



Netherlands Enterprise Agency

# Offshore wind energy in the Netherlands

*The roadmap from 1,000 to 4,500 MW offshore wind capacity*



*>> Sustainable. Agricultural. Innovative.  
International.*



# Introduction

The Netherlands is working on a transition to a sustainable, reliable and affordable energy supply for everyone. Drivers are the climate change, the declining availability of fossil fuels, and the dependence on international energy suppliers.

The National Energy Agreement, a goal of 16% sustainable energy in 2023 was agreed upon with over forty organisations including Ministries, energy organisations, employers organisations, unions, NGO's and others. All available sustainable energy sources are needed to reach this goal, including wind energy both land based and offshore.

The conditions for offshore wind energy in the Netherlands are excellent: relatively shallow waters, good wind resource, good harbour facilities, experienced industry and a robust support system.

This brochure gives a brief overview of the road map to increase offshore wind capacity from today's 1,000 MW to 4,500 MW in 2023 as part of this National Energy Agreement. The Dutch government has designated three wind farm zones where new wind farms can be developed in the coming years. In consultation with the wind energy sector, a new system was designed for the deployment of these new wind farms. The government is responsible for a greater part of the preliminary works: consents, electrical infrastructure and insight in the physical environment. Companies that want to develop a wind farm can base their Front End Engineering Design (FEED) studies on these preliminary works and register for one of the selected sites. The company with the lowest bid will be awarded with both the permit and grant to develop the wind farm. This approach contributes to efficient use of space, cost reduction and an acceleration of the deployment of offshore wind energy.



## Offshore wind farms in the Netherlands

The existing offshore wind farms and those under construction have a capacity of approximately 1,000 MW. The first two wind farms built in the North Sea off the coast of the Netherlands are the offshore Wind Farm Egmond aan Zee (OWEZ, 2006) and the Princess Amalia Wind Farm (2008).

The OWEZ Wind Farm lies 10-18 km off the coast and comprises 36 Vestas 3 MW turbines. It is owned by Noordzeewind, a joint venture between utility company NUON and oil company Shell. Utility company Eneco owns the Princess Amalia Wind Farm, located outside the 12-mile zone, 23 km off the coast. It comprises 60 Vestas 2 MW turbines.

Two projects are currently (2015) under construction: Wind farm Luchterduinen and the Gemini wind farm. Wind farm Luchterduinen is owned by Eneco and Mitsubishi Corporation and comprises 43 Vestas 3 MW turbines located 23 km off the coast. It is expected that this wind farm will be fully operational in 2015.

The Gemini wind farm will be constructed with 150 Siemens 4 MW turbines on the twin locations Buitengaats and Zee-Energie, 85 km off the coast. Gemini is owned by Northland Power, Siemens, Van Oord and HVC. This wind farm is expected to be fully operational in 2017.



## The roadmap towards 4,500 MW offshore wind power

In 2013 more than forty organisations laid the basis for a robust, future-proof energy and climate policy for the Netherlands in the Energy Agreement for Sustainable Growth. An important part of this agreement is scaling up offshore wind power. In 2014 the Minister of Economic Affairs presented a road map to the parliament enabling the Government to achieve this expansion of offshore wind in accordance with the time line agreed upon in the Energy Agreement.

The road map towards 4,500 MW offshore wind power foresees an annual tendering of 700 MW in the period 2015 – 2019, it is a precondition that the cost of offshore wind power will decrease by 40% in the coming years. The Government has decided that three offshore wind farm zones will be used for the deployment of the 3,500 MW new offshore wind capacity: Borssele (1,400 MW), South Holland coast wind farm zone (1,400 MW) and North Holland coast wind farm zone (700 MW). The tenders to select parties for realising the offshore wind farms will be done according to this schedule:

Year	Power	Wind farm zone
2015	700 MW	Borssele wind farm zone
2016	700 MW	Borssele wind farm zone
2017	700 MW	South Holland coast wind farm zone
2018	700 MW	South Holland coast wind farm zone
2019	700 MW	North Holland coast wind farm zone

Wind farms will become operational within four years after a decision on funding and can use the state-of-the-art technology available by that time. The legal bases of this road map will be a new Offshore Wind Energy Law.

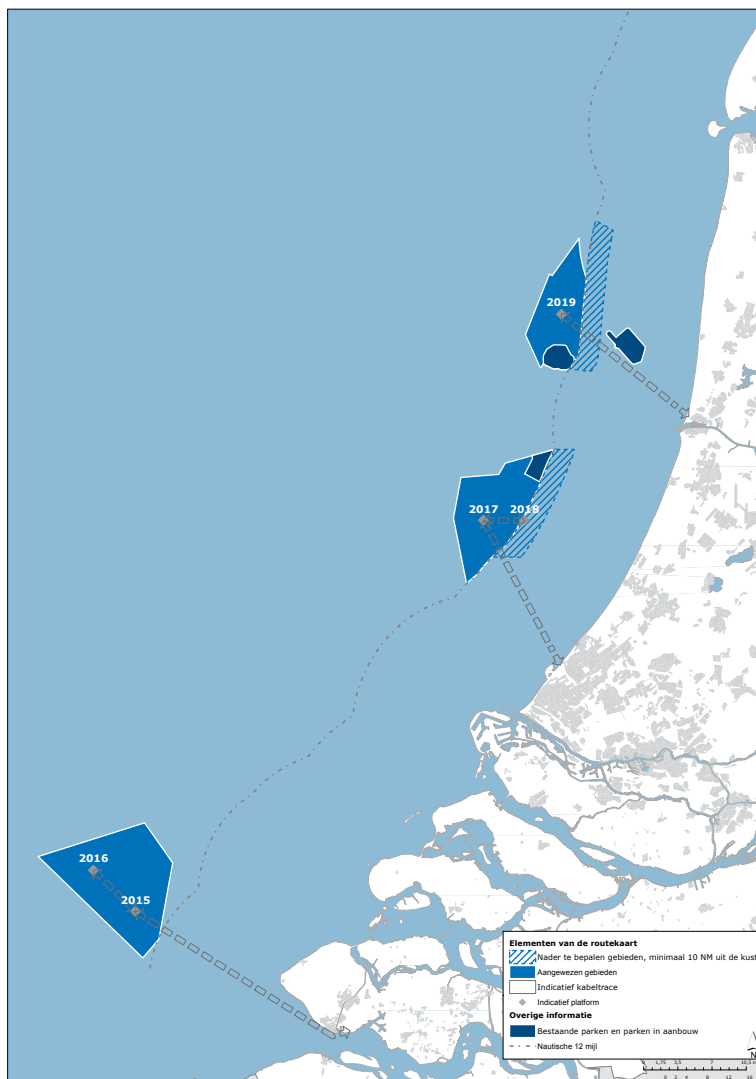
# The Offshore Wind Energy Law

The Dutch government developed a framework in which designated offshore wind areas, each with different sites, will be tendered. These sites will be consented based on an environmental impact assessment and will have a grid connection to the main land. Also the site data of the physical environment is to be made available by the government. This procedure is expected to reduce social cost compared to previously developed wind farms, in which developers were responsible for consents and investigations to provide input for their Front End Engineering Design (FEED) studies. High cost were incurred before they could apply for subsidy.

The new approach is presented in the Offshore Wind Energy Law (Wet Windenergie op Zee), which is expected to enter into force in July 2015. The bill was sent to the parliament in October 2014. The new approach was designed in consultation with the wind energy sector. It contributes to a higher efficiency in the use of space, cost reduction and it accelerates the deployment of offshore wind energy. The system has five distinct aspects:

## 1. Wind farms are only allowed in designated wind farm zones

Under the National Water Plan, wind farm zones have been designated. Only on sites within these zones, the construction of wind farms will be allowed. Any location outside these wind farm zones will not be consented.



Designated wind farm zones in the Netherlands continental shelf.

## 2. Wind farm sites consented by government

In these wind farm zones the government decides on sites where wind farms can be constructed. Each zone can contain several sites. The Ministries of Economic Affairs and of Infrastructure and the Environment will take the so-called wind farm site decisions ('kavelbesluiten'). A wind farm site decision is the necessary consent required to build a wind farm and specifies the location for the wind farm and the conditions under which it may be constructed and operated. These conditions will provide flexibility for the design of the wind farm. This gives commercial parties the best opportunities for choosing the best technical options within the natural and environmental framework and realise their project at the lowest possible costs. Wind farm site decisions are subject to an environmental impact assessment (EIA), which will be commissioned by the Ministry of Economic Affairs and the Ministry of Infrastructure and Environment.

## 3. Government provides site data

The Government investigates the physical environment of the wind farm site: the soil- wind- and water conditions. This site data will be made publicly available and provide commercial parties with information for their FEED studies and competitive bids in the tendering procedure for the grant possibilities. The Netherlands Enterprise Agency (RVO.nl) will publish the site data. This site data includes:

- a. Geological, morphodynamical and geomorphological data
- b. Archaeological and Unexploded Ordnance analysis
- c. Metocean data
- d. Wind resource assessment
- e. Geophysical and geotechnical data (based on surveys)




## 4. TSO TenneT realises grid connection

To create economies of scale the national electricity Transmission System Operator TenneT will construct five standardised platforms with a capacity of 700 MW each within the wind farm zones. They will each be connected to the national grid with two 220kV export cables. As soon as a 380kV subsea cable is available, this can be applied to reduce the amount of required cables. Connecting wind turbines directly to the TenneT platform implies no need for an OWF platform investment.

## 5. Grant tendering

Grants for the wind farm sites will be awarded through a dedicated call for tender under the Stimulation of Sustainable Energy Production. Under this scheme, producers receive financial compensation for the electricity they generate for a fixed number of years (15 years for wind farms). The lowest bidder will be awarded. The bid must be equal or lower than the maximum amount (in €/kWh) set for the specific wind farm site. The lowest bidder will be rewarded with both the grant and the consent to build and operate a wind farm according to the wind farm site decisions.



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