenda

This section sets out the general points requiring attention in the subsequent realisation phases. The focus points for the Holland Coast area and the area north of the Wadden Islands are presented in subsections 3.2 and 3.3, respectively.

The focus points for further realisation identified in this White Paper must be read in conjunction with the Policy Document on the North Sea, 6.4.5 Implementation pathway. This White Paper describes the current status of the implementation pathway and provides additional information where appropriate.

Points requiring attention in the subsequent realisation phases

a. In the designated areas, there are outstanding issues in terms of the harmonisation of wind energy with other activities and the marine ecosystem, whose resolution may reduce the space available for offshore wind energy.
b. When the National Water Plan and the associated Policy Document on the North Sea are revised, provision will be made for further application of the Framework for Defining Safe Separation Distances between Shipping Lanes and Offshore Wind Farms (see 2.3.2).
c. At the stage when the size and position of wind farm sites within the designated areas are determined, account should be taken of the agreements made regarding special arrangements for oil and gas extraction installations (see 2.3.3). The possibility of fleshing out the special arrangements will be investigated in consultation with the oil, gas and aviation sectors and other stakeholders (see 2.3.3). In that phase, detailed arrangements will also need to be made regarding the extraction of as yet undiscovered subterranean gas and oil reserves. In that context, the cabinet's aim will be to achieve the most efficient possible use of space at the production sites. The outcome of the consultations will be reflected in the revision of the National Water Plan and the associated Policy Document on the North Sea.
d. In the decision-making regarding specific wind farms, account will where possible be taken of the quality of the fishing grounds and the possibility for transnavigation and shared use (see 2.3.5). When the targets set out in the Energy Agreement are fleshed out, not all the areas designated in the National Water Plan will immediately be utilised.

e. The study Sailing and Fishing within Wind Farms was completed early in 2013. The study group included representatives of the Dutch Wind Energy Association (NWEA), the Royal Dutch Water Sports Association (KNWV), Sports Fishing Netherlands, the Fishermen's Association and VISned. The study focused mainly on transnavigation and the shared use of wind farm sites. Whether and, if so, how shared use might be realised when the size and position of wind farms are determined is currently being investigated. The findings of the latter investigation will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea.
f. The bed of the North Sea is a valuable archaeological resource, which accommodates many tangible relics of our past. Scattered across and within the seabed are historical shipwrecks and the wrecks of aircraft and submersible and surface vessels, which have the status of war graves and consequently need to be treated with due respect. The bed of the North Sea is also a submerged prehistoric landscape, with evidence of human occupation dating back ten thousand years and more.
The national government is responsible for sites and objects of cultural and historical value in and on the seabed. The protection of the archaeological relics in the North Sea is a national spatial task and therefore provided for in the SVIR. In practical terms, what that means for offshore wind development is that the national government seeks to preserve archaeological relics as far as possible and to protect them by integrating them into wind farm developments. For that to be done, the relics need to be identified and charted at an early stage in the spatial planning process. Executive and financial responsibility for the research considered necessary by the competent authority lies with the initiator[29]. The research itself must satisfy certain criteria; it must, for example, be undertaken by an organisation with an excavation licence and must conform to the quality standard for Dutch archaeology. The Ministry of Infrastructure and the Environment is the competent authority for archaeological matters. The Cultural Heritage Agency of the Netherlands acts as advisor to the competent authority.
When applying for a permit, an initiator is required to provide a report describing the archaeological relics within the relevant area to the satisfaction of the competent authority. If the construction or laying of turbines or the associated cables and pipelines is liable to cause damage to archaeological relics, the competent authority may attach additional conditions to any permit it may issue. The permit holder may, for example, be required to take technical measures, to carry out excavations or to arrange for work to be supervised by an expert in the preservation of archaeological monuments.
g. Part of the area is crossed by a relatively large number of cables and pipelines, with the result that not all of the area is available for wind farms. For reasons of spatial efficiency, safety zones and maintenance zones will be reduced where possible. The circumstances under which such zones may responsibly be reduced will be investigated in consultation with the relevant stakeholders.
h. In the context of decision-making later in the planning process – regarding the detailed design and operation of wind farms – the conditions, measures and limitations necessary to prevent significant negative ecological impact will be defined. For definition of the precise usage and demarcation of future wind farm sites within the designated areas, it will be necessary to undertake further research into the ecological impact. An Ecology and Accumulation Framework Document is currently being prepared (see 2.3.6). The extent to which additional conditions and/or restrictions should be applied to the realisation of wind farms in the designated areas will be determined by reference to the Framework Document.
The purpose of the Framework Document will be to indicate how the cumulative ecological impact may be determined more effectively and more clearly. Use of the Framework Document will be compulsory when making decisions about the exploitation and limitation of future wind farms within the designated areas (plot allocation decisions). The expertise acquired in the development of the Framework Document will be used in future decision-making regarding the areas to be designated for offshore wind energy. The Framework Document will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea.
i. The cabinet will work with the relevant stakeholders to implement the provisions of the Energy Agreement regarding offshore wind energy. In line with the undertakings made at the General Wind Energy Area Consultation Meeting of 24 April 2014 and the Collective General Energy Consultation Meeting of 26 June 2014 the cabinet wrote to the Lower House making a combined statement regarding

[29] This is the situation under the current legislation and regulations. However, a new Offshore Wind Energy Bill is currently being prepared (see j).

the White Paper, the Feasibility Study (see 1.3.3.) and the Route Map for the Realisation of Offshore Wind Energy (see 1.3.4).

j. The cabinet aims to bring the Offshore Wind Energy Bill before the Lower House in the second half of 2014.
k. TenneT's role as offshore transmission system operator will be defined in more detail in a separate bill. In anticipation of amendment of the Electricity Act and Gas Act, the Offshore Wind Energy Bill will provide for TenneT to be given the task of preparing for the creation of an offshore grid. Furthermore, in view of the particular circumstances surrounding offshore wind energy (subsidised system, systematic rollout, innovation), a separate regulatory framework is required for the investments that TenneT must make in offshore infrastructure (see 5.4).
l. Large-scale wind energy generating capacity will ultimately need to be integrated into the national high-voltage grid. The point of departure for the design, construction and management of the new infrastructure will be that generating capacity should be located as close as possible to the load (in the western conurbation). The choice of search areas for landing points for the undersea power cables serving the designated wind energy areas, together with explanatory information, will be included in the revised National Water Plan and associated Policy Document on the North Sea.

5. Supporting and related policy

The following topics are important in relation to implementation of the spatial vision and policy statements set out in the previous section.

5.1 System responsibilities

System responsibility exists both in relation to energy policy and in relation to spatial policy. The Minister of Economic Affairs has system responsibility for realisation of the Netherlands's energy objectives within the EU policy framework for climate and renewable energy. The Minister of Economic Affairs therefore periodically formulates national energy policy, as presented in the Energy Report 2011[30]. The Minister of Infrastructure and the Environment has system responsibility for spatial planning.

On the project level, the Minister of Economic Affairs and the Minister of Infrastructure and the Environment decide on the siting of wind farms, which may be authorised only within the areas designated in the National Water Plan. It is up to the market players to develop offshore wind farm projects.

In the context of offshore wind farms, distinction is made between the marine activity (wind farm and cable) and the terrestrial activity (cable or network). Where the marine activity is concerned, a new assignment system is being developed, in which the existing tools may be replaced entirely or on a sectoral basis (see 5.3). In addition, a bill is being prepared, which will provide for the realisation of an offshore grid (see 5.4). The National Coordination Regulations (RCR) are applicable to the terrestrial activity or activities and to the realisation of a grid for the transmission of voltages of 220 kV or more. In the context of the RCR

[30] Lower House, 2010-2011, 315 10, no. 45.

procedure, spatial decisions are made by the Minister of Economic Affairs and the Minister of Infrastructure and the Environment, in the form of national integration plans.
In recent years, the RCR procedure has been applied for the onshore routing of the cables serving the Luchterduinen Wind Farm and the Buitengaats and ZeeEnergie Gemini Wind Farms.

5.2
Renewable Energy Project Incentivisation Scheme Plus

At present, many renewable energy technologies are more expensive than fossil fuel-based generating technologies; the economics of renewable energy involves a so-called 'unprofitable peak'. Consequently, financial support is required to cover the additional costs if projects are to get off the ground. For the Renewable Energy Project Incentivisation Scheme Plus (SDE+), a single integrated subsidy ceiling is defined annually, beneath which renewable energy technologies compete against each other for the available budget. Until the end of 2014, offshore wind farms can also qualify for financial support under the SDE+.

In the Energy Agreement, an undertaking was made to realise 3,450 MW of offshore wind energy capacity in the coming years, assuming a reduction in the cost price of offshore wind energy per MWh of 40 per cent in the period 2014 to 2024, as provided for in the Offshore Wind Energy Green Deal[31] agreed between the government and the electricity generating industry in 2011. The national government is also to make an allocation for offshore wind energy within the SDE+ budget, sufficient for realisation of the rollout described above.

5.3
Regulatory reform

In the Energy Agreement, the cabinet has committed itself to the creation of a robust statutory framework for the realisation of offshore wind energy.

The cabinet is accordingly preparing an integrated regulatory framework for the large-scale realisation of offshore wind energy, which will lead to a new assignment system. The Offshore Wind Energy Bill will make the scaling up of offshore wind energy possible and will provide for a plot designation decree and a wind energy permit. The locations where wind farms are to be realised and the conditions governing their realisation will be defined, not in the new statute itself, but in the subordinate plot designation decree.

The envisaged system will involve a number of steps and decisions that must be taken before new offshore wind farms may be built. The construction of wind farms will be permitted only on sites (plots) designated in a plot designation decree. It will be possible to designate plots only within areas designated in the National Water Plan. Before a plot designation degree may be issued, an environmental impact report and an Appropriate Assessment will be required. The plot designation degree will define where and subject to what conditions a wind farm may be built and operated. An SDE+ tendering process will then take place for each designated plot, leading to the selection of a party that will be subsidised to realise a wind farm on the plot in question and to arrange its connection to the grid. In addition, a wind permit will be issued to the selected party, granting the exclusive right to build and operate a wind farm on the plot in question.

The cabinet aims to bring the Offshore Wind Energy Bill before the Lower House in the second half of 2014.

[31] Lower House, parliamentary year 2011-2012, 33 043, no. 7.

5.4
Transmission network and offshore grid

Transmission network

The envisaged growth of the wind-powered generating capacity places demands on the onshore electricity grid. The realisation of large-scale wind energy projects, such as those provided for in this white paper, may necessitate upgrading of the national primary transmission grid (>110 kV) operated by TenneT.

The extensions to the onshore high-voltage grid currently envisaged by TenneT in the western conurbation and in the south-west of the Netherlands, take account of the future need for sufficient capacity to transmit wind energy across the onshore high-voltage grid. Nevertheless, specific investments in the grid may be needed so that wind farms can be connected to the onshore grid and wind energy can be brought ashore. The regional and national grid operators are responsible for providing a transmission grid that has sufficient capacity to meet future requirements. All grid operators have to produce periodic Quality and Capacity Documents, which include transmission capacity requirement forecasts based on various scenarios. That documentation serves as a basis for an investment agenda, which is agreed with the Authority for Consumers and Markets.

Offshore grid

The Energy Agreement provides for an offshore grid to be realised if it proves to be more efficient than the direct connection of wind farms to the national high-voltage grid, and for TenneT to be given responsibility for any such offshore grid. On 18 June 2014, the cabinet decided[32] that grid operator TenneT was to create the necessary offshore infrastructure, as provided for in the Energy Agreement. It is an important matter of principle that the offshore grid should be in public hands. Like the onshore grid, the offshore grid will be extremely important for a reliable, affordable and sustainable energy supply.
An offshore grid will make it possible for power generated by offshore wind turbines to be transmitted to onshore consumers as economically as possible. Appointing TenneT as the sole offshore grid operator will yield a cost saving of € 3 billion over fifteen years.

The cabinet will define TenneT's responsibilities as offshore grid operator when amending the 1998 Electricity Act and the Gas Act, as announced in the legislation agenda known in Dutch as 'STROOM'. It is desirable that clarity is provided regarding the division of risks and liabilities for any delays or faults that may occur and regarding the regulatory framework required for the investments TenneT must make in the offshore infrastructure. The cabinet has announced that TenneT will be given the task of preparing for the creation of an offshore grid.

5.5
Interfaces with white papers on other energy activities

The evaluation of the Third Electricity Supply Structure Plan (SEV III) submitted to the Lower House on 10 July 2013,[33] highlighted the desirability of addressing the interfaces between the various white papers on energy activities. The white papers in question are those on the electricity supply, on offshore wind energy, on onshore wind energy, on pipelines and on other uses of the subsoil. The interfaces between the White Paper on Offshore Wind Energy and the other white papers are listed below.

[32] Lower House, parliamentary year 2013-2014, 31 510, no. 49.
[33] Lower House, parliamentary year 2012-2013, 31 410 no. 19.

Interfaces with electricity supply white paper

The SEV III makes spatial provision for (amongst other things) onshore high-voltage connections and is therefore also relevant to the connection of offshore wind farms to the grid. The lead time for the realisation of a new high-voltage line to serve offshore wind energy facilities is considerable. Furthermore, there is a risk that wind farms will not be brought into service on schedule if connections to the grid are not realised in time. Consequently, in their letter regarding evaluation of the SEV III, the ministers state that the clarity regarding wind areas provided by the White Paper on Offshore Wind Energy must be reflected in the grid operators' Quality and Capacity Documents (QCDs), and that, if necessary, the SEV III must be revised accordingly. In that context, the primary question is the landward connection of offshore wind energy facilities. If a reasonable degree of certainty exists regarding the future realisation of such a connection, but the available space is limited, the National Coordination Regulations will immediately be applied and a spatial reservation made under a National Integration Plan.

Various projects are currently in progress, which involve the upgrading or extension of the national high-voltage grid. The most significant of those projects are the Randstad 380 kV link, connecting Wateringen, Zoetermeer and Beverwijk, which is to be fully operational in 2018, and the North-West 380 kV link between Eemshaven and Vierverlaten, which is to be operational after 2019 and will increase the transmission capacity between Eemshaven and the rest of the Netherlands. TenneT regards the capacity of the onshore high-voltage grid, as upgraded and extended by the projects referred to above, sufficient to support the connection of roughly 5,000 MW of offshore wind energy generating capacity. Hence, the connection of (a total) of 4,450 MW of operational offshore capacity, as provided for in the Energy Agreement, can theoretically be realised within the parameters of what has already been agreed, without further development. However, if any further offshore wind energy initiatives are envisaged, it will be necessary to consider the need for upgrading or extension of the national grid at an early stage.

Interfaces with white paper on onshore wind energy

The cabinet adopted the definitive White Paper on Onshore Wind Energy[34] on 31 March 2014. That White Paper designates eleven areas as suitable for large onshore wind farms. The provinces themselves proposed the areas that they considered to be most suitable.

The relationship between the White Paper on Onshore Wind Energy and the White Paper on Offshore Wind Energy is largely indirect, since both onshore and offshore wind farms require connection to the high-voltage grid. The points made in the preceding subsection regarding the relationship between offshore wind energy and the SEV III apply equally where onshore wind energy is concerned, and the implications for the national high-voltage grid of the spatial decisions set out in the two White Papers need to be addressed in conjunction in TenneT's QCD.

Interfaces with white papers on pipelines and other uses of the subsoil

The White Paper on Pipelines is concerned exclusively with onshore pipelines, but identifies various landing points and therefore has a bearing on the routing of undersea pipelines. The White Paper on the Subsoil also deals with other uses of the subsoil. Cables and pipelines on the bed of the North Sea are relevant in relation to offshore wind energy in three ways. When the sites of future wind farms are defined, it will be necessary to take account of both existing and planned cables and pipelines, such as those serving more remote future wind farms or high-voltage interconnectors to other countries. Finally, cables will need to be laid to connect the new wind farms themselves. The Energy Agreement provides for an offshore grid to be realised if it proves to be more efficient than the direct connection of wind farms to the national high-voltage grid, and for TenneT to be given responsibility for any such offshore grid (see 5.4).

The other forms of use and the aspects of the marine ecosystem that need to be taken into account when defining sites for the construction of wind farms within the designated areas are described in 3.2 and 3.3 .

[34] Dutch Parliament, parliamentary year 2013–2014, 33 612, no. 23.

5.6
Support and participation

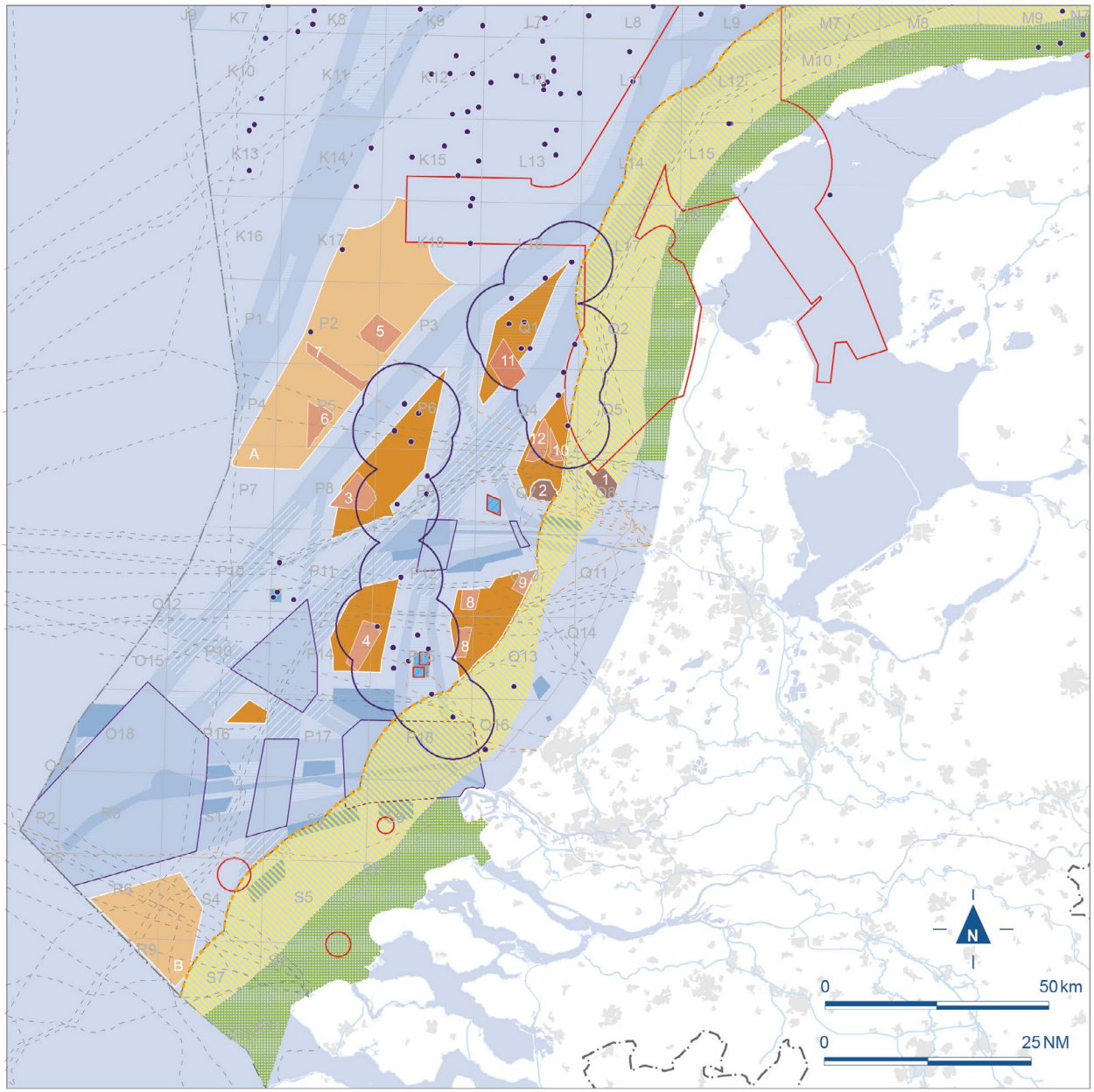
It is important that all stakeholders are involved in spatial policy processes. Participation mechanisms have been and will be used to create opportunities for consultation between the various levels and the various stakeholders are involved in the planning process. Financial participation is also worth considering. The cabinet is explicitly asking wind energy project initiators to be open to requests for financial participation.

The cabinet invites businesses and community groups to develop wind energy projects that are consistent with the spatial vision presented in this document. The cabinet recognises that its invitation is necessarily linked to the fulfilment of four key conditions: a positive investment climate, fair regulatory arrangements for the protection of other interests, the scope for feeding the produced electricity into the national and regional transmission grids, and sufficient emphasis being placed on garnering support.

Various partied have submitted comments regarding the Draft White Paper on Offshore Wind Energy and the associated Environmental Impact Reports. Commentators included members of the public, local governments in coastal areas and market players. The submission of such comments is evidence of a high level of interest in and, in many cases, concern regarding offshore wind farms. The cabinet has produced a Memorandum of Reply dealing with the various comments. All commentators will be informed about the Memorandum of Reply.

Appendices

Appendix 1
Map of the Holland Coast area



Wind energy
- A IJmuiden Ver
- B Borssele
- C Holland Coast

Existing wind farms
- 1 Egmond aan Zee Offshore Wind Farm (OWEZ)
- 2 Prinses Amalia Wind farm

Wind farms in preparation for construction
- 9 Q10 / Eneco Luchterduinen

Wind farms for which permits have been issued
- 3 Breeveertien II
- 4 West Rijn
- 5 Den Helder I
- 6 Brown Ridge East
- 7 Tromp Binnen
- 8 Beaufort
- 10 Q4
- 12 Q4 West

Wind farm for which subsidiary applications have been made
- 11 Helmveld

Shipping
- Shipping lane
- Traffic separation zone
- *Clearways*
- Areas to be avoided
- Precautionary areas
- Anchoring area

Oil and gas extraction
- Production platform
- Mining lots
- Helicopter zone 5 NM

Cables and pipelines
- Pipelines
- Electricity cables
- Telecom cables

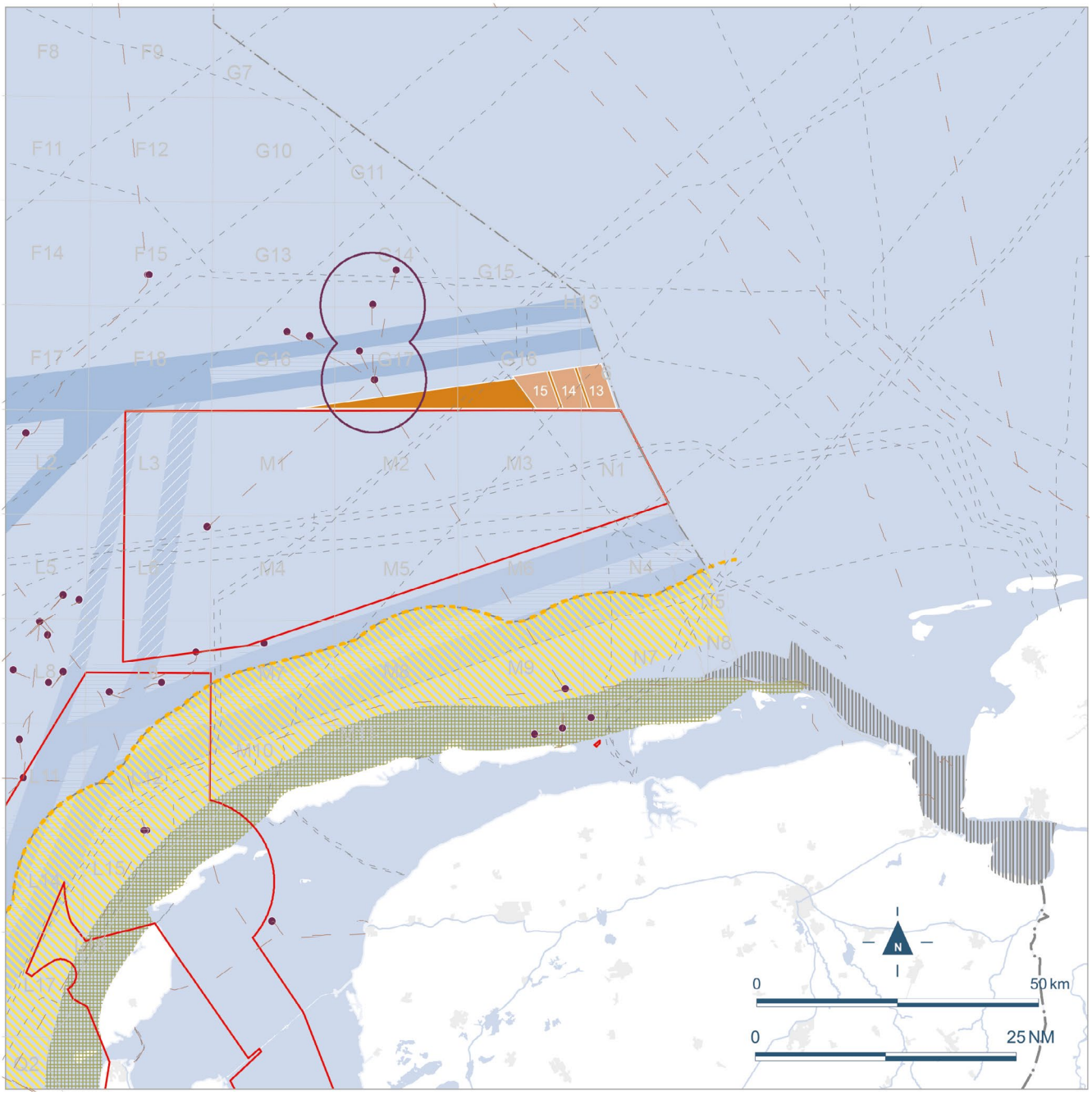
Military exercise area
- Military exercise area

Area reserved for sand extraction
- Area reserved for sand extraction

Natura 2000 area
- Natura 2000 area

Boundaries
- Dutch waters / EEZ
- Boundary of territorial waters (12-mile zone)

Appendix 2
Map of the area north of the Wadden Islands



Designated wind energy area
- North of the Wadden Islands

Wind farms in preparation for construction
- 13 Buitengaats
- 15 ZeeEnergie

Wind farms for which permits have been issued
- 14 Clearcamp

Shipping
- Shipping lane
- Traffic separation zone
- *Clearways*
- Areas to be avoided
- Precautionary areas
- Anchoring area

Oil and gas extraction
- Production platform
- Mining lots
- Helicopter zone 5 NM

Cables and pipelines
- Pipelines
- Electricity cables
- Telecom cables

Military exercise area
- Military exercise area

Area reserved for sand extraction
- Area reserved for sand extraction

Natura 2000 area
- Natura 2000 area

Boundaries
- Dutch waters / EEZ
- Boundary of territorial waters (12-mile zone)
- Eems-Dollard Treaty Area

Appendix 3
Changes relative to the National Water Plan / Policy Document on the North Sea

Aspect	National Water Plan 2009-2015 / Policy Document on the North Sea	White Paper on Offshore Wind Energy
Installed capacity objective	The cabinet is aiming to realise an installed capacity of approximately 6,000 MW as cost-effectively as possible by 2020. *National Water Plan: subsection 5.6* *Policy Document on the North Sea: section 6*	The Energy Agreement for Sustainable Growth concluded with the relevant stakeholders provides for 4,450 MW of offshore wind capacity to be operational by 2023. That implies making subsidies available for a total of 3,450 MW of capacity in the period after 2015, over and above the wind farms already in existence or under development. *Subsection 1.3.1 and subsection 2.3.1*
Wind farm size	Minimum size approximately 80 km^2 (400 – 500 MW). *Policy Document on the North Sea: section 6*	Minimum capacity of 100 MW (approximately 17 km^2). In connection with the offshore wind energy legislation and regulations under development and the proposed rollout of offshore wind energy, the wish is to identify areas capable of accommodating (multiples of) 700 MW. *Subsection 2.3.1*
Shipping		**Shipping lanes** In accordance with the Van Veldhoven motion and in consultation with the direct stakeholders (wind installation permit-holders and the shipping sector), the Ministry of Infrastructure and the Environment has developed a proposal for revision of the shipping lanes off the Dutch coast. The proposal was approved by the International Maritime Organization (IMO) in November 2012 and the revised shipping lanes became effective on 1 August 2013. The revised shipping lanes form the starting point for the designation of wind energy areas within the Holland Coast search area. *Subsection 2.3.2*
	In the designation of wind energy areas, provision is to be made for a safety zone of two nautical miles from the internationally (IMO-) defined shipping lanes, anchoring areas and nationally defined clearways. This point of departure reflects practical experience and the policy principles derived from the safe shipping risk analysis. At the detailed planning stage and in the light of practical experience, the application of this requirement may be adapted to particular circumstances. *Policy Document on the North Sea: section 6*	**Distance to shipping lanes** Following adoption of the National Water Plan, ways of adapting the safety zone principles for application in the context of the North Sea were investigated in consultation with the shipping sector. This led to definition of a Framework for Defining Safe Separation Distances between Shipping Lanes and Offshore Wind Farms. The framework is intended as a means of establishing how much space is required for shipping to move safely and efficiently. On the basis of the Framework, the separation distances necessary for safe shipping are as follows: • For ships 400m in length: 1.87 NM to starboard and 1.57 NM to port; • For ships 300m in length: 1.54 NM to starboard and 1.24 NM to port. Where clearways (routes connecting formal shipping lanes) are concerned, the safe separation distances are incorporated into the width of the clearway. Where anchoring areas and precautionary areas are concerned, the same safe separation distances can be applied as in a traffic management system. The Framework has been applied to the Holland Coast area and the area north of the Wadden Islands. Further application of the Framework will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea. *Subsection 2.3.2*

Aspect	National Water Plan 2009-2015 / Policy Document on the North Sea	White Paper on Offshore Wind Energy
Mining	Under the Mining Act, a safety zone of up to 500 metres around a platform may be required where appropriate. Platforms with helicopter pads require an obstacle-free area of five nautical miles (NM) to ensure safe helicopter traffic. At the detailed planning stage, the application of this requirement may be adapted to particular circumstances. *Policy Document on the North Sea: section 6*	The specially adapted arrangements to apply in individual situations will be fleshed out at a later stage, in consultation with the oil, gas and aviation sectors and other stakeholders. The assessment framework will be of a largely procedural nature. The content elements and their weighting will be considered only at the point of application. In the application of the assessment framework, effort will be made to minimise constraint of the relevant mining companies and wind farm project initiators. The framework will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea. *Subsection 2.3.3*
Cables and pipelines	All undersea pipelines and cables have safety zones extending 500 metres on each side. Within such a zone, no other seabed activities are permitted. Active cables additionally have maintenance zones of 500 to 1000 metres on each side. *Policy Document on the North Sea: section 4*	For reasons of spatial efficiency, safety zones and maintenance zones will be reduced where possible. The circumstances under which such zones may responsibly be reduced will be investigated in consultation with the relevant stakeholders. The outcome of that process will be taken into account at the stage when the size and position of the proposed wind farms are determined (following designation of the areas). *Subsection 2.3.4*
Through-traffic and shared use	Multiple use – involving the combination of, for example, sustainable fishing that does not disturb the seabed, marine aquaculture and recreation – should be permitted wherever possible. *Policy Document on the North Sea: section 6*	The study Sailing and Fishing within Wind Farms was completed early in 2013. The study group included representatives of the Dutch Wind Energy Association (NWEA), the Royal Dutch Water Sports Association (KNWV), Sports Fishing Netherlands, the Fishermen's Association and VISned. Whether and, if so, how shared use might be realised when the size and position of wind farms are determined is currently being investigated. The findings of the latter investigation will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea. *Subsection 2.3.5*
Ecology		The government is to develop an Ecology and Accumulation Framework, setting out the cumulative ecological impact and the mitigating measures to be taken. The purpose of the Framework will be to indicate how the cumulative ecological impact may be determined more effectively and more clearly. Use of the Framework will be compulsory when making decisions about the exploitation and limitation of future wind farms within the designated areas. The Framework will be developed in consultation with the relevant stakeholders (wind farm developers and environmental organisations). The Framework will be included in the revision of the National Water Plan and the associated Policy Document on the North Sea. *Subsection 2.3.6*
White paper map	National Water Plan map 25 and Policy Document on the North Sea map 2 *National Water Plan: subsection 5.6* *Policy Document on the North Sea: section 6*	Map 1 *Section 3*

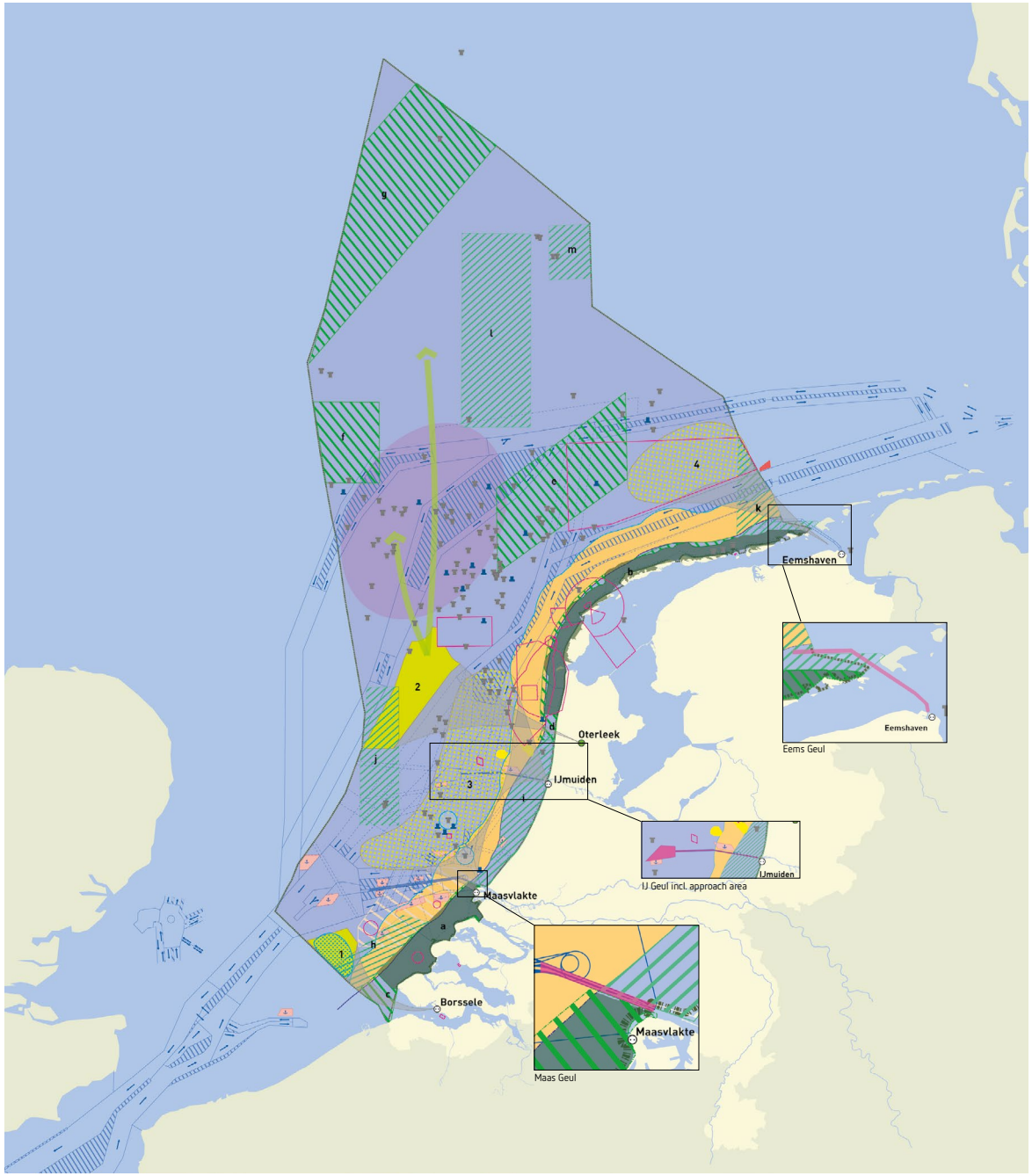
Appendix 4
Assessment of potential wind energy areas

Superseding table on page 44 of the Policy Document on the North Sea, sections dealing with the Holland Coast area and the area north of the Wadden Islands.

Area	Cost	Grid integration	Relationship with other uses		Possibilities	Conclusion
			Use	**Notes**		
Holland Coast	Relatively low, closest to coast	Power can be brought ashore at various points in the grid, e.g. Beverwijk, Vijfhuizen and Wateringen. The final choice will be made as part of the further decision-making regarding the offshore grid.	Shipping	No problem	Area approximately 1.210 km^2.	Suitable for wind energy. Detailing of whole area required in connection with mining and natural habitats.
			Oil and gas extraction	Take account of possible loss of space to prospects and existing mining installations.		
			Sand extraction	5% more expensive outside 12-mile zone.		
			Defence	N/a		
			Fishing	Review scope for through-navigation and shared use with sustainable fishing.		
			Flora and fauna	Fine-tuning required for the northern areas within 50 km of the lesser black-backed gull colony on Texel. Possible adverse effects on birds in Bruine Bank area.		

Area	Cost	Grid integration	Relationship with other uses		Possibilities	Conclusion
			Use	**Notes**		
North of the Wadden Islands	Moderate, further from the coast (northern part relatively high)	Obvious place to bring power ashore is Eemshaven. Bringing power shore will require further investment.	Shipping	No problem.	Area approximately 200 km^2.	Suitable for wind energy. Detailing of whole area required in connection with mining.
			Oil and gas extraction	Take account of possible loss of space to prospects and existing mining installations.		
			Sand extraction	N/a		
			Defence	No change to boundaries of exercise area.		
			Fishing	Review scope for through-navigation and shared use with sustainable fishing.		
			Flora and fauna	Fine-tuning required for the northern areas within 80 km of the lesser black-backed gull colony in the Waddenzee.		

Appendix 5
Map of the National Water Plan 2009-2015



basis
- boundary of territorial waters (12-mile zone)
- continuous NAP -20m line

shipping infrastructure
- boundary of traffic separation schemes
- anchoring area
- traffic separation zone
- clearways
- search area for anchoring ground for Eemshaven (in the German EEZ)
- channels [geul]: amendment in study

oil and gas recovery platforms
- platform
- underwater platform

sand extraction
- reserve area for replenishment sand and fill sand
- reserve area for concrete and masonry sand

defence
- military training areas (incl. munitions dump)

marine ecological system
- national ecological network
- Natura 2000 areas to be designated
- designated Natura 2000 areas
- other potentially ecologically valuable areas
  - a Voordelta
  - b North Sea Coastal Zone
  - c Vlakte van de Raan
  - d Expansion of North Sea Coastal Zone
  - e Frisian Front
  - f Klaver Bank
  - g Dogger Bank
  - h Zeeland Banks
  - i Territorial sea
  - j Bruine Bank [Brown Bank]
  - k Borkumse Stenen
  - l Central oyster fields
  - m Gasfonteinen

wind energy areas
- windfarms
- wind energy area
- wind energy search area, to be set out in concrete terms before 2010
  - 1 Borssele
  - 2 IJmuiden
  - 3 search area coast of Holland
  - 4 search area north of the Wadden Sea islands

wind energy landing point
- Borssele; Eemshaven; IJmuiden; Maasvlakte
- Oterleek (possible landing point)
- search area wind energy cables to landing point

renewable energy in the long term
- core area oil and gas recovery, option large-scale CO_2 storage after 2020
- direction of development of renewable energy after 2020
- search area island for energy storage and production
- pilots for CO_2 storage before 2015

Appendix 6
Assessment Framework for Defining Safe Distances between Shipping Lanes and Offshore Wind Farms

Version adopted by the Directors' Meeting of 9 July 2013
(on August 21, 2014, the precautionary areas are added to the various types of route and will get similar safety margins, see 3.5)

Report to the Director Maritime Affairs at the Ministry of Infrastructure and the Environment, by the Working Group Safe Distances
9 July 2013

Introduction

This Assessment Framework serves to enable the following question to be answered: how much space (path and safety margin) must be allowed between a shipping lane and a wind farm, in order for ships to be able to use that lane safely? The Assessment Framework serves as a basis for deciding situation-specific separation distances consistent with nautical safety principles. In other words, *safety distances that take account of both the characteristics of the particular location and the safety requirements of the particularshipping route*.

The path and the safety margins required for safe navigation have been defined on the basis of: international provisions and regulations: International Regulations for Preventing Collisions at Sea (COLREGs), General Provisions on Ships' Routeing (GPSR) and United Nations Convention on the Law of the Sea (UNCLOS),the interpretation of those provisions and regulations by nautical experts and maritime organisations, the review of that interpretation by nautical experts, and the minimum amount of space that a ship requires in order to fulfil its obligations.

As the foregoing implies, the government has chosen not to adopt fixed safety distances, but to provide informed guidance on the formulation of special arrangements based on shipping safety principles. The Assessment Framework serves as the basis for the definition of situation-specific safety distances. The need to define situation-specific distances derives from the Policy Document on the North Sea associated with the National Water Plan, which states that 'wind energy area designation should adhere to the principle that no permanent construction is permissible within two nautical miles (nM) of a shipping lane, anchoring area or nationally defined clearway. That point of departure reflects practical experience and the policy principles derived from the safe shipping risk analysis. At the detailed planning stage and in the light of practical experience, the application of this requirement may be adapted to particular circumstances.'

The Working Party recommends that Policy uses the Assessment Framework to define a policy framework, for application both in the designation of phase-3 wind energy areas and in the performance of safety studies in the context of lot assignment and permit issuance activities.
With this Assessment Framework, the Netherlands also seeks to contribute to the international debate on maritime safety and marine spatial planning by putting forward guidance that is based on a methodology for making a rational and balanced assessment of space required for safe navigation, which reflects the relevant international provisions and regulations (COLREGs, GPSR, UNCLOS), as well as the insight of nautical experts and the findings of relevant studies.

The Assessment Framework has been published in the form of an advisory report by the Working Group on Safety Distances to the Director Maritime Affairs at the Ministry of Infrastructure and the Environment/DGB. The Working Group was made up of representatives from: DGB, Public Works and Water Management Directorate Sea and Delta, Rotterdam Port Authority and Amsterdam Port Authority. The Assessment Framework has been developed in consultation with stakeholders and has been reviewed by independent nautical experts. The shipping sector provided both important practical input and the industry's views on safe navigation and the regulations that shipping should obey.

1. Request for advice

1.1 Commission

The Assessment Framework is an advice to the Director Maritime Affairs at the Ministry of I&M, by reference to which the Director may reach decisions on situation-specific safety distances between shipping and wind farms.

When commissioning the report, the Director requested the Working Group to address the following question:
What is the most objective way to determine a situation-specific safety distance that is consistent with safe navigation for a particular lane or zone? Within the parameters of the management and policy objectives, in preparation for phase 3 in the assignment of space for offshore wind energy, the Director Maritime Affairs at the Ministry of I&M requires an assessment framework for realising situation-specific safety distances between shipping lanes and wind farms, which are consistent with nautical safety.

Appendix 1, 'Account of the preparation of the Assessment Framework', describes how this advisory report was developed.

1.2 Why is an assessment framework needed?

The Assessment Framework serves primarily to answer the Director's question. The Assessment Framework is additionally important for the following reasons:

A basis for controlling safety at sea, even in situations where there are wind farms.
Government policy on the North Sea is directed towards bringing about a permanent improvement in shipping safety in all situations, including those where offshore wind farms are present (see section 2). That implies looking at the risk of ships colliding with each other and at the risk of ships colliding with wind farms. There is consequently a need for an assessment framework, which has nautical safety at its centre and is based on the interpretation of international regulations and routing measures, and the space that a ship requires to fulfil its associated obligations.

Indirect contribution to the attractiveness of North Sea ports, environmental interests and wind farms.
Exercising control over shipping safety and making carefully-considered and well-founded safety assessments is of major indirect benefit to various other interests. First, it enhances the accessibility of the North Sea ports, whose attractiveness, image and competitive position depend on safe approach and departure routes. 'Safe berth clauses' for ships mean that North Sea ports are less attractive if the approach and departure routes are significantly less safe. The competitive position of the North Sea ports does not form any part of the assessments with which this document is concerned, being a separate matter. However, the Working Group advises taking the attractiveness of North Sea ports into explicit account.

Second, having shipping safety under control may be expected to have a positive effect on environmental impact by minimising collisions.

Third, the attractiveness of the North Sea as a location for wind farming is likely to be enhanced. Wind farm proprietors benefit from the existence of a clear policy for the designation of wind energy exploitation areas, clear safety assessment for assignment of lots and the award of permits, and minimisation of the risk of accidents and collisions between ships and wind installations. This Assessment Framework supports those benefits.

Implementation of policy.
The point of departure is that the safety distance between shipping lanes and wind farms should ordinarily be 2 nM, but that special arrangements are possible (see section 2). In order that such arrangements may be formulated and to ensure that they have a substantive basis, the Assessment Framework defines the space that ships require for safe navigation. The advice contained in the Assessment Framework can be translated into policy on the formulation of special arrangements. That policy can then be used by the Ministry of I&M to designate areas for wind farms in phase 3.

Assessment methodology.
In a given specific location, the National government is responsible for performing an assessment to establish whether there is any need or scope for making special arrangements. The assessment has to be carried out at the stage that lots are assigned and/or a permit granted, and has to be based on a safety study. In that context, the Assessment Framework serves as a basis for the safety study, so that the government's assessment is safety-oriented and performed in a way that all stakeholders, including the ports and the shipping sector, can support.

Joint input to the international debate.
When proposals for the amendment of existing routeing measures on the North Sea were submitted to the International Maritime Organization (IMO) by the Ministry of I&M in 2012, as required in connection with the issue of permits for phase-2 wind farms, the following was agreed: 'To enable traffic in the proposed shipping lanes to take avoiding action when encountering crossing traffic, the proposals keep a margin of two miles between (future) wind farm sites and the traffic lanes' (document 25). It is important that at international level discussion takes place regarding the form that special arrangements should take. It is desirable that, in the context of such discussions, governments and stakeholders (including the ports and the shipping sector) adopt a joint approach. A joint approach is possible because DGB, the Public Works and Water Management Directorate and the ports and the shipping sector have jointly formulated the Assessment Framework.

2. Policy principles, legislation and regulations

2.1 Policy principles

The following documents are relevant in relation to the policy principles, targets and frameworks concerning the North Sea, shipping and safety:
- The National Water Plan (NWP)
- The Policy Document on the North Sea 2009-2015 (BN), which is appended to the NWP and transcribes North Sea policy

The Assessment Framework for defining safety distances between shipping lanes and wind farms is relevant because there is potential conflict between various policy goals. For example:
- **Multiple use.** Where there is interaction between different forms of use, the aim is to realise the multiple use of space and harmonisation with established and potential future stakeholders in the relevant areas of the sea (Integrated North Sea Management Plan 2015, IBN, subsection 3.3).
  Three pillars: 'healthy, safe and economically profitable sea' ensure the integrated nature of North Sea management (Integrated North Sea Management Plan 2015, IBN).

- **Shipping policy.** The primary objectives of shipping policy are:
  - To realise the safe and efficient management of shipping traffic along the Dutch coast and to Dutch ports
  - To carefully balance the interests of shipping with the interests associated with other uses of the North Sea (IBN).

- **Continuous improvement of safety at sea.** The aim is to realise a year-on-year reduction in the total number of serious and very serious shipping accidents in the North Sea by means of a continuous safety improvement process. Where wind farms ('multiple objects') are concerned, that implies the prevention of collisions and near-collisions between ships and wind farms. The possible creation of additional wind farms in the North Sea could be at odds with this policy of seeking continuous improvements in safety on the North Sea (document 24).

- **Safe and efficient shipping; safety distance between shipping lanes and wind farms.** The Policy Document on the North Sea (§ 6.2) states that, in the designation of wind energy areas, provision is to be made for a safety distance of two nautical miles from the internationally (IMO-) defined traffic separation schemes (shipping lanes), anchoring areas and nationally (Mining Regulations-) defined clearways. This point of departure reflects practical experience and the policy principle of using safe shipping risk analyses (Shipping Policy Document). At the detailed planning stage and in the light of practical experience, *the application of this requirement may be adapted to particular circumstances*.

Explanatory information regarding safety distances between shipping lanes and wind farms, provided in the Policy Document on the North Sea:
The general principle that, for safety, the distance between large wind energy areas and shipping lanes should be two nautical miles is dictated in practice primarily by the behaviour of ships when performing avoidance manoeuvres. There should always be sufficient space for normal avoidance manoeuvres. An average containership sails at a speed of 20 knots (nautical miles per hour). The regulations require that a course change for the purpose of avoidance should be clearly discernible and performed in ample time. An avoidance manoeuvre may result in a course change of two and a half nautical miles. A half nautical mile is the normal minimum passing distance between two ships under surveyable and clear traffic conditions. At sea, traffic in one lane does not always have priority over traffic in another, and no class of vessel is exempted from the obligation to give way (i.e. taking avoiding action). The largest tankers sometimes have to adjust course to avoid the smallest vessels.
In addition to normal avoidance manoeuvres, ships sometimes need to perform emergency manoeuvres or emergency stops. Such manoeuvres can result in a course change of 90 degrees, after which the ship may sail a further one to two nautical miles before coming to a stop, depending on the ship characteristics and its speed.
A ship may also encounter unexpected mechanical damage or engine problems. Under such circumstances, the ship requires time and space to respond to the unexpected development. Where a safety distance of two nautical miles is maintained between a shipping lane and a wind farm, a ship will not immediately drift amongst the wind turbines, if the wind and the current carry it in the direction of the wind farm.
Sometimes, ships have to contend with adverse weather conditions. Wind velocity and direction play an important role in determining an appropriate safety distance. On the North Sea, the wind is force 6 or stronger in 11 per cent of the time. The wind direction is usually south-west, west or north-west. In such conditions, a ship requires additional space to make a turn against the waves in order to cope with the sea state.
Finally, the distance between a shipping lane and a wind farm should take account of the possibility of both physical and radar visibility being impaired.

- The basic principle is that shipping should not pass through wind farms. For vessels in a shipping lane, it is irrelevant from a legal viewpoint whether it is formally permissible to sail through a wind farm, as the Colregs do not make this distinction.

2.2 Legislation and regulations

The following legislation and regulations are applicable:

1. *The Water Act (WW)*, on the basis of which permits for wind farms are granted. The Water Act stipulates that the principles of national water policy and the associated aspects of national spatial planning policy are to be set out in a National Water Plan (Section 4.1.).

2. *The National Water Plan (NWP)*. The Water Act states (Section 4.1.) that, where spatial planning matters are concerned, the NWP is also a white paper in the sense of Section 2.3, subsection 2, of the Spatial Planning Act.

3. In the management of defined routeing systems for shipping on the North Sea: internationally applicable regulations, prescriptions and guidelines, which the Netherlands is required to abide by as a member of the International Maritime Organization (IMO), such as:
   - *General Provisions on Ships' Routeing (GPSR)*
   - *International Regulations for Preventing Collisions at Sea*, 1972, as amended (COLREGs)
   - *International Convention for the Safety of Life at Sea* (SOLAS), 1974

Not only are the above-mentioned regulations, prescriptions and guidelines relevant for the shipping lane manager, but to a large extent they also define the behaviour of shipping (see appendix 4) and the opportunity that ships have for safe navigation.

4. *United Nations Convention on the Law of the Sea (UNCLOS)*, Part V, Article 60, clause 5, which specifies a safety zone of up to 500 metres may be defined around 'single objects', such as drilling platforms. An IMO circular (document 21) also advises a zone of 500 metres around multiple objects. In the Netherlands, such safety zones are also instituted for wind farms, in which context a wind farm is treated as a single entity.

3. Assessment Framework

3.1 Assessment to be based on the insight of nautical experts and on international regulations

This Assessment Framework serves to enable the following question to be answered: how much space (path and safety margin) must be allowed between a shipping lane and a wind farm, in order for ships to be able to use that lane safely? The Assessment Framework serves as a basis for deciding location-specific safety distances consistent with nautical safety principles. In other words, *safety distances that take account of both the characteristics of the particular location and the safety requirements of the particular section of shipping lane*.

The path and the safety margins required for safe navigation should be defined on the basis of: international provisions and regulations (COLREGs, GPSR, UNCLOS), the interpretation of those provisions and regulations by nautical experts and maritime organisations (see appendix 4), the review of that interpretation by nautical experts (see appendices 6 and 7), and the minimum amount of space that a ship requires in order to comply with these regulations and provisions. (see also section 4: Application).

The Working Group recommends that Policy uses the Assessment Framework to define a policy framework for special arrangements, and subsequently uses that policy framework in the context of wind farm lot assignment and permit issuance activities to assess whether the lots or permits provide for sufficient space to enable the manoeuvres necessary for safe navigation to be made. The Working Group recommends using the Assessment Framework where a safety assessment is required.

3.2 3.2 Insight into the space required for safe navigation

The Assessment Framework provides insight into the minimum amount of space that a ship requires for safe navigation. The basis of safe navigation is that a ship has sufficient space to manoeuvre and to give way within a designated shipping lane in a manner necessary for the free movement of traffic in accordance with the applicable international regulations. There must also be sufficient space for the avoidance of accidents. Finally, there must be sufficient space for anchorage. In all cases, there should be no risk of a collision or near-collision with a wind farm or any other obstacle.

That implies the availability of sufficient space for:

1. **A path**, being the space that ships require under normal circumstances, i.e. the area or lane that a ship can use at all times for manoeuvring and for normal avoidance manoeuvres.

   Under the Assessment Framework, the path for a route is to be determined by reference to the length of the standard ship using that route and the intensity of the traffic on the route (see below) in twenty years' time (reference year), and a formula is to be used to determine the width of the path.

2. **A safety margin**: a space that is not normally used by shipping, but which may be used in an emergency to avoid an accident (collision or near-collision). The safety margin is the space between the path and the outer limit of the safety zone extending 500 metres around a wind farm.
   Note for clarification: the safety margin should not be confused with the safety zone that must be maintained around an object (United Nations Convention on the Law of the Sea (UNCLOS), Part V, Article 60, clause 5).

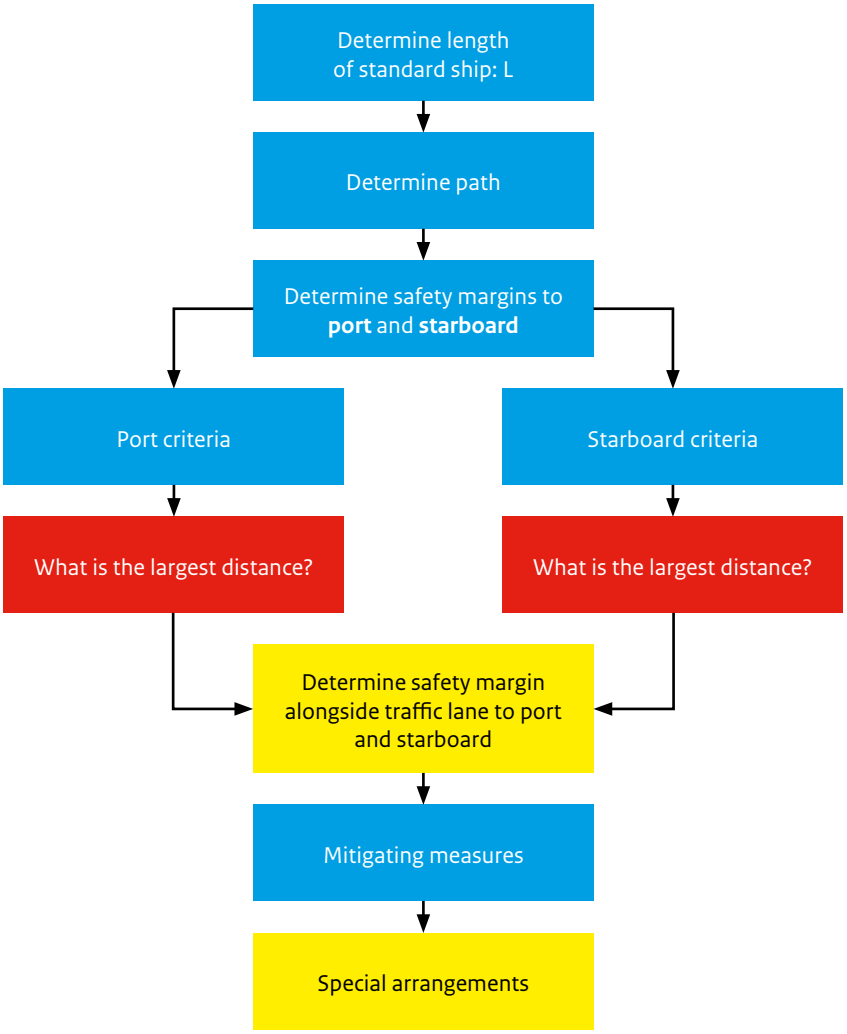
   Under the Assessment Framework the safety margin is to be determined as the space required for the avoidance of collisions and near collisions in accordance with international regulations. A series of criteria have been formulated, which need to be considered in order to determine the required space. The list of criteria (see below) is not exhaustive: it may be necessary to consider other criteria when performing a safety study for a particular wind farm at a particular location.

3. **Anchoring areas and approach routes of anchoring areas**.
   Obtaining insight into *the space that a ship requires for safe navigation* on a given route or at a given location involves a series of steps (see figure 1). First, it is necessary to determine what the 'standard ship' using that route or location is. Next, calculations are made of the amount of space required for the path and safety margin necessary for safe navigation on/at the route/location.

Insight into the path and safety margin is obtained on the basis of various criteria for safe navigation and their translation into spatial requirements. The requirements of safe navigation are based upon the international rules and regulations, which the Netherlands is required to abide by, and which 'guide' the behaviour of seafarers and ships. *The rules and regulations in question, and their interpretation by seafarers, are described in Appendix 4.*

The space required for safe navigation depends on the type of route. Distinction is made between a shipping lane defined in the context of a routing system (such as a traffic separation scheme), a clearway between two traffic separation schemes, and 'open sea'.

Figure 1 Stepped plan for determing safety distances between shipping lanes and multiple objects



3.3 Determine the size of a standard ship

The type and size of the standard ship expected to use a given route in the coming twenty years (reference year) is determined. The largest ships that are normally served by a port and that therefore use the routes leading to that port are taken as the standard or starting point for calculations; occasional visits by unusually large ships may be disregarded. The length of the standard ship is defined so that 98.5 per cent of the ships that use the route in question are no larger than the standard ship. When determining the size of the standard ship, long-term developments (ships' lengths, new types and 'generations', port expansion plans) should be taken into account. The length (L) of the standard ship is used when the criteria are translated into the 'safe space'.

Criterion		Notes and sources
Standard ship	98.5 per cent of the ships are no larger than the standard ship	• AIS shipping path study • Ship dimensions 2030, 2009, Lloyd's Register Fairplay (Doc 6) • Network evaluation 2008 (doc 17)

3.4 Path and safety margin: criteria for determining the space required for safe navigation

Calculation of the path

The path is the space calculated on the basis of the following criteria:

- Number and type of ships (appendix 4, page 8 ff)
- Space required to pass and overtake
- Space required to give way within the traffic lane

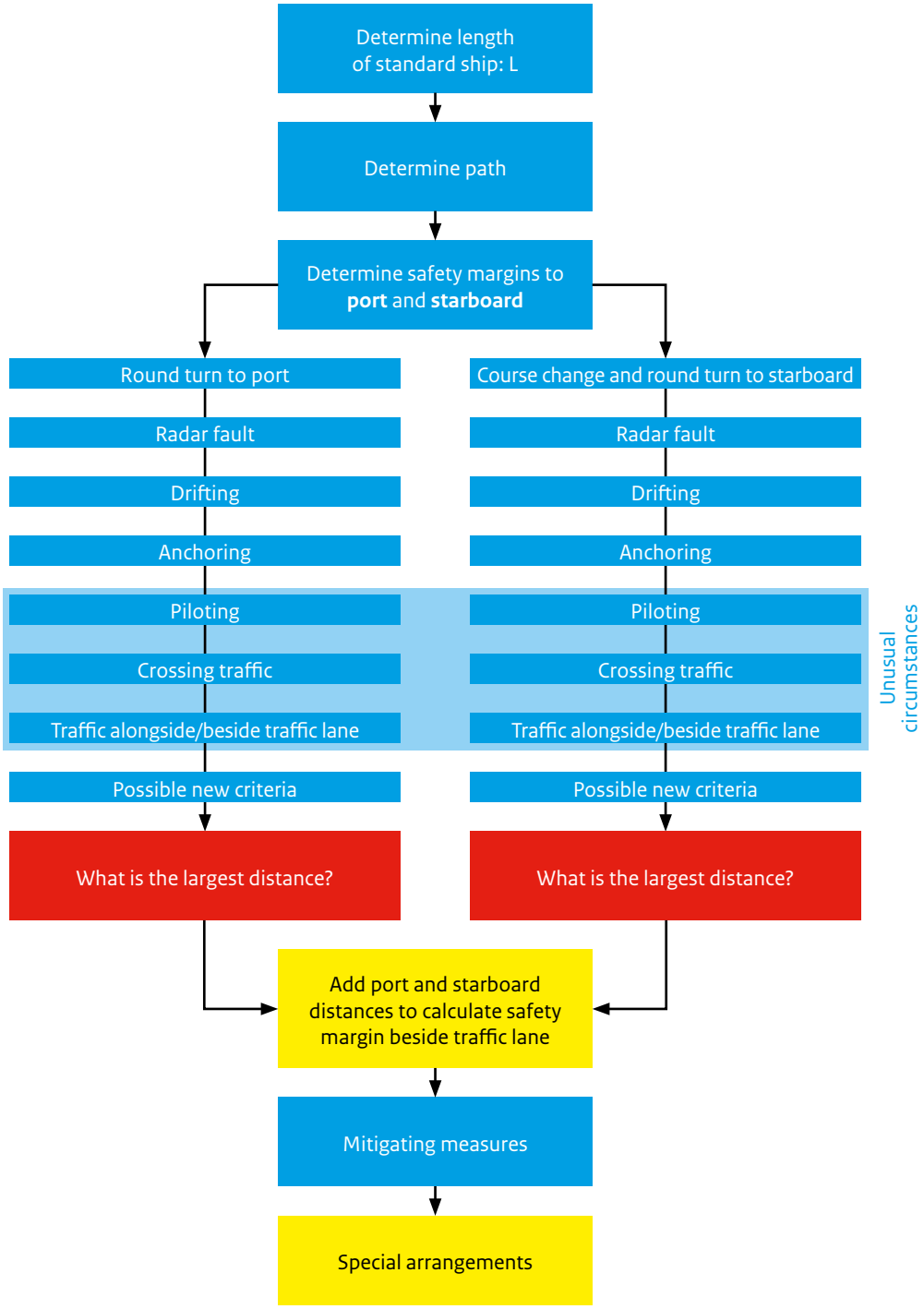
For determination of the required path width/capacity, a formula is used, in which the number of ships expected to use the route in a future reference year, is determined for the required width. The table below provides examples for standard ships with lengths of 300 and 400 metres.

Criterion	Safe space	Notes and sources
Number and type of ships	< 4,400 ships: 4L	Appendix 4 p. 8 ff
Passing and overtaking	Example: = 0.86 nM for a standard ship of 400 m = 0.65 nM for a standard ship of 300 m.	• Discussion paper on safe safety distances (doc 30) • MARIN Network evaluation 2007 p. 69-84 (doc 10) • PIANC, Approach Channels (doc 9) • Network evaluation 2006 (doc 16) • Network evaluation 2008 (doc 17)
Avoidance	Example: > 4,400 and < 18,000 ships: 6L = 1.30 nM for a standard ship of 400 m = 0.97 nM for a standard ship of 300 m. Example: > 18,000 ships: 8L = 1.73 nM for a standard ship of 400 m = 1.30 nM for a standard ship of 300 m.	• Marin simulator research West Rhine (doc 7 subsection 5.3) • International Regulations for Preventing Collisions at sea (COLREGs) (doc 13) a. The space required to starboard for an avoidance manoeuvre is based on COLREGs, rule 15. b. The space required to port for a collision avoidance manoeuvre is based on COLREGs, rules 15 and 19 (d) (ii)

Determining the safety margin

The safety margin must be sufficient for ships to perform the manoeuvres necessary for safe navigation consistent with international regulations in an emergency. The safety margin is therefore determined by working out how much space is required for ships to make the manoeuvres necessary for the prevention of collisions and near collisions. When determining the safety margin, at least the following criteria should be taken into account (see figure 2).

Figure 2 Assessment criteria



For the criteria in figure 2, the space required for safe navigation is as follows:

Criterion	Safe space	Notes and sources
Collision Avoidance manoeuvre, giving way to other traffic to starboard	To starboard 0.3 nM (see note)	Appendix 4, p. 15 ff • Marin simulator research West Rhine (doc 7 subsection 5.3) • International Regulations for Preventing Collisions at sea (COLREGs) (doc 13) • Simulation study (doc 7 p. 33) • Report: Behaviour of shipping in links (doc 4) • PIANC, Approach Channels (doc 9) • Report: Behaviour of shipping in links. No generally applicable conclusions – behaviour is situation-dependent. (doc 4) • Guidelines on the application of COLREGs. Rules on the prevention of collisions at sea (doc 12) • Network evaluation 2007 (doc 10)
Round turn after ineffective collision avoidance manoeuvre to starboard	To starboard 6L. Examples of distance for collision avoidance of other traffic and round turn to starboard, where: • Standard ship = 400 m: 0.3 + 1.3 = 1.6 nM • Standard ship = 300 m: 0.3 + 0.97 = 1.27 nM	Appendix 4 p.17 ff • Marin simulator research West Rhine (doc 7 subsection 5.3) • International Regulations for Preventing Collisions at sea (COLREGs) (doc 13) • GPSR rule 19 • IMO Standards for Ship Manoeuvrability – 'Para. 5.3.1. / Para. 1.2.3.5. (see respectively, Resolution MSC.137(76) and MSC/Circ.1053) • Network analysis 2007 (doc 10)

Note regarding criterion 'collision avoidance manoeuvre to starboard'
Within the Working Group, the consensus was that an collision avoidance manoeuvre to starboard takes up an athwartships distance of 0.3 nM from the course.

Consensus was not reached as to whether the safety margin should necessarily afford space for the manoeuvre, or whether space for the manoeuvre may also be found or may already exist within the path (see definition of 'path').

There are two viewpoints:
1. Since the whole of the path is available for navigation, a vessel may follow a course anywhere within the path, including a course along the very edge of the path. Therefore, space for collision avoidance must be afforded within the safety margin. The consulted nautical experts (experts' meeting, January 2013) supported this view.
2. If there is traffic alongside the traffic lane, a ship will hold a course some distance from the edge of the system. Therefore the space for collision avoidance may, in accordance with the definition of a path, also be found within that path.

The question is whether the 0.3 nM needed for collision avoidance should be defined within the total required space. Consideration may be given to doing so, and then raising the matter in the context of international debate.

The following points are also of significance:
a. The total space for path + safety margin to starboard ('path width', 6L, 500m UNCLOS, and 0.3 nM collision avoidance space) has to be found within the space calculated from the port boundary of the traffic lane.
b. If the space for collision avoidance manoeuvring to starboard cannot be found within the path, because it is already too narrow, consideration may be given to reserving the space within the safety margin. On the basis of viewpoint 1, that space must be available in all cases.

c. The minimum width of the safety margin is 6L (+ 500m UNCLOS).

All the organisations represented in the Working Group were willing to accept that – if the safety margin is too narrow (i.e. less than 6L, possibly plus the 0.3 nM avoidance space) – consideration should be given to making the path narrower and thus the safety margin wider on the basis of international discussion.

Criterion	Safe space	Notes and sources
Round turn to port	To port 6L (see note)	Appendix 4 p.17 ff • Marin simulator research West Rhine (doc 7 subsection 5.3) • International Regulations for Preventing Collisions at sea (COLREGs) (doc 13) • GPSR rules 15 + 19 • IMO Standards for Ship Manoeuvrability – 'Para. 5.3.1. / Para. 1.2.3.5. (see respectively, Resolution MSC.137(76) and MSC/Circ.1053) • Network analysis 2007 (doc 10)

Note regarding criterion 'round turn to port'
Within the Working Group, the consensus was that round turns to port are sometimes made (albeit rarely) and that, if made, the manoeuvre requires a space of 6L.

Consensus was not reached, however, as to whether space should be reserved for round turns to port.

There are two viewpoints:
1. Ships are obliged to follow the international rules and regulations. In order to fulfil the obligations in emergency situations, a ship needs to be able to safely perform a round turn to port. A space of 6L from the port boundary of a traffic lane should therefore be available. That view implies that the shipping lane controller should design the traffic lane in such a way that ships are able to fulfil their obligations.
2. The provision of space for a round turn to port does not promote safety, because, if there is a wind farm to the port side of the traffic lane and a safety zone of 500m is present, there cannot be any (crossing) traffic or any traffic beside the traffic lane, which the ship might be required to avoid in an emergency. Consequently, making a navigable strip available alongside the traffic lane could adversely affect traffic safety, since it would actually increase the possibility of a round turn to port being necessary.

The consulted nautical experts (experts' meeting, January 2013) supported the view that, in case of emergency, a space of 6L should be reserved to port of a traffic lane within a traffic separation scheme, in order that a round turn manoeuvre can be safely executed.
While a wind farm is under construction, allowance should be made for a larger area than that normally required for safe navigation, out of consideration for the additional traffic in and around the construction site. Following the construction phase, allowance should be made for maintenance traffic serving the site.
With regard to the width of the safety margin to port in the case of a traffic lane within a traffic separation scheme, the following point is of significance:
- None of the 0.3 nM of avoidance space required to port has to be found within the safety margin, because the manoeuvre is not performed (see appendices 4 and 6, 7: panel discussion).

Although the focus here is on the criterion 'round turn to port', it should be borne in mind that, in the context of the safety study, other criteria also need to be assessed. In all cases, the safety margin assessment is separate from the minimum dimensions of the safety zone, which has to extend 500 metres (UNCLOS) between a wind farm and a shipping lane.

Criterion	Safe space	Notes and sources
Drift	Distance depends on location, circumstances, prevailing wind speed and direction. On the basis of research, the shipping sector maintains a distance of 1.7 nM from any wind farm.	pendix 4 p. 12 • Safety research wind farm (doc 1 p. 17) • Simulator research risk analysis for TAQA platform P15-E (doc 3) • Behaviour of shipping in links (doc 4)
Radar interference	There is no objective, evidence-based standard; provisional safe distance based on the experience of the shipping sector is 0.8 nM from a wind farm.	Appendix 4 p. 13 • Various studies are mutually contradictory: MCA and QinetiQ proprietary report (doc 14), Radio Holland: interference with radar and radio signals (doc 11) • On the basis of practical experience, the shipping sector maintains a distance of 0.8 nM from a wind farm. This may be supported by the guidelines followed by shipping lines. • If evidenced by the shipping sector, Policy and the licensing authority should take account of and investigate whether a seafarer is able to select a course within the available space so as to satisfy this criterion of a safe distance from the wind farm and can act safely.

Anchoring criterion	Safe space	Notes and sources
Approach to anchoring area	2 nM is generally regarded as sufficient for safe use of an anchoring area.	Appendix 4 p. 27 • Accessibility of anchoring area 5A (doc 5) • Simulator research Q10 (doc 7)
Dragging anchor in anchoring area	Idem	Appendix 4 p. 27 • Studies for particular sites, e.g. TAQA report regarding single objects (p. 5), also followed in the design of anchoring area 5.

Special circumstances criterion	Safe space	Notes and sources
Piloting, mining, instrument towers measuring Wind or tide signal stations, shallows, wrecks	There should be sufficient space for piloting and to enable shipping to navigate safely within the path and safety margin, taking account of various factors that influence or can influence safety.	
Crossing traffic	Allowance should be made for crossing traffic. To that end, sufficient space for avoidance manoeuvres should be left at the corners of wind farms, e.g. corners of 2.5 and 3 km, as well as taking other mitigating measures.	Simulator-research Q10 (doc 7)
Traffic beside traffic lane	The type and volume of traffic beside the traffic lane should be estimated.	
Traffic separation scheme (TSS) Junction with TSS	Indent clearway of 0.3 nM at a distance of 5 nM from boundary of traffic separation scheme: no abrupt transitions between routing systems and clearways, necessitating major course adjustments.	Appendix 4 p. 25
Hotspot	Routes and sites to which numerous criteria apply and where traffic patterns are complex.	Appendix 4 p. 25

Mitigating measures
Examples: traffic guidance and traffic management, including enclosure of wind farms (on one side), marking and lighting, removing sharp corners from wind farm sites, making emergency towage available. The point of departure for safe navigation is that mitigating measures should not be required. Mitigating measures can nevertheless increase safety. It is important that possible measures are explicitly assessed from the shipping safety perspective, as well as from the cost and return perspective, cf. the FSA methodology.

Particular attention should be given to mitigating measures in connection with the construction and maintenance of wind farms. Account should be taken of the strength and direction of the prevailing wind, the additional traffic associated with the construction of wind farms (within, adjacent to, approaching and leaving the site). During the construction period, a larger area is required for safe navigation. The maintenance traffic after the construction phase should also be considered. Mitigating measures consist of provisions and measures relating to the construction and maintenance of wind farms, and arrangements for their monitoring. Mitigating measures require close consultation amongst the various government services, the ports and the shipping sector.

3.5 Conclusion and notes regarding various types of route

Conclusion
With regard to application of the Assessment Framework, the conclusion is that the total amount of space required by a ship for safe navigation has several components. First and foremost, there is the 'path width', which is calculated from the 2L ship domain and the traffic volume on the route. Then there is the safety margin, which is based on criteria such as the space required for avoidance manoeuvres, for making round turns, for drifting, for radar interference and for special circumstances. The total requirement should be measured from the 500-metre safety zone stipulated by UNCLOS. In individual cases, additional criteria may be determined for the location specific special arrangements.

Notes on application of the Assessment Framework to various route types

(a) The route is part of an existing traffic separation scheme
The characteristic of this route type is that the port and starboard boundaries of the traffic lane are marked on the chart. The ship regards the space beyond those boundaries as the safety margin.

In summary, where a traffic lane that forms part of a traffic separation scheme is concerned, the conclusion is that the minimum total amount of space required port to starboard for safe navigation, which must be provided by the path plus the safety margin, is made up of the following components:
a. 500 m for compliance with UNCLOS
b. >> depending on viewpoint: safety margin to port
c. 'path width'
d. >> depending on viewpoint: 0.3 nM to starboard to allow for collision avoidance
e. 6L safety margin starboard
f. 500 m for compliance with UNCLOS.
This is the safe navigation space on the basis of the specified criteria (round turn, avoidance). Adaptations may be made on the basis of the other defined criteria (see 'safety margin').

NB: As regards a precautionary area the same reasoning applies as for a traffic separation system.

(b) The route is a clearway between two traffic separation scheme, or 'open sea'
Within a clearway between two traffic separation schemes, no shipping lanes are marked on the chart. The total amount of space required for path plus safety margins must be provided by the space measured from the wind farm. Attention should be given to the transition to and from the traffic lane (see appendix 4).

(c) The route is part of a new traffic separation scheme
Where a new traffic management system is concerned, insight is required into the path (shipping lane) and the safety margins.

4. Application of the Assessment Framework for policy formulation, lot assignment, permit issuance, international coordination

The Assessment Framework is intended for use in the context of the effective route structure. It may also be useful in connection with the design or revision of routeing measures. The advice to I&M's Director Maritime Affairs regarding application of the Assessment Framework is as follows:

1. Application as a policy framework
   a. It is recommended that the Assessment Framework should be used as a policy framework for making special arrangements regarding safety distances between shipping lanes and wind farms *that are consistent with nautical safety*. Policy should apply the principles and criteria specified in the Assessment Framework, and should translate them into the space required for safe navigation.
   b. Regular evaluation and updating of the Assessment Framework are desirable, to take account of new insights and experiences and the outcomes of international discussion. The advice to the Ministry of I&M is therefore that the Assessment Framework should be incorporated into the National Water Plan or the White Paper on Offshore Wind Energy, so that it may be periodically updated.

2. Application in the context of lot assignment
   a. Within the designated wind energy areas, lots will be assigned for the development of wind farms. A safety assessment is made for each individual lot, since the layout and position of the lot requires assessment at the detail level. It is recommended that the Assessment Framework is used in the context of such safety studies and that the ports and the shipping sector should be involved in the safety assessment process.

3. Application in the context of permit issuance
   a. When considering a permit application, the competent authority (Public Works and Water Management Directorate) investigates whether the application is consistent with the formulated policy with regard to nautical safety and the requirements made in the context of lot assignment with regard to special arrangements concerning safety distances.

4. Application in the context of international coordination
   a. It is recommended that the Assessment Framework, the criteria and the insights regarding the space required for safe navigation be used as a joint contribution by the ports, the shipping sector and the Ministry of I&M to international discussions regarding safety distances between shipping lanes, wind farms and spatial planning at sea.

Appendix 7
Holland Coast search area and search area north of the Wadden Islands

The following information about the search areas has been added to the Policy Document on the North Sea (pages 47-48).

Holland Coast area search task

The aim of the study of the search area is to identify space for one or more larger wind energy areas with a total surface area of 500 km² to accommodate 3,000 MW of generating capacity. The study involved a broad cost-effect analysis of the area, involving comparison of the possible consequences for safe and efficient shipping in the North Sea and using the Dutch ports, the extraction of oil and gas and the safe movement of aircraft serving platforms with helicopter pads, sand extraction, fishing, defence, the marine ecosystem and an unobstructed view of the horizon from the shore. On the basis of the analysis, the government will determine the definitive locations and total size of the wind energy areas to be designated within the search area, as well as the consequences of its decision for any other uses of the area and/or any other interests that may be affected.

Focus points

1. Safety of shipping: Risk analyses indicate that the default separation distance should be two nautical miles. The estimated risk varies from one location to another, depending on factors such as how busy the shipping lane is, whether there is crossing traffic and the types of vessel using the shipping lane. Practical experience also needs to be taken into account. The risk estimation process may lead to various safe separation distances between wind farms and shipping lanes being defined for individual cases.
2. Oil and gas: The extent and seriousness of the access problems for individual oil and gas platforms will need to be examined, taking account of the relative geographical positions and the meteorological circumstances (e.g. prevailing wind directions).
3. Unobstructed view of the horizon from the shore: The best position and design for wind turbines at the inner edge of the twelve-mile zone may need to be determined on a case-by-case basis.

Area North of the Wadden Islands: search task

A social assessment will be undertaken, in which redesigning or relocating the current defence area is weighed against the realisation of at least 1,000 MW of wind energy capacity (165 km² net) by 2020.

Focus points

1. This area is attractive because, by using it in combination with the other three areas, it is possible to achieve a good geographical distribution of renewable energy installations across the North Sea (optimal use of the wind front).
2. Relative to the distance from the shore, the cost of realising wind farms in this area is similar to the cost of realisation in the area near Borssele.
3. With regard to the onshore electricity grid near Eemshaven, the following two points are significant:
   - In the short term, there will be congestion in the northern part of the high-voltage grid. Although there are already plans to upgrade the grid, the additional capacity in the Eemshaven area will be required for two new coal-fired plants in the region, for which permits have already been granted. Considerable further investment (not possible before 2018) will be required before there is sufficient capacity to carry 1,000 MW from offshore wind energy installations. Increasing the capacity of the grid will cost approximately € 1.5 billion.
   - Because power will have to be transmitted a considerable distance to users in the main conurbations, the capital cost will be very high, there will be sizeable transmission losses and the time needed to develop and approve plans will be substantial.

Appendix 8
Coordinates of the designated areas marked on the white paper map

Designated wind energy areas (coordinate system used: ETRS89).

Point	Northing	Easting
Holland Coast		
1	52° 28.852' N	003° 31.693' E
2	52° 32.816' N	003° 32.758' E
3	52° 32.909' N	003° 30.969' E
4	52° 34.705' N	003° 33.267' E
5	52° 35.362' N	003° 33.444' E
6	52° 49.851' N	003° 53.769' E
7	52° 37.802' N	003° 49.733' E
8	52° 37.732' N	003° 49.965' E
9	52° 33.453' N	003° 43.812' E
10	52° 33.051' N	003° 43.121' E
11	52° 32.612' N	003° 43.411' E
12	52° 31.755' N	003° 43.977' E
13	52° 31.750' N	003° 42.009' E
14	52° 29.069' N	003° 32.464' E
15	52° 45.449' N	004° 01.060' E
16	52° 46.648' N	004° 00.208' E
17	52° 55.005' N	004° 03.048' E
18	52° 55.681' N	004° 03.278' E
19	53° 03.134' N	004° 18.133' E
20	53° 00.663' N	004° 15.558' E
21	52° 52.625' N	004° 10.360' E
22	52° 46.801' N	004° 02.981' E
23	52° 34.278' N	004° 10.430' E
24	52° 34.324' N	004° 10.313' E
25	52° 37.688' N	004° 07.940' E
26	52° 43.836' N	004° 12.122' E
27	52° 43.821' N	004° 12.165' E
28	52° 43.671' N	004° 12.597' E
29	52° 47.454' N	004° 17.252' E
30	52° 34.868' N	004° 16.032' E
31	52° 34.858' N	004° 16.030' E
32	52° 34.840' N	004° 16.025' E
33	52° 34.823' N	004° 16.018' E
34	52° 34.806' N	004° 16.009' E

Point	Northing	Easting
35	52° 34.790' N	004° 15.999' E
36	52° 34.774' N	004° 15.986' E
37	52° 34.762' N	004° 15.975' E
38	52° 34.321' N	004° 15.553' E
39	52° 34.318' N	004° 15.550' E
40	52° 34.303' N	004° 15.535' E
41	52° 34.289' N	004° 15.517' E
42	52° 34.275' N	004° 15.498' E
43	52° 34.263' N	004° 15.478' E
44	52° 34.251' N	004° 15.457' E
45	52° 34.240' N	004° 15.434' E
46	52° 34.230' N	004° 15.410' E
47	52° 34.224' N	004° 15.394' E
48	52° 34.074' N	004° 14.974' E
49	52° 34.071' N	004° 14.965' E
50	52° 34.063' N	004° 14.939' E
51	52° 34.056' N	004° 14.913' E
52	52° 34.050' N	004° 14.885' E
53	52° 34.045' N	004° 14.858' E
54	52° 34.041' N	004° 14.829' E
55	52° 34.039' N	004° 14.801' E
56	52° 34.037' N	004° 14.772' E
57	52° 34.037' N	004° 14.761' E
58	52° 34.024' N	004° 13.918' E
59	52° 34.024' N	004° 13.900' E
60	52° 34.025' N	004° 13.871' E
61	52° 34.027' N	004° 13.842' E
62	52° 34.030' N	004° 13.813' E
63	52° 34.035' N	004° 13.785' E
64	52° 34.040' N	004° 13.758' E
65	52° 34.047' N	004° 13.731' E
66	52° 34.054' N	004° 13.705' E
67	52° 34.055' N	004° 13.703' E
68	52° 34.159' N	004° 13.376' E
69	52° 34.140' N	004° 12.651' E
70	52° 34.140' N	004° 12.625' E
71	52° 34.141' N	004° 12.596' E

Point	Northing	Easting
72	52° 34.143’ N	004° 12.568’ E
73	52° 34.146’ N	004° 12.539’ E
74	52° 34.150’ N	004° 12.511’ E
75	52° 34.156’ N	004° 12.484’ E
76	52° 34.162’ N	004° 12.457’ E
77	52° 34.168’ N	004° 12.435’ E
78	52° 34.301’ N	004° 12.000’ E
79	52° 34.301’ N	004° 11.999’ E
80	52° 34.566’ N	004° 11.128’ E
81	52° 34.568’ N	004° 11.124’ E
82	52° 34.576’ N	004° 11.099’ E
83	52° 34.586’ N	004° 11.074’ E
84	52° 34.596’ N	004° 11.051’ E
85	52° 34.608’ N	004° 11.029’ E
86	52° 34.620’ N	004° 11.008’ E
87	52° 34.633’ N	004° 10.989’ E
88	52° 34.647’ N	004° 10.971’ E
89	52° 34.661’ N	004° 10.954’ E
90	52° 34.676’ N	004° 10.939’ E
91	52° 34.692’ N	004° 10.926’ E
92	52° 34.708’ N	004° 10.914’ E
93	52° 34.725’ N	004° 10.905’ E
94	52° 34.303’ N	004° 10.457’ E
116	52° 12.301’ N	003° 57.486’ E
117	52° 14.998’ N	003° 56.665’ E
118	52° 14.998’ N	003° 56.573’ E
119	52° 15.211’ N	003° 56.600’ E
120	52° 19.017’ N	003° 55.439’ E
121	52° 23.163’ N	003° 56.779’ E
122	52° 23.172’ N	003° 56.998’ E
123	52° 23.429’ N	004° 03.109’ E
124	52° 24.563’ N	004° 04.219’ E
125	52° 25.298’ N	004° 08.768’ E
126	52° 25.869’ N	004° 12.310’ E
127	52° 25.894’ N	004° 12.468’ E
129	52° 12.921' N	003° 32.491' E
130	52° 14.679' N	003° 32.412' E
131	52° 16.875' N	003° 31.722' E
132	52° 18.598' N	003° 33.057' E
133	52° 21.542' N	003° 35.344' E
134	52° 23.244' N	003° 38.045' E

Point	Northing	Easting
135	52° 24.344' N	003° 45.089' E
136	52° 24.334' N	003° 45.092' E
137	52° 24.324' N	003° 45.095' E
138	52° 24.315' N	003° 45.099' E
139	52° 24.305' N	003° 45.104' E
140	52° 24.296' N	003° 45.109' E
141	52° 24.286' N	003° 45.114' E
142	52° 24.277' N	003° 45.121' E
143	52° 24.268' N	003° 45.128' E
144	52° 14.235' N	003° 41.926' E
145	52° 12.907' N	003° 41.856' E
146	52° 12.921' N	003° 32.491' E
147	52° 06.289’ N	003° 11.671’ E
148	52° 09.217’ N	003° 16.236’ E
149	52° 07.910’ N	003° 19.971’ E
150	52° 06.408’ N	003° 19.578’ E
North of the Wadden Islands		
1	54° 00.329’ N	005° 13.776’ E
2	54° 03.131’ N	005° 49.132’ E
3	54° 03.375’ N	005° 48.830’ E
4	54° 03.841’ N	005° 54.465’ E
5	54° 04.499’ N	006° 03.274’ E
6	54° 00.230’ N	006° 05.718’ E
7	54° 00.275’ N	005° 56.523’ E
8	54° 00.290’ N	005° 52.652’ E
9	54° 00.327’ N	005° 39.290’ E

Glossary

ADC test	A test to verify that alternatives have been investigated, that there is an urgent and important public interest, and that the effects have been offset.
EEZ	Exclusive Economic Zone *That part of the coastal waters, outside the territorial zone, to which the Netherlands claims rights, extending up to a maximum of 200 nautical miles (370.4 km) from the coast, measured from the low waterline and taking account of the limitations imposed by international law.*
GBF	Gravity-based foundations *A GBF is a large concrete structure serving as a foundation for an offshore installation. The foundation remains in place purely because of its weight and footprint size. A GBF is not anchored to the seabed by piles, but carefully positioned on a prepared area of seabed.*
IBN 2015	Integrated North Sea Management Plan 2015 *(Government Gazette, no. 20771, 18 November 2011)*
IMO	International Maritime Organization *A London-based organisation that realises international agreements amongst member states, with a view to making shipping as safe and environmentally friendly as possible. The IMO is a specialist agency of the United Nations.*
KCD	Quality and Capacity Document *A Quality and Capacity Document is a document in which TenneT specifies how the quality, safety and capacity of power transmission in the Netherlands will be assured in the future.*
KM	Kilometre (km)
KRM	Marine Strategy Framework Directive *The Marine Strategy Framework Directive (Dutch initials KRM) requires every EU member state to define a marine strategy for the protection, maintenance and restoration of the marine environment (the good environmental condition (GMT) of the North Sea) while also assuring sustainable use of the North Sea.*
MW	Megawatt
NCP	Dutch Continental Shelf *The NCP is the same as the Dutch Exclusive Economic Zone (EEZ).*
NM	Nautical mile / sea mile: 1,852 metres *Standard unit of distance used in shipping and motorised aviation..*
NWP	National Water Plan *(Parliamentary Document: Lower House, parliamentary year 2009–2010, 31 710, no. 12)*
RCR	National Coordination Regulations *The National Coordination Regulations provide for the various decisions (regarding permits and exemptions) required in connection with a project to be taken simultaneously and on the basis of consultation. The regulations also cover the national integration plan: a spatial ruling made by the national government, similar to a zoning plan.*
SVIR	White Paper on Infrastructure and the Environment *(Parliamentary Document: Dutch Parliament, parliamentary year 2011–2012, 32 660, no. 51)*
UNCLOS	United Nations Convention on Law of the Sea

Colophon

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