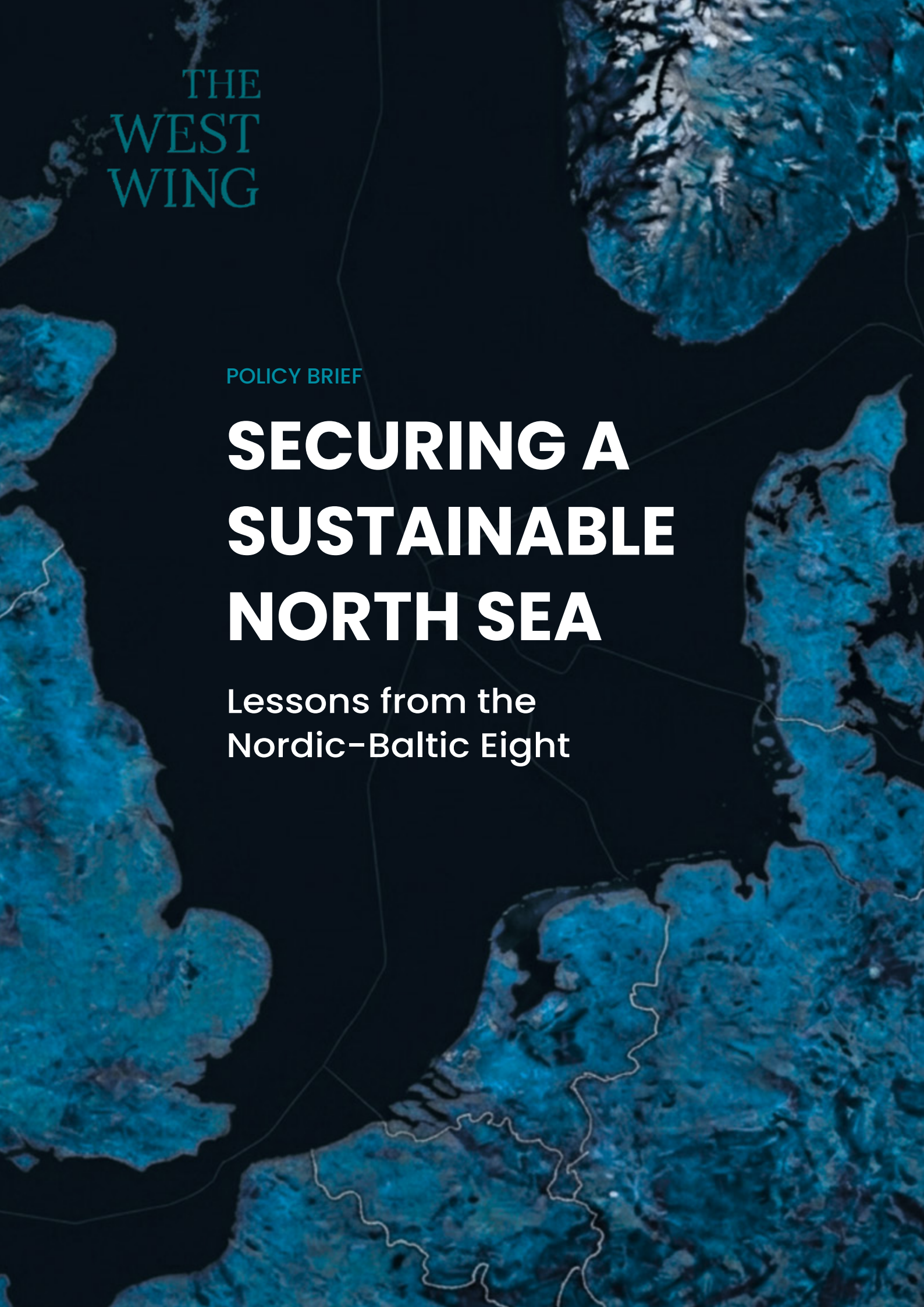

THE WEST WING

POLICY BRIEF

# SECURING A SUSTAINABLE NORTH SEA

## Lessons from the Nordic-Baltic Eight

# Executive Summary

The North Sea is under increasing strain from geopolitical tensions, environmental pressure, and intensifying use. Shadow fleet tankers pass the Dutch coast daily, marine ecosystems continue to degrade, and the offshore energy transition faces persistent bottlenecks — yet Dutch governance remains too fragmented to respond effectively.

This report looks to the Nordic-Baltic Eight (NB8), whose comparable challenges in the Baltic Sea offer directly transferable lessons. Drawing on expert interviews and extensive literature analysis, it proposes four recommendations for a more integrated approach to North Sea policy:

1. Improve monitoring at critical points in the North Sea through reformed public-private cooperation and investments in new technologies. Focus should be on intersections between critical infrastructure, wind parks, Marine Protected Areas, and zones where vessels routinely disable AIS transponders. The Netherlands should follow Denmark and Norway in deploying (under)water drones for this purpose.

2. Develop a North Sea Energy Island in cooperation with neighbouring countries. Denmark's Bornholm Energy Island demonstrates how such infrastructure can support cross-border energy integration, strengthen offshore resilience, and serve as a maritime surveillance platform.

3. Adopt a joint "one incident, one response" approach to marine and shoreline incidents, designating a lead authority and pre-agreed cross-agency roles before incidents occur. The HELCOM-coordinated BALEX exercises in the Baltic Sea illustrate the value of regular joint preparedness mechanisms.

4. Involve private stakeholders in maritime monitoring and crisis management, in particular through partnerships with fishing companies. Infrastructure operators and fishers can contribute to maritime awareness and early warning systems. In several NB8 countries, actors already active at sea play a more integrated role in reporting suspicious activity and supporting monitoring efforts.

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# The North Sea lies at the heart of Dutch history.

**For centuries, it has been a source of fishing, trade, energy and security. Now, it is under increasing pressure. Russian shadow fleet tankers pose risks to both critical infrastructure and the environment, while marine ecosystems continue to degrade, and the offshore energy transition is slowed by numerous bottlenecks.**[1]

Governing a sea this complex and busy is no simple task. Jurisdictions overlap, mandates are spread across national and international bodies, and the institutional architecture was designed for a quieter geopolitical era. The 2026 Hamburg Declaration reflects a growing awareness among North Sea states that governance has not kept pace. The effective protection of offshore energy infrastructure, critical subsea assets and the marine environment requires innovative and integrated solutions.

As "Track NB8" of The West Wing think tank, we have sought to address these challenges by looking to the Nordic-Baltic Eight (NB8) — countries facing comparable challenges in the Baltic Sea, making the region a natural reference point for the Netherlands. Based on expert interviews and extensive literature analysis, we propose four recommendations to achieve a more integrated approach to North Sea governance.

This brief first outlines four key challenges in the North Sea — monitoring and control, protection of critical infrastructure, ecological pressures, and the offshore energy transition — before presenting four policy recommendations inspired by governance approaches developed in the Baltic Sea region.

Our full policy report provides the underlying analysis, case studies, and source references.

# Key Challenges

Four key challenges in the North Sea stand out as particularly pressing for the Netherlands: monitoring and control, the protection of critical infrastructure, ecological pressures, and the offshore energy transition. While these do not represent the full range of issues facing the North Sea, they were selected because of the major risks they pose to Dutch security and sustainability objectives, and because all four involve complex governance challenges.

## Monitoring and Control

Current monitoring and control mechanisms in the North Sea are insufficient to identify and respond to high-risk and non-compliant maritime activity. Activity of the Russian shadow fleet and illegal, unreported and unregulated (IUU) fishing illustrate these gaps.

## Protecting critical infrastructure

The North Sea hosts dense networks of critical infrastructure - including pipelines, subsea cables and renewable energy assets - that are vital to Dutch energy supply and European connectivity. Protecting this infrastructure is crucial, especially given growing risks of sabotage and climate-related stress.

## Ecological pressures

The ecological health of the North Sea is critical for biodiversity, food security, and economic and societal stability. However, growing environmental pressures, ineffective MPAs, and expanding offshore infrastructure undermine marine protection.

## Offshore energy transition

The North Sea is set to become the world's largest energy hub, contributing to climate neutrality, energy resilience, affordability, and industrial competitiveness. The Netherlands seeks a resilient, affordable and sustainable energy system with a high degree of energy autonomy. Yet delivering on this ambition is increasingly complicated by a range of technical, ecological, and security challenges.

## Monitoring and control

Current monitoring and control mechanisms in the North Sea are insufficient to identify and respond to high-risk and non-compliant maritime activity. Two particular developments illustrate these shortcomings: the activity of the Russian shadow fleet and illegal, unreported and unregulated (IUU) fishing.

Russian shadow fleet tankers pass the Dutch coast daily, and pose both security and environmental risks. The vessels enable sanctions evasion and allow Russia to continue financing its war against Ukraine. In the context of growing "grey zone" tensions between Russia and NATO, the shadow fleet can also facilitate hybrid threats. For example, recent research has found a correlation between suspicious shadow fleet activity and drone incidents near military bases in Europe. Moreover, the fleet's frequent deactivation of the Automated Identification System (AIS) allows ships to evade surveys and inspections, and increases navigational risk for other vessels, raising the likelihood of maritime accidents.

As such, the shadow fleet carries major environmental risks. Many of these tankers are ageing vessels that conduct ship-to-ship oil transfers, posing a significant risk of oil spills in the North Sea. They often lack marine liability protection and indemnity (P&I) insurance which covers oil spills, potentially leaving the Netherlands with the costs of environmental damages.[2] By May 2025, over 50 incidents involving the Russian shadow fleet had been recorded worldwide, including fires, engine failures, collisions and oil spills.[3]

At the same time, various forms of IUU fishing continue to occur in the North Sea, including illegal bottom trawling, the use of prohibited fishing gear, and AIS deactivation in Marine Protected Areas (MPAs) such as the Dogger Bank.[4] Weak enforcement capacity and limited monitoring make it difficult to effectively address these practices. This contributes to the degradation of marine ecosystems that are already under pressure from pollution, climate change, and growing maritime activity.

Several factors constrain effective monitoring and enforcement. These include limited maritime surveillance capacity, weak flag state control, the deliberate use of misleading practices such as reflagging and AIS deactivation, and legal ambiguities under the United Nations Convention on the Law of the Sea (UNCLOS) regarding coastal states' enforcement powers.[5] As a result, limited situational awareness in the North Sea increases exposure to hybrid threats, environmental disasters, and long-term ecological damage.

## Critical infrastructure

The North Sea hosts dense networks of critical infrastructure - including pipelines, subsea cables and renewable energy assets - that are vital to Dutch energy supply and European connectivity. This infrastructure faces threats on multiple fronts.

The most immediate threat is sabotage. The NCTV has warned that Russia is actively identifying critical maritime infrastructure in the Dutch part of the North Sea, and conducting preparatory activities for disruption and sabotage.[6] Physical damage can have severe consequences: energy cables,

particularly those linking offshore wind parks to the national grid, are especially vulnerable, as their spatial concentration reduces redundancy and creates single points of failure. Fuel pipelines face similar vulnerability, as disruptions to even a single pipeline could have significant cascading effects on energy markets.[7] While direct attribution remains difficult, several incidents in European waters since 2022 have raised concerns about deliberate interference.

Beyond deliberate threats, critical infrastructure in the North Sea faces growing environmental pressures linked to climate change. More frequent and extreme weather events increase operational disruptions and accelerate structural fatigue in offshore installations.[8] Rising sea temperatures, ocean acidification, and changing salinity levels also intensify corrosion of subsea cables, pipelines, and structural foundations, raising maintenance demands and shortening asset lifespans. Meanwhile, dynamic seabed conditions, driven by shifting sediment transport patterns, can bury, expose or mechanically damage pipelines and cables, further complicating their protection.[9]

The Netherlands is not adequately equipped to manage these risks. Offshore energy infrastructure has not been formally designated as "critical" under the incoming *Wwke*/CER Directive framework, leaving legal obligations and responsibilities unclear, especially for the many privately owned infrastructure assets. Moreover, capacity for monitoring and documentation is insufficient, with the Netherlands lagging behind Nordic countries in deploying autonomous surveillance technologies. Public-private cooperation in incident response procedures is also underdeveloped.

## Ecological pressures

The ecological health of the North Sea is critical for biodiversity, food security, and economic and societal stability. The sea supports diverse ecosystems - including benthic habitats, shellfish reefs, and key feeding and breeding grounds for marine species - which provide essential services such as food production, climate regulation, and coastal protection.

Yet the ecological carrying capacity of the North Sea is under pressure. Climate change alters water temperatures, while fishing, sand extraction, shipping and pollution degrade habitats. Overfishing, especially through bottom-disturbing methods, threaten fish stocks. Nutrient pollution from agriculture and wastewater contributes to eutrophication, and hazardous substances enter the marine environment through rivers, industry, and shipping.[10]

To address these pressures, the Netherlands has designated MPAs covering around 26% of the Dutch North Sea under the Natura 2000 network (see *Fig. 1*). In practice, however, only 5% is fully protected from the most harmful bottom-impacting fisheries.[11] MPA protection is undermined by insufficient monitoring and weak enforcement: vessels circumvent restrictions by disabling AIS trackings systems, allowing illegal bottom trawling in ecologically sensitive zones such as the Dogger Bank.[12]

The expansion of offshore wind farms introduces additional pressures, including underwater noise disturbance, collision risks for birds and bats, and damage to the seabed. Current mitigation measures are insufficient to fully offset these risks, and cumulative impacts across the North Sea remain poorly understood.[13] Lastly, growing maritime

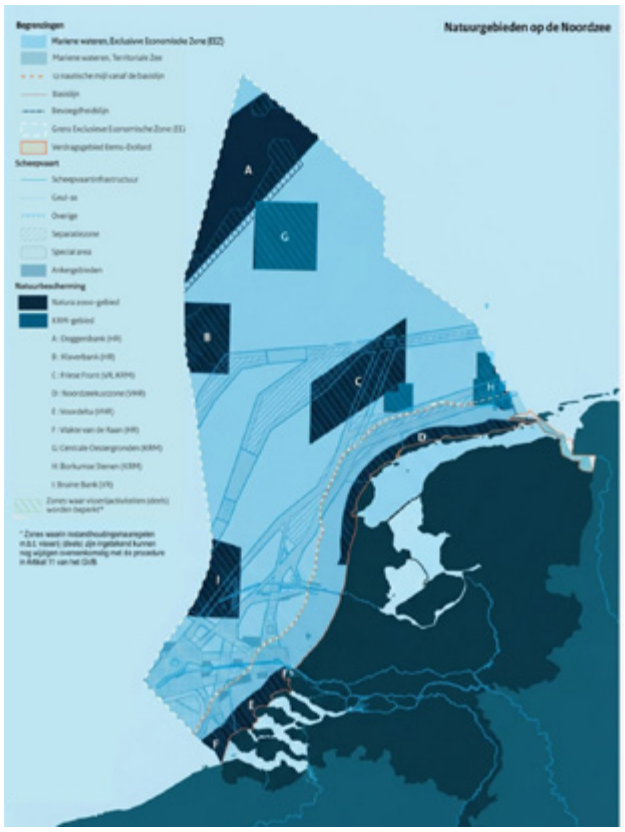


*Fig. 1) Natura 2000 areas in the Dutch North Sea*

activity, including by shadow fleet tankers, further increases the risk of oil spills and other cross-border environmental disasters for which current preparedness mechanisms remain inadequate.[14]

## Offshore energy transition

The North Sea is central to Europe's offshore energy ambitions, yet the business case for offshore wind has deteriorated sharply in recent years. Recent Dutch tender procedures have failed, with an important cause being a structural lack of system integration.[15] Offshore wind farms currently rely almost exclusively on radial connections, where individual cables link single wind farms directly to national grids. This creates severe onshore grid congestion: surplus energy cannot be redirected to other markets, heavily reducing profitability. Without sector coupling (linking electricity grids with hydrogen and other energy networks) Europe's offshore energy targets remain unfeasible.[16]

Compounding this are serious security and geopolitical vulnerabilities. Offshore installations face growing risks of sabotage from hostile actors, as well as cyber threats targeting operational technology systems.[17] Strategic exposure is further deepened by dependence on non-EU suppliers for critical components such as turbines, rare earth materials, and specialised vessels.[18]

Ecological pressures add a third dimension to this challenge. By 2050, offshore infrastructure could occupy up to 26% of the Dutch North Sea.[19] Assessing the environmental impacts of this requires coordinated international monitoring and governance.

Finally, the growing spatial complexity of the North Sea (where offshore wind must coexist with shipping, fisheries, hydrogen production, CO2 storage, and ecologically sensitive habitats) demands a shift away from single-use planning towards genuinely integrated, multi-functional maritime spatial governance. [20]

# Recommendations

We present four policy recommendations for the Netherlands to tackle the challenges described above. These are based on expert interviews and comparative insights from the NB8 countries, and offer an integrated approach to strengthening security and sustainability in the North Sea.

## 1) Improve monitoring at critical points in the North Sea through reformed public-private cooperation and investments in new technologies.

The Netherlands is failing to effectively monitor, detect and document suspicious activity in its Exclusive Economic Zone (EEZ) and the MPAs within it. Given the scale of these maritime zones, monitoring efforts should be focused on high-risk and high-value areas — in particular, locations where critical infrastructure such as pipelines and electricity cables overlaps with MPAs and wind parks, as well as areas where ships are known to deactivate their AIS. Not all infrastructure warrants equal attention: energy cables and gas pipelines deserve priority over internet cables, given their greater vulnerability, scarcity, and more severe consequences in the event of disruptions.[21]

Monitoring these critical points should not be the responsibility of the Dutch government alone. The Netherlands should develop a stronger public-private cooperation framework, drawing inspiration from Norway's Security Act: the *Sikkerhetsloven*. Under this legislation, businesses deemed essential to fundamental national functions are legally required to cooperate with authorities, conduct risk assessments, and implement strict monitoring and security measures. The Dutch *Wwke*, which implements the EU's CER Directive, falls short in several concrete areas.

» Under the *Wwke*, designated critical entities have nine months before risk assessment is obliged, with reassessment only every four years. The *Sikkerhetsloven* imposes this duty immediately and at a more regular cadence.

"When it comes to physical security and protection, subsea drones are a serious threat to infrastructure. Yet autonomous subsea drones are also a great technology for underwater monitoring around infrastructure."

Jan Stockbruegger, expert in maritime safety and security

- The *Wwke* sets a 24-hour deadline for incident reporting, whereas the *Sikkerhetsloven* requires reporting without any undue delay.
- The *Sikkerhetsloven* mandates personnel screening for those working with sensitive information; the *Wwke* leaves the manner of guarding against internal threats largely to companies themselves.
- Under the *Sikkerhetsloven*, companies are legally obliged to conduct regular security exercises. The *Wwke* only mandates the responsible ministry to support companies in organising such exercises.
- The *Sikkerhetsloven* distinguishes between three levels of criticality, enabling a more tailored approach to security obligations.

Dutch procurement must also be reformed. Current procedures follow a traditional off-the-shelf model that is too slow and bureaucratic to keep pace with modern security threats, and disadvantages innovative startups. The Dutch government should make greater use of existing exception provisions (e.g. 346(1)(b) TFEU) and introduce more pre-financing to stimulate domestic innovation.

Specifically, the Netherlands should urgently invest in unmanned maritime drones. Compared to neighbouring countries and the NB8, the Netherlands is lagging behind with these technologies: in recent years, unmanned drones have been deployed in the Baltic Sea by NATO, Denmark and Norway, and in the North Sea by the UK. The results from these deployments are striking. For instance, the two Danish drones have recorded over 170,000 ships in six months, including AIS-dark vessels.[22] The Netherlands may benefit from joint procurement with NB8+ countries, and should communicate investments and experiments publicly to strengthen deterrence.

## 2) Develop a North Sea Energy Island in cooperation with neighbouring countries.

The Dutch Ministries of Foreign Affairs and Infrastructure and Water Management should work with their international counterparts and Transmission System Operators (TSOs) in Denmark, Norway, Germany, the UK and Belgium to establish binding agreements on a fully integrated offshore energy system in the North Sea. This should include the development of a blueprint for a North Sea Energy Island, comparable to the Bornholm Energy Island (Denmark) and Princess Elisabeth Island (Belgium).

An energy island is a specialised offshore hub that acts as a central node for collecting, storing, and distributing renewable energy to multiple countries. Projects such as the Bornholm Energy Island — a joint Danish-German initiative approved by the Danish Parliament in 2020, with an operational target of 2030 — and Belgium's Princess Elisabeth Island, currently under construction 45 kilometres off the Belgian coast, demonstrate that such infrastructure is technically feasible and already underway in neighbouring waters.[23]

### Advantages

A North Sea Energy Island would provide several important advantages. First and foremost, it would function as a hybrid interconnector, collecting electricity from surrounding wind parks and distributing it across multiple national energy grids. This directly addresses the problem of price cannibalisation: during periods of high wind generation, an energy island dynamically routes electricity to the connected market with the high-

For elaborate recommendations, including secure procurements and a financing plan for energy islands, see the full report and its appendix.

est demand, reducing local market saturation and maintaining more stable wholesale prices for developers.[24] When energy production exceeds what grids can absorb, integrated Power-to-X facilities can convert surplus electricity into green hydrogen and ammonia, helping to decarbonise heavy industry and shipping. Using a hybrid interconnector also reduces the total amount of subsea cabling required, making it both more cost-efficient and more environmentally friendly than connecting multiple wind farms separately.[25]

Second, the physical infrastructure of an energy island could serve as a permanent platform for enhancing surveillance and situational awareness. Inspired by the NB8 approach in the Baltic Sea, where energy infrastructure is treated as a multi-purpose asset, the island's structure could accommodate sonar, radar, and AIS base stations — significantly enhancing monitoring capacity and enabling better protection of critical undersea infrastructure against hybrid threats.[26]

Third, by taking the lead in developing a North Sea Energy Island, the Dutch government could position itself as an international frontrunner in ambitious energy transition policy, while increasing the competitiveness of Dutch energy solutions in international markets.

## Risk and mitigation

Several risks must be acknowledged. Firstly, construction costs are high — the Bornholm and Princess Elisabeth islands each cost approximately €7 billion — which requires a clear, long-term financing structure with costs distributed proportionally among participating countries, and CEF-E funding pursued through PCI designation. Because the UK sits outside EU funding frameworks following Brexit, two parallel financing tracks will be needed. Moreover, stakeholder management is complex, and legally binding multilateral agreements through the North Seas Energy Cooperation are essential; relying on informal or ad hoc cooperation risks project delays. The island's role as a central energy hub also makes it a potential target for sabotage, though this risk is partly mitigated by the enhanced monitoring capabilities the island offers, and by its integration into a meshed grid.

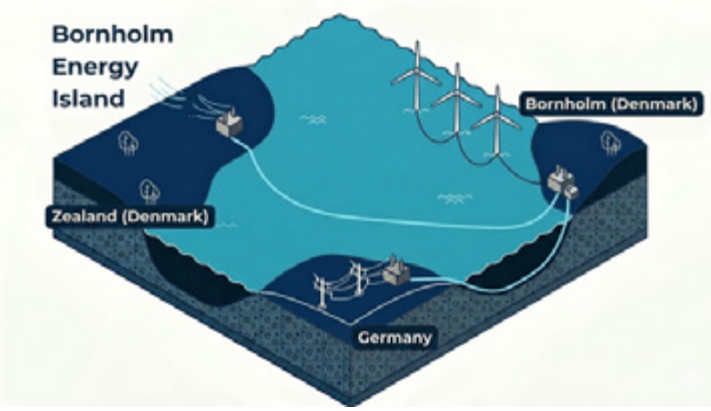


*Fig. 2) Bornholm Energy Island, systemised*

## Ecology and location

Ecologically, the construction of a North Sea Energy Island carries significant risks that nature-inclusive design can reduce but not fully offset. The island should be situated centrally between the partner states, close to existing and planned wind farms, and outside Natura 2000 areas, maritime shipping lanes, and sand extraction zones. A caisson-based construction method is preferable to sand reclamation, and the island's foundational structure should incorporate reef-like features, materials that promote biological colonisation, and habitats such as oyster beds and fish nurseries.[27]

The Dutch government should also reinstate ecological tender criteria that incentivise nature-inclusive design, and direct a portion of the island's revenues towards marine habitat restoration and stronger MPA enforcement. Crucially, however, our expert interviewees point out that the primary driver of ecological deterioration in the North Sea is not offshore energy infrastructure but unsustainable fishing practices — especially bottom trawling, which remains legally permitted across much of the designated MPAs. Ecological gains from nature-inclusive design and habitat restoration will remain limited without parallel regulatory action to restrict the most damaging fishing practices.

## 3) Adopt a joint "One Incident, One Response" approach to marine and shoreline incidents.

The Netherlands should reform its national marine and shoreline incident response governance to adopt a unified 'one incident, one response' framework, and advocate for reforms — including annual full-scale crisis exercises — within the Bonn Agreement.

When an incident occurs in the Dutch North Sea — whether an oil spill, a subsea cable rupture, or an act of sabotage — no single authority currently holds an overarching command mandate. Five ministries feed into Coast Guard governance, responsibilities between the Coast Guard and Rijkswaterstaat are not formalised under a unified command, and beyond twelve nautical miles no civilian enforcement responsibility is formally assigned.[28] The result is slow, ad hoc coordination, with private infrastructure operators lacking a clear first point of contact. This domestic fragmentation also weakens the Netherlands' credibility as a partner in international cooperation.

The building blocks for reform largely exist: the Coast Guard already spans the full Dutch maritime domain and cooperates actively with Rijkswaterstaat, but these working relationships have not been formalised into a clear command structure.

The Netherlands should therefore establish a national incident coordination centre designating the Coast Guard as the statutory first responder and single point of contact. The mandate should extend explicitly to the onshore dimension — following the Swedish model, where municipalities responding to shoreline consequences have access to national-level coordination — and private infrastructure operators should be integrated into structured threat reporting and national exercises. The current legislative momentum around the CER Directive and the *Wwke* provides a favourable context for this step.

Internationally, the Netherlands should use this domestic reform as a basis for leading reform of the Bonn Agreement, the binding legal framework for North Sea pollution response. Its exercise regime has not kept pace with the evolving threat landscape: full-scale exercises take place only once every five years and have not been adapted for shadow fleet activity, hybrid threats, or offshore infrastructure expansion.

HELCOM's annual BALEX exercises in the Baltic offer a more advanced model. The Netherlands should use its coordination of Super CEPCO 2025 as a platform to advocate for annual full-scale Bonn Agreement exercises, a common incident reporting format, and broadened participation to include non-state actors.[29]

## 4) Involve private stakeholders in maritime monitoring and crisis management, in particular through partnerships with fishing companies.

Fishers already function as informal eyes and ears at sea, yet interviews conducted for this project reveal that this potential is currently underutilised due to low trust between fisheries and maritime authorities, weak institutional follow-up, and limited involvement of fisheries in offshore governance.[30] The Netherlands should adapt its offshore wind tender model to structurally integrate fisheries into maritime monitoring and coordination throughout the full lifecycle of offshore wind projects.

The Baltic Power offshore wind project in Poland offers a concrete model. Local fishing vessels were contracted through a private offshore services company to support maritime coordination, vessel monitoring, and safety during construction, operating as part of a broader Marine Coordination Centre. A Dutch adaptation should focus on flexible, modular contracts that allow vessels to perform monitoring or guard functions on a rotational or on-demand basis, enabling fishers to combine offshore service work with traditional fishing activities. Rigid, long-term contracts are unlikely to attract participation in the Dutch context, where fishers value operational autonomy and the ability to capitalise on favourable fishing conditions.[31] Policy should primarily target vessel owners and fishing companies (*rederijen*) rather than individual crew members, since operational and financial decisions are made at fleet level.

Simply assigning monitoring responsibilities without addressing underlying governance issues would likely fail. The model must therefore include formal institutional recognition of fisheries as stakeholders, with clear feedback loops, defined reporting protocols, and visible follow-up on reported incidents. FIsheries should be involved early in the design phase of wind parks, including discussions on spatial layout, transit corridors, and potential co-use.

Retrofitting fishing vessels into basic civilian guard vessels can be achieved at relatively low cost — equipping a beam trawler with a hydrophone, AIS upgrade, VHF system, and maritime CCTV keeps retrofitting costs in the €15,000-30,000 range.[32] Because these vessels remain civilian in nature, they provide additional monitoring capacity while limiting escalation risks.

The tender system should also require Environmental and Social Action Plans (ESAPs), ensuring continuous ecological monitoring throughout construction and operation. Unlike one-off Environmental Impact Assessments (EIAs), ESAPs allow developers to adapt activities if ecological thresholds are exceeded. By embedding these socio-ecological requirements directly into tender criteria, the costs of coexistence, ecological protection, and maritime coordination are internalised into project development from the outset.

# Notes

1) Dimitri Tokmetzis and Jesse Pinster, 'Milieuramp dreigt door Russische olietankers op de Noordzee', Follow the Money, 11 October 2024, https://www.ftm.nl/artikelen/russische-oliesmokkel-bedreigt-noordzee
2) Tokmetzis and Pinster, 'Milieuramp dreigt door Russische olietankers op de Noordzee'; 'They droned back', Digital Digging with Henk van Ess, https://www.digitaldigging.org/p/they-droned-back; European Parliamentary Research Service, 'Russia's "shadow fleet": bringing the threat to light', November 2024, https://www.europarl.europa.eu/RegData/etudes/BRIE/2024/766242/EPRS_BRI%282024%29766242_EN.pdf.
3) IZA Institute of Labor Economics, 'Nautical patrol and illegal fishing practices', September 2022, https://oceanrep.geomar.de/id/eprint/57698/1/dp15543.pdf.
4) Ben Diamond and Bryce D. Beukers-Stewart, 'Fisheries discards in the North Sea: waste of resources or a necessary evil?', Reviews in Fisheries Science 19, no. 3 (2011): 231–45; European Commission, 'Fisheries in the North Sea and North Western Waters: landing obligation not respected', https://ec.europa.eu/newsroom/mare/items/667721/en; Oceana Europe, 'Multiple EU countries are failing to stop destructive fishing in protected areas', https://europe.oceana.org/press-releases/multiple-eu-countries-are-failing-to-stop-destructive-fishing-in-protected-areas/.
5) Irina Popescu, 'Illegal, unreported and unregulated (IUU) fishing', European Parliamentary Research Service, October 2022.
6) National Coordinator for Security and Counterterrorism (NCTV), The critical national infrastructure threat landscape 2025, 14 November 2025, https://english.nctv.nl/documents/2025/11/14/the-critical-national-infrastructure-threat-landscape.
7) Jan Stockbrügger, interview with the authors, 4 February 2026.
8) Marine Climate Change Impacts Partnership, 'Transport and infrastructure', https://www.mccip.org.uk/transport-and-infrastructure; Sam Tabahriti, '"Predicting the future" is essential to prevent damages to offshore structures', Offshore Technology, 11 October 2021, https://www.offshore-technology.com/features/predict-future-prevent-damage-offshore-structure/.
9) Jinxin Dong et al., 'Climate change impacts on coastal and offshore petroleum infrastructure and the associated oil spill risk', Journal of Marine Science and Engineering 10, no. 7 (2022): 849; Bergen L. Kane et al., 'Building climate resiliency in offshore wind energy expansion plans', Environmental Research: Infrastructure and Sustainability 5, no. 3 (2025): 032003.
10) Rijkswaterstaat, 'Programma Noordzee 2022–2027', Noordzeeloket, https://noordzeeloket.nl/beleid/programma-noordzee/programma-noordzee-2022-2027/; Oceana Europe, 'Multiple EU countries are failing to stop destructive fishing in protected areas'.
11) Rijkswaterstaat, 'Programma Noordzee 2022–2027'; Stichting De Noordzee, 'Bescherming Nederlandse natuurgebieden in zee ondermaats', 16 April 2024, https://www.noordzee.nl/bescherming-nederlandse-natuurgebieden-in-zee-ondermaats/.
12) Greenpeace UK, 'AIS dark bottom trawling in the Dogger Bank', 15 October 2024, https://www.greenpeace.org.uk/resources/ais-dark-bottom-trawling-dogger-bank/; Ocean and Coastal Futures, 'EU introduces ban on bottom trawling in Dogger Bank protected areas', 4 November 2025, https://www.cmscoms.com/eu-introduces-ban-on-bottom-trawling-in-dogger-bank-protected-areas/.
13) A. Hermans and B. Schilt, Onderzoek naar natuurbeschermende en natuurversterkende maatregelen voor energie infrastructuur op de Noordzee, n.d.; Van der Kamp et al., Exploration of potential collaboration on preventive, mitigation, and compensation measures (2023), https://tethys.pnnl.gov/publications/exploration-potential-collaboration-preventive-mitigation-compensation-measures.
14) Tokmetzis and Pinster, 'Milieuramp dreigt door Russische olietankers op de Noordzee'.
15) 'Geen enkel bedrijf wil windmolenpark Noordzee bouwen', NOS, 31 October 2025, https://nos.nl/artikel/2588594-geen-enkel-bedrijf-wil-windmolenpark-noordzee-bouwen.

16) TenneT, 'TenneT presents Target Grid, its vision for the electricity grid of 2045', https://www.tennet.eu/news/tennet-presents-target-grid-its-vision-electricity-grid-2045.

17) AIVD, Threat assessment of state actors 2025, 26 September 2025, https://english.aivd.nl/documents/2025/09/26/threat-assessment-of-state-actors-2025; RenewableUK, New threats and new tools: reinventing energy security for an era of instability, https://www.renewableuk.com/news-and-resources/publications/new-threats-and-new-tools-reinventing-energy-security-for-an-era-of-instability/.

18) European Commission, An EU strategy to harness the potential of offshore renewable energy for a climate neutral future (2020), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:741:FIN.

19) Rijkswaterstaat, 'Programma Noordzee 2022–2027'.

20) Topsector Energie, 'North Sea Energy 2023–2025 programme', https://projecten.topsectorenergie.nl/projecten/north-sea-energy-2023-2025-programme-38633.

21) Stockbrügger, interview.

22) NATO Allied Command Transformation, 'NATO ACT deploys unmanned vehicles for surveillance in the Baltic Sea', Naval News, 8 July 2025, https://www.navalnews.com/naval-news/2025/07/nato-act-deploys-unmanned-vehicles-for-surveillance-in-the-baltic-sea/; 'Britse operatie moet onderwaterkabels beschermen tegen Russische spionageschepen', NOS, https://nos.nl/artikel/2601829-britse-operatie-moet-onderwaterkabels-beschermen-tegen-russische-spionageschepen; Morten Strauch, 'Sailing drones: efficient surveillance on the Baltic Sea', YACHT, https://www.yacht.de/en/travel-and-charter/denmark/sailing-drones-efficient-surveillance-on-the-baltic-sea-soon-with-weapons/; Kongsberg, 'HUGIN: safeguarding our critical undersea infrastructure', October 2025, https://www.kongsberg.com/news/stories/2025/10/hugin-safeguarding-our-critical-undersea-infrastructure/.

23) European Commission, 'Energy highways: Germany and Denmark agree on joint development of the Bornholm Energy Island', 26 January 2026, https://energy.ec.europa.eu/news/energy-highways-germany-and-denmark-agree-joint-development-bornholm-energy-island-offshore-wind-2026-01-26_en; Flanders Investment & Trade, 'Princess Elisabeth Island: a groundbreaking project in the North Sea', https://openforbusiness.belgium.be/en/partnerships/princess-elisabeth-island-groundbreaking-project-north-sea; Jan De Nul, 'Princess Elisabeth Island, Belgium', https://www.jandenul.com/projects/princess-elisabeth-island-belgium.

24) North Sea Wind Power Hub Programme, Hubs-and-spokes: a feasible option for offshore infrastructure development in the North Sea (2024).

25) North Sea Energy Island, https://northseaenergyisland.dk/en.

26) HCSS, The high value of the North Sea, 8 November 2021, https://hcss.nl/report/high-value-of-the-north-sea/.

27) ARC Marine, 'Nature-inclusive design for marine infrastructure', 5 November 2025, https://arcmarine.co.uk/nature-inclusive-design-building-marine-infrastructure-that-restores-life/.

28) Kustwacht Nederland, 'Bestuur van de Kustwacht', https://kustwacht.nl/besturingsmodel/.

29) Bonn Agreement, 'Super CEPCO 2025', 6 January 2026, https://www.bonnagreement.org/news/super_cepco25/.

30) Jelle Kaptijn, interview with the authors, 8 April 2026.

31) Kaptijn, interview.

32) Indication based on the average price of an AIS class A transponder, VHF radio, Starlink Maritime installation, and basic hydrophone (e.g. Aquarian H1a). Costs include an estimation of labour hours and peripheral equipment for installation, as well as additional registration fees with the ILT.