

How economic valuation studies influenced natural gas extraction in the Dutch Wadden Sea - NL

1. Policy Objective & Theme

- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space
- SUSTAINABLE ECONOMIC GROWTH: Balancing economic, social, cultural development whilst enhancing environment

2. Key Approaches

- Integration
- Ecosystems based approach

3. Experiences that can be exchanged

This case shows how a comprehensive, environmental, economic valuation study of a potentially damaging sectoral coastal activity can be used to modify the implementation of that activity.

4. Overview of the case

Proposals were made to begin gas extraction from a Natura 2000 site. The economic benefits from obtaining the gas were weighed against a number of other, environmental factors to determine the true worth of the extracted gas. The study caused a modification to the way in which the extraction was eventually conducted.

5. Context and Objectives

a) Context

The Dutch Wadden Sea is a shallow, semi-enclosed part of the North Sea, mainly consisting of tidal mud flats, sand flats, sea gullies and salt marshes. The area is bordered by a series of dune barrier islands, the Wadden islands. The Wadden Sea stretches along the North Sea coast from Den Helder in the Netherlands up to Esbjerg in Denmark and is the largest tidal wetland area in Europe. Most of the sea and the uninhabited islands are National Nature Reserves and regulated by the Nature Conservation Law and a spatial planning act (PKB). The entire area constitutes approximately 250,000 hectares; the nature reserve is ca. 150,000 ha. The Wadden Sea is of international importance being a nursery of marine life, a resting, moulting and feeding area for several millions of migratory birds, and a habitat for thousands of birds, seals and many other species. The area has been selected for European protection as part of the Natura 2000 Network. The Wadden Sea is not only a region of ecological importance, but provides many economic benefits as well. The region, especially the Wadden islands, is a key recreational area for the Netherlands and Germany. Other important activities include fisheries, military practices, wind energy and gas exploitation.

Amongst these activities, probably because of its extractive nature, gas exploitation has been a key issue in research and policy debate over the past years. An estimated 200 billion cubic meters of gas are located below the Wadden Sea distributed over several small fields. However, gas exploitation can cause subsidence of the sea floor, which would affect the area's tidal mud flats, sand flats, sea gullies and salt marshes, including its flora and fauna. In 1969, the 'Nederlandse Aardoliemaatschappij B.V.' (NAM), Mobil and Elf Petroland received a concession with respect to gas exploitation from the Wadden Sea. Due to increasing environmental concern, a moratorium was agreed from 1984 to 1993. In the mid-1990's, the NAM started several test drills from three locations on the mainland. Six gas fields were found and NAM intended to start

exploitation again.

b) Objectives

An economic valuation of gas exploitation in the Dutch Wadden Sea was conducted to determine the benefits and costs to society from a multi-sectoral point of view as opposed to a purely sectoral determination of the financial benefits.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

The area is owned by the State and managed by Rijkswaterstaat (The Ministry of Public Works, Transport and Water Management (V & W)).

b) ICZM tools

The plans of NAM to exploit the gas reserves resulted in public debate and research efforts on the effects of gas exploitation in the Wadden Sea. Nature management in the area is determined by the PKB Waddenzee, a national planning instrument to combine economic development with environmental protection of the area. Through the various PKBs the government promotes sustainable development by controlling the extent of fisheries, gas exploitation, recreation, tourism and military activities. The PKB is binding upon all national, provincial and municipal authorities. The 3rd draft PKB determining the future of the area for the next 10 years is still under discussion. Gas exploitation from the Wadden Sea is an important contributor to the Dutch economy, providing a yearly benefit of approximately €5 billion per year, which is substantial part of the total revenues of fossil fuels in the Netherlands. In addition, by reducing the dependency on fuel imports from the Middle East, Dutch natural gas plays an important role in the European Union as well. Besides economic benefits, gas exploitation may also have an impact on the environment. It was argued that NAM did not take into consideration the effects on ecosystem services such as water regulating, drinking water supply, tourism etc. In addition, the economic value of these ecosystem services has been underestimated and not properly defined in previous studies. Therefore, an economic valuation study of the Wadden Sea, including a Cost-Benefit Analysis (CBA) of gas exploitation was conducted. The Total Economic Value (TEV) of the Wadden Sea should then be taken into account in decision-making instead of the sectoral approach taken before.

Four ecological functions were defined: regulation functions (e.g. CO₂ storage - benefit transfer, flood protection damage - cost avoided, seawater purification - benefit transfer), habitat functions (e.g. breeding grounds of mussel, plaice and sole - market price), information functions (e.g. tourism and recreation - market price) and production functions (e.g. production of mussels & shrimps - market price). For each of these functions, the ecosystem services of the Wadden Sea were selected and valued. Bequest and existence values were not included in the study. Using several valuation techniques, it was estimated that the TEV was approximately €4.4 billion. It was further concluded that gas exploitation could lead to considerable negative effects and damage to the Wadden Sea ecosystem. The estimated damage to ecosystem functions that depend on sand flats, sea gullies, salt marshes, beaches and dunes was put at approximately € 1.1 billion. The economic benefits of gas exploitation on the other hand were estimated based on three different scenarios, each with a different time period in which exploitation takes place. Applying a 4% discount rate under the baseline scenario (realization period 2011- 2025), it was estimated that the aggregated value of the benefits was between €3 to €18 billion over the same period. Finally, these results were applied in a Cost-Benefit Analysis for three different scenarios. The least harmful scenario (no damage in year 1-5, 50% damage in year 6-10, 100% damage in year 11-50), resulted in a societal loss of €3 to €15 billion as a result of gas exploitation

As a result of this new information, in December 1999, the government eventually decided not to give permission for gas exploitation. However, uncertainties and discussions about the effects of gas exploitation continued. In 2003, the government appointed the 'Committee Meijer', an advisory committee, to give an integral advice on the Wadden Sea ('Space for Wadden'). They concluded that there are no ecological reasons to prohibit exploitation. The main reason for this conclusion was that the dynamic system of the Wadden Sea would probably compensate for soil subsidence. Due to natural dynamics and the supply of sand and mud from the North Sea, the effects of soil subsidence resulting from gas exploitation would be balanced by increased sedimentation and soil accretion. Gas could be exploited without negative consequences. The committee therefore recommended that gas exploitation from the Wadden Sea should take place under strict conditions and regulations. After the advice of the 'Commissie Meijer' the government in 2004 approved gas exploitation from the Wadden Sea. In 2006, NAM published the Environmental Impact Assessment. The main conclusion of the EIA is that gas exploitation does not have

negative consequences for the environment. An independent committee confirmed this conclusion and the government issued the licenses.

7. Cost and resources

No costs are known for the study.

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

Although the economic valuation studies did not halt the project, it increased the awareness of policy makers about the potential economic losses of ecosystem services and thus affected the design of the gas exploitation infrastructure. Gas exploitation can only take place from outside the boundaries of the Wadden Sea, with oil pipes entering the gas reserves in a sideward direction. Moreover, clear conditions were set with regard to possible unforeseen environmental impact that may occur in the future.

Since February 2007, gas has been extracted from two new gas fields at Moddergat (province of Friesland). From 2008 and 2009, gas will also be exploited from another location in the province of Groningen. Exploitation will continue for 35 years. In total, gas exploitation will take place from all six gas fields, with about 25 billion cubic meters of gas exploited.

9. Success and Fail factors

The study recognised that the results were based on limited scientific knowledge of several of the presented values and include many uncertainties. Therefore, the results might involve double counting and overestimation of costs and benefits. On the other hand, intrinsic values were not included and contingent valuation studies to estimate such values were lacking.

10. Unforeseen outcomes

The creation of the Waddenfonds (Wadden Fund): €600 from the financial benefits of gas exploitation has been set aside for a fund to support nature restoration initiatives and sustainable development initiatives in the Wadden region.

11. Prepared by

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12. Verified by

It has not been possible to verify this case.

13. Sources

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ruimte voor de wadden (701.74 KB)

