

Eyes on the North Sea

Balancing Energy, Ecology, and
Livelihoods of Fishing Communities
in the Dutch Energy Transition

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39 J.	UK	151

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36 J.	UK	183
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31 J.	UK	185
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39 J.	UK	243
29 J.	UK	202

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Abstract

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The North Sea is a highly contested space, shaped by competing stakeholder interests across energy, ecology and maritime industries. As the Netherlands accelerates its transition toward renewable energy, primarily through offshore energy production, these pressures intensify, often overlooking local communities. Central to this study are Dutch fishing communities, who are overlooked in decision-making processes and disproportionately affected by spatial and economic transformations at sea. This research investigates how the energy transition toward renewable energy can enable a just future for fishing communities in the Netherlands.

Through media and geospatial analysis, the study maps the fears and dreams of Dutch fishing communities and proposes a community vision. These insights are positioned in relation to the interests of dominant stakeholder interests to reveal key conflicts and opportunities for alignment. The revised vision is grounded in a justice-oriented framework that guides transition strategies, integrating fisheries into the evolving maritime energy landscape rather than displacing them.

This strategy operates across scales. At the local and regional level, a network of inland and coastal hubs, centred around the IJsselmeer, supports economic diversification while maintaining cultural ties to fishing practices. At sea, spatial strategies promote the co-location of activities, such as fishing between offshore wind farms, alongside new roles for fishers in offshore maintenance and emerging maritime industries. Simultaneously the North Sea functions as a regenerative common, sustaining both food and energy production while preserving maritime heritage and enabling stakeholders to share infrastructure, resources, and knowledge.

Together, these interventions reposition fishing communities as active participants in the energy transition, enabling pathways toward a just energy transition in the Netherlands and the North Sea. By linking spatial design with economic diversification and adaptive governance, the project demonstrates how justice can be operationalised within large-scale marine transformations, offering a transferable commoning model for balancing renewable energy development with local livelihoods.

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1 Introduction

1.1 Problem Definition

1.1.1 THE IMPORTANCE OF THE ENERGY TRANSITION

Through out human history, multiple energy transitions have shaped not only the global energy landscape, but also how humans live together and societies function: the transition from fuel wood to coal, from coal to oil and now the ongoing transition from oil to renewable energy (Yang et al., 2024). Three main reasons make the current transition from fossil fuel-based energies to renewables one of the main challenges of the 21st century and a non-negotiable necessity: (1) fossil fuel depletion, (2) geopolitical dependencies and most importantly, global warming (3) (Sijmons, 2014).

[1] Fossil fuel depletion

Fossil fuel resources like gas, oil and coal are finite and therefore subject to depletion (Sijmons, 2014). Although ongoing discoveries of new reserves and technological innovations make it difficult to determine exact depletion timelines, current consumption rates exceed the natural rate at which these resources are formed (Sijmons, 2014; Our World in Data, 2025). If we keep on using known fossil fuel reserves at the current rate, gas is expected to run out by 2069, oil by 2076, and coal by 2159 (Our World in Data, 2025) (figure 1.1).

If no changes are made in the way energy is generated and used, the consequences would be severe. The Dutch context illustrates this clearly. If current fossil fuel dependencies remain unchanged, 75.5% of the Dutch total energy supply would no longer be available by 2075. By 2159 that number would rise to 83% (Our World in Data, 2025; International Energy Agency, 2024) (figure 1.1). New sources of energy production are therefore needed.

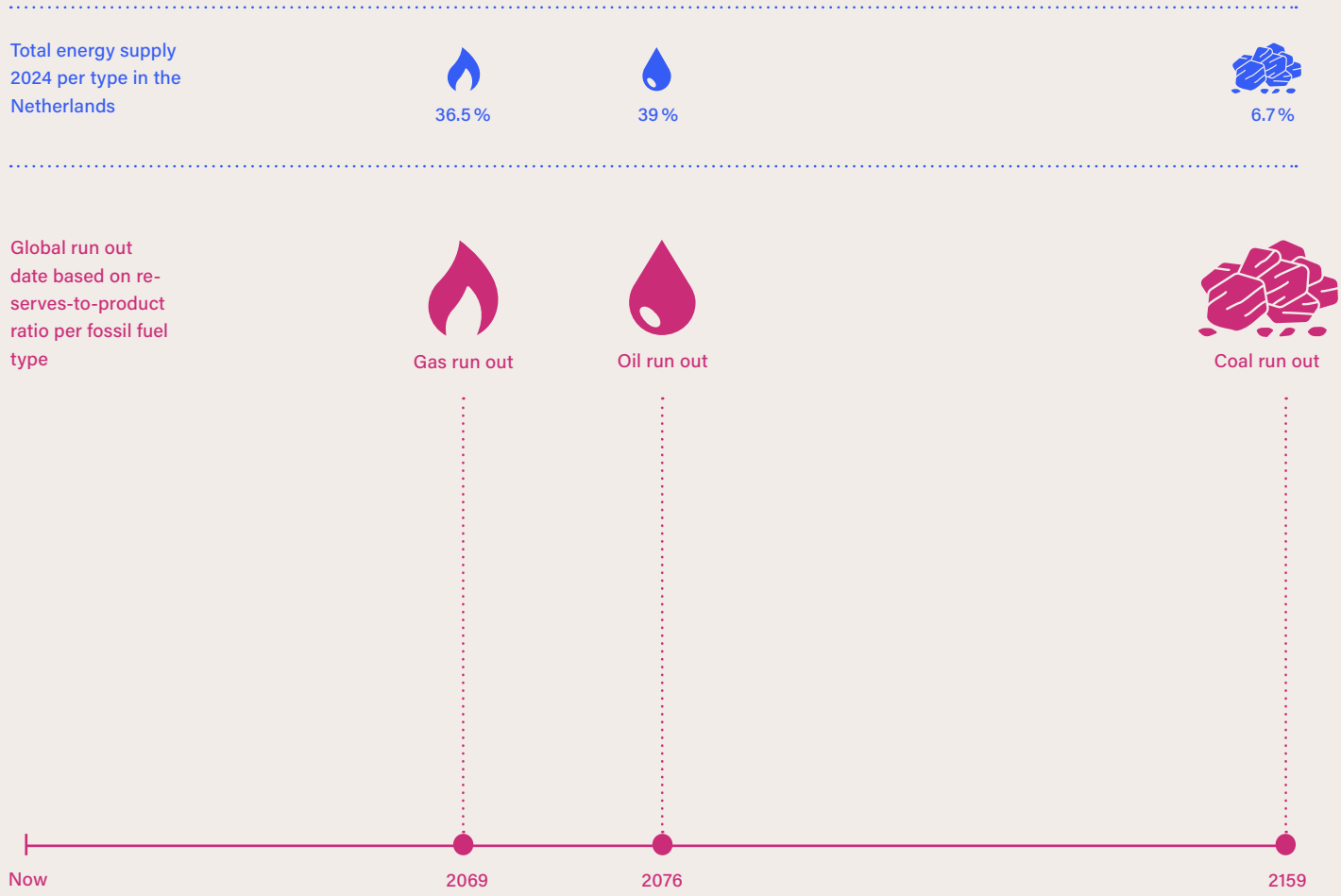


Figure 1.1: Fossil fuel run-out based on known global reserves and present annual production rates (reserves-to-product (R/P) ratio)
Source: Our World in Data, 2025 [Data]; IEA 2024 [Data]; The Noun Project [Icons]

[2] Geopolitical dependencies of the EU

Besides this long-term perspective, more immediate geopolitical factors support the urgency of the energy transition (Sijmons, 2014). Fossil fuel reserves are unevenly distributed across the world, leading to asymmetric power over resources and geopolitical dependencies on other countries (Yang et al., 2024). At the moment, the European Union is highly dependent on fossil fuel imports from relatively unstable regimes (Eurostat, 2026; Sijmons, 2014) (figure 1.2).

In 2021, 45% of the European Union’s gas supplies were imported from Russia (Zolotarova & Lukash, 2025). Although in recent years a shift away from Russian fossil fuel imports has been initiated, new dependencies on liquefied natural gas (LNG) from the United States have emerged in order to maintain energy supply levels – resulting in a shift rather than a solution of the problem (Zolotarova & Lukash, 2025; Eurostat, 2026) (figure 1.2).

The transition towards renewable energy sources would reduce such dependencies, as resources like sun and wind are (relatively) evenly distributed and can be used locally (Sijmons, 2014).

[3] Global warming

The most pressing issue, however, lies in the acceleration of global warming due to fossil fuel usage (Sijmons, 2014). The current increase in global temperature of around 0.8°C can largely be attributed to CO₂ emissions created by the use of fossil fuels (Sijmons, 2014). If current energy production patterns remain unchanged, by the time we run out of fossil fuels, global temperatures could rise by 18°C (Sijmons, 2014) (figure 1.3). A critical point of no return, however, is already reached at around 2°C of warming (Sijmons, 2014) (figure 1.3).

Therefore, the European Union has intensified its efforts to advance the transition towards renewable energy systems (European Commission, n.d.). A legally binding target for climate neutrality (an economy with net-zero greenhouse gas emissions) has been set for all member states, to be achieved by 2050 in the European Green Deal (European Commission, n.d.).

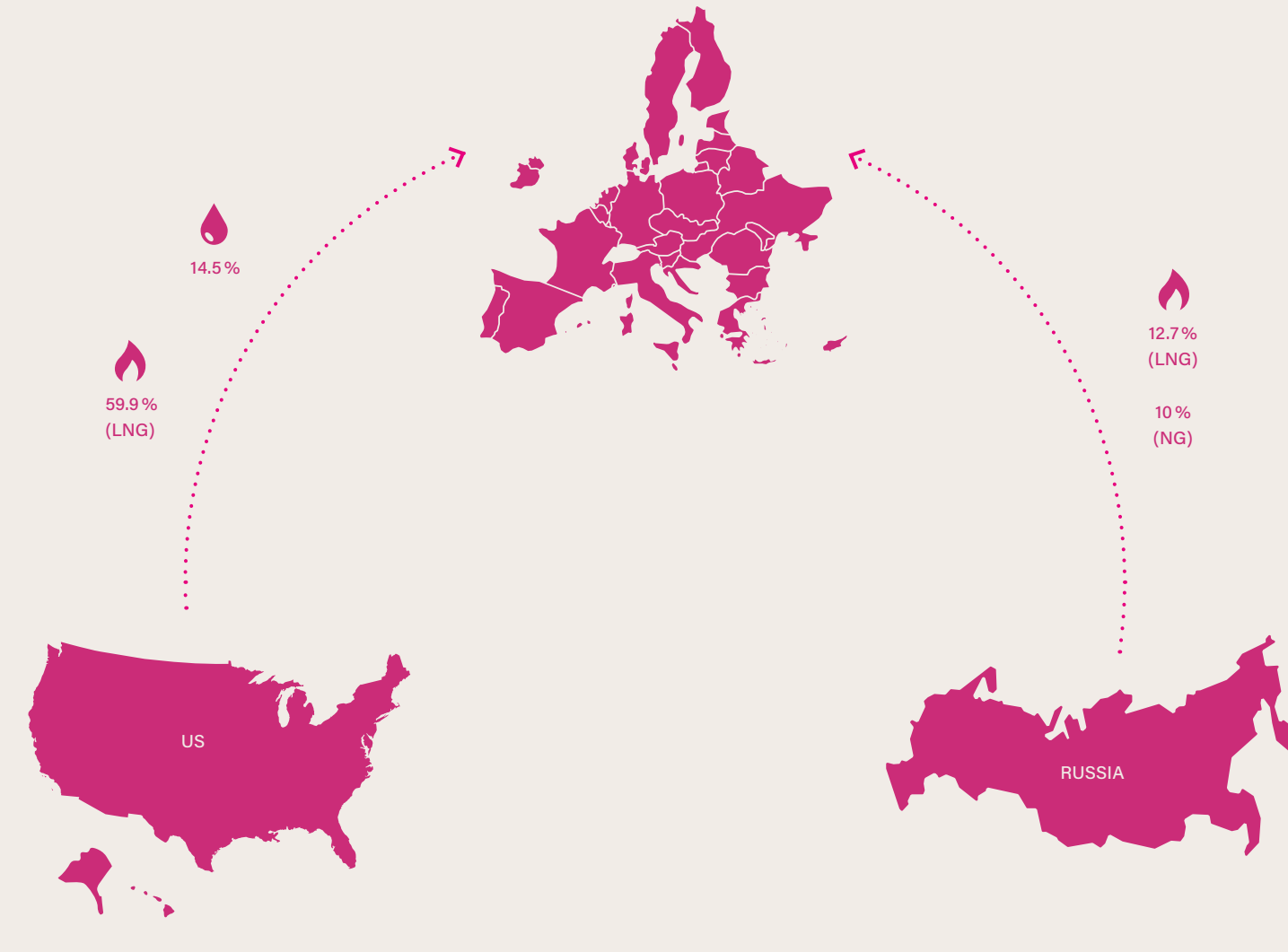


Figure 1.2: Geopolitical dependencies – percentage of oil and gas imports to the EU from unstable regimes in 2025
Source: Eurostat, 2026; The Noun Project



Figure 1.3: Global warming after all global fossil fuels reserves are depleted
Source: Sijmons, 2014; Our World in Data, 2025; The Noun Project

1.1.2 IMPLEMENTATION TROUBLES OF THE ENERGY TRANSITION

But the proposed changes until 2050 are not merely a technical transition (Yang et al., 2024). They also entail far-reaching socio-economic consequences (Yang et al., 2024). On the one hand, new energy infrastructure requires space that is already highly contested (Sijmons, 2014). On the other hand, the transition can create economic burdens for industries and occupations that remain dependent on fossil fuels (Radtke & Löw-Beer, 2025).

As a consequence, many countries are experiencing growing societal and political backlash against the energy transition, as its costs and benefits are distributed unevenly across society (Radtke & Löw-Beer, 2025) (figure 1.4). These injustices may in turn foster feelings of being left behind by affected groups (Mamonova & Franquesa, 2020). Such perceptions can reduce trust in government among individuals and transition communities (Radtke & Löw-Beer, 2025). The dynamic can develop into a feedback loop: declining institutional trust often increases support for right-wing parties, which are generally more sceptical of climate and energy transition policies (Radtke & Löw-Beer, 2025; Mamonova & Franquesa, 2020). In turn, the energy transition slows down further.

The loop is intensified in communities that have felt left behind before (e.g., rural regions) (van Vulpen, 2025; Mamonova & Franquesa, 2020). Listening to affected communities and incorporating their visions into policy processes can, however, moderate the entire dynamic (Campbell, 2023). It is therefore crucial to integrate formerly left-out communities into energy transition.

The plus and minus signs indicate the relationship between two connected elements (Coleman, 1987). A minus sign means that X reduces Y, while a plus sign indicates that X enhances Y (ibid.). The graphic illustrates possible correlations only and does not imply assured causal relationships.

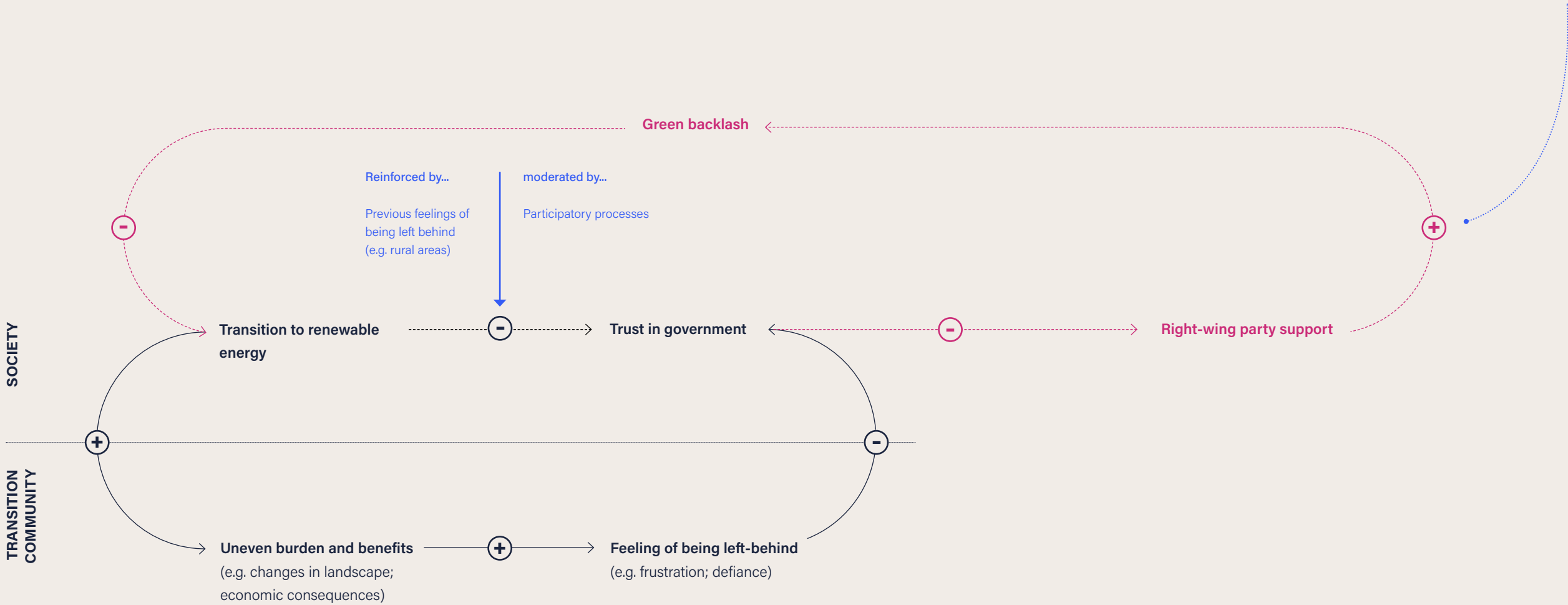


Figure 1.4: Legitimacy problems in the energy transition – the relationship between uneven burden and benefits, trust in government, right-wing populism and the energy transition
Source: Based on Mamonova & Franquesa, 2020; van Vulpen, 2025; Campbell, 2023; Sijmons 2014; Radtke & Löw-Beer, 2025; Coleman, 1987

1.1.3 THE DUTCH CONTEXT: ENERGY TRANSITION AND FISHING COMMUNITIES

These dynamics become particularly visible in specific local contexts: Dutch fishing communities have experienced processes of marginalisation in the past and are now once again highly affected by the energy transition.

Loss of space at sea

In the past, policies about fishing quota, bans of established fishing practices (e.g., pulse fishing), the placement of oil and communication infrastructure, the appointment of shipping corridors as well as national defence and Natura 2000 zones have affected them due to fishing prohibition zones (Witteman, 2023; Boon, 2024; Pulskens & van Hoof, 2024)¹. Space in the North Sea has become more and more contested: what was once a shared space with inherent cultural significance, has increasingly become a highly regulated, divided and crowded economic space (Couling & Hein, 2020).

One of the main Dutch strategies for reaching the set net zero goals by 2050 is an increasing reliance on offshore wind farms in the North Sea, since the constantly high wind speeds make it a reliable space for energy generation (Governments of the Netherlands, n.d.; Netherlands Enterprise Agency, 2025). If all planned wind farms are built, the Dutch North Sea will become increasingly dense, and a high amount of fishing hot-spots will be lost in turn (figure 1.5 + figure 1.6). Newly planned wind farms often overlap with fishing hotspots of Dutch fishing vessels (figure 1.6).

¹ Policies within the Common Fisheries Policy were primarily introduced to prevent overfishing (Noordzeeloket, n.d.-b). Although these measures are often perceived negatively by fishing communities, they are existing to address ecological sustainability concerns, which need to be considered when evaluating their impacts.

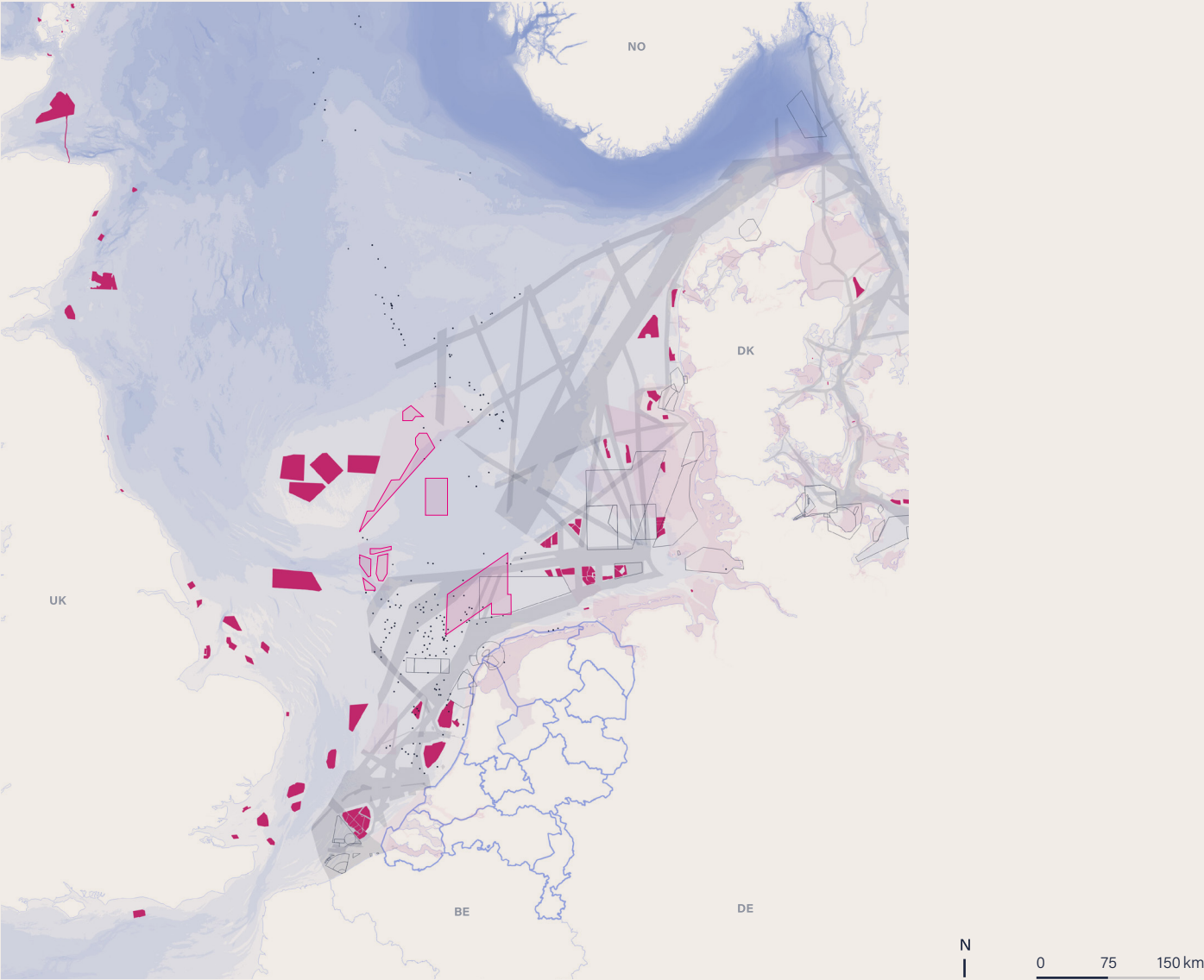


Figure 1.5: Current elements influencing fishing restrictions at the North Sea for Dutch fisher folk
Source: Het Informatiehuis Marien; EMODnet European Commission; Eurostat/GISCO; PDOK

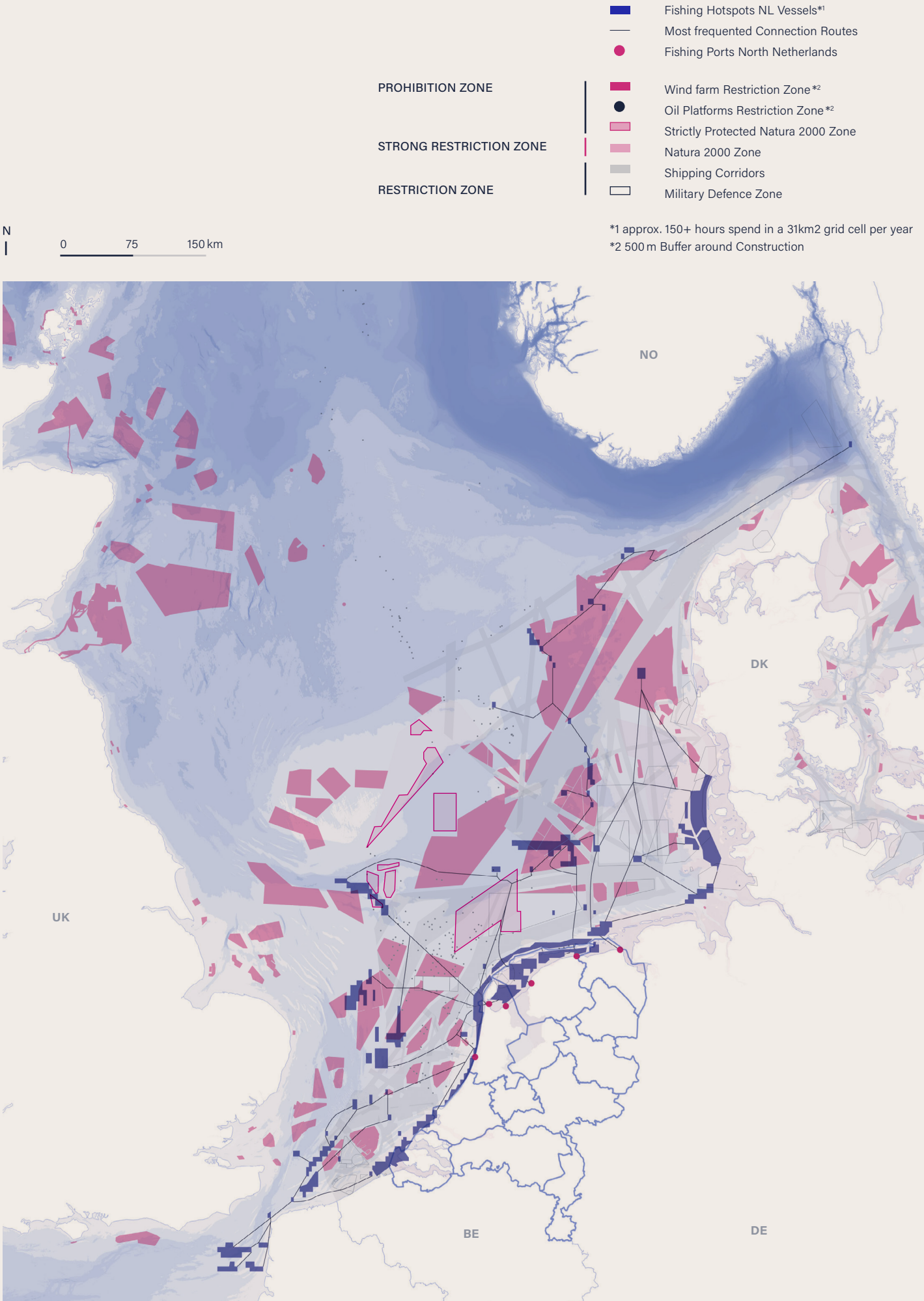


Figure 1.6: Loss of fishing grounds for Dutch fishing communities if all planned wind farms are being built
Source: Het Informatiehuis Marien; EMODnet European Commission; Eurostat/GISCO; PDOK

Loss of space at land

Since offshore wind energy alone is not sufficient to meet overall energy demand, onshore wind turbines are another key focus of the Dutch energy transition (Government of the Netherlands, n.d.). Besides offshore areas, the highest wind potential in the Netherlands can be found along the Dutch coastline, where fishing villages are also located (figure 1.7). Moreover, potential areas for onshore wind turbine placement often overlap with fishing communities, making it likely that Dutch fishing communities will not only be highly affected by the energy transition at sea, where they fish, but also on land, where they live (figure 1.8). Beyond the economic impacts, these changes threaten occupational identities and community structures, as fishing constitutes not only a livelihood but also a historically embedded way of life (Clay & Olson, 2007; Kraan et al., 2025).

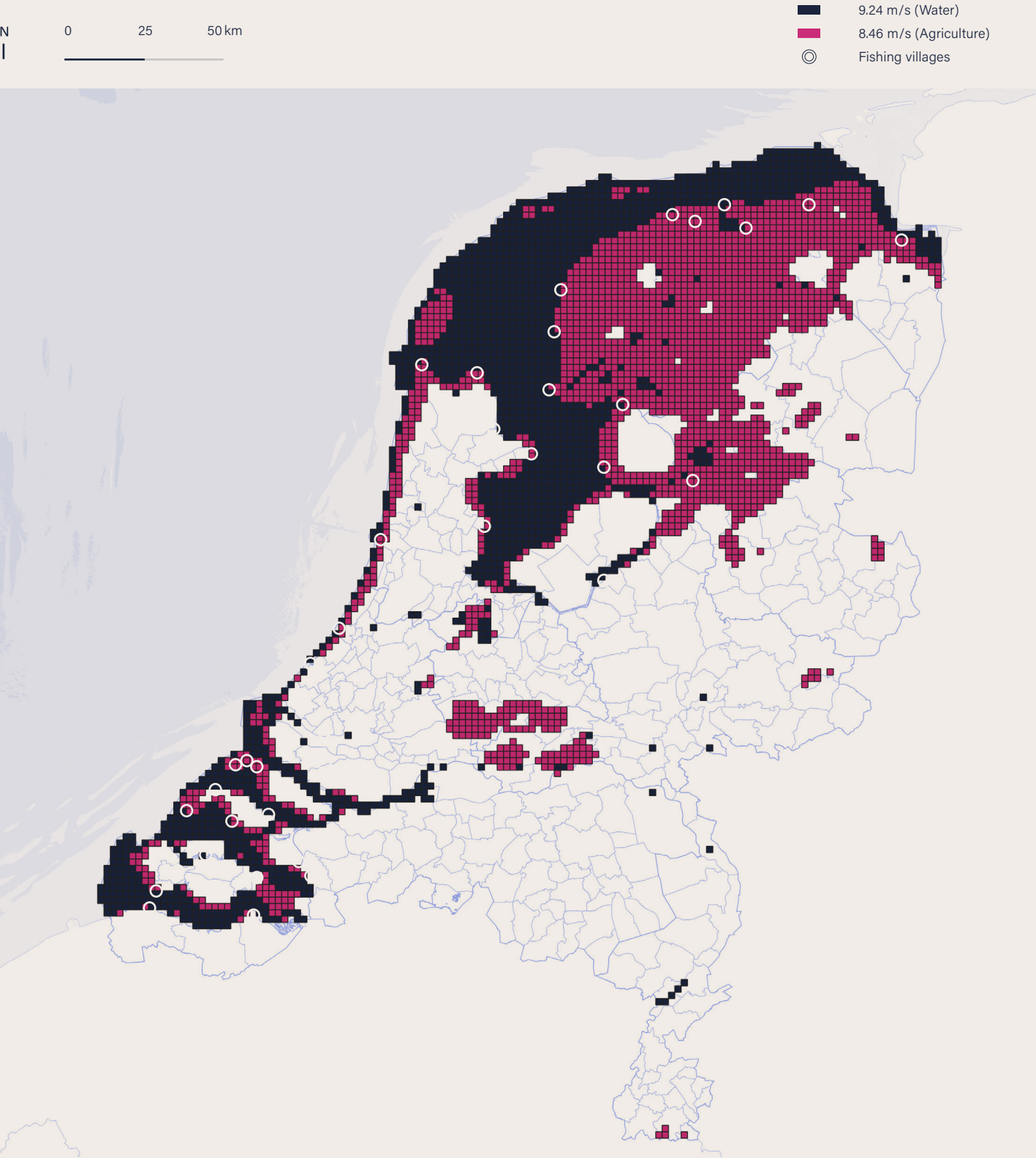


Figure 1.7: Highest wind potential clusters NL – overlap with fishing villages
Sources: Copernicus Land Monitoring Service; European Environment Agency; Global Wind Atlas; Rijksdienst voor Ondernemend; Kraan et al., 2023; EMODnet; Eurostat/GISCO; PDOK

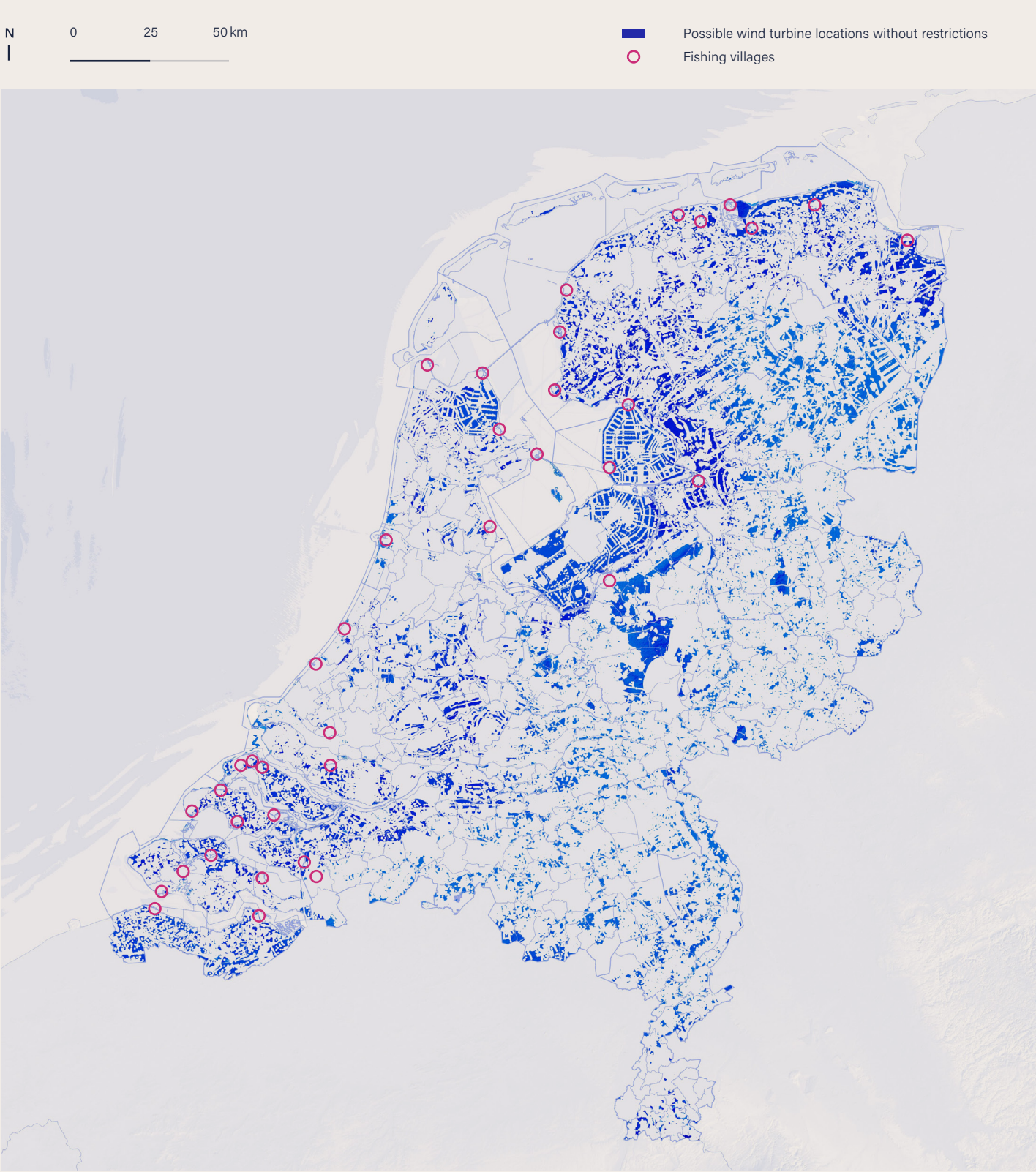


Figure 1.8: Possible placement spots for wind turbines without restrictions – overlap with fishing villages
Sources: EMODnet; Eurostat/GISCO; PDOK; Source materials AR2U086 2026

1.2 Research Questions

1.2.1 MAIN RESEARCH QUESTION AND OBJECTIVES

The project therefore seeks to answer the following question: [MRQ] How can the energy transition towards renewable energy enable a just future for fishing communities in the Netherlands? In order to answer this question, several sub-questions must be addressed.

1.2.2 SUB-RESEARCH QUESTIONS

The Dutch energy system and its transition

First, it is necessary to clarify how the energy transition in the Netherlands is planned. The context to which Dutch fishing communities respond must therefore be outlined: [SRQ1] How is the energy transition in the Netherlands planned, particularly in relation to marine and coastal sectors?

Influence of the energy transition on Dutch fishing communities

Next, it is important to examine in more detail how the described energy transition changes the lives and work of Dutch fishing communities – how exactly these communities are affected, what they fear, and how they respond: [SRQ2] In what ways does the energy transition reshape the livelihoods and socio-economic practices of fishing communities now, and how do these communities negotiate and adapt to these transformations?

Wishes of the Dutch fishing communities for their future in the energy transition

Once it is clear how fishing communities are affected, their visions and wishes for the future within the energy transition must be identified: [SRQ3] How do fishing communities envision their ideal future in the context of the energy transition?

Stakeholder evaluation of the community vision

To make the vision more compatible with other affected stakeholders, their reactions to the vision must be identified: [SRQ4] How do key North Sea stakeholders evaluate the proposed community vision?

1.2.3 DESIGN OBJECTIVES

By answering these questions, the project aims to develop a justice-oriented design strategy for the Dutch energy transition that strengthens distributive, procedural, and recognitional justice for fishing communities.

1.2.4 REPORT STRUCTURE

The report answers the research questions step by step. After an introduction to the methods used (Chapter 2), a brief overview of the Dutch energy transition plans is provided, along with an explanation of the most important emerging energy sources (Chapter 3 – SRQ1). Following this contextual introduction, the report defines what constitutes fishing communities in the Dutch context, specifies which communities are examined in this project, and outlines their concerns regarding the energy transition (Chapter 4 – SRQ2). Subsequently, the theoretical and conceptual framework of the study is introduced, which provides a guiding structure for the project’s vision and strategy (Chapter 5). Based on the communities’ concerns and aspirations, a community vision for the future is developed within this framework. The vision illustrates what the sea and landscape could look like if fishing communities were able to realize their ideal future within the energy transition (Chapter 6 – SRQ3). This vision is then revised by incorporating feedback from key North Sea stakeholders, resulting in a more legitimized vision (Chapter 7 – SRQ4). To ultimately answer the main research question, a strategy for implementation is presented, outlining which elements should be realized, for what reasons, when, and with the involvement of which stakeholders (Chapter 8 – MRQ).

1.3 Introduction Summary: Condensed Problem Statement

Overall, the preceding analysis shows that declining fossil fuel reserves, geopolitical dependencies, and the escalating impacts of climate change have intensified efforts to accelerate the transition towards renewable energy systems. As these transformations are inherently spatial, they generate social and political consequences, often producing tensions where burdens and benefits are unevenly distributed.

In the Netherlands, the energy transition relies increasingly on offshore wind development in the North Sea and along the Dutch coastline. Fishing communities represent one group disproportionately affected by these developments. The growth of offshore wind infrastructure intensifies spatial competition at sea, constraining fishing grounds, altering marine ecosystems, and reshaping long-established fishing practices. Beyond economic impacts, these changes threaten occupational identities and community structures, as fishing constitutes not only a livelihood but also a historically embedded way of life.

These pressures are further compounded by previous sectoral transitions, such as the EU-wide ban on pulse trawling, alongside the limited inclusion of fishing communities in policy and planning processes. This imbalance risks deepening social inequities and undermining the perceived legitimacy of the energy transition.

Taken together, these developments indicate that the energy transition produces unevenly distributed impacts, particularly affecting fishing communities in the Netherlands. Therefore, this project examines how the transition towards renewable energy transition affects Dutch fishing communities and how their needs, rights, and knowledge can be meaningfully integrated into a more just design strategy for the Dutch energy transition.

2 Methodology

To address the challenges faced by Dutch fishing communities, this study applies qualitative research methods and analytical tools, translating insights from fieldwork, policy analysis, and community perspectives into actionable knowledge.

2.1 Used Methods

To answer the research questions, various qualitative research methods and corresponding design tools were used ^(figure 2.1).

SRQ1: The Dutch energy system and its transition

To examine how the energy transition in the Netherlands is planned, a qualitative document analysis was carried out. The analysis focused on government sources, policy papers, and spatial development programmes as they enabled the identification of general goals and spatial visions of official Dutch institutions. This was complemented by a spatial (system) analysis using analytical maps and systemic sections.

SRQ2: Influence of the energy transition on Dutch fishing communities

To develop an understanding of fishing communities and their (perceived) exposure to the energy transition, a qualitative media analysis of Dutch newspaper articles and Dutch fishing Facebook groups was conducted ³. The newspaper articles included local, regional, and national sources to capture a broad range of perspectives. Facebook posts provided less mediated accounts of concerns and were complemented by a spontaneous interview conducted during fieldwork in a Dutch fishing village ⁴. The information was supplemented by a literature review of Dutch case studies and analytical maps to support the content of the concerns. Given the transnational nature of fishing activities, case studies from Norway and the United Kingdom, as well as EU policy research papers, were also included.

The analysis was framed by a literature review on defining characteristics of fishing communities and fieldwork observations in Urk (one of the main Dutch fishing communities), to inform the development of analytical categories and supported a better interpretation of the media material.

SRQ3: Wishes of the Dutch fishing communities for their future in the energy transition

A similar approach was used to investigate what the future aspirations of Dutch fishing communities are. As the media analysis mainly revealed concerns, the analysis was extended with papers about the future of fishing communities, and the identified fears were translated into wishes.

The results were translated into an analytical struggle map as well as fear- and dream sections, illustrating how the future might look like if all fishing communities' fears or dreams would become reality. All of this was used to form the community vision of the project, composed of vision statements for all identified sub-communities in fishing communities and goal maps.

SRQ4: Stakeholder evaluation of the community vision

Finally, to evaluate how key stakeholders might respond to the proposed vision, a stakeholder analysis was used to first identify actors with high power and interest that could either endanger or help implement the proposed vision. For the identified main stakeholders (renewable energy companies; oil companies; environmental groups and a North Sea security alliance), position papers were written that work out alignments and conflicts with the proposed vision. Based on these insights, an additional stakeholder goal map was developed.

To arrive at the answer to the main research question, community and stakeholder goal maps were integrated into strategy maps that were elaborated through spatial intervention cards as well as governance and phasing diagrams.

³ A breakdown of the different newspapers and facebook groups used can be found in the appendix: Appendix B Media Analysis

⁴ The interview memory transcript as well as detailed information about the field trip information can be found in the appendix: Appendix C Fieldwork; D Interview Memory Protocol).

Research Question	Analytical Dimension	Method
[SRQ1] How is the energy transition in the Netherlands planned, particularly in relation to marine and coastal sectors?	Energy transition strategy	› Qualitative document analysis of government sources and policy papers
	Spatial planning implications	› Qualitative document analysis of spatial development programmes (with a focus on maritime spatial planning)
	Spatial-energy system analysis	› QGIS-based spatial mapping and systemic section
[SRQ2] In what ways does the energy transition reshape the livelihoods and socio-economic practices of fishing communities now, and how do these communities negotiate and adapt to these transformations?	General understanding fishing communities	› Literature review of papers about defining characteristics of fishing communities › Field work observations Urk (Pictures of traces of religion; fishing practice; community life)
	Fears/Struggles Dutch fishing communities	› Qualitative media analysis of newspaper articles and facebook group entries › Literature review of Dutch case studies › Informal interview with one resident of Urk (wife of representative for fisherman on EU level) › Critical mapping of new energy infrastructure in relation to fishing practices and community hotspots
	Fears/Struggles of fishing communities in other contexts	› Literature review of international case studies (Norway; UK) and EU policy research reports
[SRQ3] How do fishing communities envision their ideal future in the context of the energy transition?	Wishes Dutch fishing communities	› Qualitative media analysis of newspaper articles and facebook group entries › Literature review of Dutch case studies › Translation of fears into dreams
	Wishes of fishing communities in other contexts	› Literature review of papers about the future of fishing
[SRQ4] How do key North Sea stakeholders evaluate the proposed community vision?		› Stakeholder mapping › Writing of position papers evaluating the proposed vision (Stakeholders: Environmental groups; oil companies; renewable energy companies; North Sea security alliance)

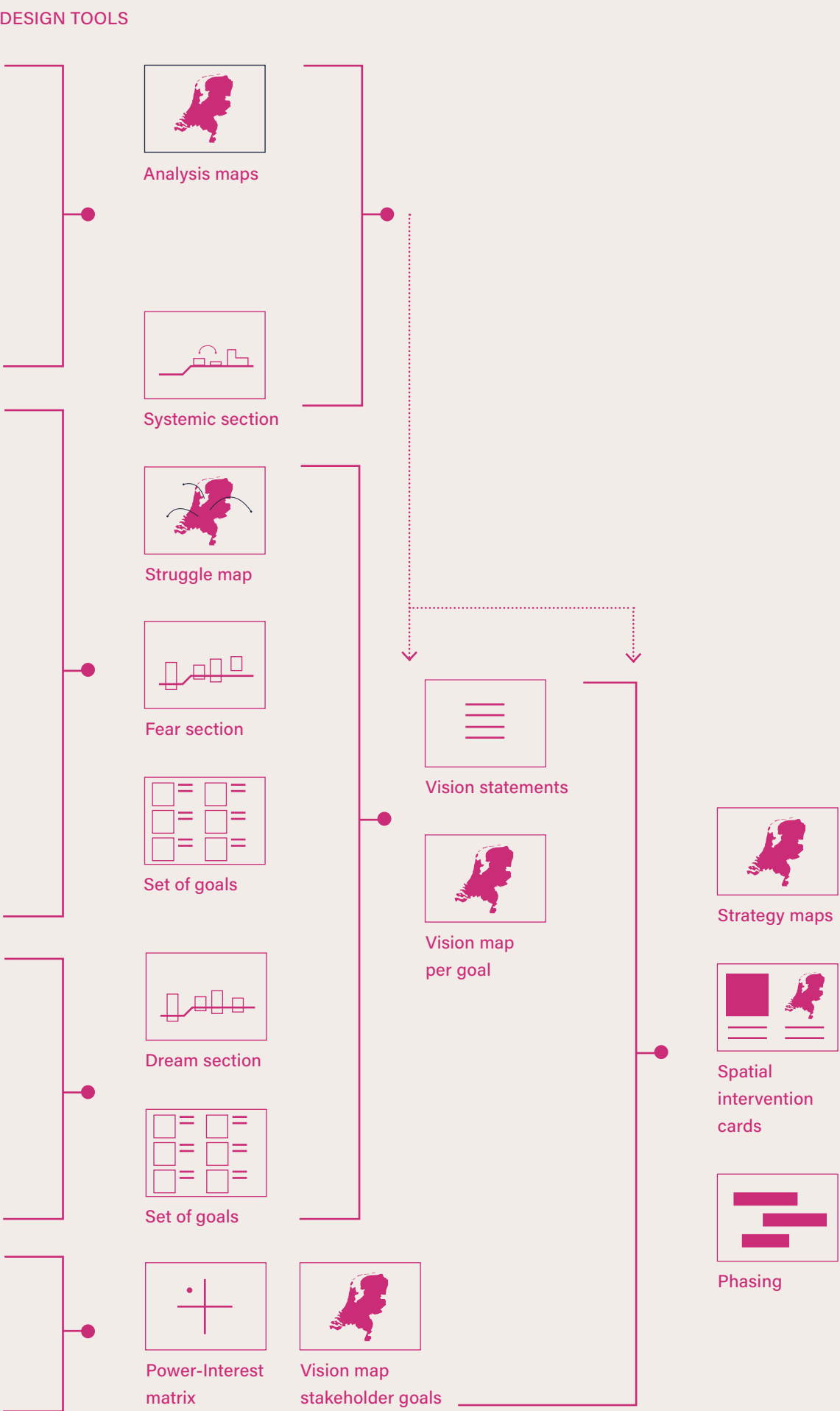


Figure 2.1: Research questions and the used methods and design tools to answer them
Source: The Noun Project

2.2 Research and Design Process

The research and design process was characterized by a continuous alternation between opening up and narrowing down information, as well as an ongoing exchange between research and design (figure 2.2). Research was often used to open up new perspectives, whereas design tools helped to deepen understanding and to narrow these perspectives down again.

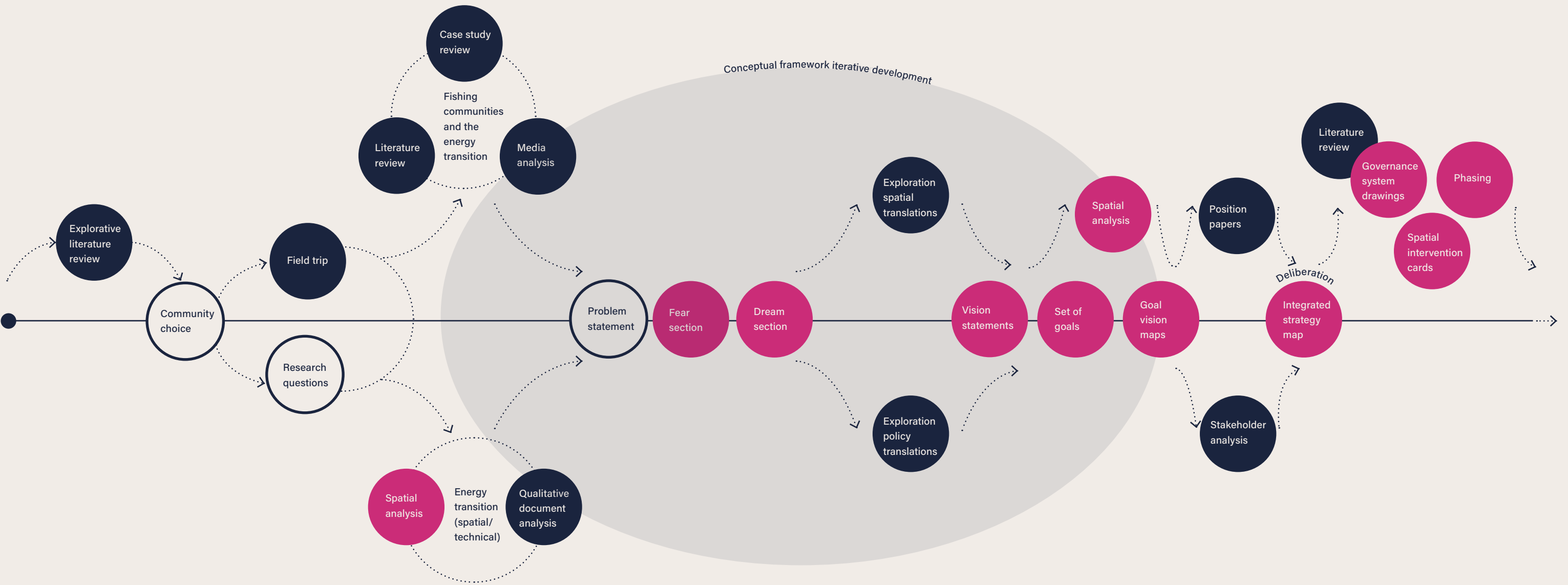


Figure 2.2: Design process throughout the quarter
Source: inspired by the project "Donut Diet" – Q3 2023/2024

3 The Dutch Energy Transition

Guided by research and iterative design, we turn to a pressing Dutch challenge; the energy transition. Energy is the backbone of modern society, powering homes, industries, transportation, and digital infrastructure. In the Netherlands, energy production and consumption not only drive economic activity but also shape the physical and social landscape, both on land and at sea. Dutch energy used to rely heavily on fossil fuels, particularly natural gas, oil, and coal, but environmental concerns, climate commitments, and energy security goals are accelerating a shift towards renewable sources such as wind, solar, biomass, and emerging technologies like green hydrogen.

3.1 The Energy Transition Until Now

The energy transition is more than a technological shift, it is closely tied to spatial interventions. Renewable energy infrastructure requires substantial space, whether on land or offshore. Wind farms, solar parks, and biomes facilities occupy large areas that were previously used for agriculture, recreation, our natural habitats, while offshore wind projects intersect with shipping lanes, fisheries, and marine ecosystems.

Energy production and consumption data provide insights into the current state of the Netherlands energy transition. The energy production charts (figures 3.1 & 3.2) shows the relative contribution of fossil fuels and renewables in 2021, and projected for 2025, highlighting both the progress achieved and the work that remains. Meanwhile the energy usage chart (figure 3.3) shows how different sectors consume energy, helping to identify priorities for achieving improvements and possible key areas of focus in the transition.

Understanding the Netherlands energy transition requires linking these statistics to spatial realities. Renewable energy projects can alter landscapes, seascapes, while new innovations such as floating offshore wind farms, hydrogen and biofuel, can help optimise the balance between energy production and environmental considerations.

By combining energy data with spatial perspectives, this chapter sets the stage for exploring how the energy transition is reshaping Dutch landscapes and seascapes. The following sections will systematically examine the future transition plans of the Netherlands and the impacts of wind, solar, biomass and hydrogen, using concrete examples to illustrate both opportunities and challenges of transitioning to a sustainable energy future.

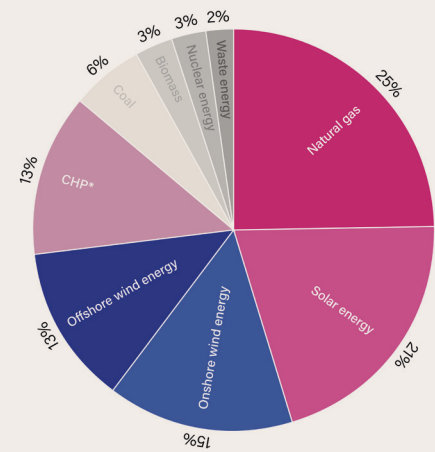


Figure 3.1: Total Electricity production 2025 per source
Source: Nationaal Energy Dashboard (n.d.)
Total produced electricity is 121.372 GWh, from which 32.235 GWh comes from wind production (16.850 GWh onshore and 15.384 GWh offshore).

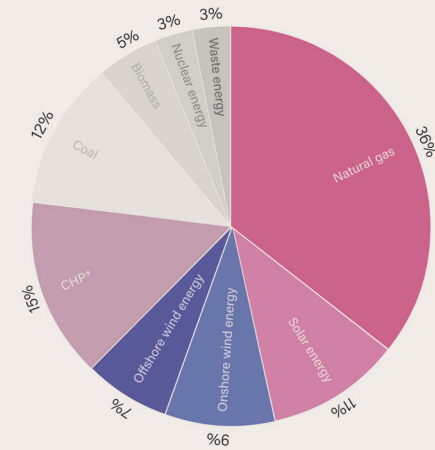


Figure 3.2: Total Electricity production 2021 per source
Source: Nationaal Energy Dashboard (n.d.)
Total produced electricity is 116.986 GWh.

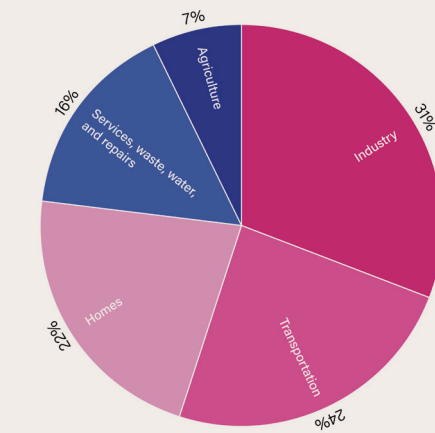


Figure 3.3: Electricity usage per sector 2022
Source: Energie Nederland (n.d.)

3.2 Future Transition Plans

Building on the current energy landscape, the Dutch government has set an ambitious target of achieving a fully renewable energy system by 2050, relying on a combination of wind, solar, biomass, hydrogen, and nuclear power (Ministerie van Algemene Zaken, 2024). Meeting this target will require more than simply expanding production capacity, it will demand the strategic integration of energy infrastructure into the country’s landscapes, seascapes, and maritime economies, carefully balancing environmental, economic and social needs.

Offshore energy development will play a central role in this strategy. By 2040, the Netherlands aims to reach 30-40 GW of offshore wind capacity, while in 2023 it was 4.7 GW (Rijksdienst van Ondernemend Nederland, n.d.-b), organized around energy hubs where electricity from multiple wind farms is converted into hydrogen before being transported onshore (Ministerie van Economische Zaken en Klimaat, 2022; Rijksdienst van Ondernemend Nederland, n.d.-b). Key landing points, such as Eemshaven, are strategically chosen to connect with ports, industrial clusters, and existing infrastructure, while minimizing conflicts with maritime traffic (Rijksdienst van Ondernemend Nederland, 2026).

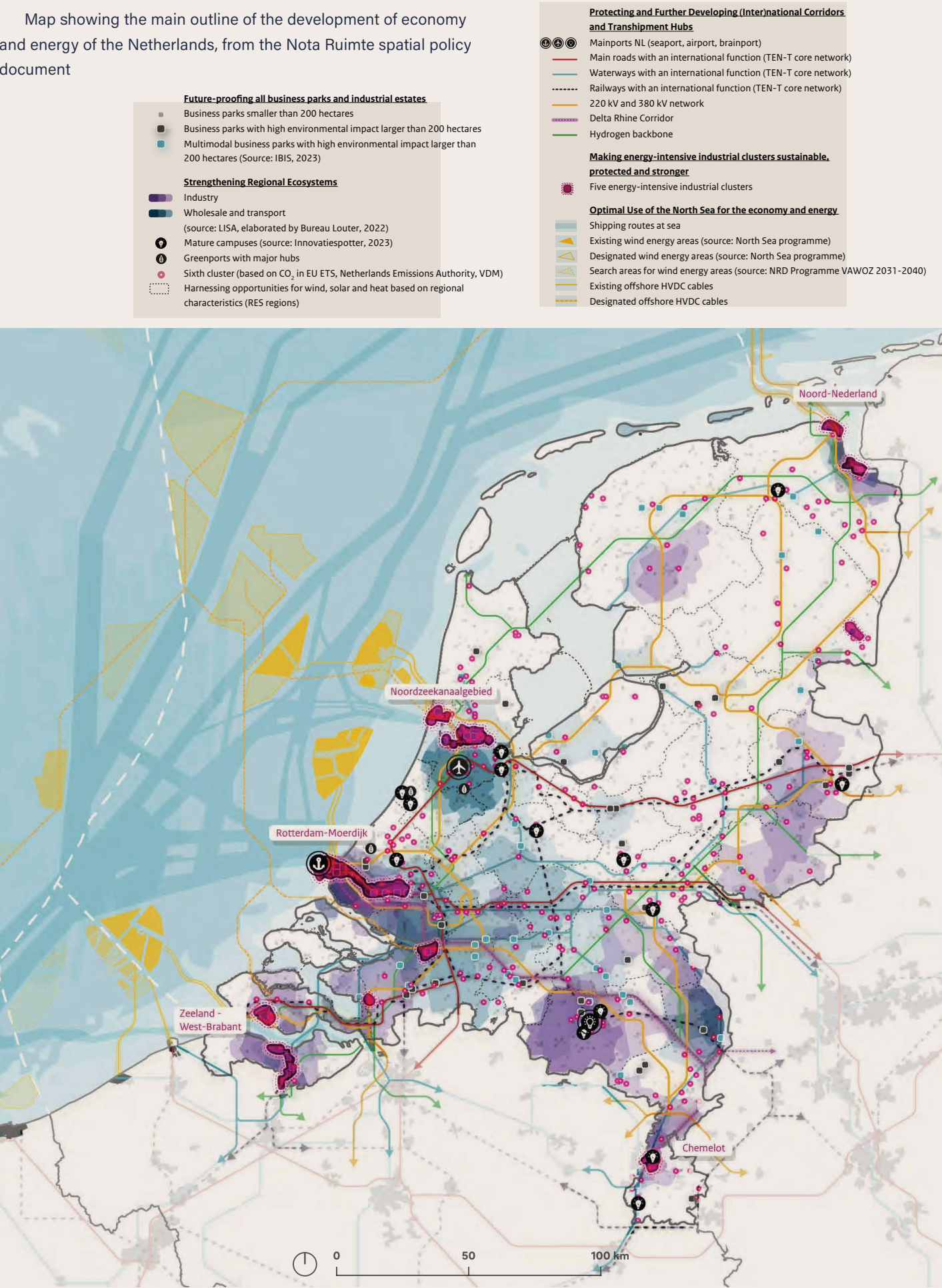
To support these developments, the national energy grids will also undergo a major expansion. Tens of thousands of kilometres of new high footage cables and electrical cabinets will be installed, linking offshore and onshore production to urban and industrial demand centres (Ministerie van Algemene Zaken, 2024). At the same time, hydrogen production and storage facilities will be located near ports and renewable energy sources, allowing surplus electricity from wind and solar to be stored and dispatched when demand peaks (Wolf, 2023; Hydro, n.d.).

Industrial and maritime adaptation will complement these spatial measures. Ports such as Rotterdam and the North Sea canal area are being prepared to integrate renewable electricity and green hydrogen into shipping, industry, and logistics operations, while biofuels derives from residual waste, including fish processing byproducts, offer near term solutions for maritime transport and other hard-to-electrify sectors (Rijksdienst van Ondernemend Nederland, 2021).

The Netherlands’ energy transition is not just a technical shift but a comprehensive strategy (Figure 3.4) to achieve a fully renewable energy system by 2050, reduce greenhouse gas emissions by 55% by 2030, and secure energy independence while protecting landscapes, seascapes, and local economies (Ministerie van Algemene Zaken, 2024; Planbureau voor de Leefomgeving, 2025). By expanding offshore wind to 50 GW, scaling solar capacity to over 100 GW, integrating green hydrogen hubs, and supporting bioenergy by industry and maritime transport, the country aims to create a flexible, reliable, and spatial integrated energy system (Ministerie van Economische Zaken en Klimaat, 2022). The transition emphasises the need for co-existence with maritime activities, industrial clusters, and local communities, particularly fishing sectors, demonstrating that ambitious climate targets need to align with economic and social resilience.

Figure 3.4: The new national environmental vision
Source: Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025

Map showing the main outline of the development of economy and energy of the Netherlands, from the Nota Ruimte spatial policy document



3.3 The Energy Sources in Detail⁵

3.3.1 SOLAR

Solar energy plays an increasingly important role in the Netherlands' energy transition (figure 3.1 and 3.2), driven by rapid technological development and declining costs (Solar Energy International, n.d.; Ministerie van Algemene Zaken, 2024). Photovoltaic (PV) systems are widely deployed across the country, ranging from small-scale rooftop installations to large-scale solar parks (Ministerie van Algemene Zaken, 2024), supported by national schemes (Ministerie van Economische Zaken en Klimaat et al., 2026).

Spatially, Solar energy is highly flexible. Large-scale parks require significant surface area and are often located on agricultural land, former industrial sites or along infrastructure corridors (Solar Energy International, n.d.), while rooftop solar installations make use of existing built surfaces.

However, solar energy is inherently variable due to weather and seasonal fluctuations, requiring careful integration into the energy system, including storage solutions and coordination with other energy sources. Emerging developments such as floating solar parks, including the Skûlenboarch project in Friesland (GroenLeven, 2026), demonstrate how solar energy is sepxanding into new spatial contexts.

3.3.2 BIOMASS

Biomass provides a complementary renewable energy source by converting organic waste materials into heat, electricity, or biofuels (Rijksdienst van Ondernemend Nederland, n.d.-a; Energy.nl – TNO, 2024). It relies on diverse feedstocks such as agricultural residues, and organic waste such as fish waste.

Biomass facilities are typically located near sources of organic material, such a ports, agricultural areas, or waste processing sites, in order to reduce transportation distances and increase efficiency (Jayarathna et al., 2020). This results in a more distributed network of installations embedded within productive landscapes.

A key advantage of biomass is its controllability, enabling on-demand energy production. Increasingly, innovations focus on waste-based feedstocks, such as fish processing residues, which can be converted into biodiesel or biogas (Jaiswal et al., 2024). These developments are particularly relevant for sectors that are difficult to electrify, such as maritime transport, where biofuels are being teste das alternatives to conventional fuels (GoodFuels, n.d.; Bioenergy International, 2020).

3.3.3 HYDROGEN

Hydrogen is an emerging energy carrier in the Netherlands, particularly for sectors that are difficult to electrify (International Energy Agency, n.d.). As a secondary energy carrier, it must be produced using other energy sources, with green hydrogen generated through electrolysis powered by renewable electricity (Detz et al., 2020).

Its spatial development is closely linked to industrial clusters, ports, and energy infrastructure, where production, storage, and demand can be efficiently aligned (Wolf, 2023). Locating hydrogen facilities near renewable energy sources and demand centres reduces transport needs and supports system integration.

Hydrogen also enables long-term energy storage, helping to balance fluctuations in renewable energy supply. Increasingly, production is integrated with wind energy systems, where surplus electricity can be converted into hydrogen, contributing to grid stability and a more flexible energy system (Roland Berger, 2022).

5 More detailed information on each energy source can be found in Appendix A.

Skûlenboarch project:
A large inland floating solar park, located on the sand quarry Skûlenboarch, will be realized in 2026 initiated by Groen Leven (GroenLeven, 2026). The solar park will be around 35 hectares, generating 46 megawatts, contributing to the livability of the surrounding villages, around 16.500 households (GroenLeven, 2026). The local ownership by an energy cooperation and the municipality of Tytsjerksteradiel, makes sure the energy will be dedicated to local distribution and usage (GroenLeven, 2026).

SALMO project:
SALMO is a pilot project that coverts fish processing waste into marine biofuel, led by Green Fuels Research Ltd in collaboration with Cardiff University and London South Bank University (Bioenergy international, 2020). The project was launched in 20214, with the focus of transforming salmon farming residues, like fish heads, guts and processing leftovers, into sustainable drop-in fuel for diesel marine engines (Bioenergy international, 2020).

The Duwaal project:
Duwaal is a Dutch green hydrogen initiative in Noord Holland, that integrates wind energy with hydrogen production, storage, distribution and refuelling on site (Hydro, n.d.). The core of the project focuses on combining the electrolyzer directly in our close to a wind turbine, to directly convert electricity into green hydrogen (Hydro, n.d.). Duwaal aims to demonstrate an efficient, scalable hydrogen chain as ground-work for a regional network of hydrogen fuelling and transport infrastructure (Hydro, n.d.).

3.3.4 WIND ENERGY

Wind energy is a central component of the Netherland's renewable energy strategy, supplying large-scale electricity from onshore, inland water, and offshore installation (Centraal Bureau voor de Statistiek, 2022).

Wind farms require significant spatial planning due to turbine spacing, which is necessary to minimize wake effects and optimize performance (Son, 2014). As a result, wind energy occupies extensive areas, particularly offshore and in inland water such as the IJsselmeer, where installations interact with other spatial uses (Windpark Fryslân, n.d.).

Innovations in turbine design, floating offshore platforms and hybrid systems, that combine wind with solar or hydrogen production, are expanding both the efficiency and spatial flexibility of wind installations (Rijksdienst van Ondernemend Nederland & Ministerie van Buitenlandse Zaken, 2026). Projects like Hollandse Kust Noord (Crosswind Hollandse Kust Noord, n.d.) illustrate the integration of multiple energy functions withing a single site, reflecting the evolving role of wind energy in complex energy landscapes.

3.3.5 CONNECTED INFRASTRUCTURE

The Dutch energy transition is shaped by the integration of production sites, infrastructure and energy users into a connected system (Ministerie van Algemene Zaken, 2024). Renewable energy technologies are not isolated but linked through a shared network of cables, substations, and transmission lines (Rijksdienst van Ondernemend Nederland, n.d.-b).

This network connects offshore, rural, and urban areas, with the high voltage grid acting as a central backbone (CBS, 2022). Increasingly, it is complemented by storage and energy conversion technologies, such as hydrogen, which helps balance supply and demand (Detz et al., 2020; Wolf, 2023).

Together, these elements from a multi-layered and spatially distributed energy system, in which production, storage, and consumption are interconnected across land and sea.



Figure 3.5: Hydrogen infrastructure
Source: Freepik

Windpark Fryslân project:
Windpark Fryslân is the Largest inland water wind farms in the world, located in the Friesland part of the IJsselmeer (Windpark Fryslân, n.d.). The park closest out of 89 turbines, with a total electricity production capacity of approximately 1.5 terawatt-hours (TWh) per year (Windpark Fryslân, n.d.). The park has been operational since 2021, powering 500.000 households (Windpark Fryslân, n.d.). The turbines are arranged in a hexagonal cluster layout with about 600 metres between turbines to optimise wind capture while maintaining sightlines (Windpark Fryslân, n.d.).

The Hollandse Kurst Noord project:
This project is located at around 18,5 km away from the Dutch coast from the height of Egmond aan Zee, consisting out of 69 wind turbines that are each 1 km away from each other (Crosswind Hollandse Kust Noord, n.d.). Originally in 2020 where 100 wind turbines planned, but with better and more powerful equipment knew Cross Wind create the same amount of power with only 69 turbines (Crosswind Hollandse Kust Noord, n.d.). Creating a high efficient farm, with low costs and limited impact on the ecosystem (Crosswind Hollandse Kust Noord, n.d.).



Figure 3.6: Wind farm Fryslan windturbines

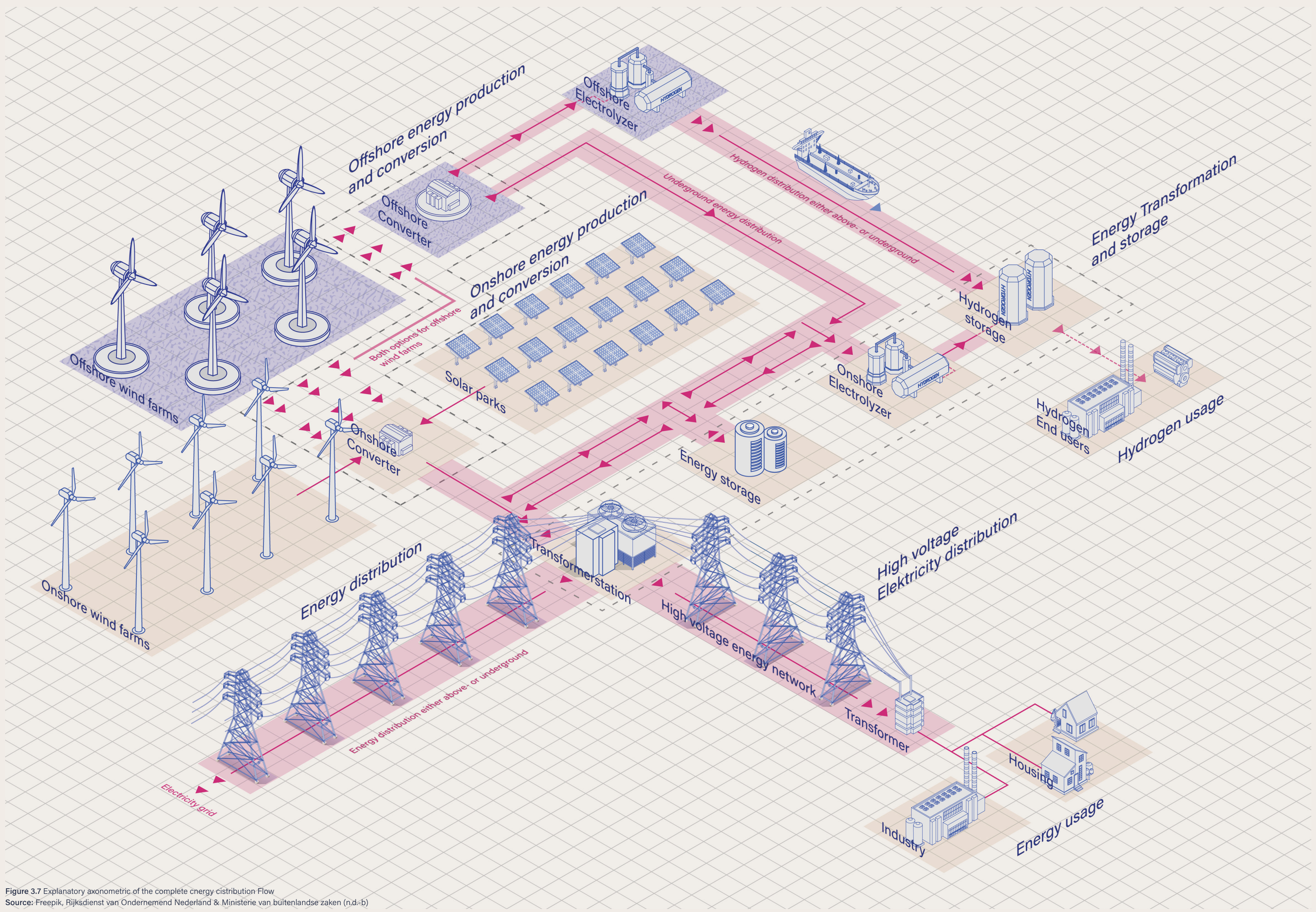


Figure 3.7 Explanatory axonometric of the complete energy distribution flow
 Source: Freepik, Rijksdienst van Ondernemend Nederland & Ministerie van buitenlandse zaken (n.d.-b)

4 Dutch Fishing Communities In The Energy Transition

The Dutch energy transition is carefully coordinated across offshore and onshore infrastructure, balancing energy production with spatial and industrial priorities. Beyond planning, these developments ripple through landscapes, seascapes, and the lives of those who depend on them. To understand these impacts more closely, it is important to examine fishing community directly affected by these changes.

4.1 Defining Dutch Fishing Communities

This chapter therefore focuses on Dutch fishing communities, first explaining how fishing communities are defined in general, to then go on and state which regions and villages in the Dutch context the project will therefore focus on. After this framework, the outcomes of the media analysis will be presented in order to explain how the energy transition reshapes the livelihoods and socio-economic practices of the selected Dutch fishing communities, and how they negotiate and adapt to these transformations [SRQ 2].

4.1.1 SHARED CHARACTERISTICS OF FISHING COMMUNITIES

Although a comprehensive definition of all fishing communities worldwide is not possible and remains largely elusive, fishing communities often share certain characteristics (Clay & Olson, 2007; Kraan et al., 2025) (figure 4.1). The main elements that bind them are a collective identity formed through interconnected spatial, ecological, socio-cultural, historical, and economic processes. Dutch fishing communities and the media analysis presented later, should be understood in this context.

4) ECONOMIC: Fishing communities are marked by shared fishing practices at sea as well as land-based, fishing-related activities such as processing, sales, accounting, and net-making (Clay & Olson, 2007). Kinship-based hiring practices, along with the often unacknowledged involvement of women in land-based activities, further embed the economy within family structures and the community itself (Clay & Olson, 2007).

3) CULTURAL, SOCIAL AND HISTORICAL: Fishing communities consider fishing a core element of their cultural and social life, fostering their strong connection to the land- and seascape in which they live and work, as well as to fishing practices (Kraan et al., 2025). Individual identities within these communities are strongly shaped by this connection (Kraan et al., 2025). This belief persists even when fishing is no longer the main economic sector and not all members are engaged in fishing-related activities (Kraan et al., 2025; Clay & Olson, 2007). Fishing therefore extends beyond a purely economic activity and constitutes a socio-cultural and historical practice that binds community members together.



1) SPATIAL: Fishing communities are characterised by a shared living space on land as well as a shared working space at sea, thereby transcending classical boundaries of towns, municipalities, or even countries (Clay & Olson, 2007).

2) ECOLOGICAL: Fishing grounds at sea are shaped by specific ecological characteristics, closely relating these communities to ecological processes (Clay & Olson, 2007).

PROJECT DEFINITION: Fishing communities are characterized by common living and working spaced between land and sea, while having a strong belief that fishing is the back bone of the cultural, economical and spatial fabric of the community, despite that each member is not directly involved in the practice of fishing. The fishing community is bound together by a strong kinship that supports their collective identity.

Figure 4.1: Shared characteristics fishing communities and the derived project definition for fishing communities
Source: Own illustration based on Clay & Olson, 2007; Kraan et al., 2025; Input from the media analysis (Appendix B)

IJsselmeer scale

In the Netherlands, fishing communities are mostly clustered in the North and Southwest of the Netherlands (figure 4.2). Since a lot of the fishing communities in the North have been affected in the past by the closing of the Afsluitdijk, the project focusses on these fishing communities around the IJsselmeer (figure 4.2). Furthermore, especially the northern islands along the wadden coast, as well as the fishing communities on the east coast of the IJsselmeer are rather rural areas with little infrastructure, making them more prone to political distrust (van Vulpen, 2025) (figure 4.3). Therefore, it is especially important to listen to their voices, in order to legitimise the planned transition and make it more just.

Road density*
* Includes motorways, primary roads that connect urban centres, secondary regional roads and their links

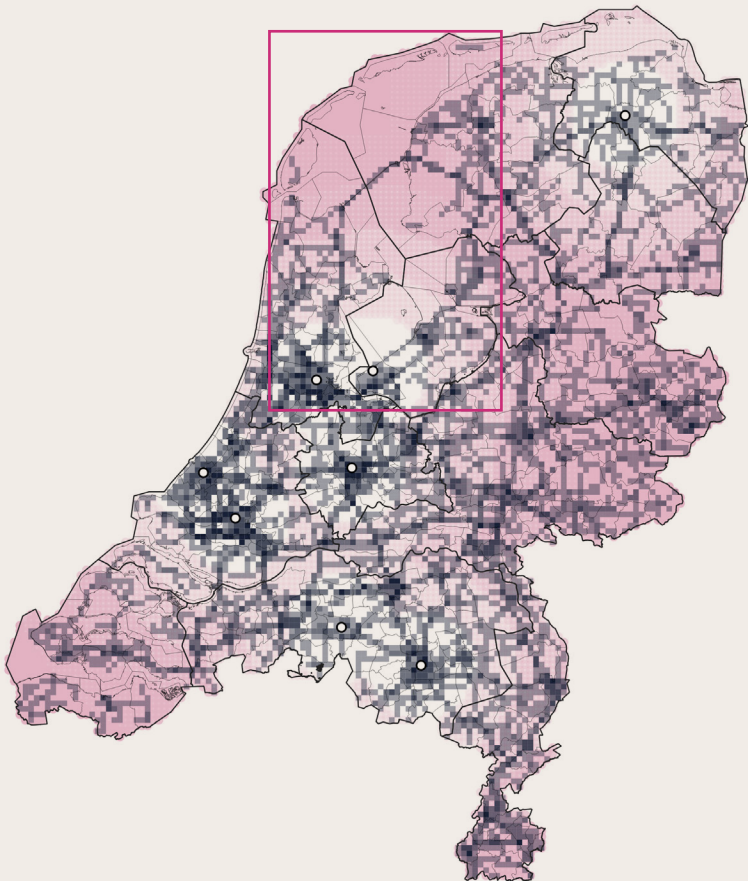
- Very low
- Low
- Medium
- High
- Very High

Distance to urban centres*
* Defined here as cities with over 200.000 inhabitants

- Low
- High
- Focus area project
- Main urban centres



Figure 4.3: Road density gradient Netherlands – rural vs. urban areas
Sources: QuickOSM; CBS; Statista, 2025
Variables: Road density – Very low = 0–1,32 km; Low = 1,33–4,15 km; Medium = 4,16–8,21 km; High = 8,22–14,91 km; Very high = 14,92–29,43 km



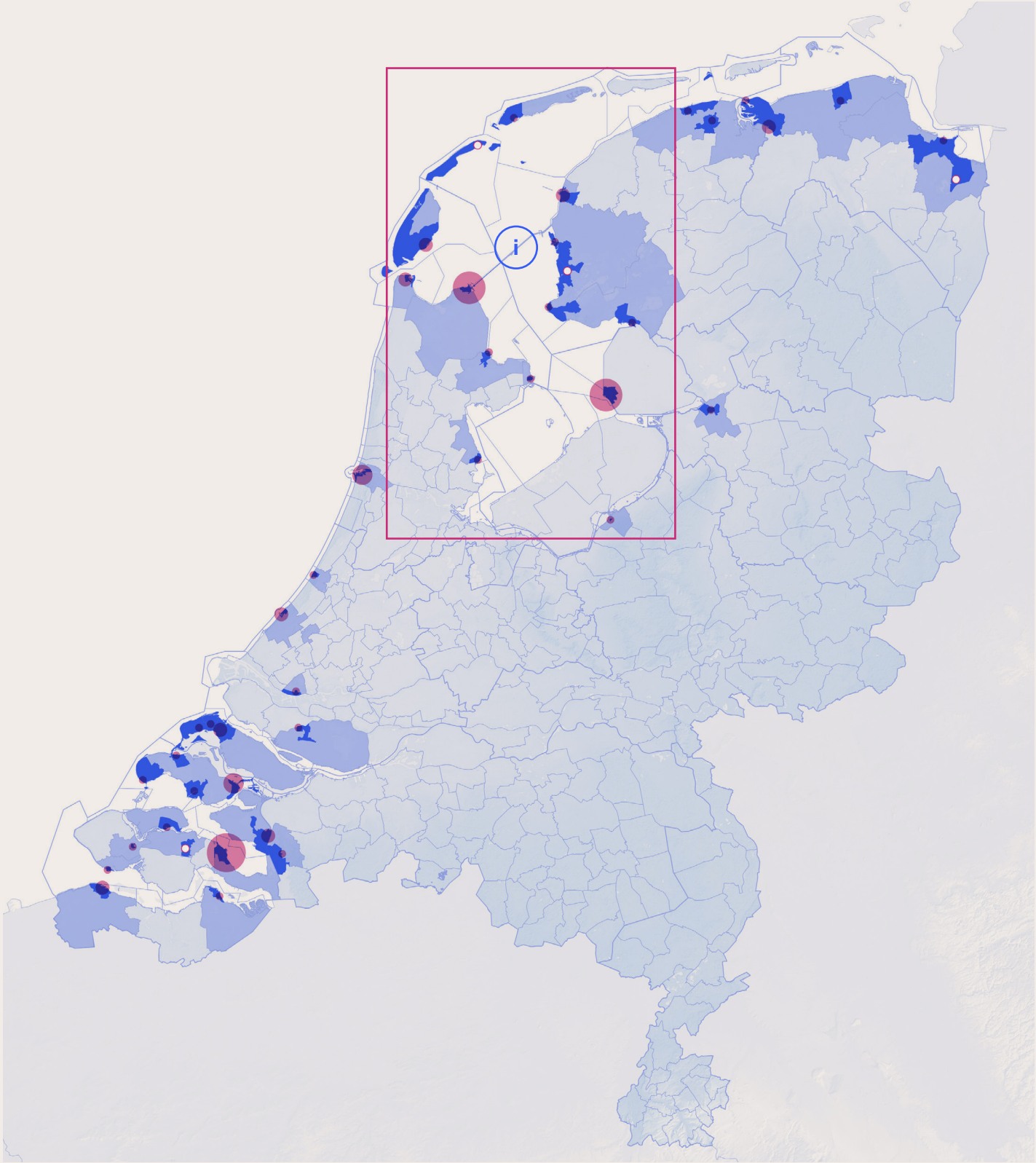
- Fishing town*
- Municipality with fishing town
- Focus area project
- * based on Kraan et al., 2023

Number of registered vessels at the house port

- No Data
- 0 – 20
- 20 – 40
- 40 – 60
- 60 – 80 (not applicable)
- 80 – 100
- 100 – 120



Figure 4.2: Dutch fishing communities and project focus located
Sources: Rijksdienst voor Ondernemend, 2026; Kraan et al., 2023; EMODnet; Eurostat/GISCO; PDOK



The Afsluitdijk is a 32 km long dike separating the IJsselmeer from the Wadden- and North Sea. It was constructed in 1932 to protect the Netherlands from flooding (Rijkswaterstaat, n.d.). Its construction led to many fishing communities around the IJsselmeer being cut off from direct access to the Wadden Sea and the North Sea (Langbroek & Vanclay, 2012). As a result, they could no longer travel directly from their home ports to the open sea (Langbroek & Vanclay, 2012).

North Sea scale

To understand how the energy transition affects these fishing communities, a broader perspective on the North Sea is also necessary. Spatial changes related to the energy transition across large parts of the North Sea will affect IJsselmeer fishing communities, as such communities are defined by their tendency to transcend classical boundaries of towns, municipalities, or countries through their fishing practices (Clay & Olson, 2007). Dutch fishing vessels do not only operate in Dutch waters. Some of their main fishing grounds extend across France, Belgium, Germany, and Denmark (figure 4.4). A similar pattern can be observed for harbours where IJsselmeer fishing vessels land their catch (figure 4.5),

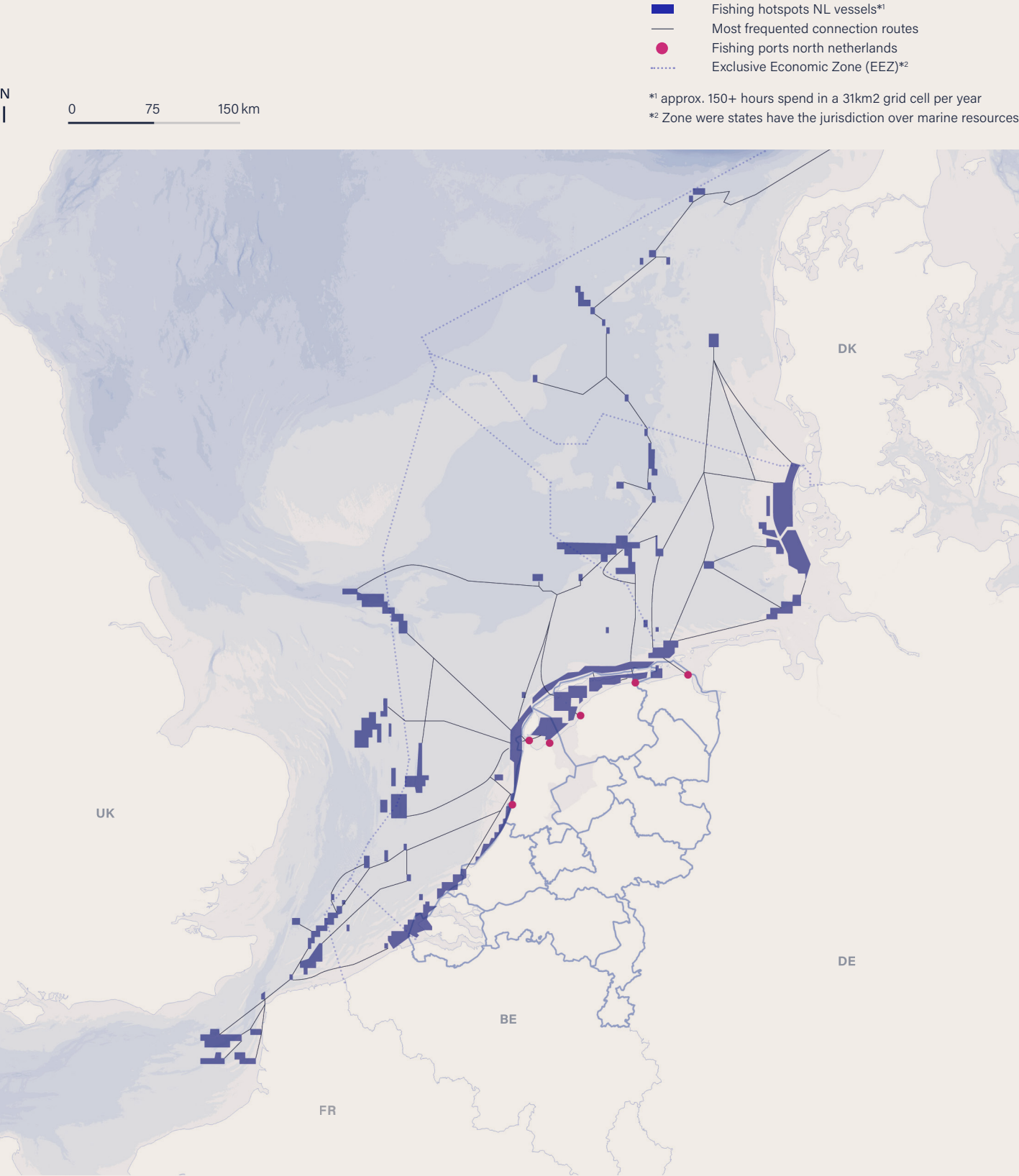


Figure 4.4: Fishing hotspots of Dutch fishing vessels around the North Sea
Sources: EMODnet European Commission; Eurostat/GISCO; PDOK; Global Fishing Watch

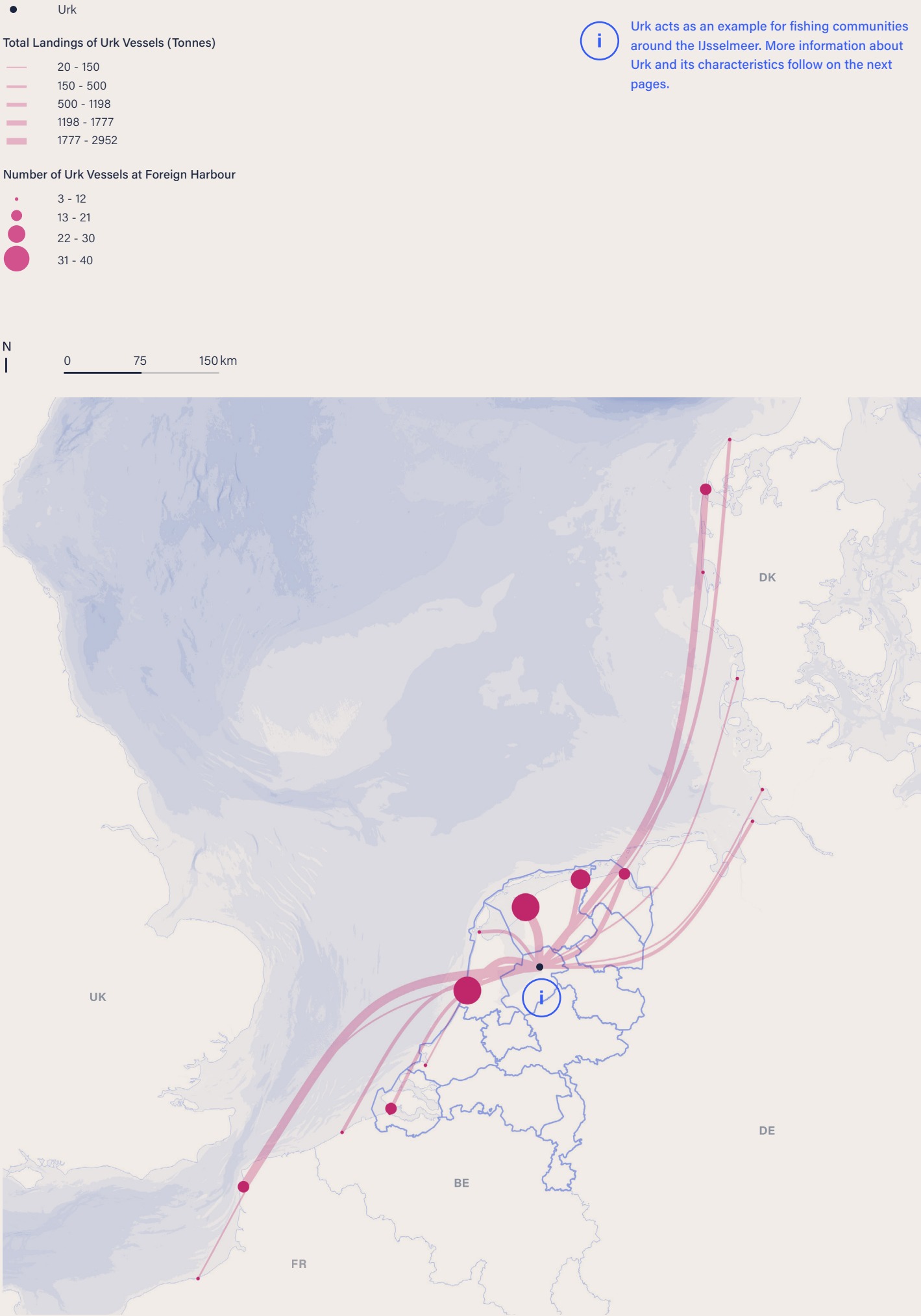


Figure 4.5: IJsselmeer fishing communities ties to harbours around the North Sea: example Urk – total landings by harbour
Sources: Pulskens & Van Hoof, 2024; Eurostat/GISCO; PDOK

Fishing community scale: Urk as an example

Urk is one of the main fishing communities around the IJsselmeer and therefore serves as a suitable case study representing IJsselmeer fishing communities at a local scale throughout this report. It is one of Europe’s major hubs for fish processing, hosts one of the continent’s largest fishing auctions, and remains highly dependent on fishing as a profession (Pulsens & Van Hoof, 2024; Langbroek & Vanclay, 2012). Urk used to be an island and only became a lakeside town in 1939 with the construction of the Noordoostpolder (Langbroek & Vanclay, 2012). This is relevant in two ways: first, island communities often have a strong community bond, reinforcing the identity shaped by fishing. Second, Urk was not only affected by the closure of the Afsluitdijk, but also by its transformation into a lakeside town.

Its a community physically shaped by two extremes – old, picturesque harbour structures, churches, and fishing memorials alongside small fisher houses (figures 4.6-4.9) and large industrial areas connected to fishing-related businesses (figures 4.10-4.12),

SITE ONE: THE PITORESQUE FISHING TOWN



Figure 4.6: Small houses and Urks lighthouse along the coastline of Urk with wind turbines in the background
Sources: Photo from Willy the Wizard on Unsplash



Figure 4.7: Fisher monument in Urk, overlooking the sea: The fisher monument in Urk shows the 368 names of Urk fishermen lost at sea (Flevoland, n.d.). The women looks towards the sea, where her husband or sun should have returned from (ibid.). It shows the connection of the town to the fishing practice.



Figure 4.9: Fisher monument in Urk, overlooking the sea and wind turbines: Today, the women not only looks at the open sea, but rather towards the wind turbines along the coastline of Urk.



Figure 4.8: Old harbour of Urk



Figure 4.10: Big parking and logistic facilities next to the old harbour



Figure 4.12: Fish distribution building in Harlingen from the Urk North Sea fleet – similar buildings can be found in the industrial area of Urk



Figure 4.11: Het Spijk industrial area next to Urk with fish processing and distribution facilities
Sources: Urk Seafood

4.2 Fears and Dreams of Dutch Fishing Communities in the Energy Transition

Media analysis formed a central methodological approach for understanding the perspectives, narratives and lived experiences of communities in relation to ongoing energy transitions. By examining a wide range of media sources such as news coverage, public discourses on community blogs and social platforms we were able to capture both explicit opinions and underlying sentiments shaping local responses.

This process revealed a diverse spectrum of aspirations, concerns and points of tensions allowing for a more nuanced understanding of the different sub-communities affected. These groups are not homogenous but rather occupy varied positions depending on their economic dependencies, cultural ties to the marine landscape and openness to change. As such media analysis served not just a tool for observations but also as a means of identifying patterns of alignment, resistance and adaption.

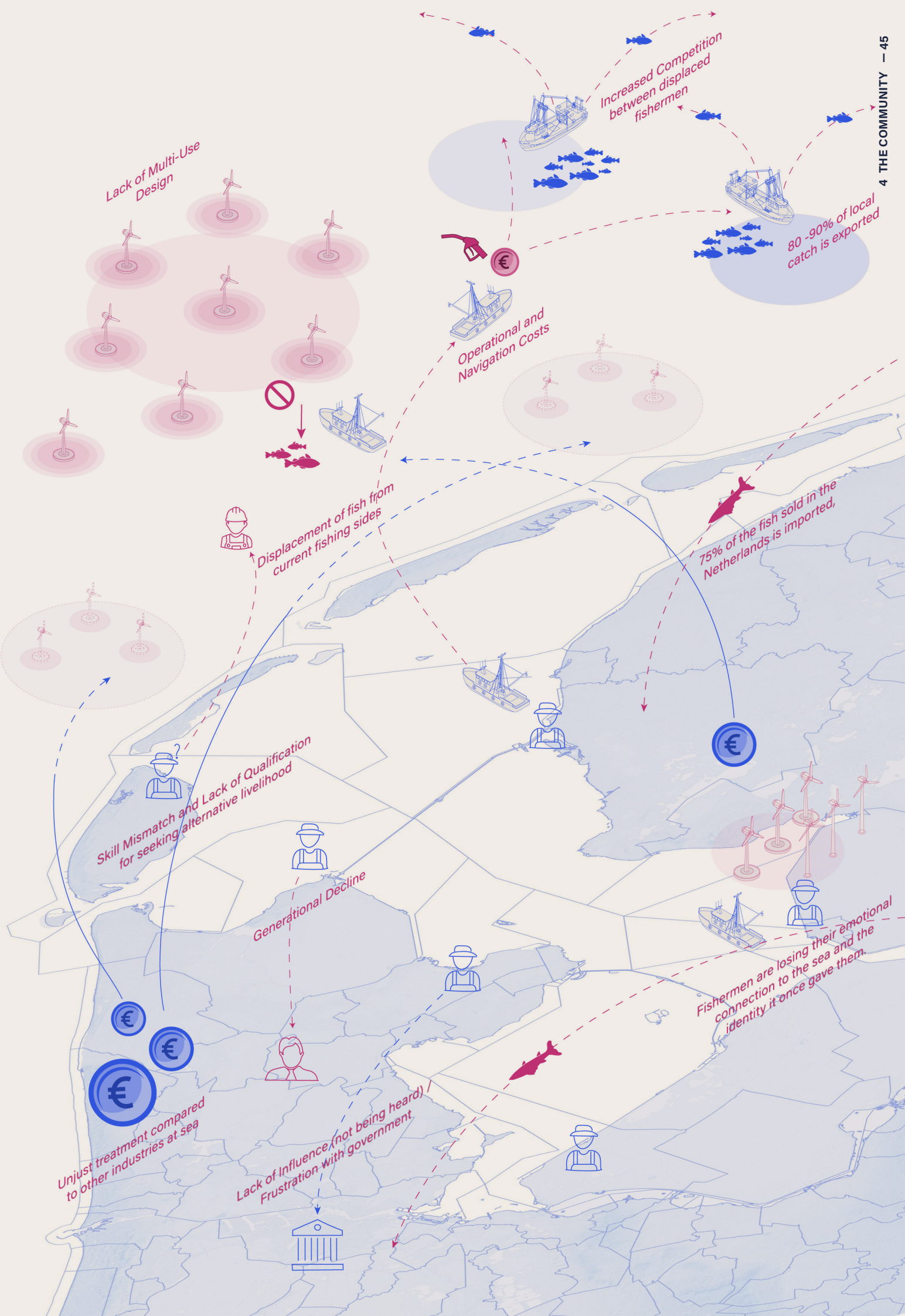


Figure 4.13: Mapping the Discourse, Representing the spatial repercussions of energy transitions on community activities and sources of livelihood.

Sources: pngwing; freepik; Noun Project

4.2.1 FEARS / CRITIQUES

Fishermen face growing threats to their livelihoods and traditions due to changing sea use, regulations, and maritime industry shifts, leaving many uncertain and frustrated. The following section highlights key media-reported concerns ⁶.

6 All quotes of the fears and dreams of fishing communities can be found in the Appendix: Appendix B Media Analysis. Some of the here presented information has to be understood as a compilation of all the collected information.

Loss of fishing grounds due to wind parks

“Wind turbines are far from the only problem facing the fishing industry alongside Brexit, high fuel prices, or the closure of nature reserves but they are the most hated.” (Witteman, 2023, p. 2)

Wind farms in the North Sea are reducing access to key fishing grounds, displacing fishermen from valuable areas and increasing competition within the grounds that remain (Witteman, 2023; Basir, 2021). They also raise costs by forcing longer routes and higher fuel use limit operational flexibility and create insurance challenges due to liability risks around subsea infrastructure (van Hoyer et al., 2021).



Figure 4.14

Lack of multi-use design

“Respondents thought that governments have prioritized wind energy over (sustainable and healthy future) food, so wind farms are all designed solely for wind energy production. Wind turbines are close to each other and cables are all over the seafloor. This makes aquaculture very difficult” (van Hoey et al., 2021, p. 48)

Effective discussions for the management of offshore wind farms requires transparency, clear communication and designs that support multi use to enable coexistence with sectors like aquaculture (van Hoey et al., 2021). However, wind farms are often prioritized and are designed solely for energy production with dense turbine layouts and extensive cabling that hinders other users (van Hoey et al., 2021). Aquaculture stakeholders may bear higher risks face limited access, (eg. for anchorage), and are sometimes insufficiently consulted raising concerns about fairness and practicality of co-use (van Hoey et al., 2021).



Figure 4.15

New regulations on fishing techniques and equipment

“In recent years, the Dutch fishing industry has been hit hard. Not only because of the consequences of Brexit, the construction of offshore wind farms, and sky-high diesel prices, but also increasingly because of regulatory pressure from Brussels — including the landing obligation, the abolition of pulse fishing, and the plan for camera surveillance on cutters.” (Boon, 2024, p. 1)

Pulse fishing, which used mild electric shocks to guide fish into nets, reduce sea bed damage by 20% halved bycatch, and cut fuel used by 45% making it a boom for fishermen (Witteman, 2023). Yet in 2019, the European Parliament banned it after French fishermen, felt threatened by the more effective Dutch fleet Leaving many in the industry frustrated over the lost opportunity for a more sustainable and cost effective method (Witteman, 2023).



Figure 4.16

Loss of voice

““Then I think: what do you, as a government, want? If you want to get rid of me, just say so. Then I’ll hand over my stuff.” But please give some clarity: do we even have a right to exist as a fishing industry?” (Witteman, 2023)

Fishermen often feel their input comes too late in the process after the footprint of a wind farm has already been decided leaving them with little influence over the final outcome (Witteman, 2023). As government policies, energy transitions, and regulations increasingly threaten their livelihoods, they feel powerless and ignored, forced to continue their work despite mounting obstacles (Witteman, 2023; Akinci, 2023; Boon, 2024).



Figure 4.17

Loss of profession as a whole

““Normally, we scrap one, or at most two, fishing vessels per year,” says Steenhuis. „38 this year.” Next to him on the quay are cutters from Urk, Katwijk, and Tholen, ready to be cut to pieces.”” (Witteman, 2023, p. 1)

Fishermen in regions like Texel and Den Helder feel increasingly powerless as their profession vanishes (Witteman, 2023; DeTelegraaf, 2022; van Dillen, 2024; Boelens, 2022). Longstanding fishing communities are seeing fleets shrink, fish auctions close, and subsidies on restructuring schemes failing to offer sustainable solutions. Historical resilience from surviving floods, trade blockades and wartime confiscations has made fishermen pessimistic as they feel their trade depends entirely on imports and external decisions. Industry leaders and workers alike report falling fish supplies, idle ships and economic strain leading to fears that the very soul of their villages fleets and traditions is disappearing.



Figure 4.18

Safeguarding wellbeing of the family

“He always said that he was married to the sea and I was the affair because the sea always comes first.” (Szaboova et al., 2022, p. 64)

Fisherwomen live with constant anxiety as the sea dictates family life forcing men to go out even when conditions are dangerous in order to earn a living (Szaboova et al., 2022). This creates a deep fear of loss as well as stress from unpredictability and financial issues (Szaboova et al., 2022). They are left managing both their own worry and their children’s distress feeling powerless while their loved ones face risks at the sea (Szaboova et al., 2022).



Figure 4.19

4.2.2 FEAR SECTION: SOCIOECONOMIC PRESSURES

The fishermen of IJsselmeer fear a future where the waters that once sustained them no longer provide enough space to work as fishing grounds are steadily reduced by wind farms, protected areas, fishing quotas and other competing users. What was once open and familiar is becoming increasingly restricted and uncertain 7.

With each trip fishermen find themselves investing more fuel, time, resources and effort yet seeing little to no return. As catches continue to decline and costs keep rising the shrinking returns make it increasingly difficult to sustain a viable livelihood placing constant pressure on those who remain.

Beyond the economic strain lies a deeper concern about what might be lost. Fishing is more than a job, rather it is a way of life for the community that is passed down through generations. As the opportunities dwindle many of the younger people chose to leave, moving to cites in search of stable work and with them the continuity of knowledge tradition and community begins to fade.

Underlying all of this is a sense of imbalance. While these communities are asked to adapt, give up space and absorb the risk of change the benefits often seem far removed from their daily lives. In that growing disconnect there is a lingering fear of being left behind watching the future of the IJsselmeer unfold without them as a part of it.

7 The fear section provides a synthesis of fears identified through the media analysis. For a comprehensive overview of all fears and their corresponding sources, see Appendix B, which also contains the full set of extracted quotes.

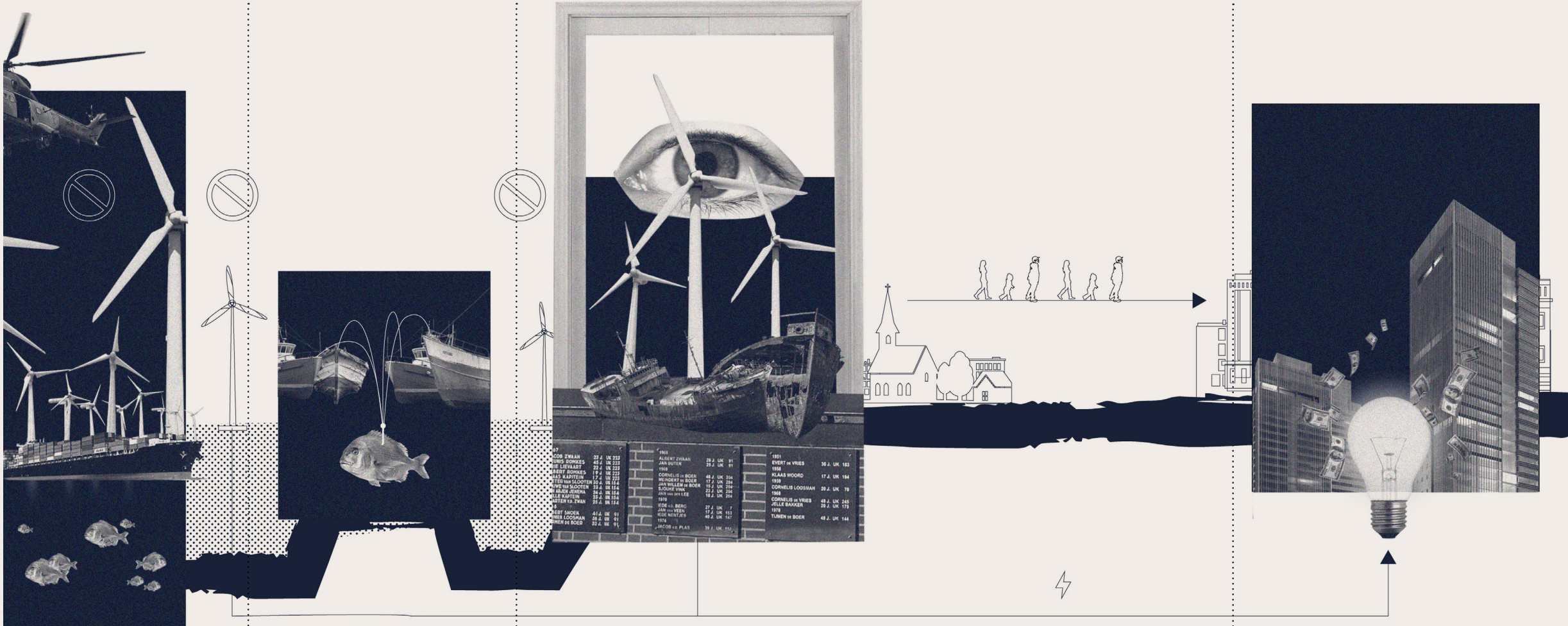


Figure 4.20: Fear Section of the Fishing Communities, presenting the key concerns and anxieties of the fishing communities, highlighting their perceived threats, uncertainties, and fears for the future.

Sources: pngwing; freepik; Vecteezy

LOSS OF FISHING GROUNDS

New Burdens:
Windparks at Sea

Enhanced by:
Brexit
Fishing Quotas

Military / Shipping / Oil / Nature Zones

COMPETITION

LOSS OF ECONOMIC FEASIBILITY AND IDENTITY

New Burdens:
Higher Fuel Usage
Higher Fuel Costs

Enhanced by:
Slow/Little Fuel Subsidies
Ban Pulse Fishing

Windparks on Shoreline
Generational Decline

UNEQUAL
BURDENS & BENEFITS

4.2.3 DREAMS / ASPIRATIONS

Fishermen hold hopes of sustaining their livelihoods and preserving community traditions, dreaming of stable seas, supportive regulations, and thriving maritime industries that allow them to work with confidence and pride. The following section highlights key media-reported wishes expressed by fishermen across the north sea.

Less wind farms

“We have been saying for years that it is insane to fill the North Sea with wind turbines without taking into account fishermen, nature and a healthy food supply.” (van Hove, 2025, p. 1)

The fishermen aspired to keep their work environments stable by limiting large developments like wind farm projects thus protecting access to waters and preserving fishing populations and navigations (Moons, 2024; van Hove, 2025). They believe that this ensures a consistent and reliable livelihood that safeguards conditions that benefit both their communities and a broader ecosystem.

Changes in policy/regulations & more cooperation

„What also doesn’t help is the strict regulations within wind energy zones. For example, fishermen who have been granted permission to enter the area must maintain a minimum distance of 250 meters from the turbines. Lobsters and crabs are particularly abundant around the foundations, having found shelter among the rubble.” (Wisse, 2024, p. 2)

Fishermen face strict regulations that make working in offshore rent farms insufficient and unprofitable (Wisse, 2024). Rules preventing the use of multiple phishing gears in a day maintaining A-250 meter distance from turbines and prohibiting nighttime fishing block access to areas rich in lobsters and crabs (Wisse, 2024). Combined with heavy bureaucracy, these obstacles force fishermen to navigate rules rather than focus on the catch, highlighting the urgent need for reforms to make these zones more accessible and productive (Wisse, 2024).

New jobs at sea

“I’ve been at sea all my life. You shouldn’t put me behind a computer in an office.” (DeTelegraaf, 2022, p. 2)

Since many fishers’ identities are tied to the sea, new jobs should remain maritime, even if they aren’t traditional fishing roles. Positions in offshore maintenance, wind farm operations, aquaculture, or supporting roles onshore, like logistics and fish processing, allow fishers to stay connected to the marine environment, use their expertise, and transition to alternative livelihoods without losing their skills or identity. (DeTelegraaf, 2022; Akinci, 2023 & Boelens, 2022)



Figure 4.21



Figure 4.22



Figure 4.23

Possibility of fishing between windfarms / Co-use

“Where large wind turbines are now being erected, there is room for large ,fish basins’. [...] according to Flynth director Auke Hoefnagel, young fish could be raised there.” (van Dillen, 2024)

The fishermen aspired to keep their work environments stable by limiting large developments like wind farm projects thus protecting access to waters and preserving fishing populations and navigations (Moons, 2024; Wisse, 2024; van Dillen, 2024). They believe that this ensures a consistent and reliable livelihood that safeguards conditions that benefit both their communities and a broader ecosystem.

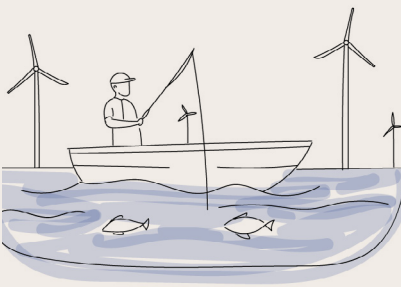


Figure 4.24

Strategic park structure

“In terms of mitigation, the government is asking developers to consider the types of fishing that takes place in the area and their minimum operating space requirements (for deploying and hauling gear) and vessel manoeuvrability. This is then factored into wind farm layout, configuration and turbine spacing at an early design process stage.” (van Hoey et al., 2021, p. 50)

Reorganizing the layout to leave major, historical fishing grounds untouched or creating shipping corridors allows fishermen to reach distant grounds more efficiently. This is then factored into wind farm layout, configuration and turbine spacing at an early design process stage (van Hoey et al., 2021). For example, ensuring turbine spacing is at least 800 m to 1000 m allows fishing activity to continue after construction of the wind farm and encourages coexistence between marine users and industries (van Hoey et al., 2021).

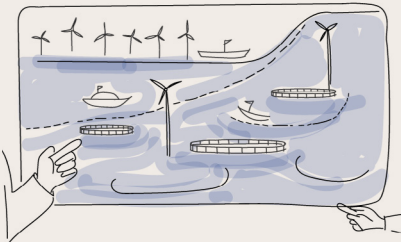


Figure 4.25

Aquaculture integration

“[...] OWF expansion is seen as an opportunity for Blue Growth activities like aquaculture [...]. To develop offshore aquaculture in OWFs, co-management of multi-use initiatives by wind developers and the aquaculture sector can be developed and stimulated by governments 2021.” (van Hoey et al., 2021, p. 22)

Fishermen see offshore wind farms (OWFs) as an opportunity to expand aquaculture rather than a threat (van Hoey et al., 2021). Current aquaculture in the North and Baltic Seas is not endangered by OWF construction, and OWF expansion could support Blue Growth activities, including aquaculture (van Hoey et al., 2021). Fishermen advocate for government supported co-management between wind developers and the aquaculture sector to promote multi-use initiatives within OWFs (van Hoey et al., 2021).

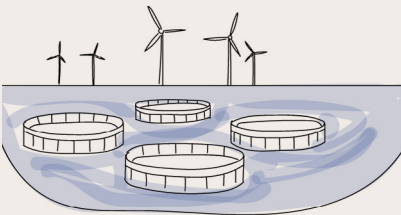


Figure 4.26

4.3 A Diverse Community: Acknowledging Differences in Dutch Fishing Communities

4.3.1 SUB COMMUNITIES

Based on the media analysis it is evident that energy transitions have a profound impact on various members of the community while the significance of these transitions is widely recognized the opinions and reactions differ across groups. Based on these differences the community is divided into several subgroups.

Figure 4.27: Sub Communities in Fishing Communities



Traditional fishers

Represent a group strongly anchored in continuity. They demonstrate a clear commitment to preserving existing fishing practices and actively resist structural or regulatory transformations.

Their stance is not merely passive preference but often manifests as vocal opposition, suggesting a perceived threat to cultural identity, livelihood stability, and accumulated expertise. This group tends to frame change as externally imposed and potentially unjust, reinforcing their collective resistance.



Tierd fishers

Occupy a more precarious and transitional position. Although they initially express a desire to maintain their role within the fishing industry, they are less vocal and increasingly disillusioned.

Structural pressures be it economic instability, regulatory burdens, or declining yields gradually erode their capacity to persist. Unlike Traditional Fishers, their resistance is subdued, and over time, they may disengage entirely, often without a clear alternative pathway.



Silent fishers

represent an ambivalent category shaped by internal conflict. While they are potentially open to leaving the fishing profession or transforming their livelihoods, they are constrained by deeply embedded social norms, traditions, and a sense of pride.

Their hesitation is less about lack of awareness and more about the social and cultural implications of change, including fear of judgment within tight-knit communities. As a result, their position remains largely unexpressed, making them less visible in public discourse.



Adaptive fishers

in contrast, embody a forward-looking perspective. While they share with Traditional Fishers a desire to remain within the fishing sector, they acknowledge shifting conditions and seek to reposition themselves accordingly.

Their approach is characterized by openness to innovation, diversification, and alternative economic strategies linked to fishing or maritime livelihoods. This group demonstrates a higher degree of agency and resilience, actively engaging with change as an opportunity rather than as a constraint.



Fisherwomen

Occupy a position between Silent and Adaptive Fishers, reflecting a complex interplay of social, economic, and gendered factors. Their engagement with the industry is shaped by a desire for structural changes and seek greater financial stability, equitable distribution of labor burdens, and recognition of unpaid contributions within fishing households and communities.

To them the ongoing energy transition and broader sectoral shifts present potential opportunities to address these long-standing inequities.



Younger generation

The next generation of fishing communities aligns closely with the characteristics of Adaptive Fishers. Unlike older cohorts who may prioritize continuity, these younger fishers are committed to remaining connected to their communities while recognizing that the fishing industry must evolve to remain a viable and attractive profession.

Their outlook demonstrates a pragmatic and forward-looking approach, reflecting an understanding that resilience and sustainability in the sector depend on both adaptation and community cohesion.

4.3.2 SUB-COMMUNITIES TYPOLOGY

The following matrix is used to position each of these sub communities within a two dimensional field helping to illustrate their response to energy transitions. The matrix is structured along two axes.

The vertical axis represents the level of engagement or vocal intensity ranging from passive at the bottom to active at the top. The horizontal axis reflect their approach to livelihoods indicating whether the communities prefer to maintain traditional fishing practices (status quo) or shift toward alternative marine-related occupations and operations (experimental)

Together these axes provide a framework for understanding how different sub communities perceive and respond to change highlighting both their level of participation and their strategic orientation towards future opportunities.

- TRADITIONAL FISHERS
- TIERD FISHERS
- SILENT FISHERS
- ADAPTIVE FISHERS
- FISHER WOMEN
- YOUNGER GENERATION

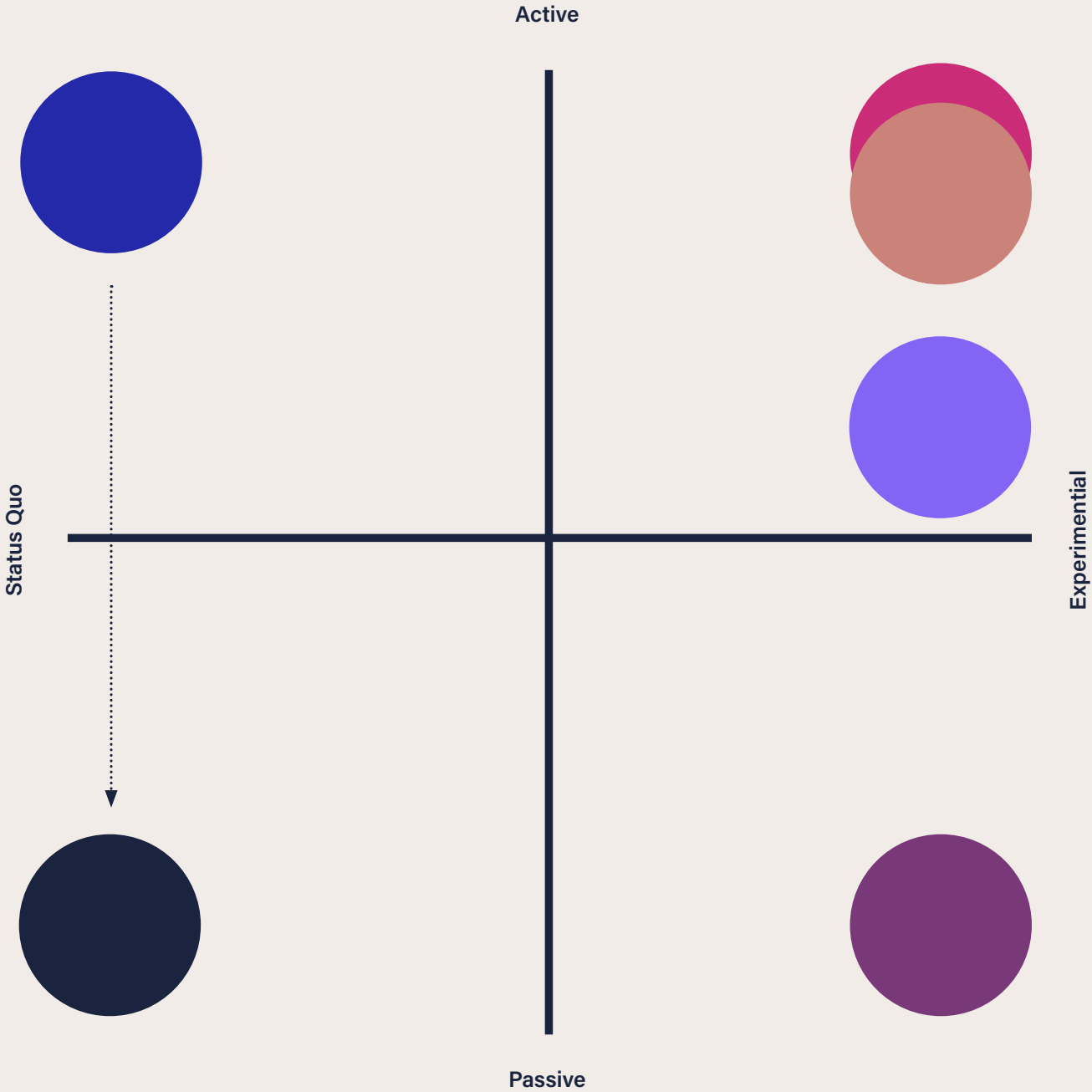


Figure 4.28: Positional Matrix, presenting each of these sub communities within a field thus helping to illustrate their response to energy transitions.

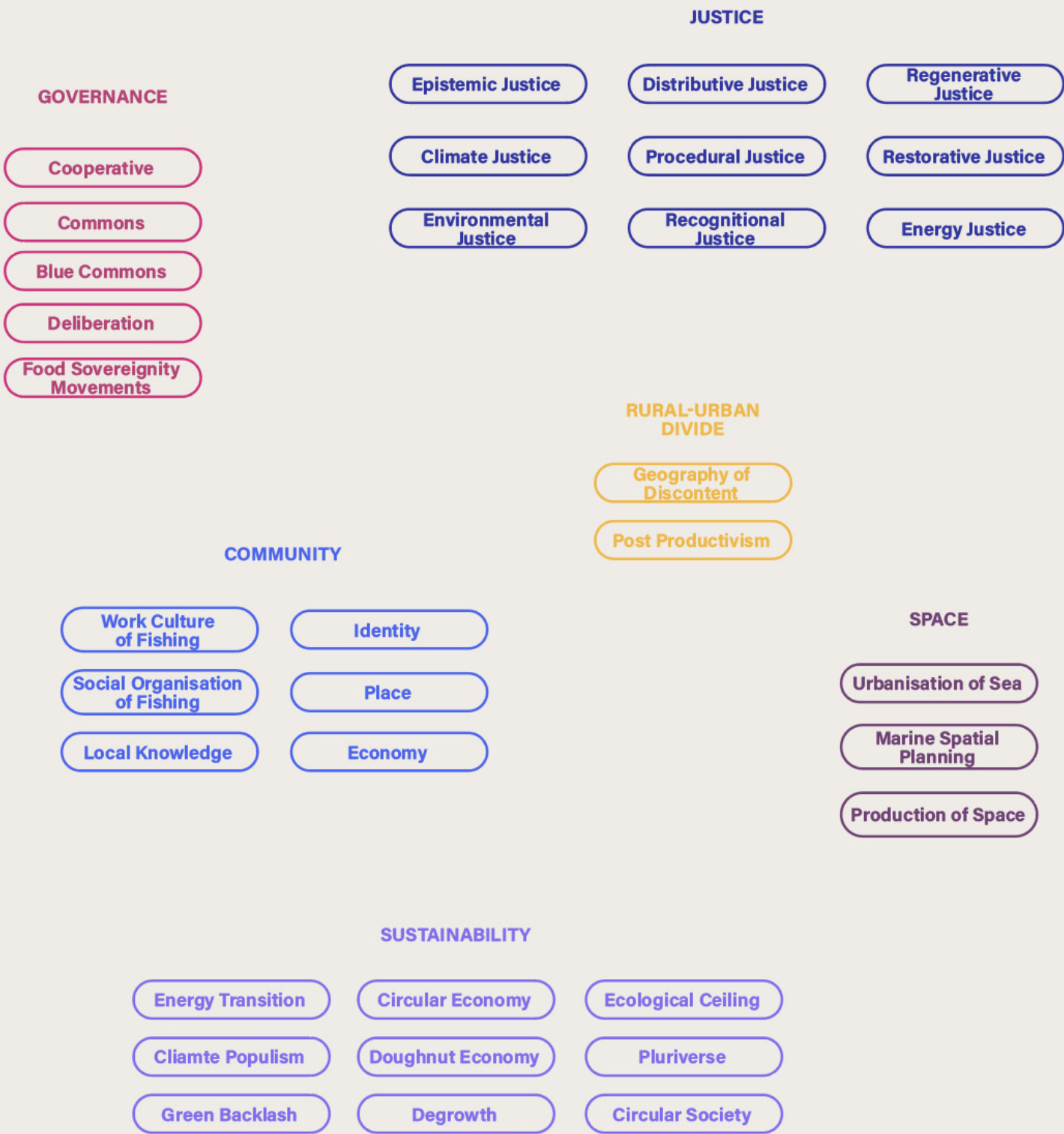
5 Conceptual Framework

The proposed framework positions the dreams and fears of fishing communities within the broader theoretical discourse on just energy transitions. The integration of local and academic knowledge enables the operationalisation of theory and the envisioning of an alternative community future.

5.1 Introduction: A Dialogue Between Local and Academic Knowledge

Diverse concepts and theories were explored to navigate the struggles of fishing communities in the context of energy transitions and regional planning. Figure 5.1 provides an overview of the breadth of literature considered in developing the conceptual framework. This body of knowledge offers a cross-disciplinary understanding of how fishing communities are positioned within energy transitions across spatial scales, and of the broader societal forces that shape their lived experiences. Key concepts were then selected to formulate the conceptual framework guiding the research and design processes.

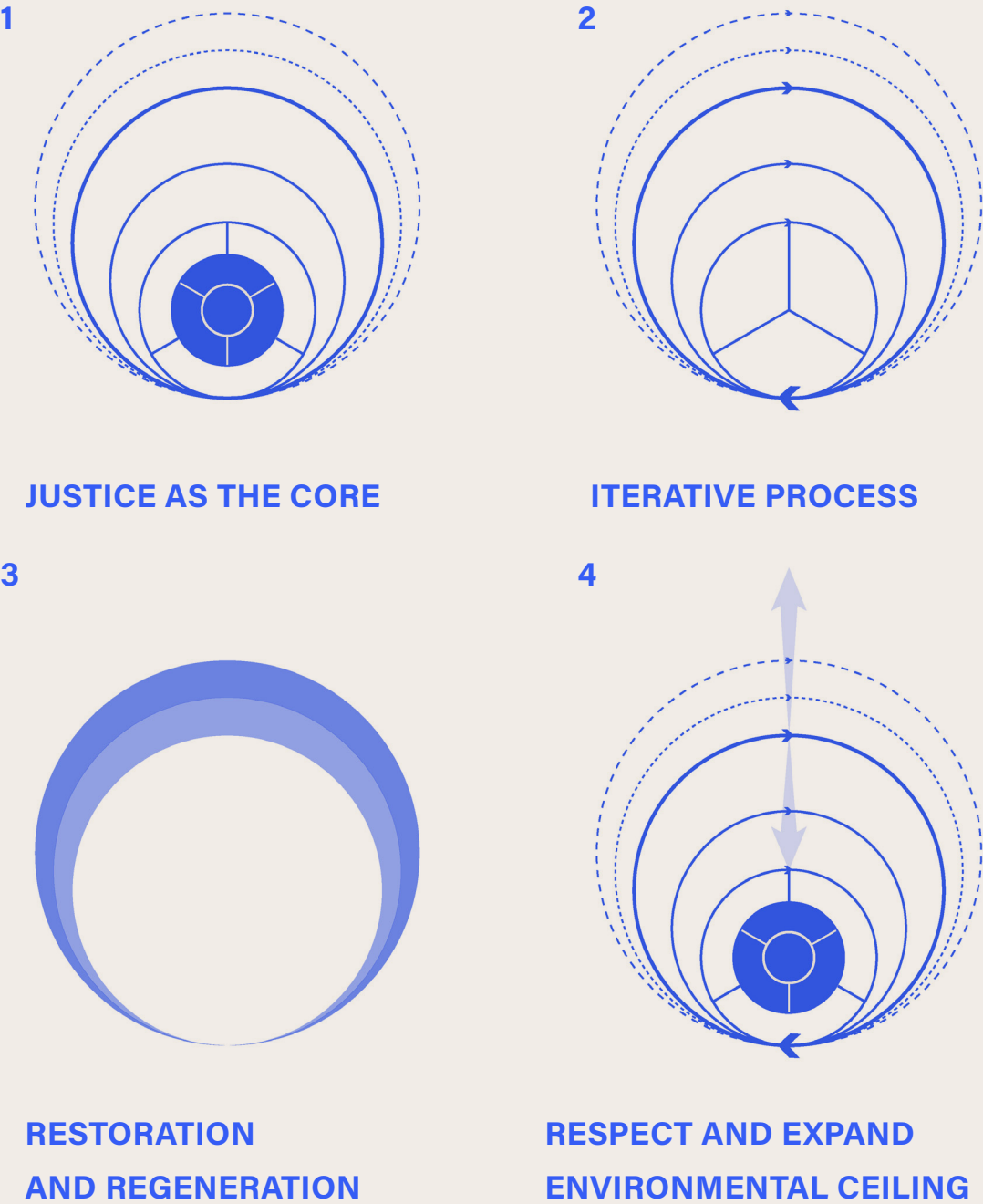
Figure 5.1: Concept Brainstorm Board



5.2 Conceptual Framework: Towards Regenerative Justice in the Energy transition

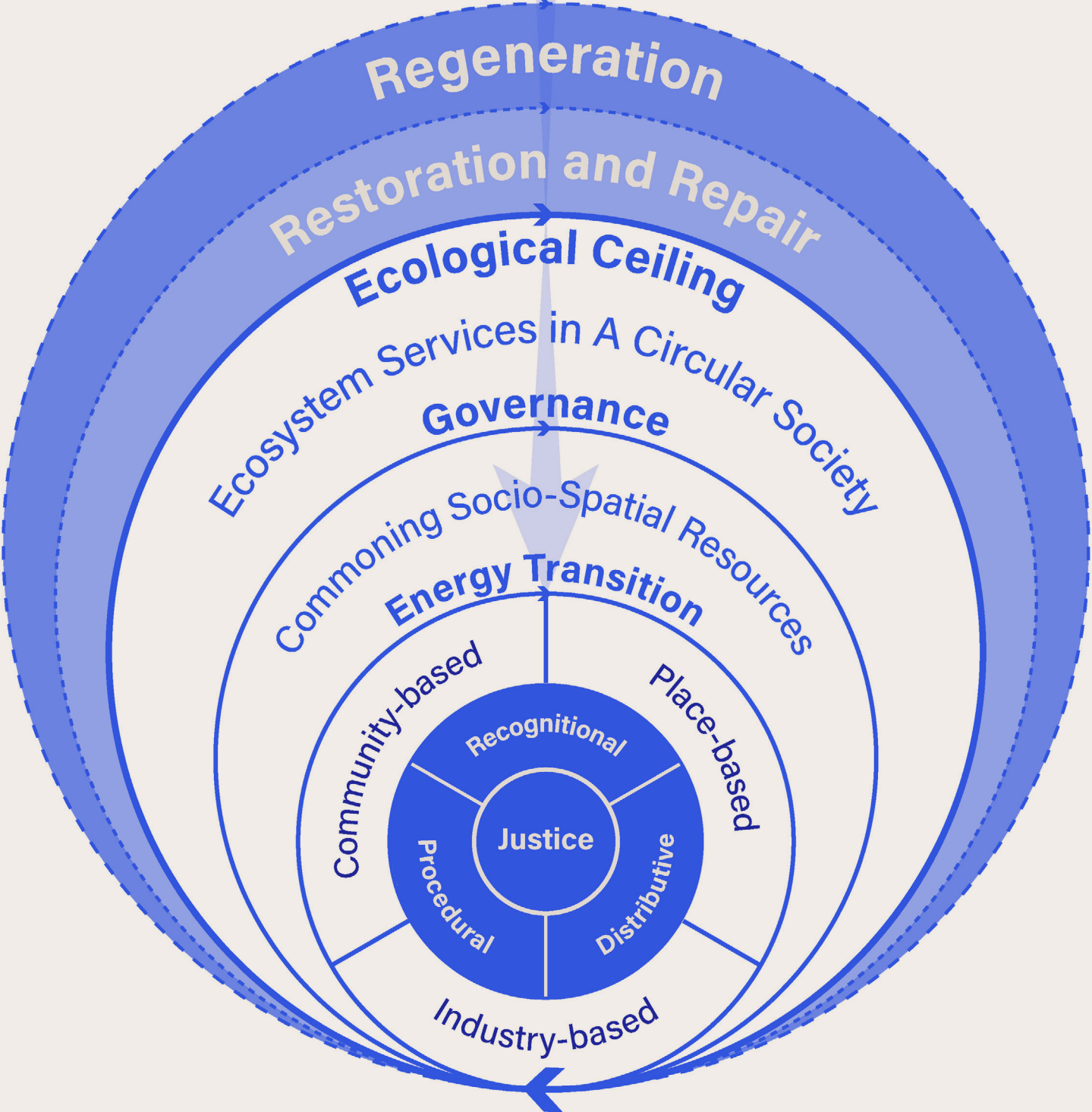
The framework adopts a justice-oriented approach, with justice, encompassing recognitional, procedural, and distributive dimensions, at its core. These three dimensions guide community-based, place-based and industry-based measures of the energy transition. They further inform the formulation of three goals underpinning the project’s vision of safeguarding the livelihoods of fishing communities. These measures are supported by a common comprising diverse stakeholders in the energy transition, around the IJsselmeer and the North Sea. The commons facilitates the negotiation of managing socio-spatial resources within the ecological ceiling. A circular society could further safeguard this by facilitating resource efficiency and social justice. Through effective commoning, the commons could first restore and repair environmental impacts, before progressing towards regenerative measures to expand the ecological ceiling in the long term. Ultimately, enhancing the resilience of ecological systems and advancing more-than-human justice.

Figure 5.2: Project conceptual framework supplemented by key features



Justice-Oriented Approach

Conserving and Expanding Environmental Ceiling



Key concepts included in the conceptual framework are further expanded and contextualised.

Spatial Justice

The relationship between social justice and space was first developed by Harvey (1973), who introduced the concept of territorial distributive justice as a precursor to territorial social justice. He explained that the goal of territorial social justice encompasses two aspects: the equitable distribution of income and the mechanisms that facilitate it. Soja (2010) coined the term spatial justice and further solidified the socio-spatial dialectic, arguing that the spatiality of (in)justice shapes social processes in the same way as the other way around. He further expanded on how injustices are produced and reproduced through land ownership via ongoing enclosure, replacing collective ownership of land with individual, public, or private ownership. Positioning this concept, along with the debate on the energy transition in the North Sea demonstrates how “the ‘Great Enclosure’ of the sea” (Standing, 2023, p. 20) has (re)produced the injustices that fishing communities experience during the energy transition.

To operationalise this concept in the research and design process, Rocco (2025) identifies three dimensions of spatial justice: distributive, procedural and recognitional justice (Rocco, 2025). Within the proposed framework, justice serves as the fundamental lens through which other concepts in the project are articulated.

Energy Transition

Energy Transition, according to Yang et al. (2024),

refers to a process of fundamental transformations of the main elements of the energy system towards a new configuration of energy service embodied in a prolonged chain and complex system that involves energy production, storage, transmission and consumption, energy technologies, management, and practices related to energy security, geopolitics, and energy governance. (p. 3)

The transition towards renewable energy from fossil fuels represents the third energy transition human society has experienced. Given the intertwined relationships between energy systems and social, environmental and ecological systems, Yang et al. (2024) call for further research on the multi-scalar impacts of energy transition to safeguard a just trajectory. Informed by the justice-oriented framework, the project approaches the energy transition through a just lens, ensuring distributive justice, procedural justice, recognitional and restorative justice, as outlined by Carley and Konisky (2020).

Positioning fishing communities as the transition community, this project situates energy transition within a community perspective. According to Kraan et al. (2025), fishing communities can be understood as (i) place-based, (ii) social and cultural-historic, and (iii) practice-based. The impacts of energy transition are examined through these three lenses, yielding (i) place-based, (ii) community-based, and (iii) industry-based measures ^(figure 5.2).

Commons

Commoning serves as a mechanism to govern the socio-spatial resources generated by energy transitions, preventing Hardin's (1968) notion of “the tragedy of the commons” from occurring in the sea. His allegory of the rational herdsmen who seek to maximise their gain on a shared pasture reflects how “freedom in a common brings ruin to all” (p. 1244). The dilemma of privatising or regulating the rights to access was later addressed by Ostrom (1990), who proposes self-governance as an alternative approach to managing common-pool resources. Her empirical research on long-lasting commons institutions is summarised into eight design principles, which guide the development of

the commons governance system in this project.

The application of commons as an analytical framework serves to unfold the diverse interests in the energy transition across three dimensions: (i) common resources, (ii) commoning practices, and (iii) commoners (Kip et al., 2015). As the gradual urbanisation of the sea makes the commons no longer governed by local communities alone, but increasingly features regional and global actors, a definition of the urban commons is adopted. According to Huron (2015), the urban commons is “a specific way of experiencing collective work, among strangers, to govern non-commodified resources in spaces saturated with people, conflicting uses, and capitalist investment” (p. 977).

To contextualise the commons concept, two new concepts, namely blue commons and energy commons, are introduced. Standing (2023) defines the sea as the ‘blue commons’, whose resources have been exploited under rentier capitalism, and calls for the transformation from blue growth to blue commoning. He stresses the need to strike a balance between human and non-human beings and further outlines seven principles supported by a common-wealth distribution system and funds. Furthermore, there is growing research and practice on energy commons in the energy transition. Bauwens et al. (2024) identify five paradoxes requiring further research, including the need to integrate decentralised local energy commons with multi-level governance structures, and the relations between the commons and the state and market. These paradoxes are conducive to guiding the engagement and policy design.

Ecological Ceiling

Inspired by The Doughnut of social and planetary boundaries 3.0 (“The Doughnut”), the definition of the ecological ceiling is adopted, drawing on the nine dimensions of the planetary boundaries framework (Raworth, 2025). The framework “identifies nine processes that are critical for maintaining the stability and resilience of Earth system as a whole” (Richardson et al., 2023, p. 1). According to Fanning and Raworth (2025), seven out of nine planetary dimensions were overshooting their boundaries in 2022, including climate change and biodiversity breakdown. Although the energy transition primarily contributes to the mitigation of climate change, its indirect impacts on the other planetary boundaries must be considered. By recognising the ecological ceiling as the absolute boundary constraining future development, the project develops an alternative approach to counteract the growth-oriented energy transition narrative. It also expands the notion of just transitions, specifically just for whom, questioning whether non-human beings are included.

Circular Society

Derived from circular economy, the circular society “could help break from economy-centric and capital-centric understandings of circularity and expand the imaginary towards key socio-ecological cycles and considerations” (Calisto Friant et al, 2024, p. 33). It serves as “an umbrella concept that unites all these alternative circularity visions and perspectives” (p. 33). The authors further clarify the concept of circularity through seven socio-ecological cycles⁸, highlighting their fundamental importance in securing both human and planetary well-being. In the energy transition, recognising the entangled nature of these cycles fosters a more holistic understanding of the transition community and facilitates the development of strategies across the seven systems.

Calisto Friant et al. (2020) categorised the diverse circularity discourses into four typologies: the Reformist Circular Society, the Transformational Circular Society, the Technocentric Circular Economy and the Fortress Circular Economy. This project is positioned between the Reformist and Transformational Circular Society typologies which, according to the authors, are the most complex to achieve. Guided by a justice-oriented framework, the project aims to “challenge and transform capitalist value definitions” (p. 1) and “foster agency rather than passivity” (p. 2), both of which are central themes in advancing the discussion of the Circular Society as outlined by Jaeger-Erben et al. (2021).

⁸ Seven socio-ecological cycles include: (1) Biogeochemical cycles of the Earth, (2) Ecosystem cycles, (3) Resource cycles of materials and energy, (4) Political cycles of power, (5) Economic cycles of wealth, capital and money, (6) Knowledge cycle of technology, information and education, (7) Social cycles of care

Restorative (Environmental) Justice

It refers to “repairing the harm of the Anthropocene” while “healing earth systems and healing the relationship of humans with nature and with each other” (Biffi & Pali, 2019, p. 9). In contrast to conventional justice, which focuses on material victim reparation, punishment and its deterring effects, restorative justice focuses on moral and emotional reparation, needs-based reparative action and empathy towards victims (Minguet, 2021). The author stresses the need to adopt a restorative justice approach in addressing environmental conflicts, so that the impacts of perpetrators’ behaviour on environmental and human health can be repaired. As restorative justice is a collaborative process involving stakeholders (Minguet, 2021), the commons serve as an effective governance mechanism to facilitate the restorative practices of energy corporations.

In practice, Forsyth et al. (2021) identify five attributes of environmental restorative justice: (i) repair harm, (ii) direct participation of perpetrators and affected communities, (iii) dialogue and storytelling as means of empowerment, (iv) identification of harm and responsible stakeholders, and (v) accountability of stakeholders with power. Grounded in the principle of voluntary participation in the restorative justice process (Minguet, 2021), the project incorporates diverse methods for engaging stakeholders, particularly fishing communities, who are most affected by the energy transition. This opens an alternative pathway to envisioning a future in which more proactive efforts are directed towards repairing ecosystems through the energy transition.

Regenerative Justice

Developed from the field of criminology, regenerative justice refers to the combination of restorative and generative justice, with an emphasis on explicit and intentional meaning-building towards the future (Hansen & Umbreit, 2018). Regenerative practices could potentially mediate relations between offenders and victims, namely energy corporations and fishing communities, in the energy transition context. Rastegar (2025) further defines regenerative justice, in the field of tourism, as “a transformative paradigm aimed at renewal and growth (regenerate)” (p. 3), extending beyond addressing past harms. The concept, therefore, builds on restorative justice and proposes a more proactive approach to improving the environment.

To operationalise regenerative justice in the design process, literature on regenerative design and regenerative sustainability is incorporated for further elaboration. As described by Reed (2007), regenerative design positions humans as part of nature and enables more-than-human flourishing through co-evolution. By combining regenerative design with distributive design (central to the proposed framework), the project moves towards what Raworth (2017) described as “the Doughnut’s safe and just space” (p. 147). The sustainability discourse, therefore, requires further transformation from a mechanistic to an ecological worldview, which enables the reconceptualization of relationships between human and non-human systems (Zhang et al., 2015). In the energy transition context, this calls for a scrutiny of the notion of ‘green’ energy: how green it is, and green for whom.

Practically, regenerative planning creates room for nested communities to transform their surroundings across spatial scales (Crowley et al., 2021). The authors also highlight the importance of a “fractal-like, multi scaled [sic], community-led, bottom up [sic] governance” structure in upscaling local regenerative practices (p. 101). The ongoing engagement of citizens would facilitate the co-evolution between communities and their ecosystems.

6 The Vision

Building on the conceptual framework, this chapter translates the theoretical foundations into a shared vision for the North Sea and the IJsselmeer, and its fishing communities. Rather than proposing immediate spatial interventions, it focuses on bringing together different perspectives, values, an aspiration into a coherent narrative of the future. The chapter begins by exploring the dreams of different fishing subcommunities, highlighting their diverse needs and concerns. These are then synthesised into our collective vision, which is further structured through a set of interconnected goals and design principles.

6.1 Vision Statements

Before creating the vision, it is important to understand the perspective of the fishing subcommunities themselves. This section presents individual vision statements that reflect the values concerns and aspirations of different groups. By capturing these diverse perspectives, common ambitions and potential tensions can be identified, later forming the foundations for a shared future of the Dutch fishing communities.

Figure 6.1 Photograph of a Fishing Boat in the Water
Source: Freepik



6.1.1 SUB COMMUNITIES VISION STATEMENTS

Following the media analysis, the perspectives of different sub communities were translated into individual vision statements ⁹. These statements capture how each group envisions the future, reflecting their key values, concerns, and ambitions.

⁹ These statements are not direct quotations from specific sources in the media analysis, but rather a synthesis of findings across all analyzed materials. For traceability and access to the original quotes, see Appendix B.

Figure 6.2: Sub Communities Vision Statements

Traditional fishers

“Fishing is at the heart of our community and identity, and we are proud of our longstanding contribution to the Dutch fishing industry. Generations of our families have relied on the sea for their livelihoods, and we want to continue in passing this tradition on to our future generations. Well we recognise the pressure of modern regulations, technological changes, and the expansions of offshore wind energy, we remain committed to keeping fishing central through our town’s economy and culture.

We envision a future where our fishing practises are respected and supported by government policies that consider our expertise, our economic contributions, and our social role in the community. We hope for more dialogue and collaboration, where our forces are heard before decisions are made about fishing grounds, energy developments, or environmental regulations. The government should consider other energy resources and look for better areas for the windfarms, so we can sustain our traditions and family businesses.”



Tired fishers

“Fishing has been part of our families for generations, yet the future feels uncertain. EU- wide restrictions, the white spreads installations of wind turbines, and dwindling interest from younger generations make it hard to see a path forward. We have little hope that the industry can recover under current conditions, and many of us face a difficult reality of changing careers to survive.

Despite these challenges, we aim to remain connected to maritime work wherever possible, through fisheries, vessel support, or other coastal industries. We hope for opportunities to re-enter the industry if conditions improve, and we call for greater consultation with local communities before major decisions are made. Our vision is a community that balances survival with identity, where those who are forced to leave the industry can still return, and where the wisdom and expertise of generations remained valued even in a changing economic landscape.”



Silent fishers

“We see a future in which our community transforms to remain resilient while preserving maritime traditions. Parts of our fishing fleets will shift towards tourism and recreation, creating safer and more stable livelihoods, while other members take on emerging roles in offshore wind support, maintenance, and inspection.

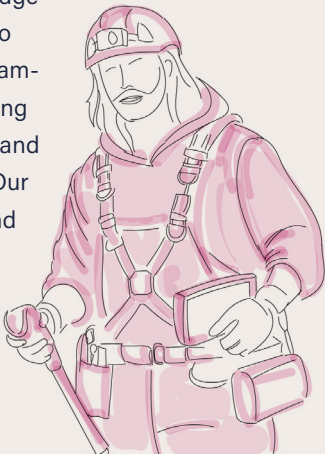
Access to training, equipment, and financial support will allow us to maintain our expertise, strengthen technical and digital skills, and navigate highly regulated offshore environments. We envision young people having meaningful career paths in renewable energy, tourism, and maritime services, while remaining connected to the fishing communities and contributing to community life. Tradition and innovation will coexist, ensuring that our maritime knowledge, family livelihoods, and social cohesion continue into the future.”



Adaptive fishers

“We are part of a community proud of its adaptability, entrepreneurship, and deep connection to the sea. All fishing remains an important part of our identity, we recognise the need to diversify economic roles and strengthen our community’s position in fish processing, trade, logistics, and related maritime sectors.

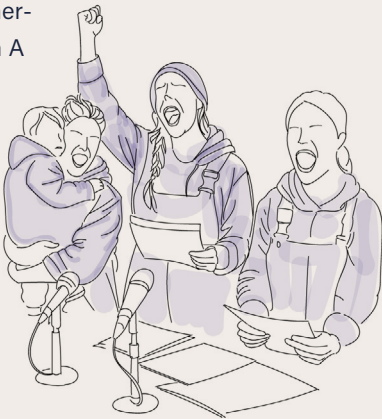
We envision a fishing sector that is both economically viable and environmentally responsible, supported by innovation, modern practises, and fair regulation. By combining practical knowledge with higher education and professional experience, we aim to create long term opportunities for our community. Urk for example will become a hub for sharing maritime knowledge, training new generations in sustainable practises, vessel operations, and emerging sectors such as offshoring and maritime tourism. Our goal is a resilient, all sufficient community where tradition and innovation work hand in hand.”



Fisherwomen

“We see a future where family businesses remain strong, and our role as women is recognised and supported. We contribute not only to economic stability but also to emotional and social resilience, and we seek policies that reflect this.

Stable and diversified income, shared responsibilities, and improve childcare and health care access allow us to support our families while participating fully in community life. We aim for inclusive decision making, where women have a voice in shaping the future of the fishing industry. By fostering skills, mentoring younger generations, and strengthening family networks, we envision A resilient and balanced community that preserve traditions while opening opportunities for all.”



Younger generation

“We will remain part of the community we love, grounded in solidarity, traditions, and connection to the sea. Phishing continues to define our identity, did we also seek opportunities to use our skills and education to strengthen family businesses and the wider economy.

Our vision is a future where livelihoods support both work at sea and family life, where young people can pursue diverse careers in fisheries, tourism, and renewable energy while remaining connected to our community. We seek a balance between tradition and change, ensuring our self-sufficient, resilience community where knowledge, culture, and family bonds are ensured for future generations.”



Conflicts and Synergies

To further structure these visions and bring them together into one vision statement, the underlying wishes have been organised into a comparative overview. The table below (figure 6.3) translates the subcommunities visions into a set of concrete themes, making potential overlaps, conflicts, and synergies between groups more explicit and providing a foundation for the design.

By synthesizing shared ambitions and carefully addressing conflicts between the different sub-communities, unifies main vision statement was developed (see the next page). This vision builds on the previous identified wishes and their main relationships, translating them into a cohesive direction that guides the overall design and future development.

Text

Symbiosis between sub-communities

Text

Conflicts between sub-communities

Text

Half-Half (Symbiosis with some others sub-communities but not all)

Text

Added translations of dreams from the authors

Figure 6.3: Table of Community Wishes, showing conflicts and synergies between sub-communities

SPATIAL DESIGN PRINCIPLES	TRADITIONAL FISHER	TIRED FISHER	SILENT FISHER	ADAPTIVE FISHER	FISHERWOMEN	CHILDREN/ THE FUTURE GENERATION
	The sea as an open space, to protect fishing hotspots and routes. (No more wind farms at sea, The north sea as common ground, Opening up the Afsluitdijk and Return the most profitable fishing grounds, trough the deconstruction of wind parks) Reinstate the important local fishing community status (Deconstruction of Wind Park in front of fishing communities , Urk as the centre for fish export and Shared community tools) Fishing stock protection tactics to keep traditional fishing (Turbine base mussel farm, Windturbine reef bases to attract fish (fishers could fish here and help sustain) and Offshore windturbines with noise canceling bases) The energy transition as a way to keep the way of traditional fishing (Local Solutions for energy production, The fishing communities as part of an energy cooperative for clean energy and Electric fleet floating charging hub)	The sea as an open space, to protect fishing hotspots and routes. (Make spaces for Aqua-culture to diversify fishing industries)	Using change to protect the fishing heritage and showcase our traditions (Transform part of our fishing fleet into vessels for recreation and tourism along with preserving maritime knowledge and traditions and Harbour zone dedicated for working + tourism fleet) Transition into new maritime professions connected to offshore wind farm (Urk as a physical service node for offshore wind operations, Technical yards for manufacturing and repair of offshore equipment, fishermen re-educated for maintenance of wind turbines with training workshops) Enabling Technological Up-grades in Fisheries (Access to financial support to adapt our boats and invest in equipment and Labs for installation of navigation, monitoring and safety systems) Next-Generation transition in Career Pathway (Career discovery and orientation center and Flexible teaching rooms for schools and training providers)	Broader range of employment opportunities (close to home), for resilient and self-sufficient future (Small workshops for marine engineering and Shared prototyping / testing spaces) Regional hub for sharing and transferring knowledge on fisheries (Offshore wind and marine systems training workshops and Knowledge of fishers as a part of national wide marine courses) Using change to protect the fishing heritage and showcase our traditions (Reuse historic sheds, quays and warehouses as active buildings and Windturbinse reef bases to attract fish (fishers could fish here and help sustain)) Preserving the Social Fabric of Fisheries (Remain part of the fishing community and that fishing remains part of our identity) Developing an economically viable and environmentally responsible practice (Public Transport for ships to get further on the sea, Rotational Sea Steward Zones and Production of their own bio-based fuels) New forms or energy support the fishing industries towards a more sustainable future (Hydrogen wind turbines, Windfarms in the deep parts of the sea, Fishing between the wind turbines)	Broader range of employment opportunities (close to home), for a resilient and self-sufficient future (More fishing-related businesses and More businesses in general) Extra support for the future generation of the fishing communities (Higher Educational Spaces, Spaces of informal Maritime Learning close to home, Places where children can learn about fishing to feel closer to their father, Childcare facilities supported by the government nearby, Protection of Spaces of the Community and Offshore storm refuge platforms)	Broader range of employment opportunities (close to home), for a resilient and self-sufficient future (More fishing-related businesses, More businesses in general and New connections to the sea) Extra support for the future generation of the fishing communities (Higher Educational Spaces, Spaces of informal Maritime Learning close to home, Places where children can learn about fishing to feel closer to their father, Childcare facilities supported by the government nearby and Protection of Spaces of the Community)
	New Policies: Economic stability support (Fuel Compensation, Subsidies to make Vessels CO2 friendly, Insurance Security and Credit Security) Involvement in our own fishing future (Direct impact on decisions where and if windparks are built at sea) Cancellation of Existing Policies: Removing Operational Restrictions in Fisheries (Pulse Fishing, Transportation of multiple types of fishing equipment on one cutter, Quota on fishing and the Prohibition of Night Fishing) Reduce Fisheries-Driven Spatial Regulation (Fines in case of damage to cables/wind parks and breach of access restrictions, Brexit: Accesibility/Fishing Restrictions UK waters and Restrictions Zones around Wind Parks and Oil rigs)	Fisheries Workforce Transition and Diversification (Upskill training programs for fishers who plan to work in other industries, Transitional programs for fishers who want to work in other part of the fishing value chain and Diversify fishing industries) Support for the Green Transition of the Fishing Fleet (Subsidies for energy-efficient and nitrogen-friendly shipping vessels (given tired fishers could have more financial constraints))		Fisheries Workforce Transition and Diversification (Providing free or affordable workshops and training for fishermen to gain the necessary qualifications to work and Funding for documentation and teaching programmes to support vernacular knowledge to be transfer within the community and to others) Enabling Technological Upgrades in Fisheries (Providing subsidies to upgrade existing vessels so they can be repurposed for part-time maintenance work) Spatial Safeguarding of Maritime Functions (The municipality reserves land exclusively for future maritime and fisheries-related activities) Simplified accreditation procedure	Compensation and Community Safety Nets (Compensation for Fisherman Partners (e.g. for unpaid labour around fishing and unstable income situation of partner): Fisher widow pension fund and Compensation for important family days) Balanced and Secure Work Conditions (Safety upgrades vessels subsidised, Health Regulations for Fisherman, Stable working hours fisherman (9-5 scheme rapprochement), Flexible Working Hours Child Support and Part-Time Fishing subsidies) Gender Equity in Fisheries (Gender Pay-Gap Policies and Direct inclusion of fisherwomen groups at EU and National Level) Fisheries Workforce Transition and Diversification (Upskill training programs for fishers who plan to work in other industries)	Study-Subsidies for the next generations that contribute to more sustainable fishing future Balanced and Secure Work Conditions (Safety upgrades vessels subsidies, Stable working hours fishermen, Flexible Working Hours Child Support, Part-Time Fishing subsidies and Fishing shifts (fisherman share a boat, where half go fishing monday-thursday and the other the rest of the week, so the rest can have family time as well)) Compensation and Community Safety Nets (Compensation for important family days (e.g. instead of sick days / family days like birthdays etc.))
OTHERS	Fisheries as a Social System (More Education of the public what the Dutch fishermen do for food security and A fishing wellness program to check mental- and body health) Ensuring Ecological Integrity in Offshore Development (More Research/Higher Restrictions on the effect of Wind Parks on currents and fish movements)			Using change to protect the fishing heritage and showcase our traditions (Seasonal Sea Festival Around Migration, to celebrate fishing as a profession as well)	Balanced and Secure Work Conditions (Fishing shifts (fisherman share a boat, where half go fishing monday-thursday and the other the rest of the week, so the rest can have family time as well)) More research/data collection on women in fishing industry	

6.1.2 SHARED VISION STATEMENT¹⁰

We envision a future in which Dutch fishing communities thrive alongside a sustainable and diversified North sea. In 2100, fishing towns are resilient hubs of maritime innovations, where families maintain strong cultural ties to the sea while engaging in aquaculture, maintenance of wind farms, and other maritime-related industries. The North sea functions as a regenerative common, supporting food and energy production while preserving all maritime professions. Core values guiding this vision include justice, solidarity, environmental stewardship and meaningful community participation.

Today, fishing communities face unequal burdens from energy policies, limited inclusion in decision-making and there for fear of the survival of their way of life and fishing as a profession. Furthermore, the expansion of energy production sites (like wind farms) on sea has greatly reduced their fishing grounds, disrupted livelihoods and threatened occupational identities. Without action, generational decline, economic instability and cultural loss of these fishing communities will continue.

To achieve the vision, an inclusive governance system must be built that recognizes the voices and knowledge of the fishing communities. Protected fishing hotspots, adaptive floating energy infrastructure, maritime learning corridors and a fishing cooperative network will create economic stability, resilience and opportunities for the next generation. Policies should integrate distributive, procedural and recognitional justice, ensuring equitable access to resources, shared decision-making and preservation of cultural identity.

We move towards this future through participatory planning, collaborative governance and iterative learning. By connecting local communities, governments, energy sectors and civil society in a North sea common, stakeholders can negotiate shared benefits and responsibilities. Knowledge exchange and adaptive practices will enable the energy transition to strengthen communities and transform the North sea into a model of just fishing development.

¹⁰ The dream section provides a synthesis of fears identified through the media analysis. For a comprehensive overview of all dreams and their corresponding sources, see Appendix B, which also contains the full set of extracted quotes.

"In 2100, we, as fishing communities are proactive actors in the North Sea Common, where we share the benefits and burdens of energy transitions with other commoners through ongoing cooperation and negotiation.

Meanwhile our fishing towns are hubs of adaptive and diversified fishing/maritime practices that contribute to strong local economy, community solidarity and environmental stewardship. The North Sea is our home where food and energy is produced in a regenerative way."

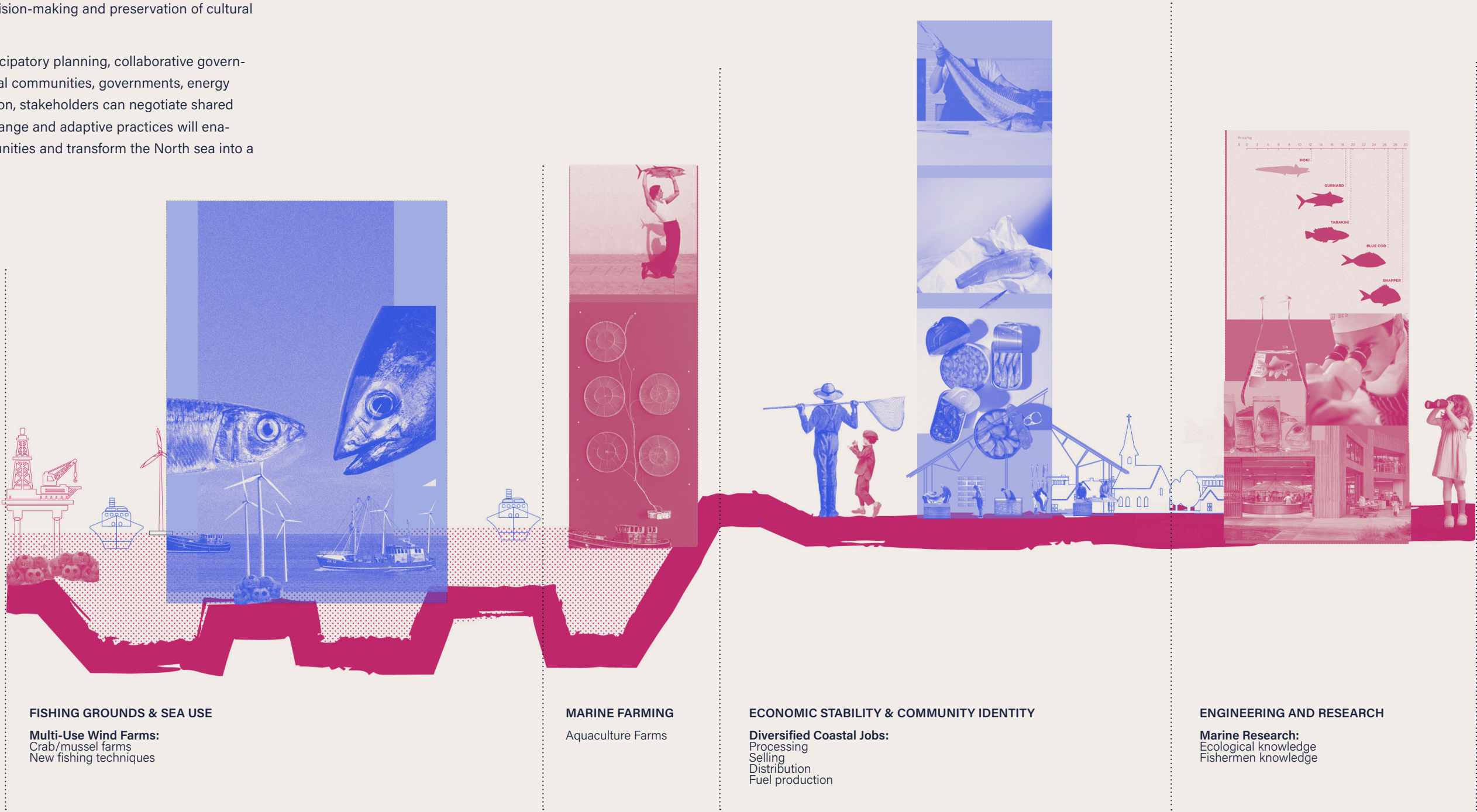


Figure 6.4: Dream section of the fishing communities, presenting the key dreams and aspirations of the fishing communities, highlighting their hopes, priorities, and visions for the future.

Source: Shutterstock; Freepik; SAIGLOBALNT, 2022; Friosurproductosfyc, 2026; Khmel, n.d.; Dabart, 2013; Ship Brokers, n.d.; Slow Food Roma, 2024; Dougherty, n.d.; Dearnly, n.d.; Seafood Industry Council, n.d.; Saroff, 2018

6.2 Vision Goals

To make this vision possible, three main goals are identified based on the Table of community wishes (figure 6.3). These goals translate the vision into key priorities for the future of fishing communities and the North Sea. Each goal is composed through a set of design principles that outline the spatial interventions and how it can be achieved in practice. When later combined, these goals overlap and interacts, reinforcing one another and collectively shaping the overall vision.

6.2.1 GOAL 1: THE SEA AS DIVERSE FISHING HOTSPOT

For goal 1, the North Sea is reimaged as a diverse and resilient fishing hotspot, where traditional fisheries are protected while new, sustainable maritime practices are integrated. This goal focusses on safeguarding key fishing grounds, routes and cultural practices, while allowing for flexible and ecologically responsible use of space. Though strategic spatial planning and collaboration with fishing communities, the North Sea becomes a shared and productive environment that balances ecological recovery with operational freedom.



Figure 6.5

Open sea: protecting fishing hotspots and routes

This design principle focuses on maintaining the North Sea as an accessible and collectively managed space for fishing communities, guiding how its layouts organized to balance traditional fishing, emerging maritime activities, and energy production. By recognizing it as a shared resource, it protects operational freedom while strengthening the role of fishers in decision-making. In doing so, it supports the continuation of traditional practices and encourages inclusive and adaptive governance, ensuring that those who depend on the sea remain actively involved in its future.

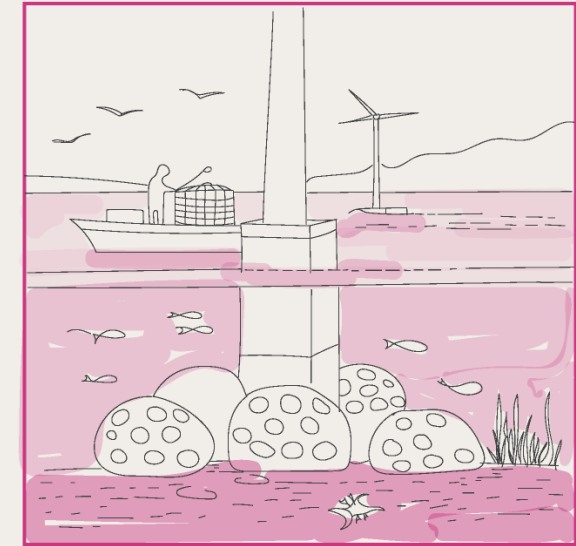


Figure 6.6

Multi-use marine food landscapes

This principle aims to diversify food production at sea by integrating traditional fisheries with aquaculture and ecological enhancement. As pressure on fishing grounds and stocks increase, relying solely on capture of fisheries becomes less viable (European Environment Agency, 2020). Layered, multifunctional marine food systems support economic resilience, food security, and ecological balance, while providing fishing communities with new ways to engage sustainably with the North Sea.



Figure 6.7

Integrated wind energy

This design principle promotes integration between fisheries and offshore energy production, reducing spatial conflicts and creating mutual benefits. Instead of separating fishers and energy developments, shared use of maritime space allows both sectors to coexist. This approach also provides new opportunities for fishers to diversify economically within the offshore energy system while maintaining strong connection to traditional maritime practices.



Figure 6.8

Fishing stock protection

This design principle emphasizes the protection and regeneration of marine ecosystems to ensure long-term fish stock sustainability. Healthy fish populations are critical not only for ecological balance, but also for the survival and resilience of fishing communities (European Environment Agency, 2020). By prioritizing measures that reduce disturbances and support natural recovery, this principle strengthens the ecological foundation on which maritime livelihoods depend.



Figure 6.9

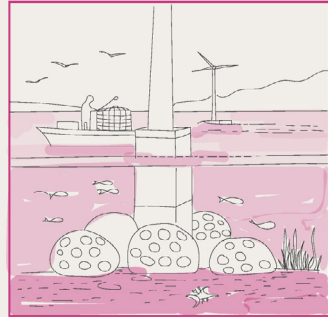
Offshore fisheries infrastructure

This design principle addresses the need for improved working conditions, safety, and operational flexibility in a changing maritime environment. As fishing activities move further offshore and increasingly interact with other sectors, support structures and services become essential. By enabling safer and more adaptable operations, this principle ensures that fishers can continue to maintain their livelihoods while responding to evolving spatial and economic challenges.



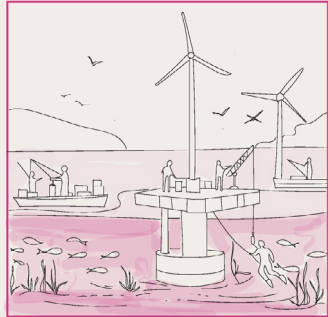
Open sea: protecting fishing hotspots and routes

- The North Sea Common Opening the Aflsuidtjijk
- Wind farms
Existing Wind Farms
Plannend Wind Farms
Plannend Floating Hydrogen Wind Farms
- Oil rigs
Oil Rig reused for Energy Transition
Oil Rigs for Deconstruction
- Fishing base
Selected Dutch Fishing Communities
Protected Fishing Hotspots
Main Fishing Routes



Multi-use marine food landscapes

- Potential Aquaculture Areas
- Deconstructed Wind Farms, turned into New Fishing Hotspots



Integrated wind energy

- Wind farms
Existing Wind Farms
Mixed-Use
Plannend Wind Farms
Mixed-Use
Plannend Floating Hydrogen Wind Farms



Fishing stock protection

- Wind farms
Existing Wind Farms
Plannend Wind Farms
Plannend Floating Hydrogen Wind Farms
Deconstructed Wind Farms, turned into New Fishing Hotspots

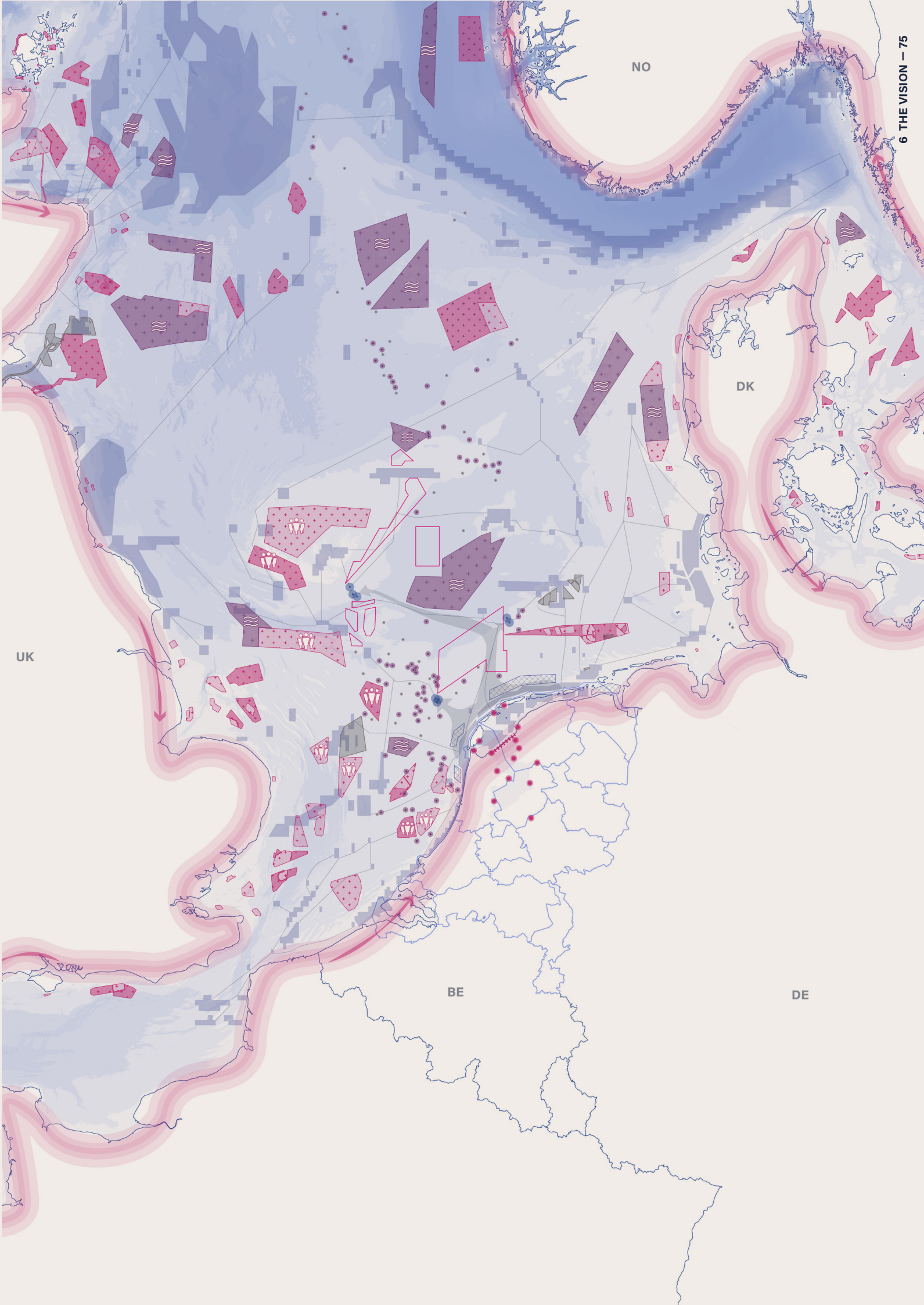


Offshore fisheries infrastructure

- Fishing Hubs at transformed Oil Rigs
- Public Tansport towards Fishing Hubs



Figure 6.10: Vision goal map 1; The sea as diverse fishing hotspot, on the North Sea scale
Source: Het Informatiehuis Marien; EMODnet European Commission; Eurostat/GISCO; PDOK



6.2.2 GOAL 2: A DIFFERENT PATH FOR THE NEW GENERATION

The second goal focuses on preparing new generations of fishers for divers and meaningful career opportunities within and around their communities. As the maritime economy continues to change, relying solely on traditional fishing is no longer sufficient to ensure long-term stability (Fabinyi & Barclay, 2021). This goal therefore supports the development of alternative career pathways in sectors such as offshore energy, tourism, aquaculture and maritime technology. By investing in workforce development, skill building, and accessible transitions between professions, it aims to create a resilient and adaptable community in which future generations can remain connected to their merit team identity while pursuing new opportunities.

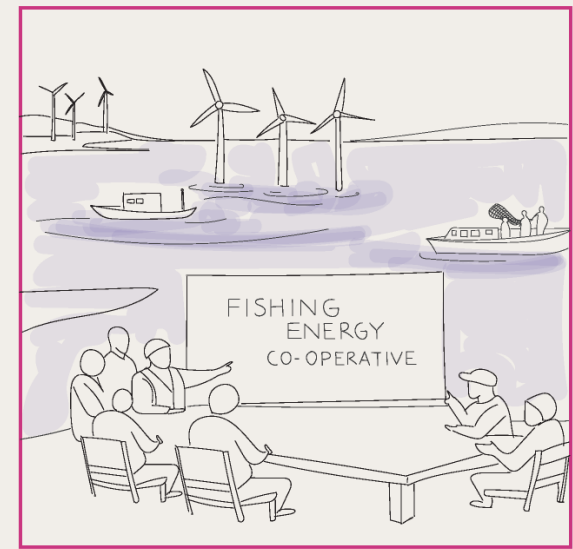


Figure 6.11

Community-led maritime education

This principle emphasises the importance of locally rooted and community driven education systems. By embedding learning environments within fishing communities and involving local knowledge holders, education becomes more accessible, relevant, and culturally connected. This approach strengthens the transfer of both practical and formal knowledge, ensuring that new generations remain engaged with their community while developing skills for a broader range of maritime careers.

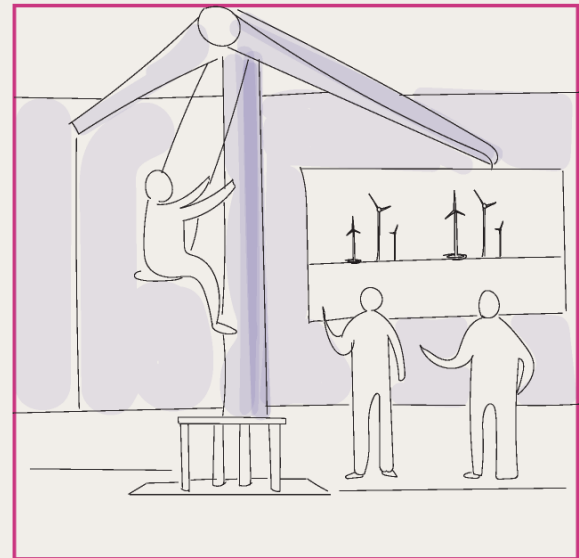


Figure 6.12

Maritime re-Skilling programme

This design principles focused on enabling fishermen and younger generations to adapt to a changing maritime economy through targeted education and training. As traditional fishing becomes less stable, access to new skills is essential for transitioning into alternative professions (Food and Agriculture Organization of the United Nations, 2018). By lowering barriers to retraining and recognising existing knowledge, this approach supports smoother career shifts and opens up opportunities in emerging maritime sectors, including offshore energy and aquaculture.



Figure 6.13

Multi-Use marine food landscapes

This design principle supports the diversification of maritime livelihoods by expanding food production systems beyond traditional fishing. By integrating aquaculture and other marine based practises, it creates additional economic opportunities that remain closely connected to existing knowledge and skills. In this way, it allows both current and future generations to engage in new forms of food production while maintaining their relationship with the sea.

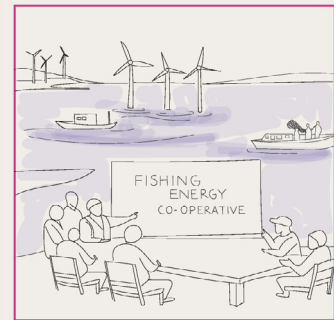


Figure 6.14

New maritime industries

This principle focuses on strengthening and expanding the local economy through the development of new maritime related industries and businesses. By creating opportunities both within and beyond the fishing sector, it supports economic diversification while keeping employment rooted in the community. This includes not only new forms of production and services, but also spaces for informal learning, collaboration, and innovation, allowing fishing communities to remain economically active and self-sufficient in a changing context.

VISION GOAL MAP 2

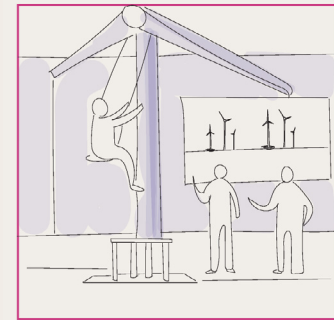


Community-led maritime education

Education
Maritime Learning Corridor
Educational Centre

3 Max. Education Level 4
HBO MBO

New Public Transport



Maritime re-Skilling programme

Educational Centre

1 Max. Education Level 2
Workshops Training

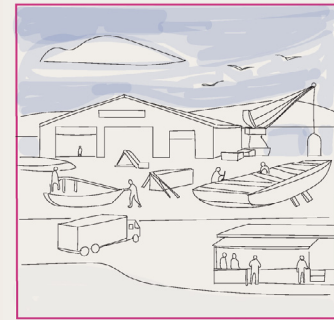
Educational Wind Farms
Fishing between Windfarms
Maintenance of Windfarms

Educational Aquaculture sites



Multi-use marine food landscapes

Potential Aquaculture Areas



New maritime industries

Fishing support centres
Fishing related industries
Fishing business development

Map base

Fishing community
Municipality boundaries

Province of Friesland
Province of Noord-Holland
Province of Flevoland

Provincial capital
Dutch capital
Settlements
Train
Water
Highway

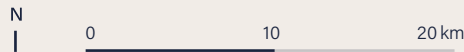
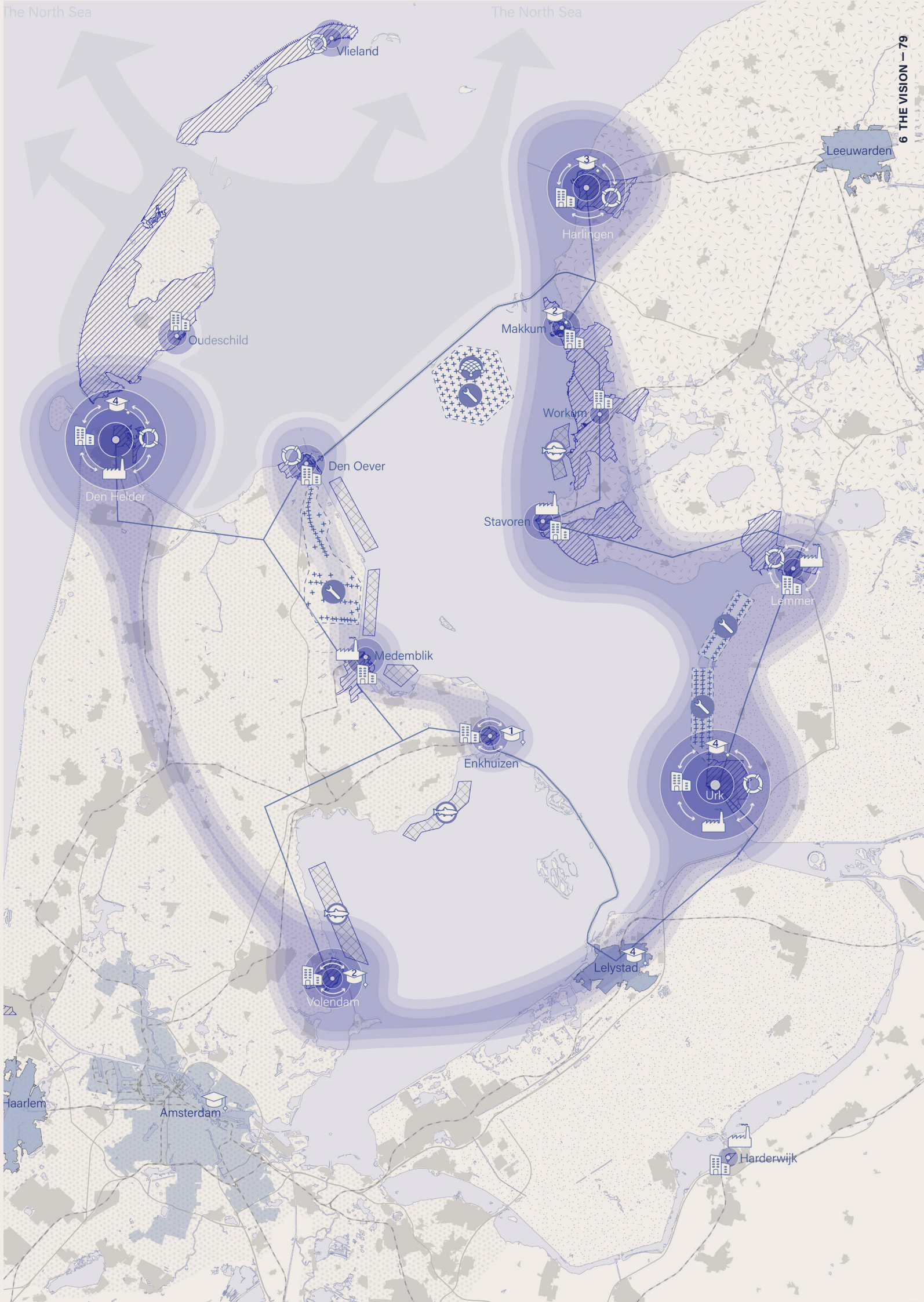


Figure 6.15: Vision goal map 2; A Different Path for the New Generation, on the IJsselmeer scale
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; Source materials AR2U086 2026; RIVM



6.2.3 GOAL 3: RESILIENT FISHING COMMUNITIES

The third goal focuses on strengthening the social, cultural, and economic resilience of fishing communities. As external pressure from policy, market shifts, and the energy transition continued to reshape the maritime sector, maintaining community cohesion and identity becomes increasingly important (Food and Agriculture Organization of the United Nations, 2018). This goal therefore emphasises well-being, inclusion, and local autonomy, while supporting the modernization of fisheries through sustainable technologies and knowledge exchange. By balancing tradition with innovation, it aims to ensure that fishing communities remain strong, self-sufficient, and deeply connected to their heritage.

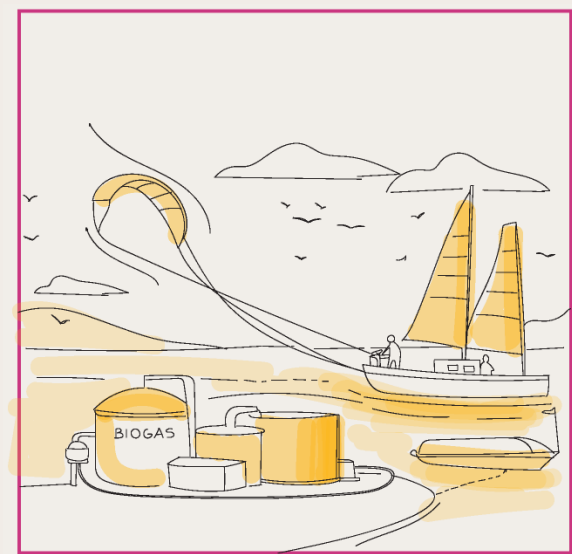


Figure 6.16

Energy transition of the fishing fleet

This design principle focuses on supporting the transition towards more sustainable and future-proof fishing practices. As environmental regulations tighten and fuel systems evolve, fishing fleets must adapt to remain viable. By encouraging the adaption of alternative energy sources and more efficient technologies, the approach reduces environmental impact while strengthening the long-term economic stability of the sector.

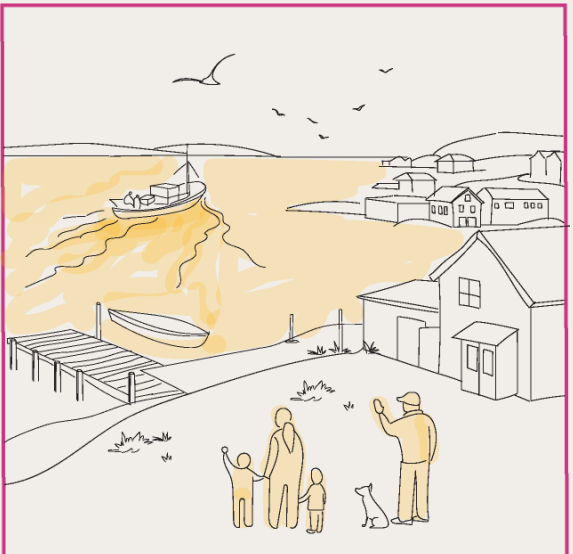


Figure 6.18

Supporting the wellbeing of fishing households

This design principle emphasizes the social dimension of resilience by addressing the wellbeing of fishing households. The fishing profession often places pressure not only on fishers, but also on their families, particularly in terms of unstable income, care responsibilities, and emotional strain (Food and Agriculture Organization of the United Nations, 2015). By recognizing and supporting these dynamics, this approach aims to create more balanced, secure, and sustainable living conditions within fishing communities.

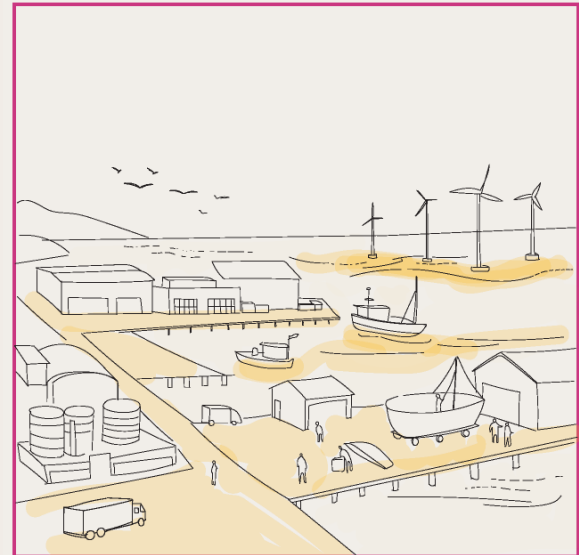


Figure 6.17

Fishing support infrastructure

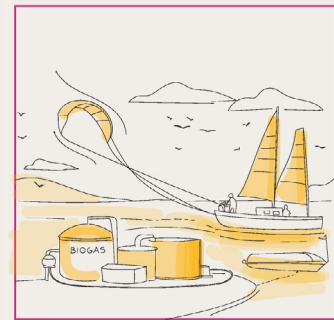
This principle focuses on strengthening the operational foundation of fishing activities through shared resources and improved support systems. By enhancing safety, maintenance capacity, and collective access to equipment, it reduces individual vulnerability and increases the overall resilience of the sector. This collective approach enables fishing communities to better withstand economic and environmental uncertainties.



Figure 6.19

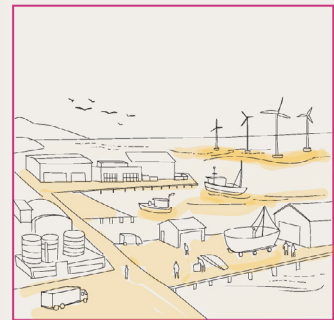
Securing maritime space and local ownership

This design principle focuses on strengthening local control and long-term security over maritime and coastal resources. As external actors increasingly shape the use of space, it becomes essential for fishing communities to retain influence and benefit from these developments. By promoting local ownership models and safeguarding space for maritime activities, this principle supports economic independence, fair distribution of benefits, and preservation of community identity.



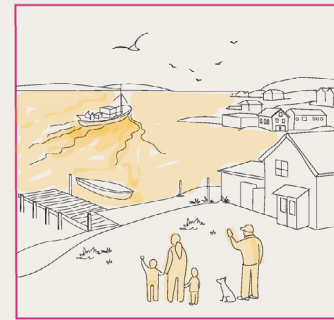
Energy transition of the fishing fleet

- Fishing Cooperative-Network
- Vessel Technology
- Financial Security



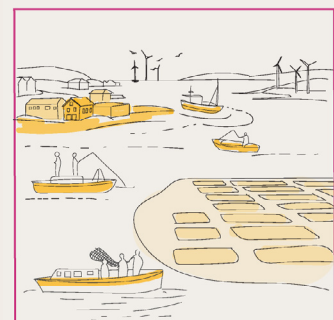
Fishing support infrastructure

- Fishing Cooperative-Network
- Vessel Technology
- Opening the Afsluitdijk



Supporting the wellbeing of fishing households

- Fishing Cooperative-Network
- Collective Political Power
- Childcare
- Health
- Opening the Afsluitdijk
- New Public Transport Connection



Securing maritime space and local ownership

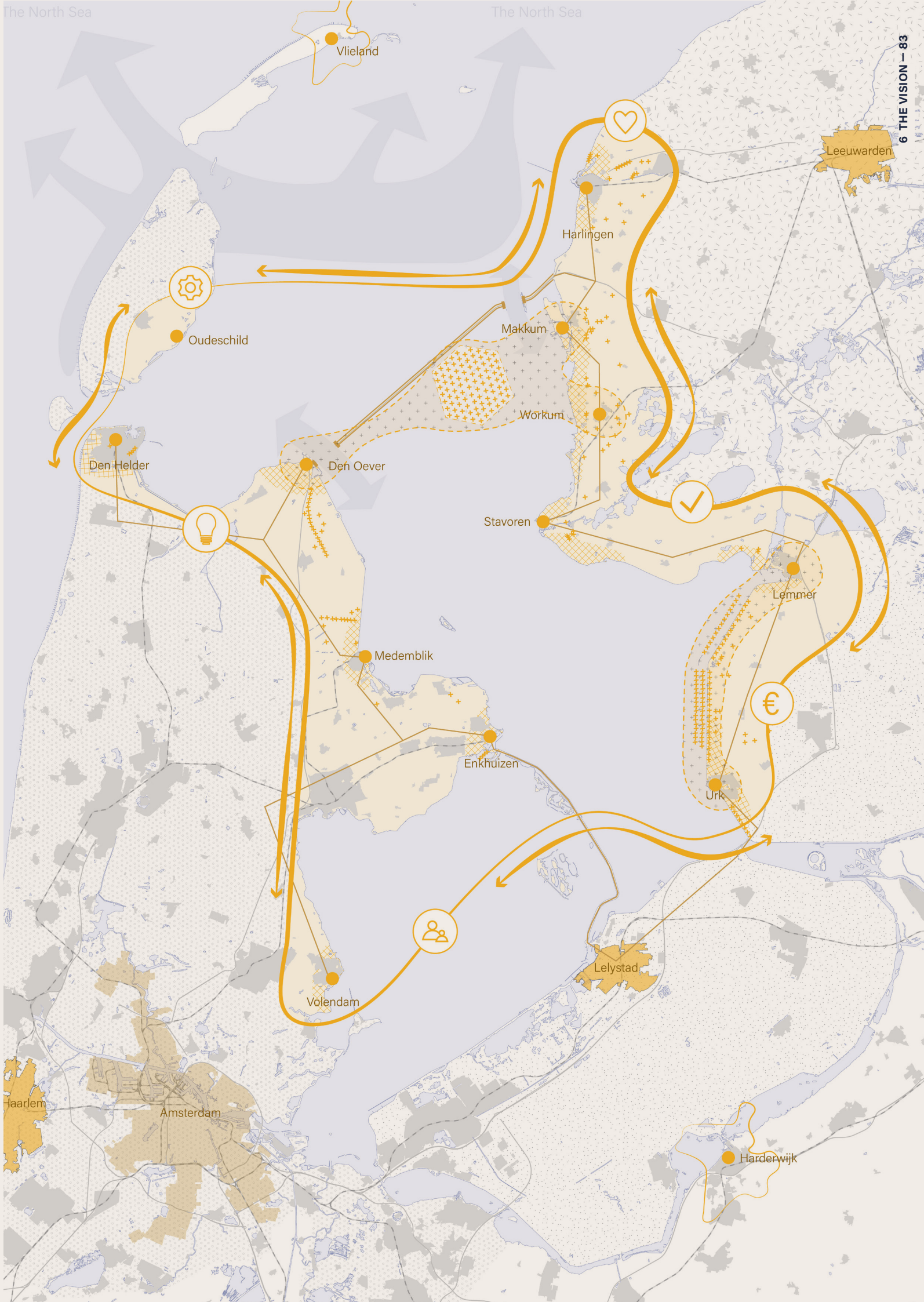
- Fishing Cooperative-Network
- Electricity
- Local Wind Energy Production
- Joined Wind Energy Production
- Local Land Protection

- Map base

 - Fishing community
 - Province of Friesland
 - Province of Noord-Holland
 - Province of Flevoland
- Provincial capital
 - Dutch capital
 - Settlements
 - Train
 - Water
 - Highway



Figure 6.20: Vision goal map 3; Resilient Fishing Communities, on the IJsselmeer scale
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; Source materials AR2U086 2026; RIVM



6.3 The Complete Vision

6.3.1 THE IJSSELMEER REGION

At the scale of the IJsselmeer region, the vision integrates all three goals with a focus on communities and livelihoods. Economic diversification, workforce development, and social resilience work together to prepare new generations for meaningful careers, while maintaining strong cultural and maritime traditions. Here, the special, economic, and social dimensions of the vision overlap, demonstrating how onshore development, education, and community support are interconnected with offshore changes. Together, these interactions create resilient and adaptive fishing communities that remain closely tied to the North Sea and its resources.

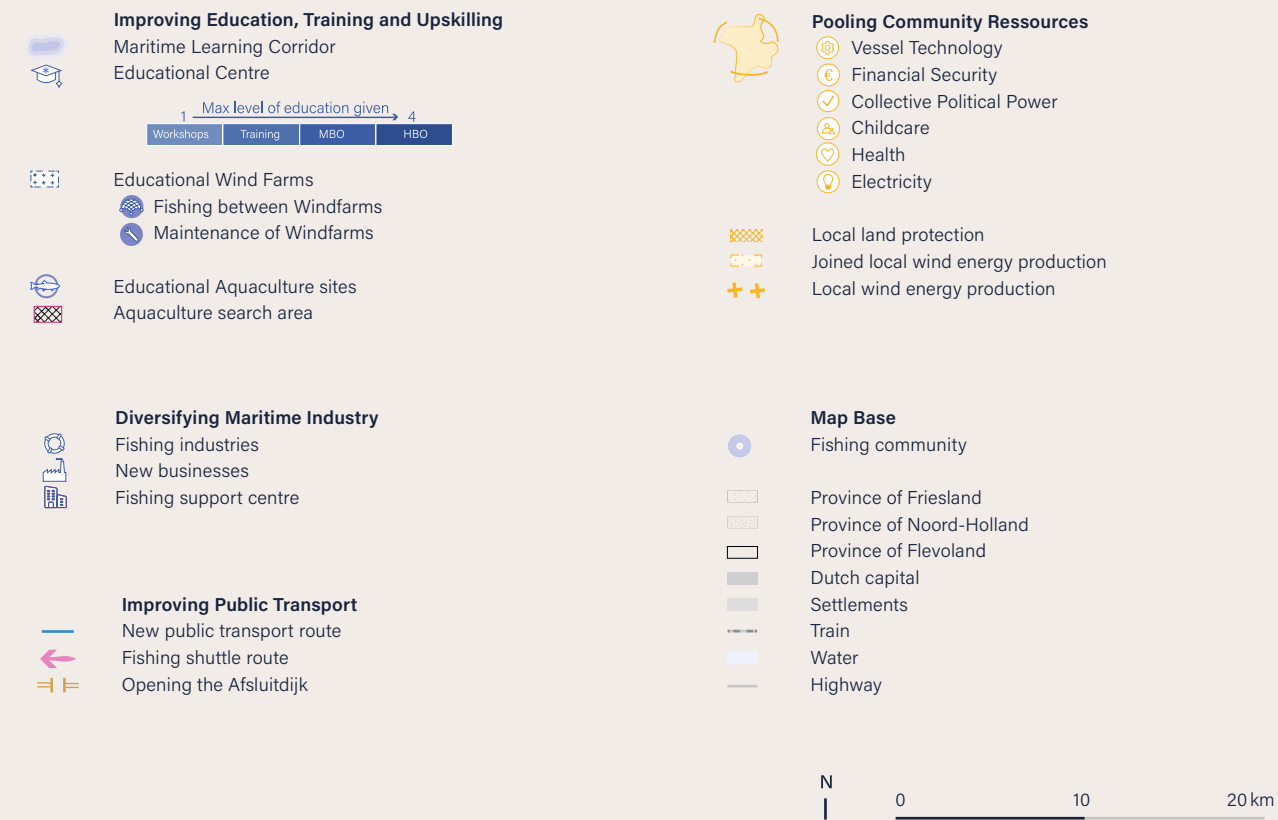
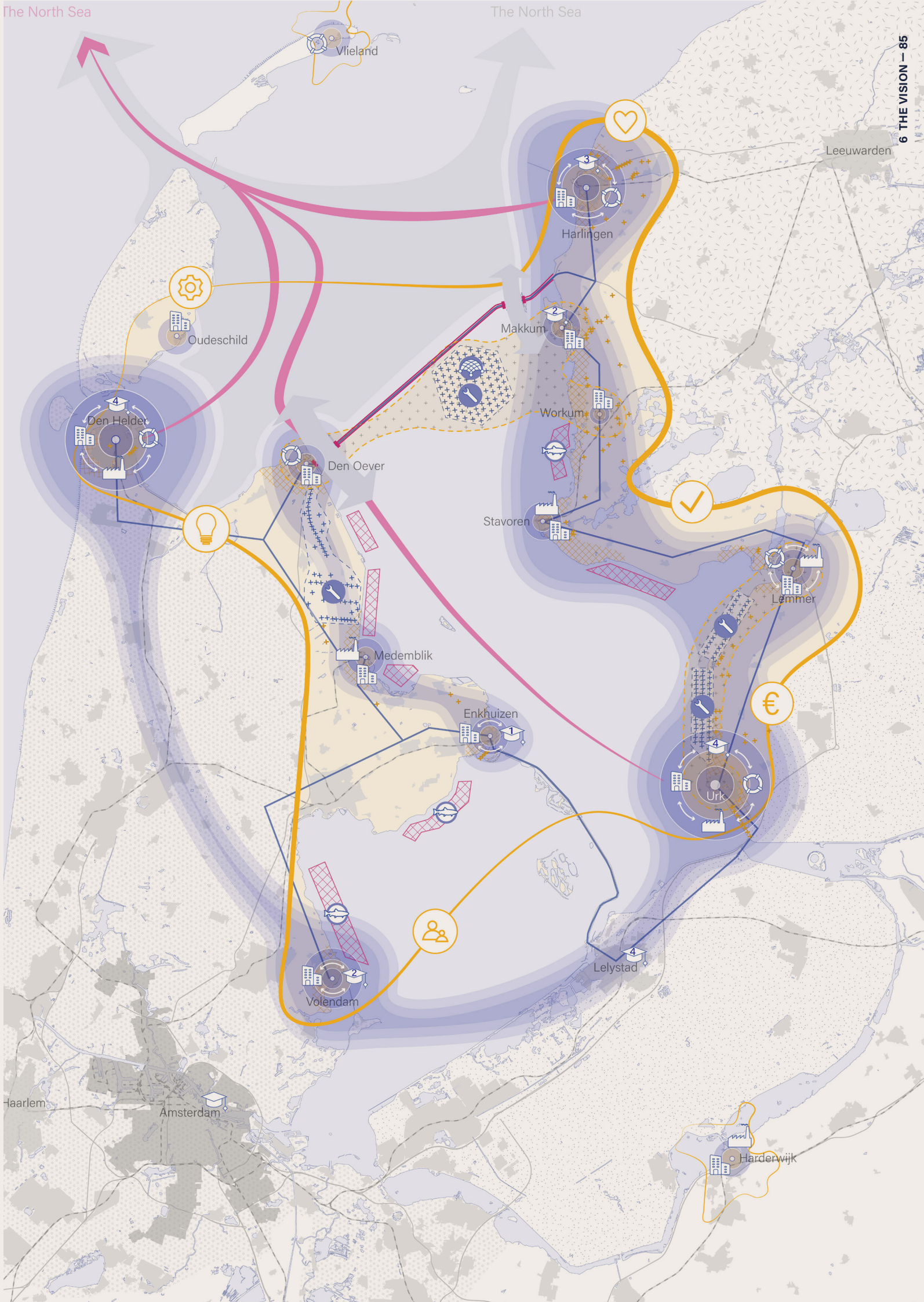
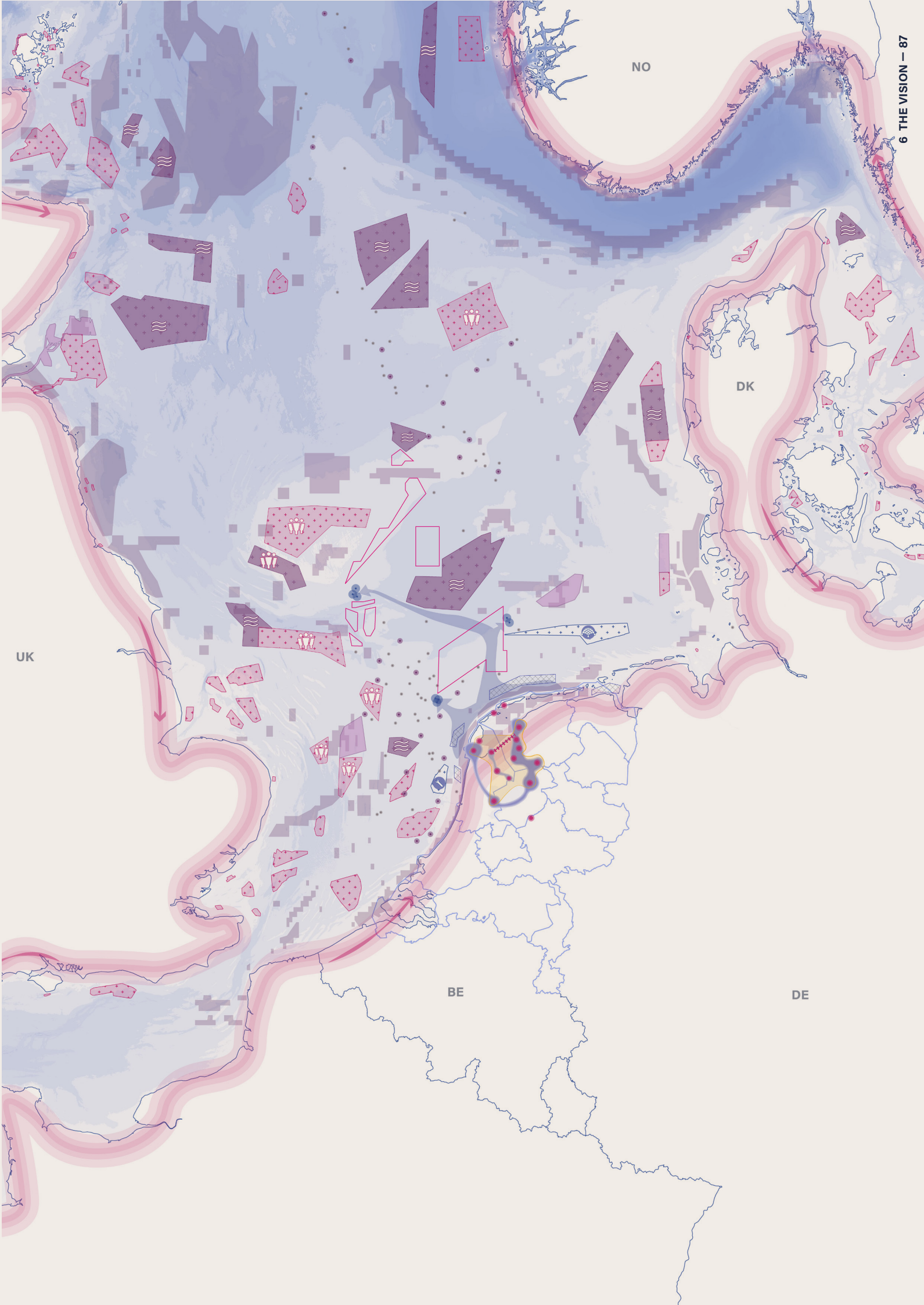
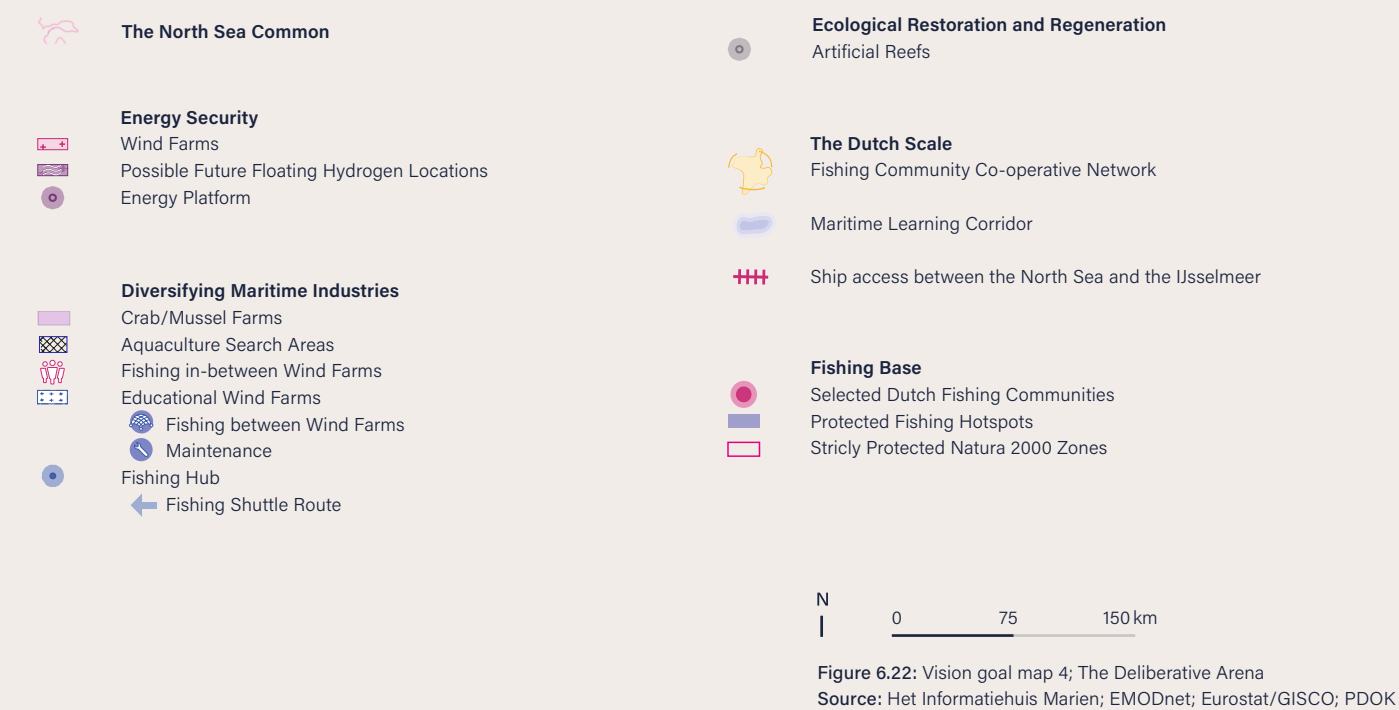


Figure 6.21: Vision map; The IJsselmeer region
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; Source materials AR2U086 2026; RIVM



6.3.2 THE NORTH SEA SCALE

At the scale of the North Sea, the vision brings together all three goals to shape a future in which maritime space is both productive and resilient. Fishing hotspots, energy production, and ecological systems are balanced in ways that support economic opportunities and long term community stability. Here, spatial, economic, and social goals overlap, showing how offshore transformations can coexist with sustainable fisheries, innovation in maritime industries, and the preservation of cultural identity. The North Sea becomes a regenerative and inclusive common, where different uses and stakeholders interact to strengthen both the environment and the communities that depend on it.



6.3.3 THE COMMUNITIES PERSPECTIVE

This vision sets a direction for a more balanced and resilient future of fishing communities, as illustrated in the perspective drawing below, where new maritime activities, community life, and traditional practices coexist. From the perspective of these communities, the future is not only defined by spatial and economic change, but by how these changes are experienced in everyday life, through continuous access to the sea, new opportunities for work, and stronger social support systems. Its realisation, however, depends on the stakeholders involved. The following section therefore analyses their roles, interests, and influence in shaping this transition.

Figure 6.23: Drawing of the Fishing Communities Perspective of the Overall Vision



6.4 Stakeholder Analysis

6.4.1 PROFILING STAKEHOLDERS

Stakeholders involved in the energy transition at the IJsselmeer and North Sea scales are mapped according to their interests, perception of the issue, attitude towards the proposed vision, power and resources¹¹. They are subsequently classified into eight categories using the Power-Interest-Attitude Matrix, which provides a clearer picture of the stakeholder in the project and facilitates stakeholder engagement (Murray-Webster & Simon, 2006).

¹¹ The entire table with all stakeholders and their interests, perceptions, and attitudes in detail can be found in the Appendix: Appendix E.

Deliberative Arena

- Environmental Groups
- Renewable Energy Corporations
- Military
- Fossil Fuel Corporations

Fishing Communities

- Traditional Fisher
- Fish Processing Industries
- Tired Fisher
- Boat Industries
- Shipping Industry
- Future Generation
- Adaptive Fisher
- Silent Fisher
- Fisherwomen

Main Stakeholders

- European Union
- European Union Member State
- Norway Government
- U.K. Government
- National Government

Others

- Nature
- Kustwacht
- Research Institutions and Universities

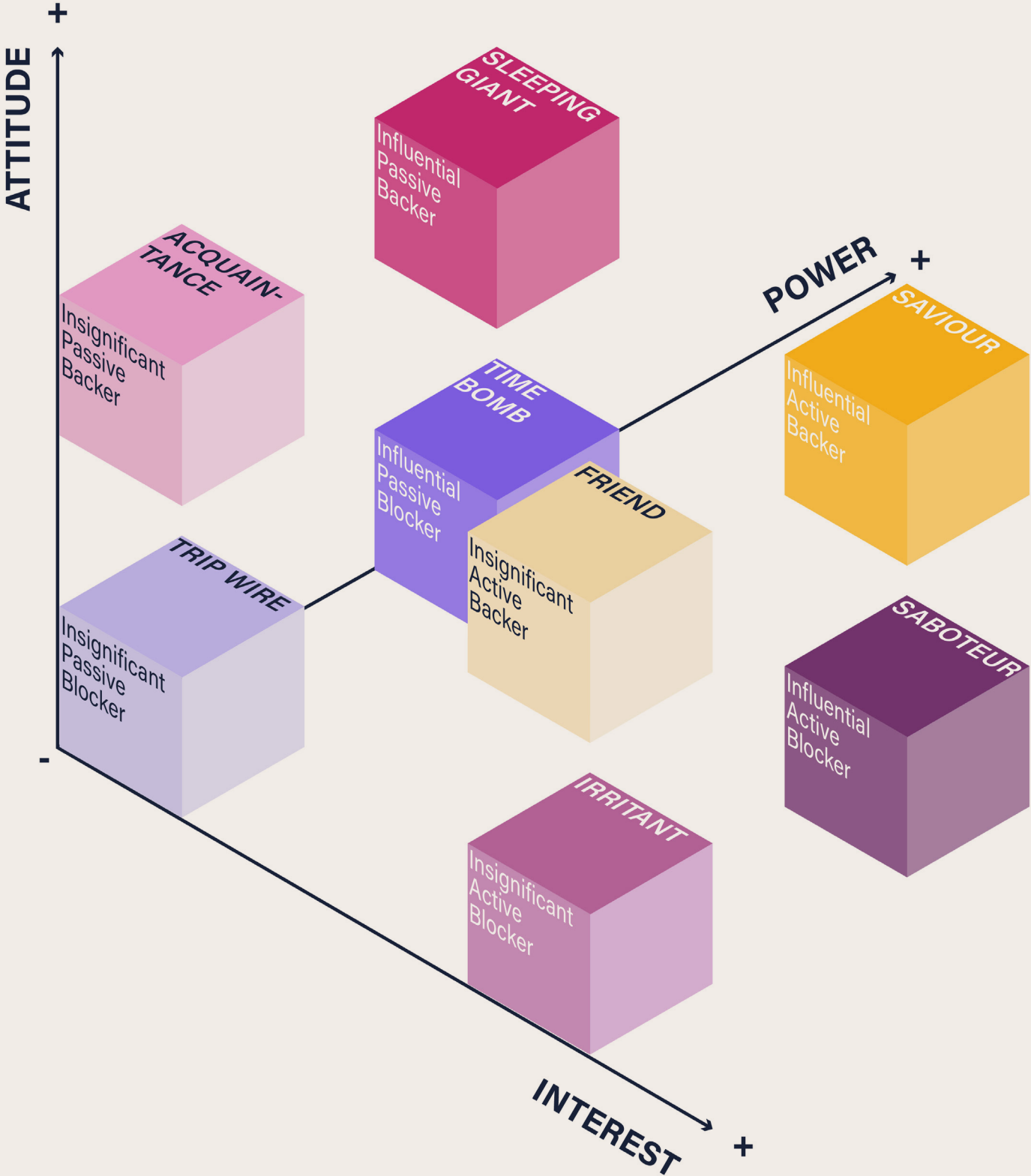


Figure 6.24: Power-Interest-Attitude Matrix showing the eight categories of stakeholders
Source: Murray-Webster & Simon, 2006

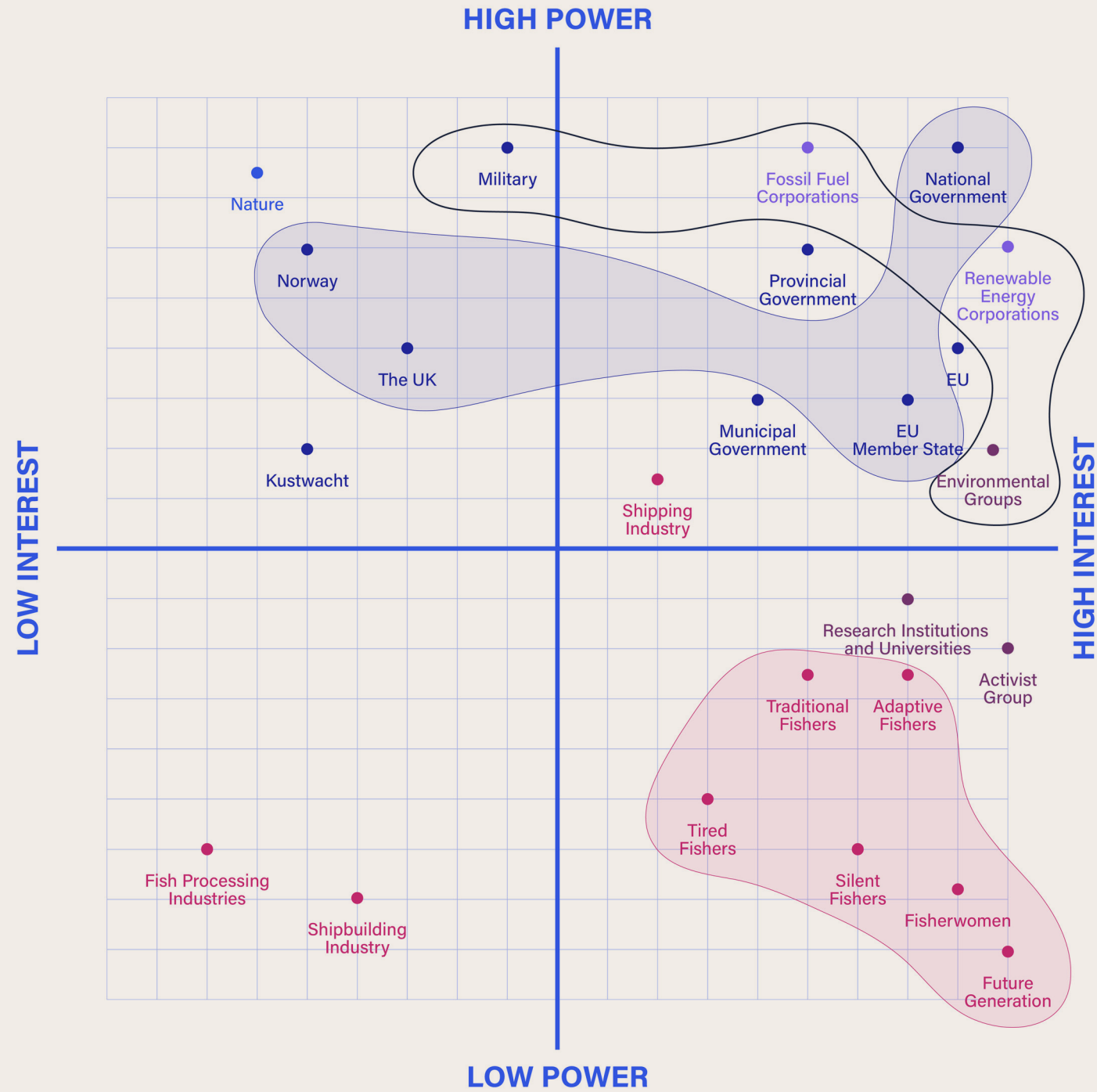
6.4.2 FROM STAKEHOLDER CONFLICTS

Based on the stakeholder profiles, Power-Interest Matrix is employed to visualise the stakeholders involved in the contested arena of the North Seam, which provides us with a clear direction for engaging parties with different interests. Stakeholders with high power and high interests are predominantly government bodies around the North Sea such as the Dutch government and EU member states including Denmark and Germany, alongside major energy corporations (figure 6.25). In contrast, local communities and civil society organisations are characterised by high interest but comparatively limited power. The deliberative arena, therefore, prioritises engagement with high-power, high-interest stakeholders, exploring how their interests in the energy transition can be leveraged to advance the just transition discourse.

Figure 6.25: Power-Interest Matrix showing the current positions of stakeholders in the North Sea arena
Source: Bryson, 2004

- Nature
- Government
- Energy
- Communities
- Civil Society
- North Sea Governance
- Core Transition Community
- Deliberative Arena

CURRENT



6.4.3 TO A NEGOTIABLE COMMONS

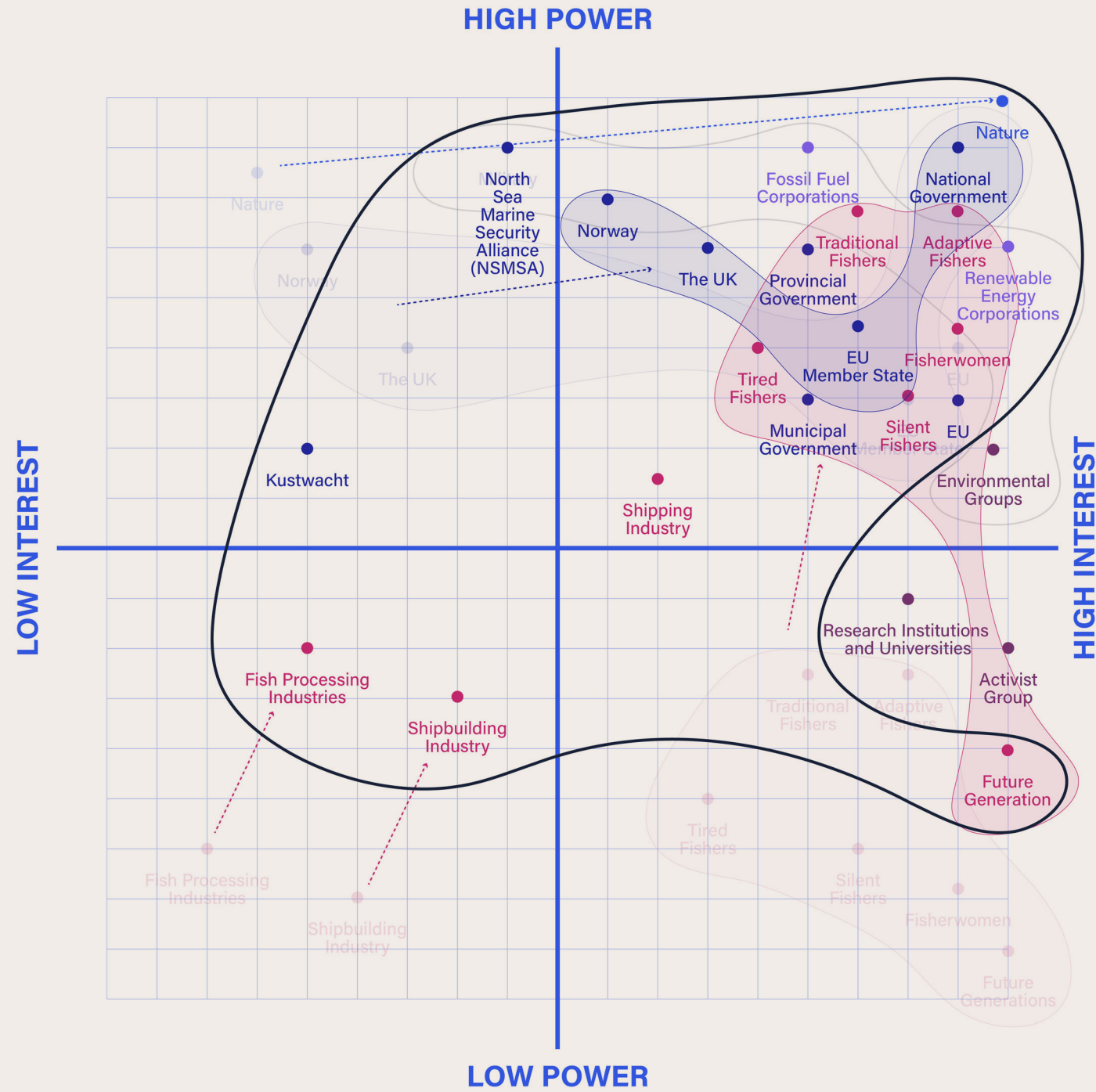
In the envisioned North Sea Common, the goal is to amplify the voices of the underrepresented commoners, including nature and fishing communities, while inviting North Sea countries to participate in the process. This approach builds momentum towards establishing a cross-sectoral and cross-border commons, in which civil society becomes the observer, as the eyes of the sea.

Within the commons, commoners will occupy varying positions in the Power-Interest Matrix, and engagement strategies will be tailored accordingly. Governments, energy sectors, fishing communities and nature are envisioned as the primary actors, while civil society will be kept informed of developments in the North Sea. Security-related commoners including NSMSA and Kustwacht, will be engaged to ensure that marine security is not compromised and ancillary industries supporting the fishing industry will be monitored.

Figure 6.26: Power-Interest Matrix showing the future positions of stakeholders in the North Sea Common
Source: Bryson, 2004

- Commoner: Nature
- Commoner: Government
- Commoner: Energy
- Commoner: Communities
- Observer: Civil Society
- North Sea Governance
- Core Transition Community
- The North Sea Common

FUTURE



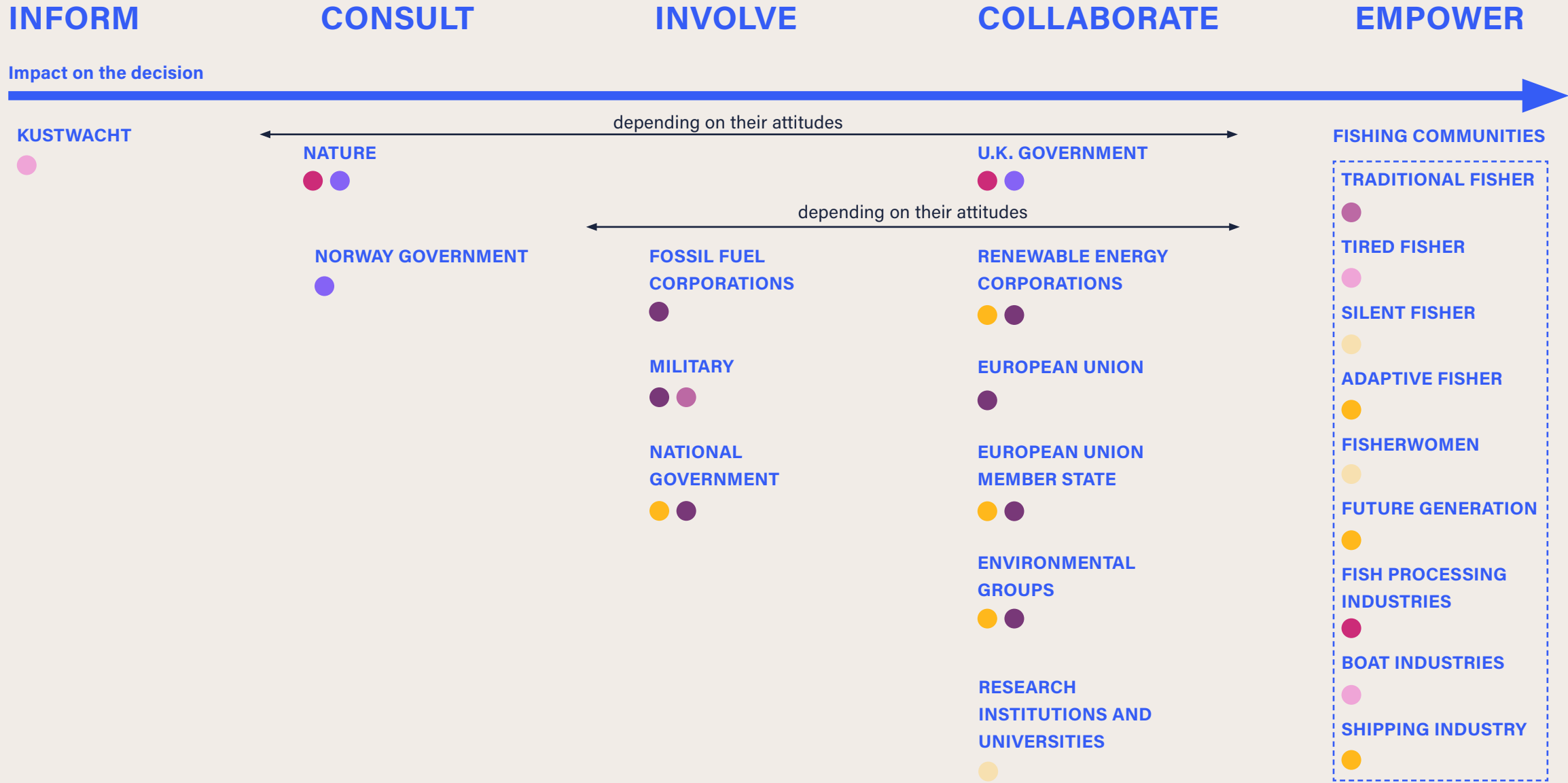
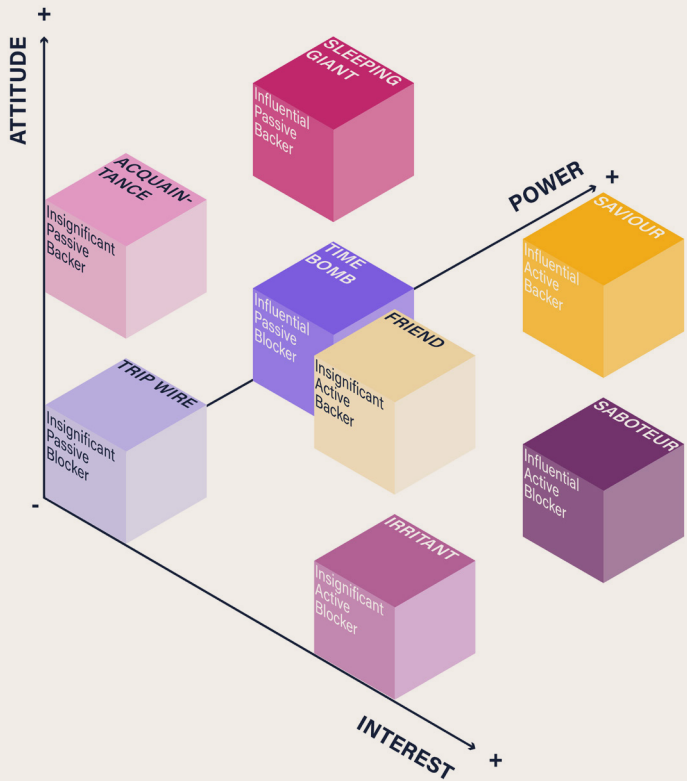
6.4.4 ENGAGING COMMONERS WITH DIVERSE STRATEGIES

To facilitate the formation of the North Sea Common, key stakeholders are selected for further engagement planning, with strategies applied in accordance with the eight categories of stakeholders outlined in Murray-Webster and Simon (2006).

Recognising fishing communities as an underrepresented group in the energy transition discourse, they will be empowered within the commons, regardless of their subcommunity categorisation. Governments and energy sectors will be either involved or actively collaborated with, depending on their attitudes and capacities. Engagement strategies also have to be adjusted across different project stages to ensure that all stakeholders are adequately engaged without generating counter-effects.

Figure 6.27: Spectrum of Public Participation with eight categories of stakeholders
Source: Adopted from International Association for Public Participation (IAP2), 2006

Figure 6.28: Power-Interest-Attitude Matrix showing the eight categories of stakeholders
Source: Murray-Webster & Simon, 2006



7 Deliberation

While the community vision is an important tool to amplify the voice of Dutch fishing communities, empower them and better recognitional, distributional as well as procedural justice, the implementation likelihood of such a vision is highly dependa- ble on other affected stakeholders’ opinion on this vision. Especially since fishing communities are stakeholder with high interest, but low power.

7.1 Deliberative Arena Definition

Affected stakeholders by the vision with high power, could be potential backers (so called “Saviours” or “Friends”) or active blockers (“Saboteurs or Irritants”) (Mur- ray-Webster & Simon, 2006). Hence, for its legitimisation, it is crucial to ask: “How do key North Sea stakeholders evaluate the proposed community vision?” [SRQ4].

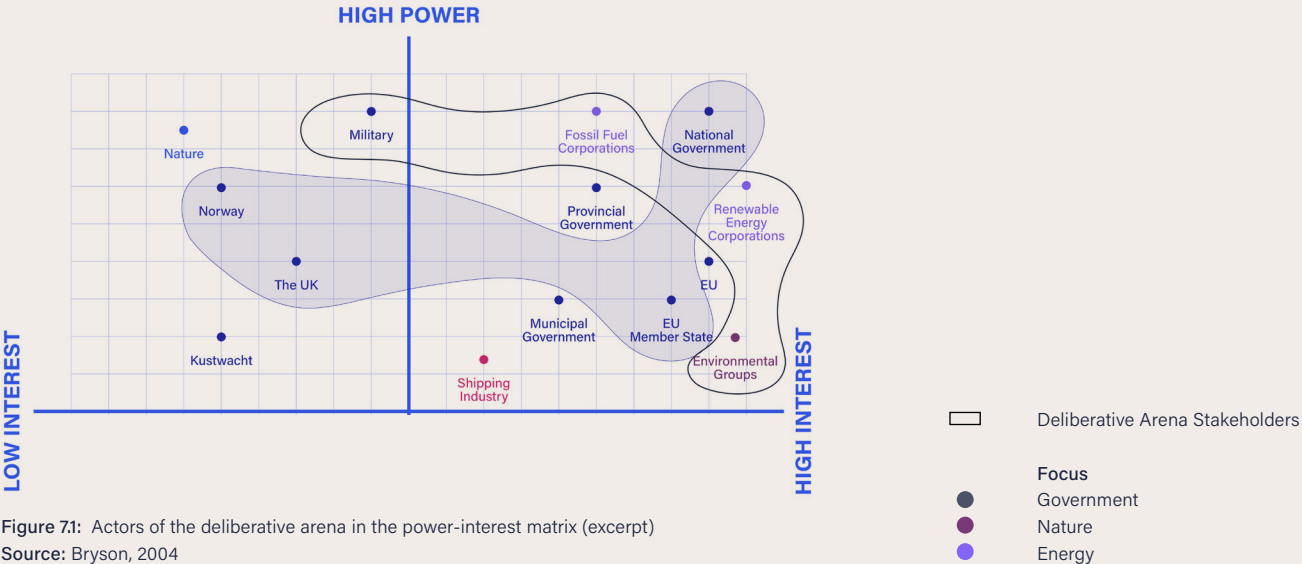
7.1.1 INVOLVED STAKEHOLDERS

On the North Sea scale, renewable energy cooperations (between Saviour and Sab- oteur), oil cooperations (Saboteur), environmental groups (between Saviour and Sab- oteu) and the military in form of a North Sea Security Alliance (Saboteur) are therefore chosen as part of a deliberative arena. They all have high power and high interest – the communities vision therefore needs legitimisation among these stakeholders to have have a chance of implementation (figure 7.1).

7.1.2 DELIBERATION AS A TOOL

A powerful tool to foster legitimisation is deliberation: the open exchange of differ- ent stakeholders (Schaal & Heidenreich, 2016). Deliberation does not mean a negotia- tion of positions (market-based interests), but rather a discussion guided by openness to others and the conviction that independent of one’s own position, the best argument should win (Schaal & Heidenreich, 2016). Positions that are expressed in the delibera- tive arena have to withstand public discussion and are therefore in need of good con- sideration (Schaal & Heidenreich, 2016). Since one of the main downfalls of deliberation is, that these basic requirements are already tough to achieve, considerations about the sincerity of the stakeholders were taken into account while deciding on elements that are altered in the deliberated vision (Schaal & Heidenreich, 2016).

To use deliberation as a tool, for each stakeholder of the deliberative arena, position papers were written and compiled into a new goal map, that was then brought together with the vision map of the fishing community.



7.2 Position Paper Summaries

For each stakeholder, a summary of the position paper is presented here. To fully understand their argument though, a thorough read of the position paper is recommended ¹².

7.2.1 RENEWABLE ENERGY COOPERATIONS: VATTENFALL

Vattenfall, as a utility-scale offshore wind farm developer, holds long-term development rights for offshore wind projects¹³. While the company supports the broader sustainability and justice goals of fishing communities, it adopts a cautious stance towards the integration of fisheries and offshore wind development in the North Sea, emphasizing that the North Sea should primarily serve as a strategic space for renewable energy infrastructure.

Vattenfall emphasizes the need for efficiency, reliability, and cost-effectiveness of such infrastructure. Proposed multi-use wind farms, offshore developments located further out at sea, hydrogen-based wind farm concepts, and maintenance activities carried out by fishers are considered challenges to the reliability and cost-effectiveness of these systems.

Multi-use wind farms and maintenance work by fishers are regarded as risks, as wind farms are sensitive technical systems that may be damaged by untrained personnel (Figure 7.2). Since issues of liability and insurance remain unresolved in these cases, cost-efficiency is potentially endangered.

Offshore wind farms located further at sea are furthermore associated with higher costs, as they are exposed to harsher weather conditions and require longer cable connections. While hydrogen-based solutions are acknowledged as a potential alternative, they are considered insufficiently developed to ensure reliability.

Overall, Vattenfall does not reject the vision but calls for more thorough research and planning to balance innovation and community interests with economic viability and risk management.

12 The full position papers can be found in the Appendix: Appendix F)

13 All arguments are derived from the position paper of Vattenfall. Sources, as well as the full argumentation, can therefore be found in the position paper (Appendix F).

Figure 7.2: Collage of fishing vessels damaging wind farm cables with their anchors and nets
Source: Freepik; TechXplore, 2025



7.2.2 OIL COMPANIES: SHELL

Shell, as an integrated energy company deeply involved in both the current and future energy systems of the North Sea, supports the vision of a just and sustainable North Sea but emphasizes that a rapid energy transition to ensure energy security must be the primary priority¹⁴ (Figure 7.3).

A fast shift away from fossil fuels, the proposed North Sea Common, and the designation of fishing hotspot protection zones are seen as barriers to both financing the transition and establishing an efficient energy system.

In particular, the proposed phase-out of oil is viewed critically, as the energy transition is considered highly dependent on fossil fuels until renewable energy can be supplied in a more scalable and stable manner. Shell argues that this support cannot be maintained if fossil fuel activities are completely phased out.

Furthermore, a rapid transition is argued to require efficient decision-making structures and sufficient spatial capacity, both of which may be limited by the Common and strict fishing protection zones. Centralized planning, combined with flexible multi-use policies, is therefore seen as essential to achieving this.

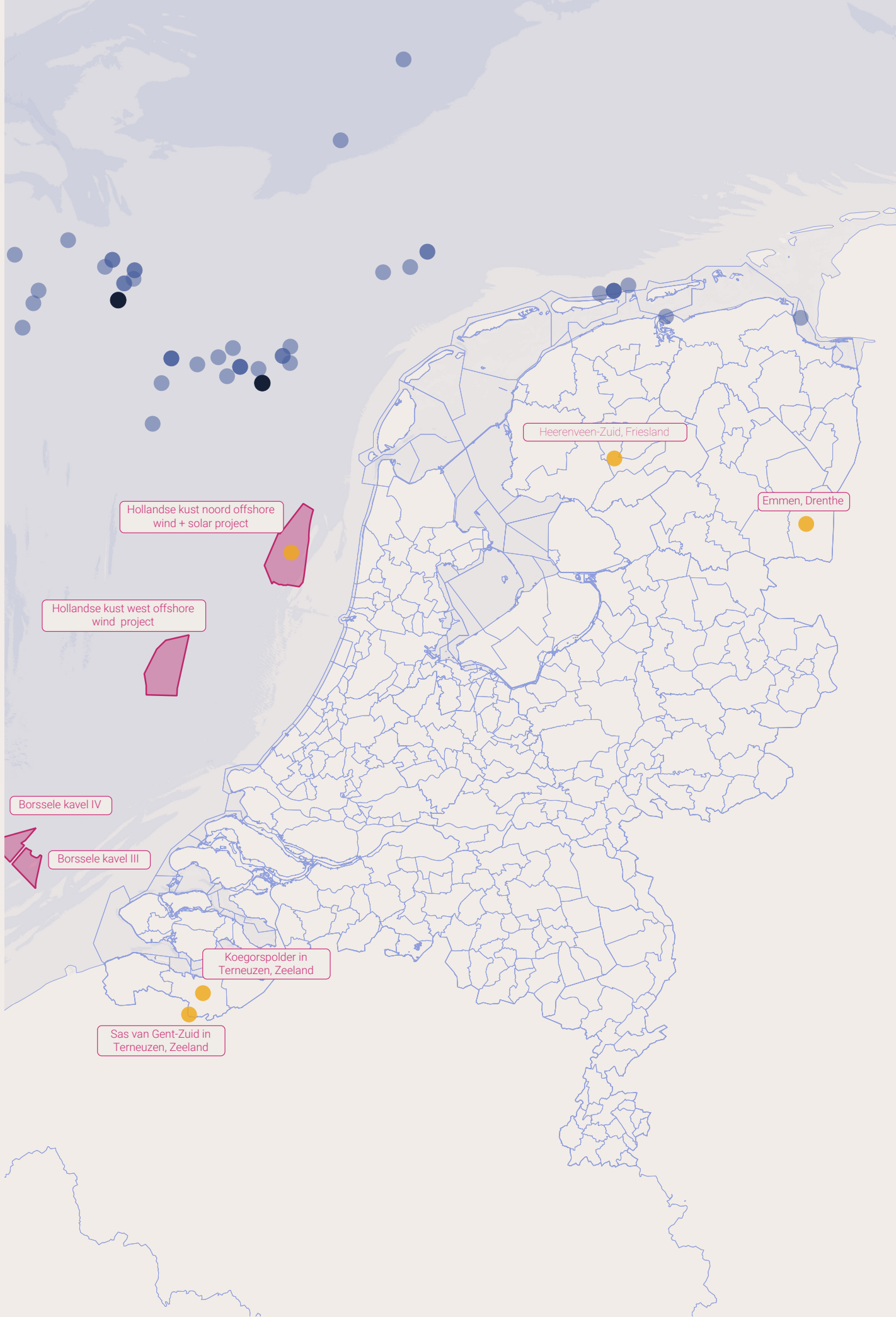
Shell therefore proposes a gradual transition in which oil platforms continue to provide energy security and financial resources for renewable development, while decommissioned platforms are re purposed for carbon capture and storage to contribute to achieving net-zero emissions by 2050.

14 All arguments are derived from the position paper of Shell. Sources, as well as the full argumentation, can therefore be found in the position paper (Appendix F).



Figure 7.3: Shell's active involvement in diversifying its investments towards renewable sources of energy.

Source: EMODnet; Eurostat/GISCO; PDOK; Data collected from Shell



7.2.3 ENVIRONMENTAL GROUPS: SEAS AT RISK

Seas at Risk, as an environmental group that positions itself as a guiding actor in the energy transition to prevent greenwashing, strongly supports the community vision due to its inclusion of human needs¹⁵. However, it emphasizes that ecological limits and the restoration of nature must be taken into account more strongly.

The idea of a North Sea Common is supported for its potential to foster environmental stewardship while empowering affected communities. Through co-use approaches, low-impact fishing and a transition towards a more sustainable fishing sector are seen as being encouraged.

At the same time, Seas at Risk highlights the need to integrate non-price criteria, such as biodiversity and community benefits, into the auctioning of offshore wind projects within the Common.

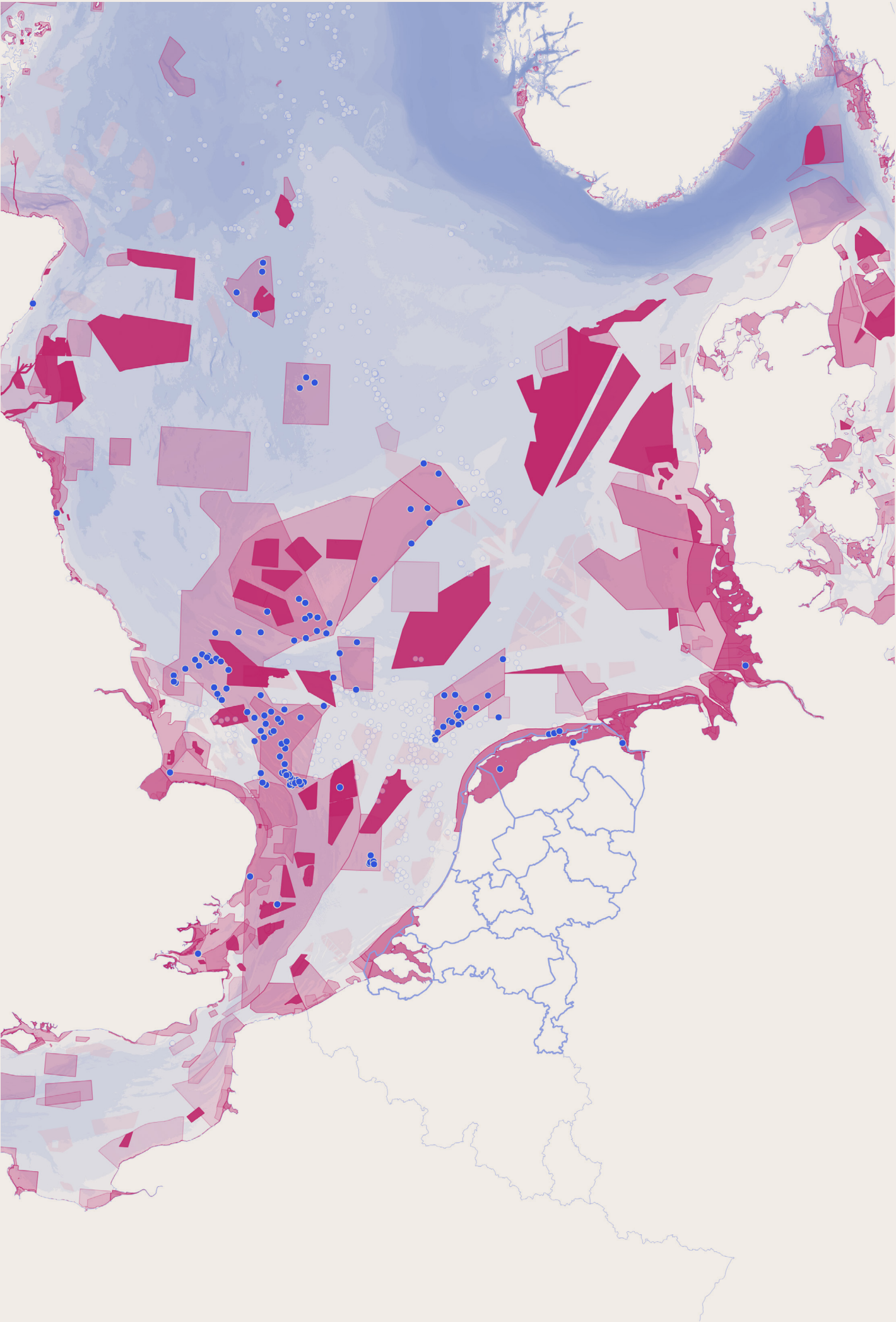
Furthermore, it stresses that the planning, construction, operation, and decommissioning of wind farms must be designed more carefully to support circularity and biodiversity. In this context, the conversion of decommissioned oil rigs into artificial reefs is supported, particularly in ecologically sensitive zones (Figure 7.4).

In this way, Seas at Risk identifies the potential for a truly sustainable blue economy that combines human needs with ecological restoration in the community vision.

15 All arguments are derived from the position paper of Seas at Risk. Sources, as well as the full argumentation, can therefore be found in the position paper (Appendix F).



Figure 7.4: Energy Infrastructure with Ecological Restoration Potential in the North Sea
Source: EMODnet; Eurostat/GISCO; PDOK; Protected Planet



7.2.4 THE MILITARY: NORTH SEA MARITIME SECURITY ALLIANCE (NSMSA)¹⁶

The NSMSA, as a transnational security alliance tasked with protecting critical infrastructure at sea, supports the vision of a more transnationally governed North Sea, but highlights the need for an integrated security framework to make it work. Through the placement of an abundance of new energy infrastructure at sea, a new system for detection of threats to these systems, the prevention of attacks and the response in case of sabotage is needed.

The proposed North Sea Commons are considered a good way to foster coordination and data sharing amongst the members, which is seen as improving the detection of attacks on critical infrastructure.

Multi-use wind farms, hydrogen wind farms as well as ones placed further out at sea, centralized infrastructure and decommissioned oil rigs are seen as potential security threats requiring adjustment (Figure 7.5).

The NSMSA sees multi-use wind farms as a threat to detection measures, as fishermen could be used as proxies by other states to damage the infrastructure. Wind farms at high seas are seen as significantly increasing the response times of rapid response units and centralized infrastructure, as well as hydrogen wind farms and decommissioned oil rigs being regarded as hindering prevention efforts due to their accessibility and high explosivity.

Instead of refusing the vision, the NSMSA proposes a security framework of security clearance permits to fish in between wind farms, maritime information hubs on land as well as hubs for rapid response units at sea close to high sea wind farms and a focus on artificial reefs. Training wind farms for rapid response units close to each naval basis complete the framework.

Overall, the NSMSA supports the development of a transnational North Sea Commons but argues that without institutionalized security, increasing offshore infrastructure expansion will remain vulnerable to security risks.

¹⁶ Multiple actors at international (Monaghan et al. 2023) as well as more regional (Six North Sea Countries 2024; Knighton 2024) and national level (Bekkers et al. 2021) propose the introduction of new alliances at North Sea level to tackle the problem of unclear responsibilities and missing authorities in the securance of critical maritime infrastructure.

In the context of the fishing communities' vision for the North Sea in 2100, maritime security is therefore unlikely to be addressed by a single national actor such as the Dutch Coast Guard or Navy. Instead, it is more plausible that a coordinated alliance of North Sea states will play a central role in safeguarding offshore infrastructure.

The position paper therefore argue from a perspective of the (imagined) “North Sea Maritime Security Alliance” (NSMSA) – an alliance between the Netherlands, Belgium, France, UK, Germany, Denmark, and Norway to protect critical maritime infrastructure at the North Sea.

All arguments are derived from the position paper of the NSMSA. Sources, as well as the full argumentation, can therefore be found in the position paper (Appendix F).

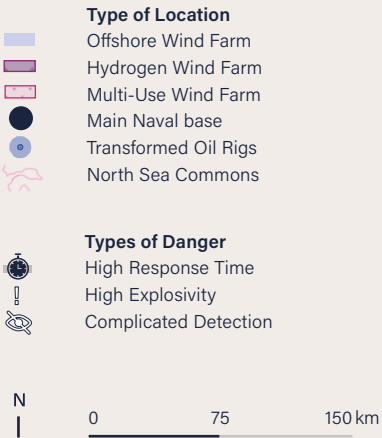
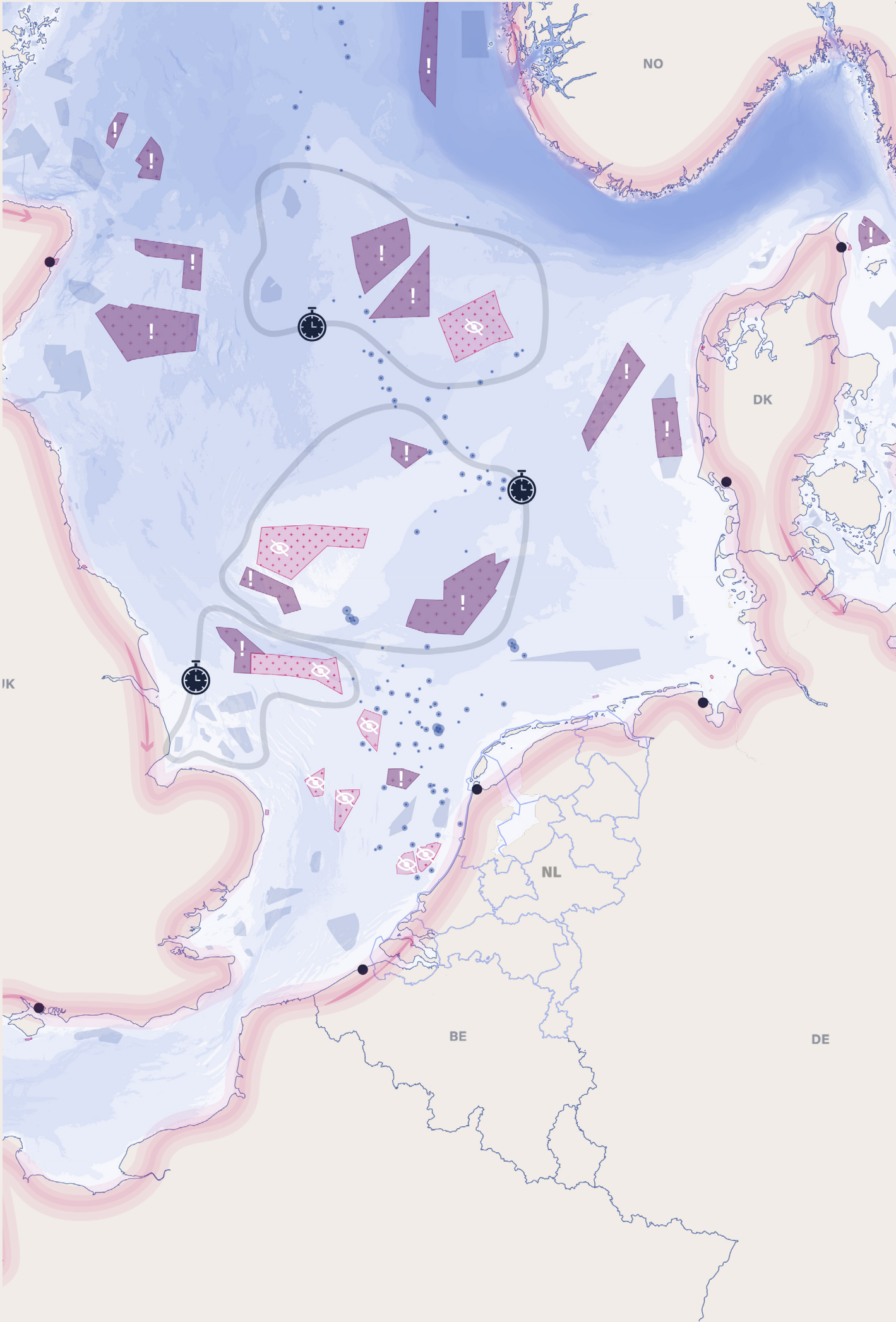


Figure 7.5: Locations of Security Risks in the Fishing Communities 2100 Vision
Source: EMODnet; Eurostat/GISCO; PDOK; Noun Project



7.3 Goal Map 4: Stakeholder Perspectives

Even though all stakeholders react differently to the proposed vision, some common ground can be identified, which therefore forms part of their shared goal: to integrate valuable insights from their knowledge into the community vision in order to enhance it.

A security framework for the North Sea commons

The stakeholders agree that a security framework should be established. Maritime information hubs for central data collection at all major fishing and naval ports, together with focused NSMSA integrated training parks and rapid response hubs near wind farms that are not easily accessible, should form part of the envisioned system. In addition, every fisherman would be required to obtain a security clearance permit before being allowed to fish in multi-use wind farms, in order to prevent both costly damage to wind turbines and potential vulnerabilities related to proxy attacks.

Research focus on hydrogen before integration

This includes the vision that hydrogen wind farms are not yet planned as fixed elements of the future renewable energy system in the North Sea, since further investigation into the technology and its risks is deemed necessary.

Environmental protection and regeneration as core

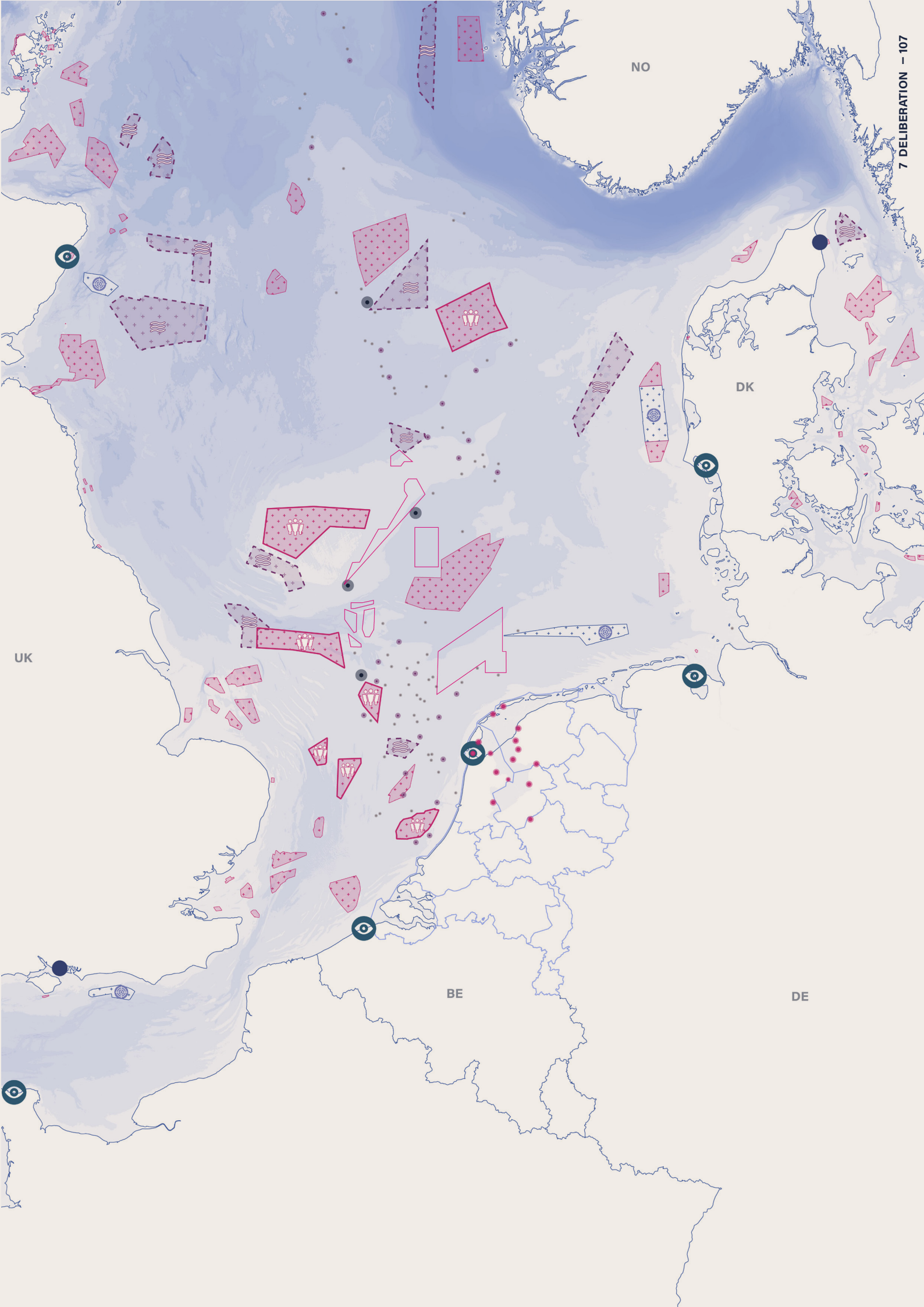
Artificial reefs and carbon capture and storage at oil rigs that are gradually decommissioned are intended to support the achievement of the net zero goals by 2050 and promote ecological regeneration. Even though not supported by all stakeholders, the inclusion of non-price criteria in the auctioning of wind farms is considered a desired direction, as this has been identified in the deliberative process as most beneficial for the common good.

Transition support for oil companies

Furthermore, policies should be developed to support the oil industry in its transition towards the renewable energy sector.

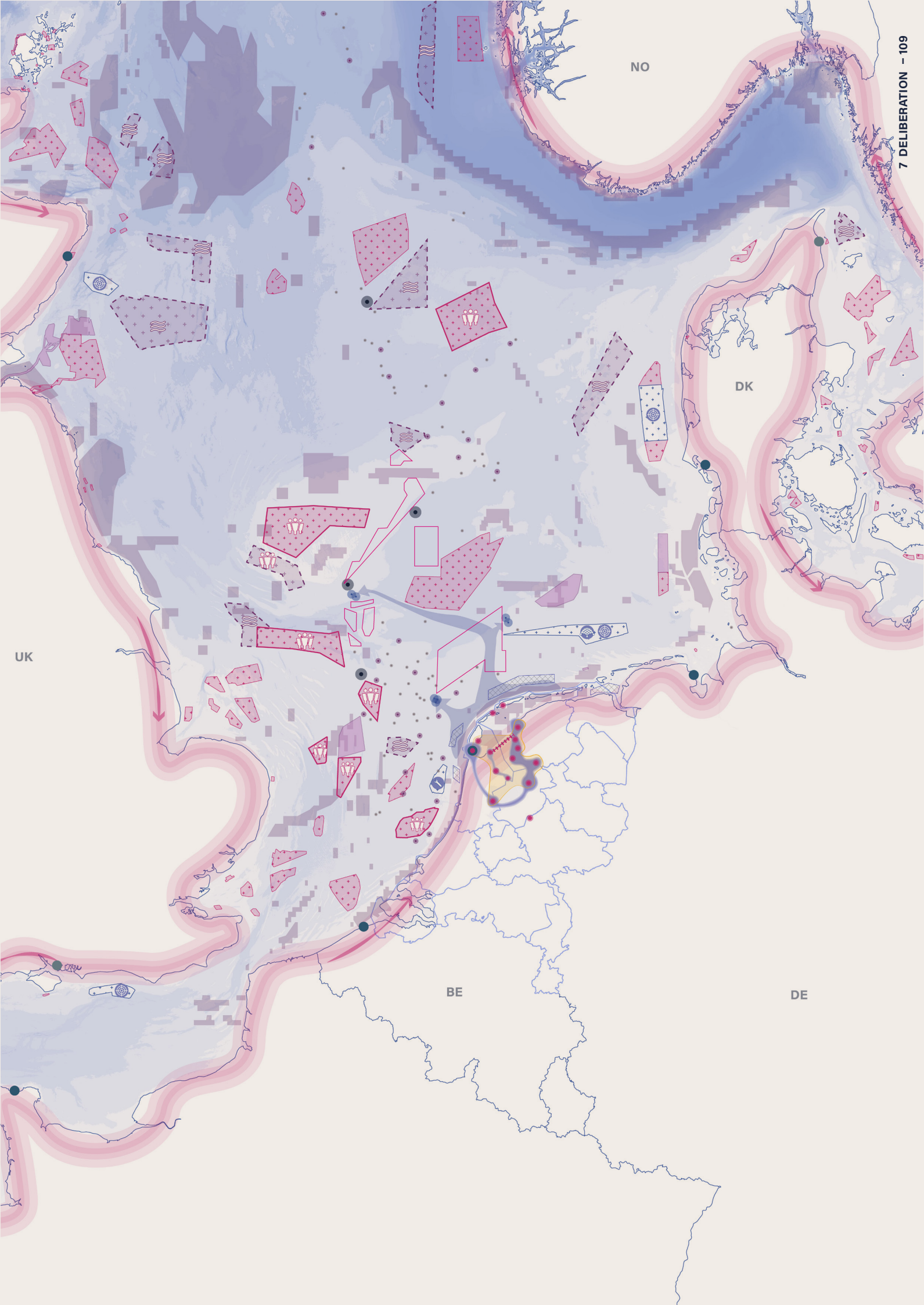


Figure 7.6: Vision goal map 4; The Deliberative Arena
Source: Het Informatiehuis Marien; EMODnet; Noun Project; Eurostat/ GISCO; PDOK



7.4 Integrated Vision

In a final step, the goals and spatial interventions set out in Goal Map 4 were integrated into the Community Vision. The final vision places a stronger emphasis on artificial reefs and carbon capture and storage at decommissioned oil rigs, considers hydrogen wind farms only as a possible option rather than a fixed element, and incorporates the elements of the security framework to make the implementation of the vision more realistic.



8 Design Strategy

With the community's vision refined and grounded in spatial, environmental, and security considerations, a future begins to take shape that is both ambitious and realistic. Yet a vision only gains meaning through its translation into action, requiring clear strategies and spatial interventions that can guide change across different scales over time. The following chapter builds on the vision by transforming its principles into concrete design and policy changes, outlining how long-term development can support resilient communities while navigating the complexities of the North Sea.

8.1 An Introduction to the Strategy

The design strategy carries forward the project's vision at both at IJsselmeer and North Sea scales, responding carefully to the unique aspirations of each subcommunity. These aspirations are translated into concrete design and policy interventions that are implemented at an urban scale, creating tangible frameworks where communities can actively engage with the stakeholders who will exist alongside them in the North Sea.

Each intervention is carefully structured into targeted actions, phased strategically across a span of seven decades. This long-term phasing allows the project to adapt to changing environmental, economic, and social conditions while maintaining continuity in community engagement. At each stage, the strategy highlights the stakeholders who will play an active role (ranging from local fishers and industry partners to EU-level institutions) ensuring that responsibilities, resources, and benefits are clearly distributed and collaboratively managed.

Through this approach, the project not only strengthens the resilience and agency of fishing communities but also establishes a replicable model for integrating local practices with large-scale regional and maritime infrastructures, fostering sustainable development and equitable participation across multiple scales.

8.2 Phasing

Three main themes are important in the strategic development of the deliberative vision: spatial and practice transition, governance transition and transition support. Each main theme consists of key spatial projects and policies and permits as well as programmes and institutions that make the spatial project feasible and establish its foundation. All themes are developed in three main phases: base setting, strategic development and repetition/ upscaling and stabilization. After these three phases, a new cycle with more uncertainty begins, since the first implemented energy structures reach the end of their lifespan and uncertainties about the functionality of the governance structure will strongly influence the spatial transition of the future.



Figure 8.1: Logic of the projects phasing

- | THEME | PHASING |
|-------|---------|
|-------|---------|

Training and Upskilling ^[1, 2]



3 Transition Support^[3, 4]

Figure 8.2: Broad overview of the projects phasing themes and main steps concerning key projects, policies, programmes and their dependencies

8.2.2 TRANSITION SUPPORT POLICIES IN DETAIL

The transition towards the main milestones takes time. The problems that the North Sea and their stakeholders are facing, however, are still present in the transition stage. Transition support policies' key function is therefore to mitigate existing problems until the new system is in place, that hopefully, attacks the root causes of the problem more permanently.

Figure 8.3: Policy explanation cards

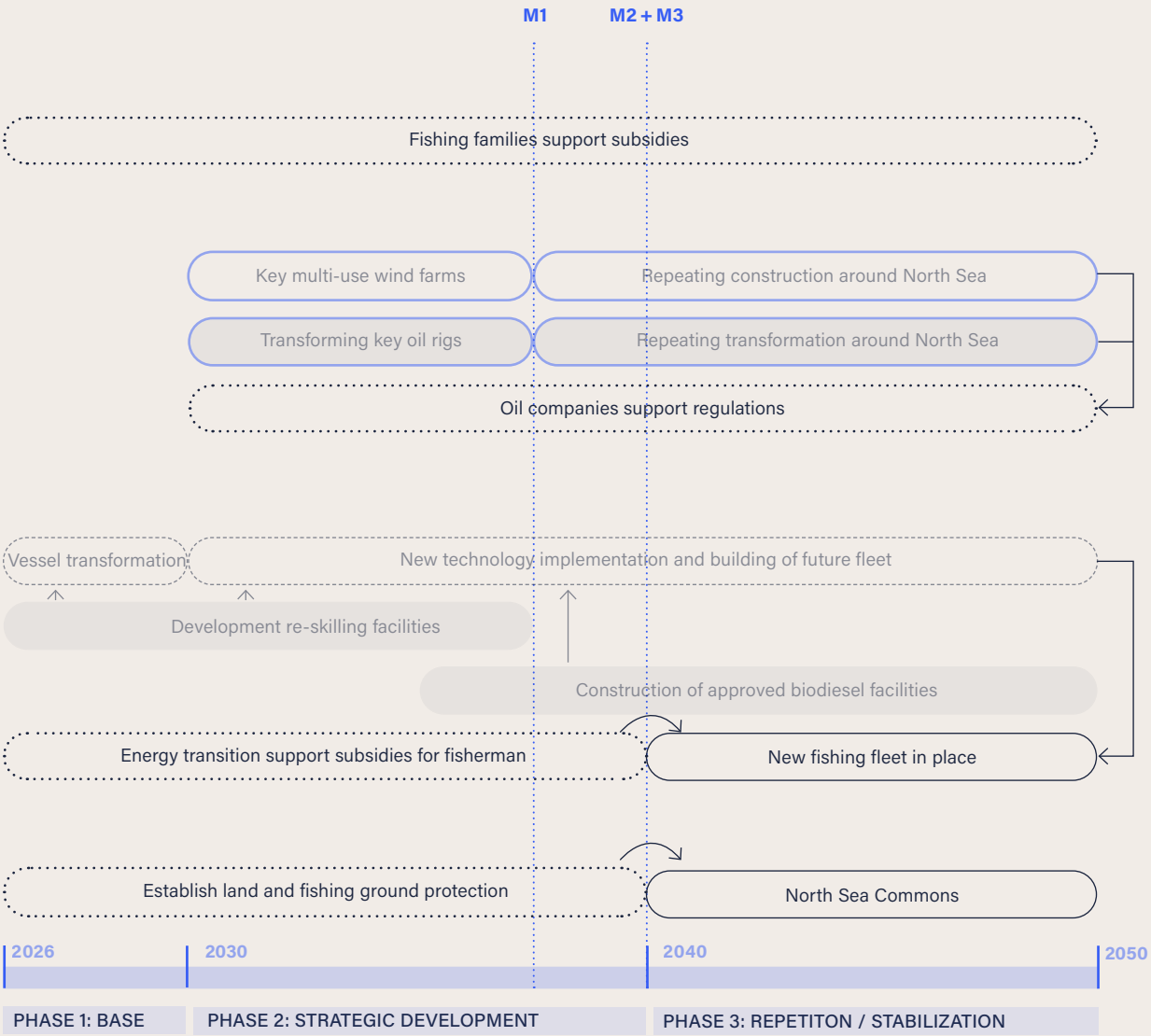


Figure 8.4: Dependencies of policies on other elements of the strategy

8.3 The North Sea Scale

The North Sea emerges as the principal testing ground where the project is realised at a both national and transnational scale. It positions the sea not simple as a site of ex- traction but as a shared and productive landscape with-in which fisherman from across the region and the European continent can converge, collaborate and continue their practice. Within this framework fishing communities are not displaced by the energy transitions but are instead strategically embedded within it thus becoming active par- ticipants in the evolving maritime economy.

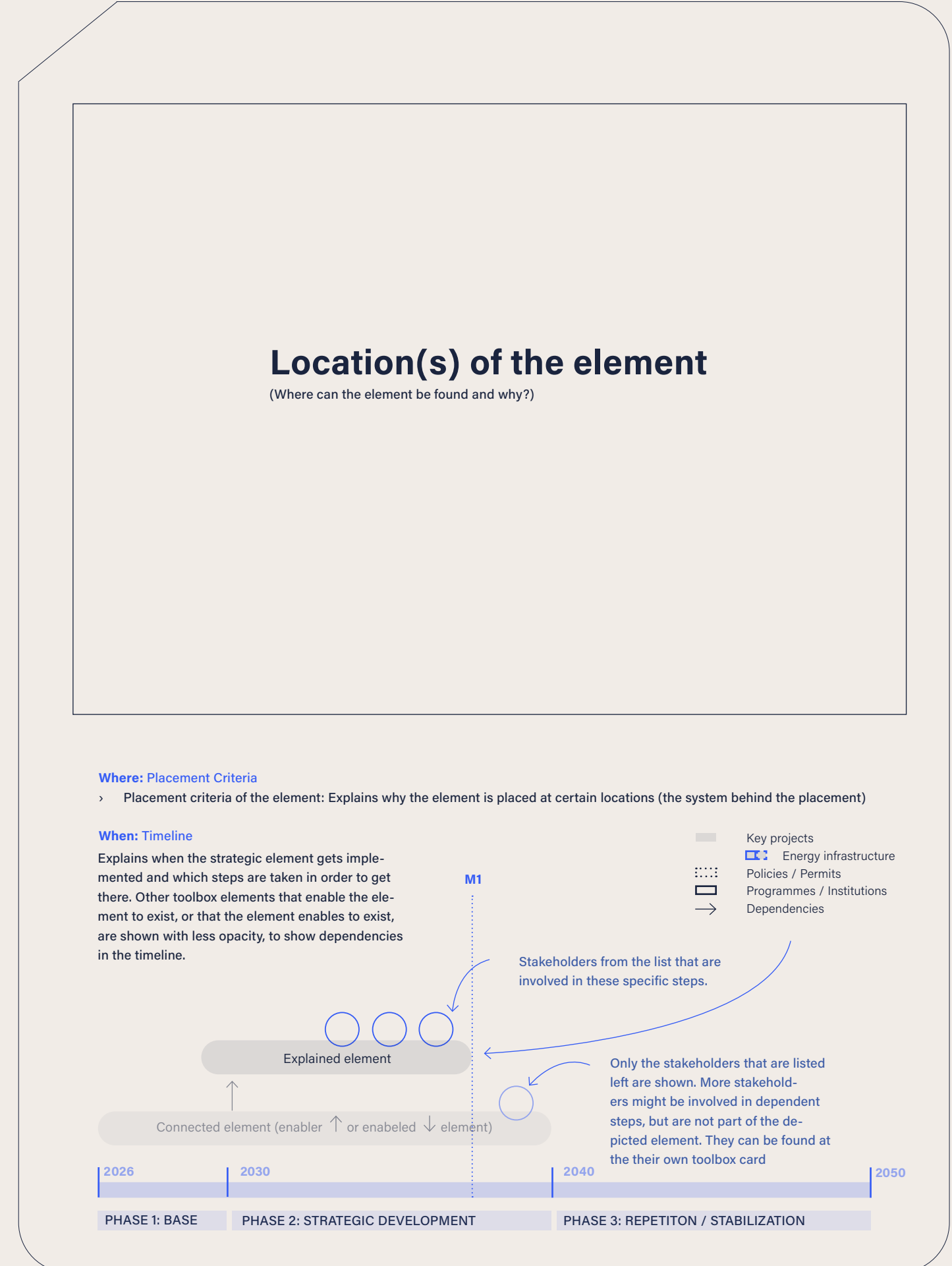
The proposal therefore examines how fisheries can adapt and persist within an in- creasingly infrastructural seascape where offshore energy developments such as wind- farms and hydrogen production redefine spatial, ecological and economical conditions. At the same time, it foregrounds the potential of reusing redundant and ageing energy infrastructure, transforming them into assets that support new energy systems as well as alternative forms of livelihood. This approach not only reduces material waste but also preserves and reactivates existing offshore knowledge and spatial investments.

Crucially, the project constructs a platform for cooperation among fishermen and energy producers by fostering shared use, knowledge exchange and co-dependency, it reframes the North Sea as a collective arena rather than a contested one. In doing so it promotes a model of mutual benefit where stakeholders are not only sustained individ- ually but are also strengthened through their interrelations thus functioning as comple- mentary actors within a border ecological, economical and infrastructural network.

Figure 8.5: Open North Sea
Source: Vecteezy



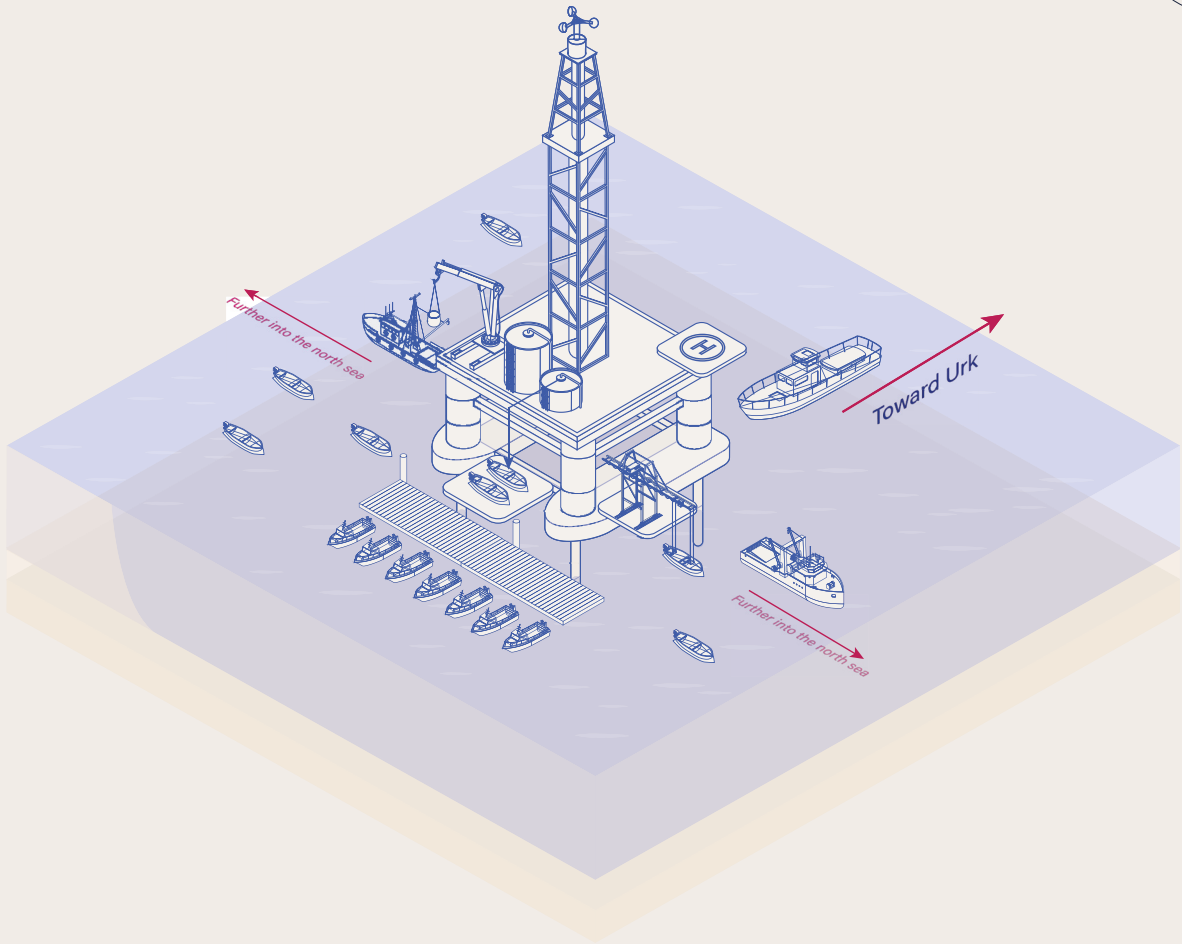
Figure 8.6: Template of spatial intervention cards



Oil rigs transformation typology

Figure 8.7:
Sources: The Noun Project; Flaticon

Fishing Hub



What: Definition
Fishing hubs are ferry stations in the North Sea where fishermen transfer to smaller vessels, change shifts, refuel, and carry out minor repairs.

Why: Key Functions
1) Fishing between wind farms [Goal 1]: Smaller vessels reduce the risk of damaging infrastructure, allowing fishermen to operate safely between off-shore wind farms that are normally not reachable by small boats due to their distance to shore (Neitzel, 2025).

2) Fishing further out at sea [Goal 1]: Through the North Sea Commons, new fishing hotspots open up that are far away from the fishermen’s home harbours. The fishing hubs as public transport stations ensure reachability without too many additional costs.

3) Shift work [Goal 2; 3]: Instead of staying at sea for a full week, fishermen can work in shifts. Transport vessels bring crews to the hub for rotation, enabling part-time work at sea and on land in other related fishing businesses. This increases income stability and strengthens their family role at home.

Who: Involved Stakeholders

Fishing Communities

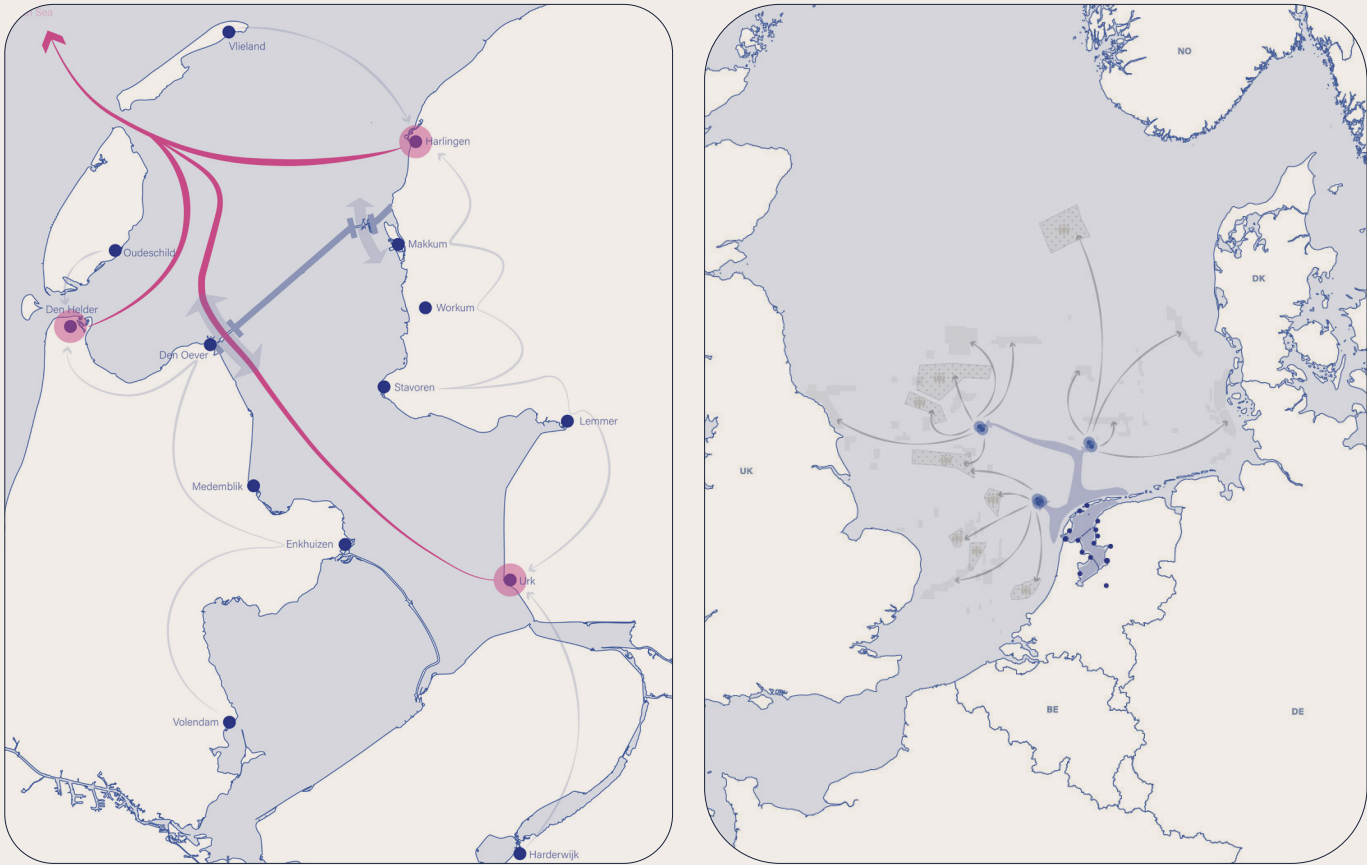
Oil Companies

NSMSA

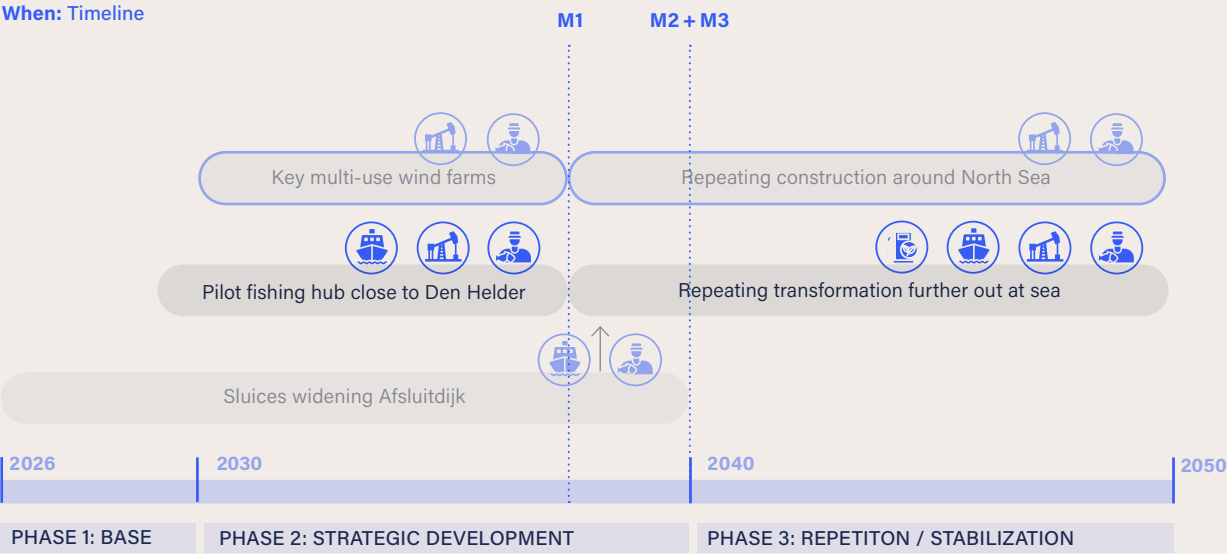
Biofuel Industry

NS Ferry

- *Related spatial interventions**
- > Sluices Afsluitdijk
 - > Offshore multi-use wind farms
 - > Fish processing and biofuel facility
 - > Research and education centre
 - > Rapid response hub



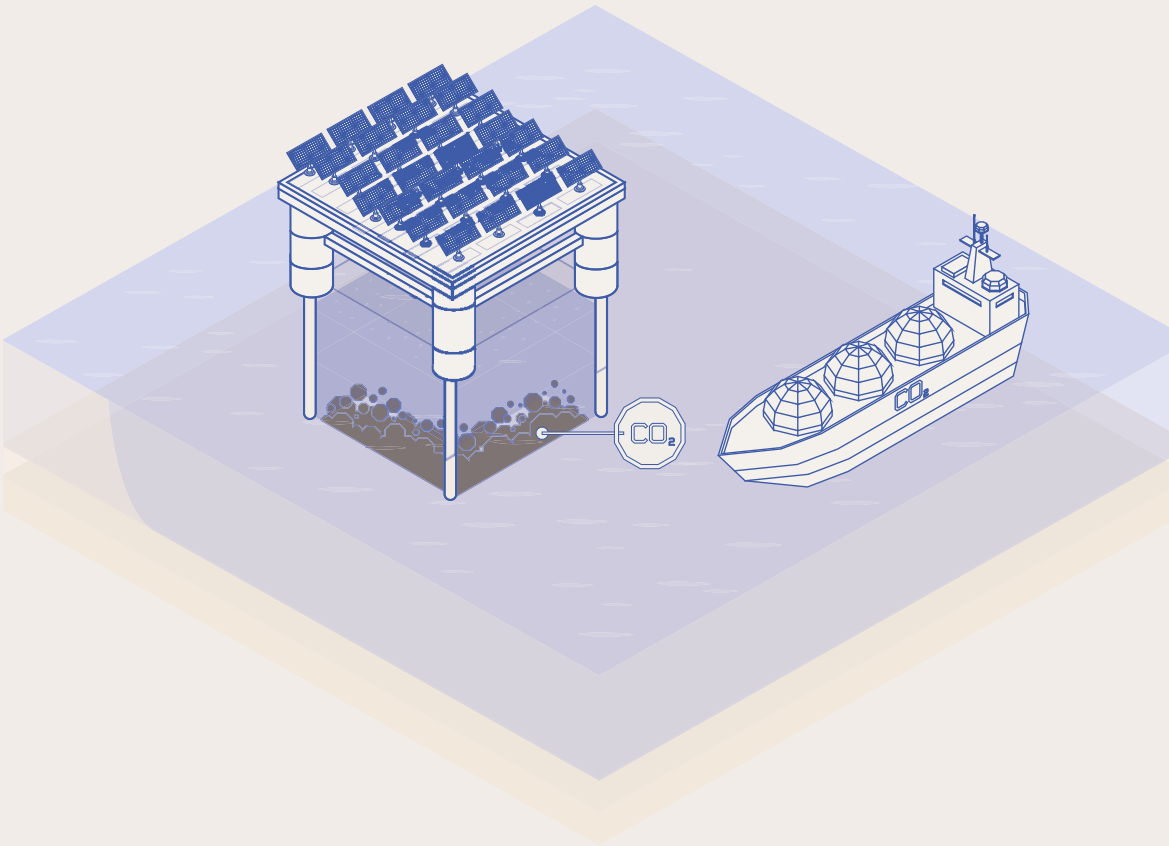
- Where: Placement Criteria**
- > Decommissioned oil rigs
 - > Proximity to main high-sea fishing hotspots () and multi-use wind farms ()
 - > Starting points at fishing communities (● = places with the most docked boats)



Oil rigs transformation typology

Figure 8.8:
Sources: The Noun Project; Flaticon

Carbon Storage & Energy Production



What: Definition
Carbon capture and storage (CCS) platforms store CO² captured from onshore industries. The CO² is injected into depleted oil or gas reservoirs, after transportation by ship (Oil & Gas Authority, 2019). The platforms can be multifunctional with integrated solar panels for energy production.

Why: Key Functions
1) Reduce greenhouse gas emissions (Goal 4): By capturing CO² from onshore industrial sources and storing it underground, carbon capture and storage (CCS) reduces greenhouse gas emissions and contributes to the Net Zero target (Oil & Gas Authority, 2019).
2) Renewable energy production (Goal 4): Integrated solar panels provide energy for the platform (e.g., monitoring practices) or other purposes nearby.

While the longterm integrity of CCS is not yet completely assessed, pilot projects have been successfully used for over 20 years now (e.g., Sleipner saline aquifer Norway) (Oil & Gas Authority, 2019).

Who: Involved Stakeholders

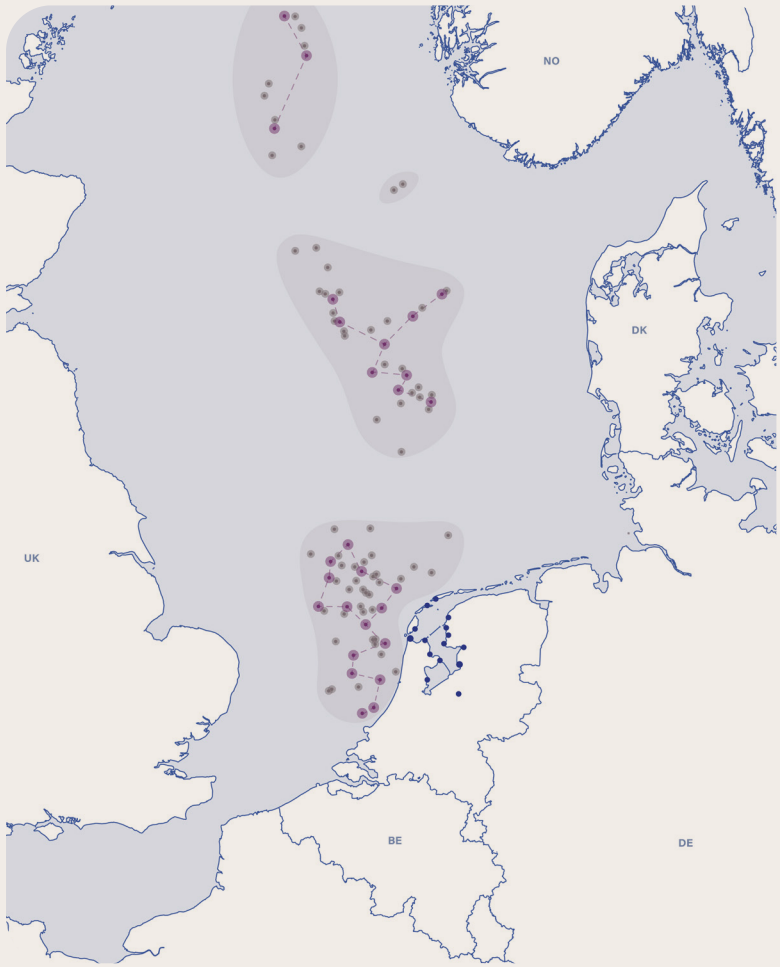
Renewable Energy Cooperations

Oil Companies

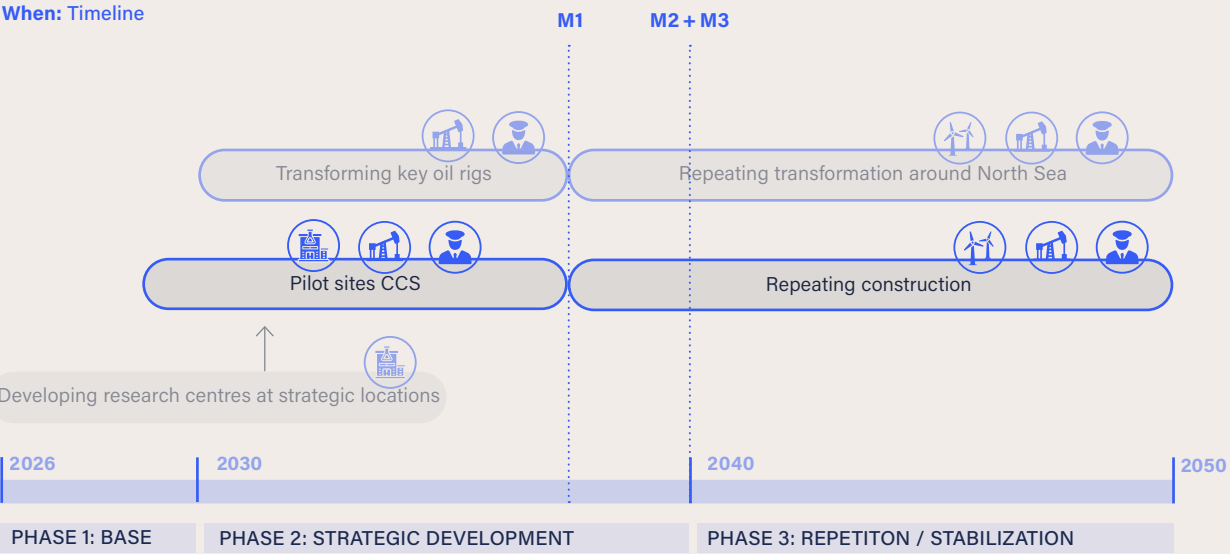
NSMSA

Research Institutions

- *Related spatial interventions**
- › Rapid response hub
 - › Research and education centre



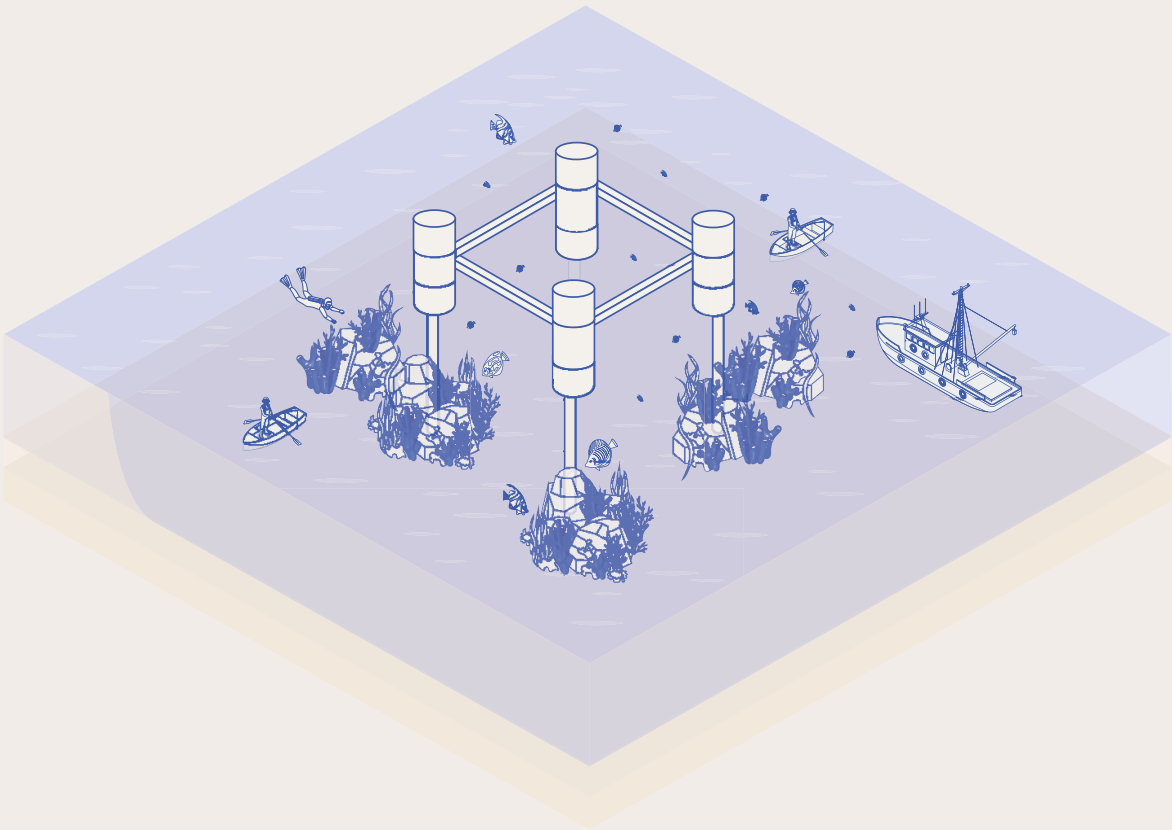
- Where: Placement Criteria**
- › Decomissioned oil rigs (potential must be evaluated case-by-case)
 - › Distant to shore: CCS (○)
 - › Close to shore: energy production (●)



Oil rigs transformation typology

Figure 8.9:
Sources: The Noun Project; Flaticon

Artificial Reef



What: Definition

Artificial reefs are reefs created from the legs of de-commissioned oil platforms (Texas Parks and Wildlife, n.d.). Either the upper sections of the legs are removed, leaving the base structure in place as a reef, or the entire structure is toppled onto the seafloor to form an artificial reef (Texas Parks and Wildlife, n.d.). Prior to implementation, environmental assessments are conducted to determine whether specific oil rigs are suitable and where reefs should be established in the future (Texas Parks and Wildlife, n.d.).

Why: Key Functions

1) Nature Conservation (Goal 4): Artificial reefs support biodiversity and can enhance ecological connectivity (Verbeek, 2013).

2) New fishing opportunities (Goal 1): Artificial reefs increase fish stocks and create new opportunities for fishing and recreational diving (Verbeek, 2013).

"Rigs-to-Reefs" has been implemented in varying intensity worldwide (IMSA Amsterdam, 2013).

Who: Involved Stakeholders



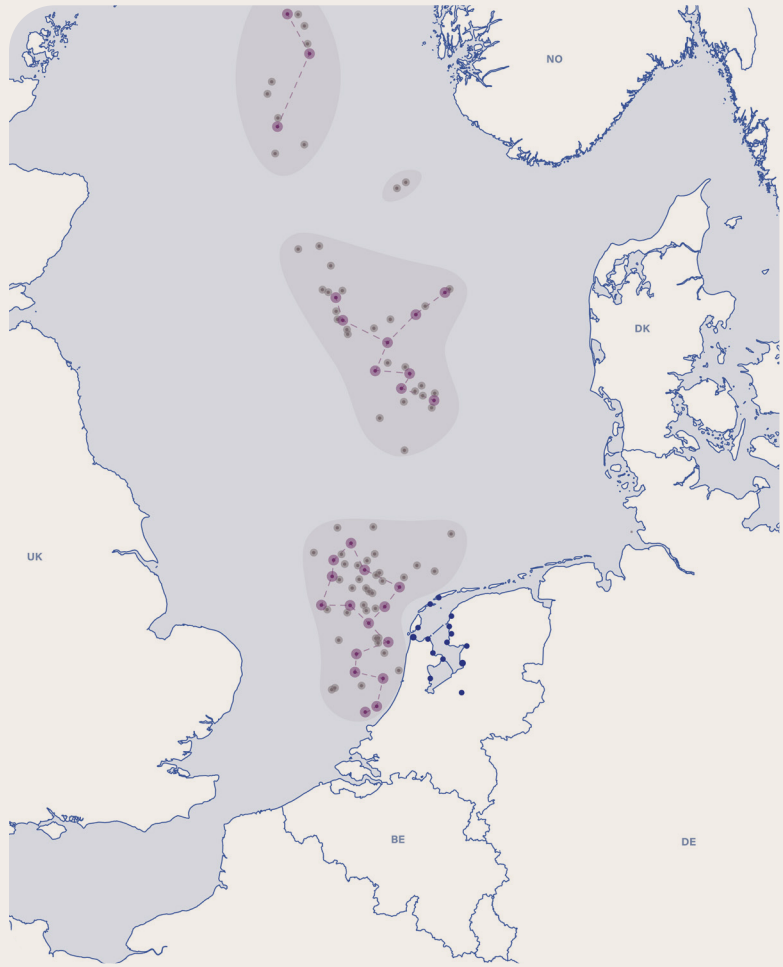
Environmental Groups



Oil Companies



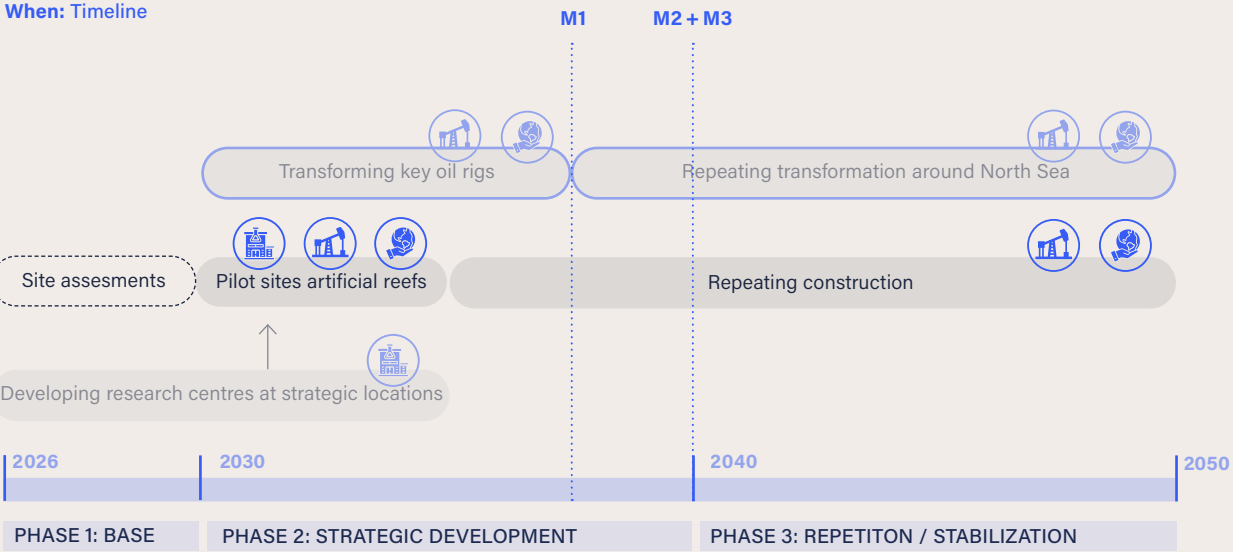
Fishing Communities



Where: Placement Criteria

- Seabed conditions: hard rock; hard packed sand; gravel; shell (Stephan et al., 2002)
- Marine life: in line with target species (Stephan et al., 2002)
- Distance to shipping lanes (Stephan et al., 2002)

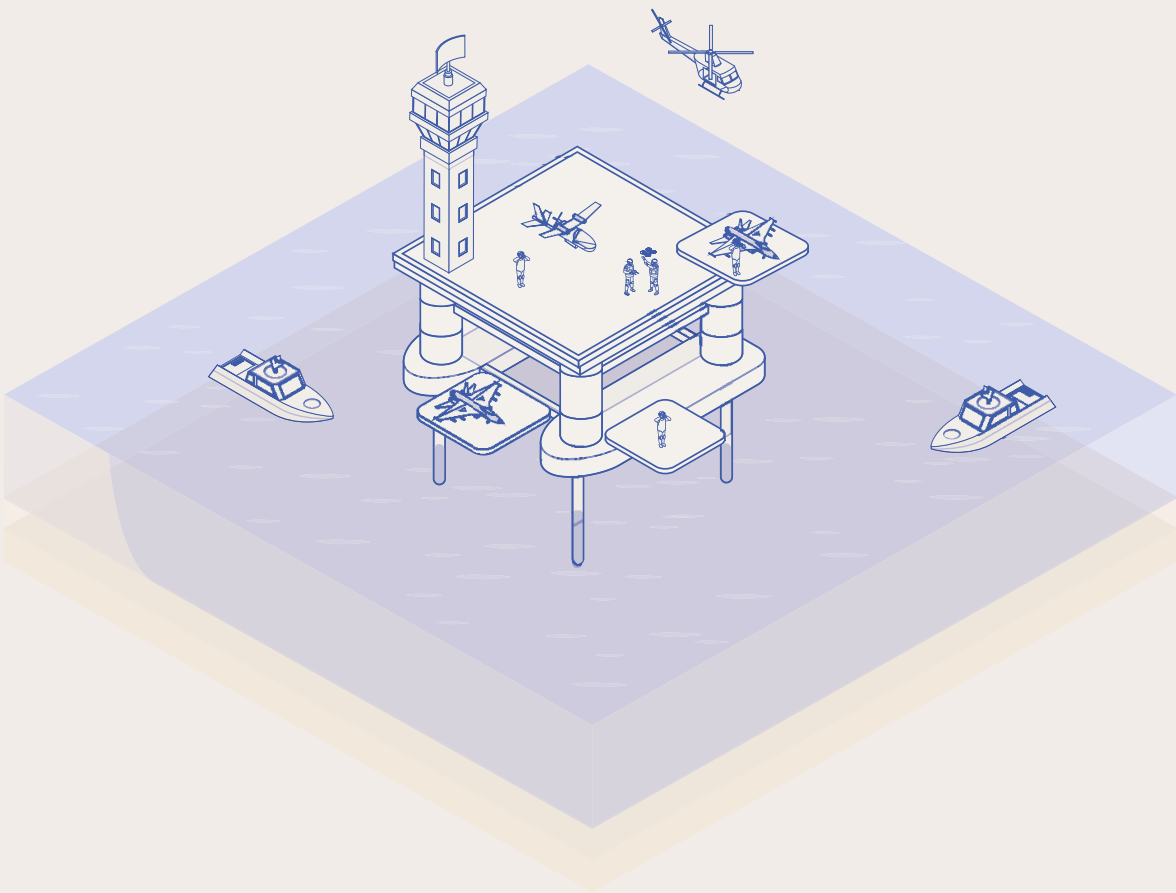
When: Timeline



Oil rigs transformation typology

Figure 8.10:
Sources: The Noun Project; Flaticon

Rapid Response Hub



What: Definition

Rapid response hubs are small bases located on decommissioned oil rigs near critical infrastructure, designed to support rapid response units (RRU) of the North Sea Maritime Security Alliance (NSMSA). Small response units and their equipment can be stationed at these hubs.

Why: Key Functions

1) Optimized detection (Goal 4): Enhanced monitoring of offshore infrastructure like multi-use and hydrogen wind farms, that are especially vulnerable due to the amount of involved actors or explosivity (Bueger & Edmunds, 2024; Bekkers et al., 2021).

2) Optimized response (Goal 4): Their proximity to critical maritime infrastructure reduces response times in the event of attacks or incidents (Monaghan et al., 2023).

Who: Involved Stakeholders



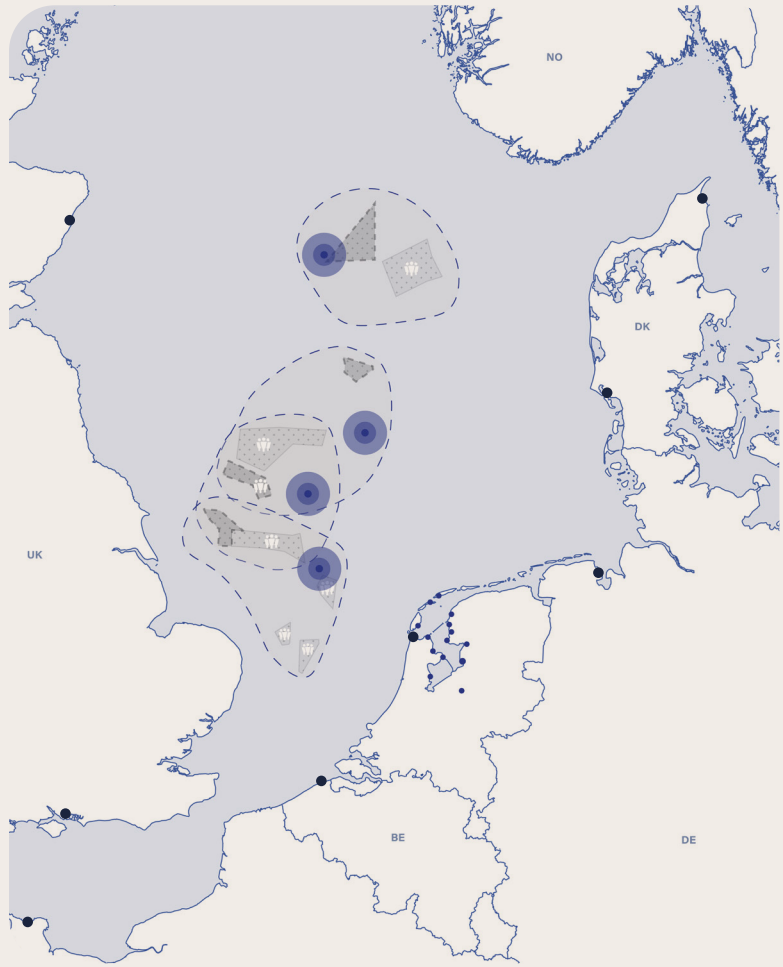
Oil Companies



NSMSA

*Related spatial interventions

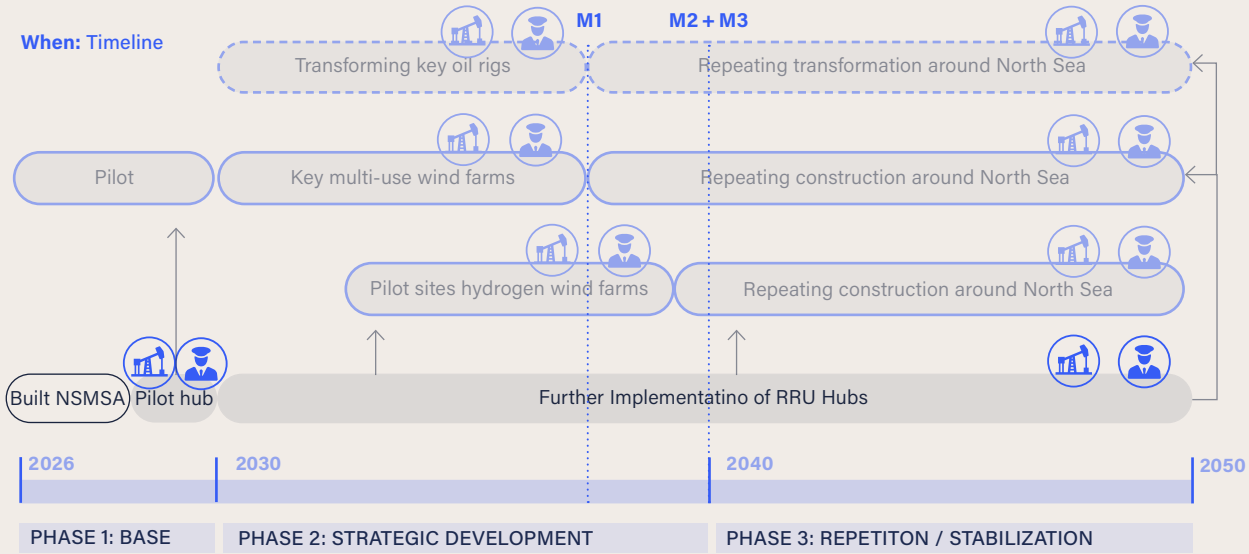
- › Offshore multi-use wind farm
- › Floating hydrogen wind farm
- › Carbon storage and energy production
- › Fishing hub



Where: Placement Criteria

- › Decommissioned oil rigs
- › Proximity to multi-use wind farms (⚙️): due to the danger of grey zone attacks carried out by proxies
- › Proximity to hydrogen wind farms (🔥): due to their high explosivity
- › High distance to already existing naval bases (●)

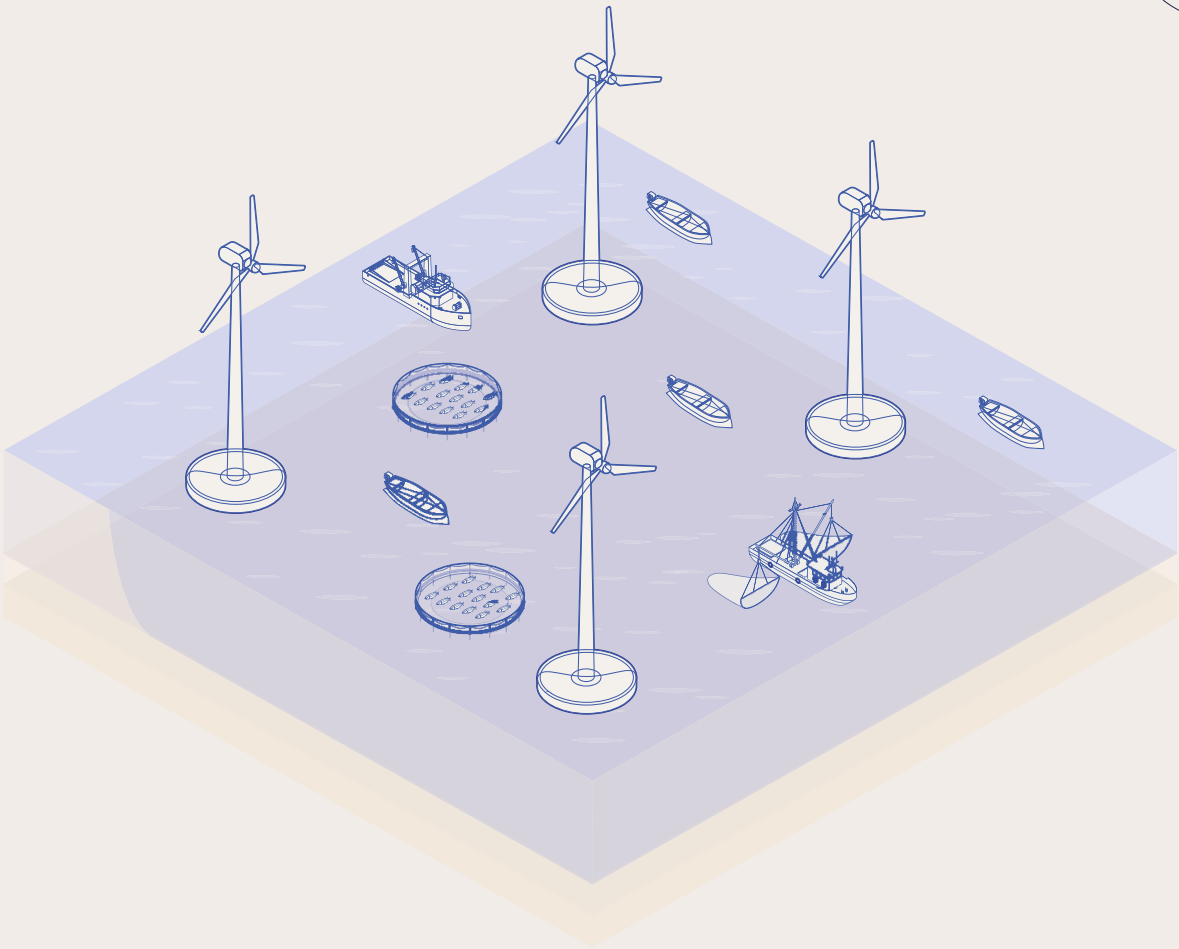
When: Timeline



Wind farms typology

Figure 8.11:
Sources: The Noun Project; Flaticon

 Offshore Multi-Use Wind Farm



What: Definition

Multi-use wind farms are offshore wind farms that serve not only as energy production sites but also as fishing hotspot for fishers with clearance permit. The increased spacing between turbines allows fishing activities and the integration of mariculture sites.

Why: Key Functions

1) Renewable energy production (Goal 4): Offshore multi-use wind farms produce energy without depleting non-renewable resources or contributing to global warming, due to strong and consistent winds at sea (Noordzeeloket, n.d.-a). They are therefore a key component for the Netherlands to achieve net zero carbon emissions by 2050 (Government of the Netherlands, 2022).

2) Protection of fishing hotspots and diversified fishing opportunities (Goal 1): Multi-use wind farms provide fishers with opportunities to operate between turbines using both passive and active fishing methods. Instead of reducing available fishing space, they can create new fishing opportunities, as fish stocks are often higher around turbine structures (Bonsu et al., 2024).

Who: Involved Stakeholders



Fishing Communities



Oil Companies



Renewable Energy Cooperations



NSMSA

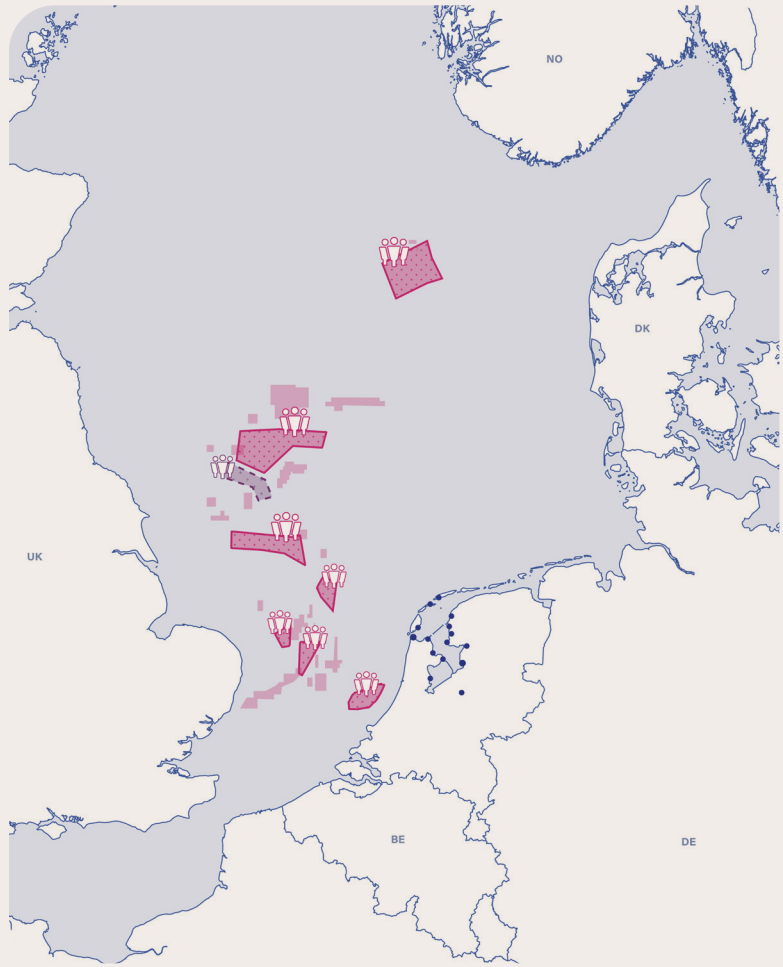


Research Institutions

i So far, only passive fishing has been tested in existing Dutch wind farms (Neitzel 2025), while active fishing requires further research.

*Related spatial interventions

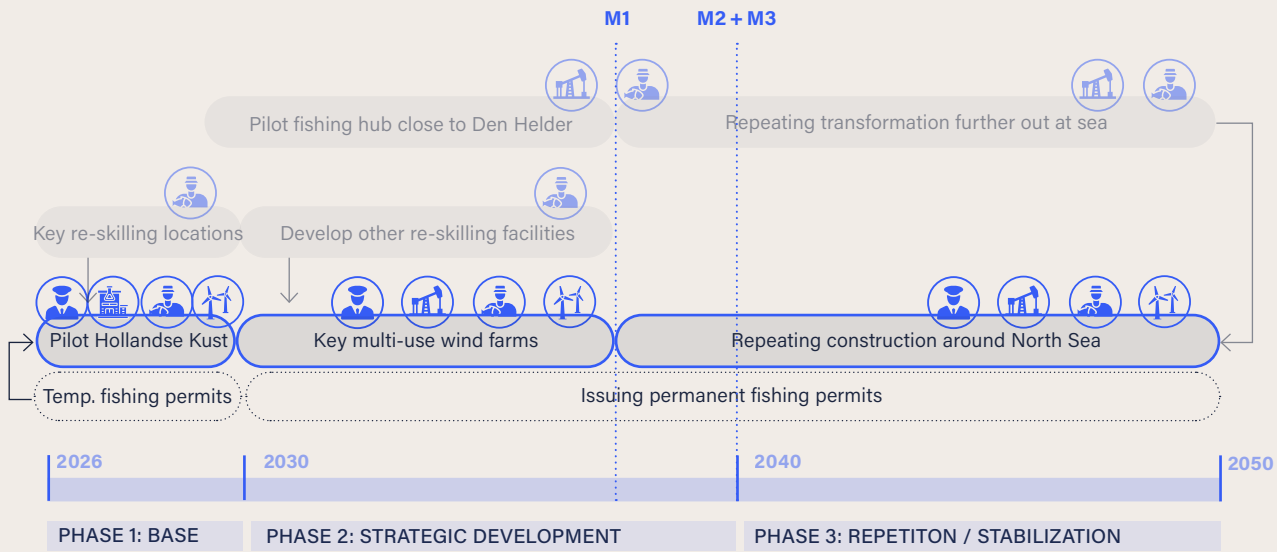
- › Fishing hub
- › Rapid response hub
- › Re-skilling centre with training facility
- › Research and education centre



Where: Placement Criteria

- › Proximity to existing fishing hotspots: Close to, but not overlapping with, existing fishing grounds (red rectangle) to protect them while benefiting from increased fish abundance.

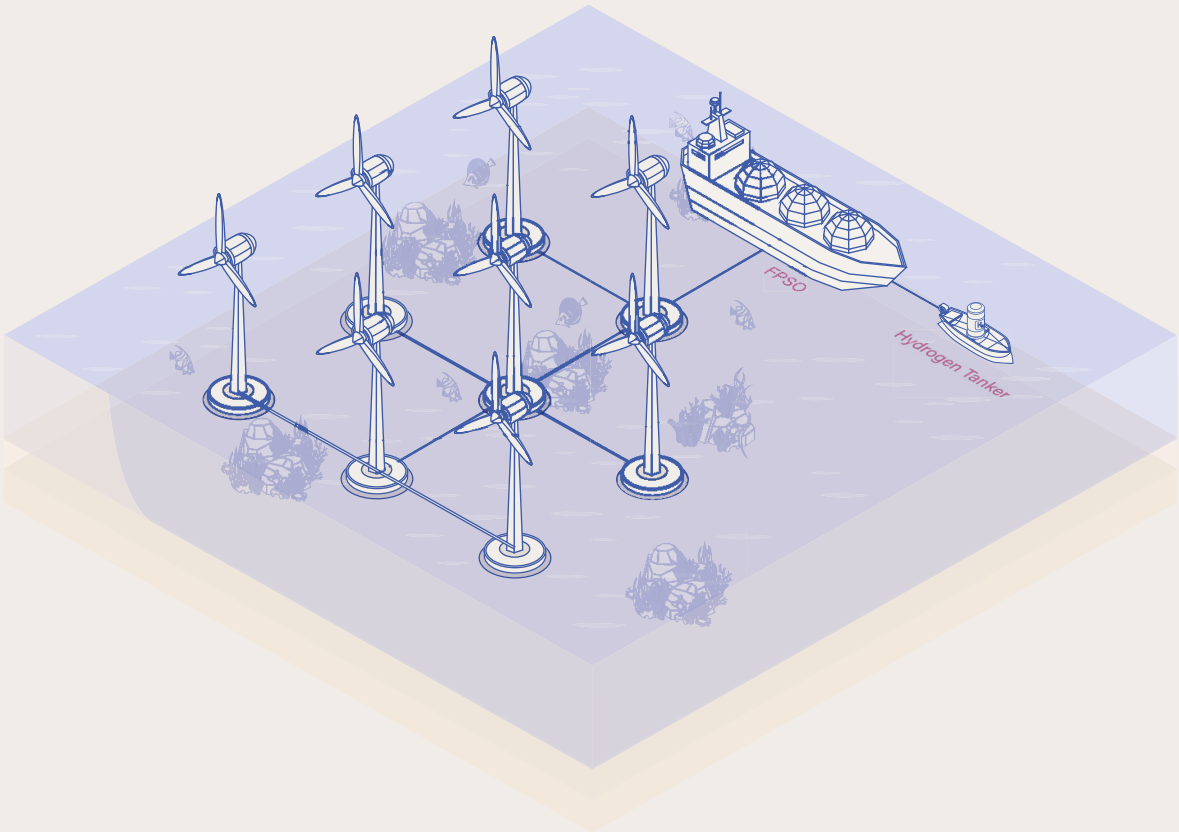
When: Timeline



Wind farms typology

Figure 8.12:
Sources: The Noun Project; Flaticon

 Floating Hydrogen Wind Farm



What: Definition

Floating hydrogen wind farms are offshore wind farms located in deep-sea areas that can store excess energy as hydrogen via a permanently docked production, storage, and offloading unit (FPSO) (Marine Research Institute Netherlands, n.d.). The produced hydrogen can be stored temporarily on board or transported to users by tanker or pipelines (SwitchH2, n.d.).

Why: Key Functions

1) Fish hotspots protection (Goal 1): Floating hydrogen wind farms can be located in deep-sea areas, leaving shallow water (where most fish are found) available for fishing. Since hydrogen can be transported by ship instead of cables or pipelines, more space remains accessible for trawling activities.

2) Renewable energy production and grid support (Goal 4): Floating hydrogen wind farms convert offshore wind energy into green hydrogen, which can be used directly by industries or stored for later use (Fairley, 2020). This supports the transition to renewable energy and helps reduce grid congestion (Fairley, 2020).

Who: Involved Stakeholders



Renewable
Energy
Cooperations



Oil
Companies



Research
Institutions

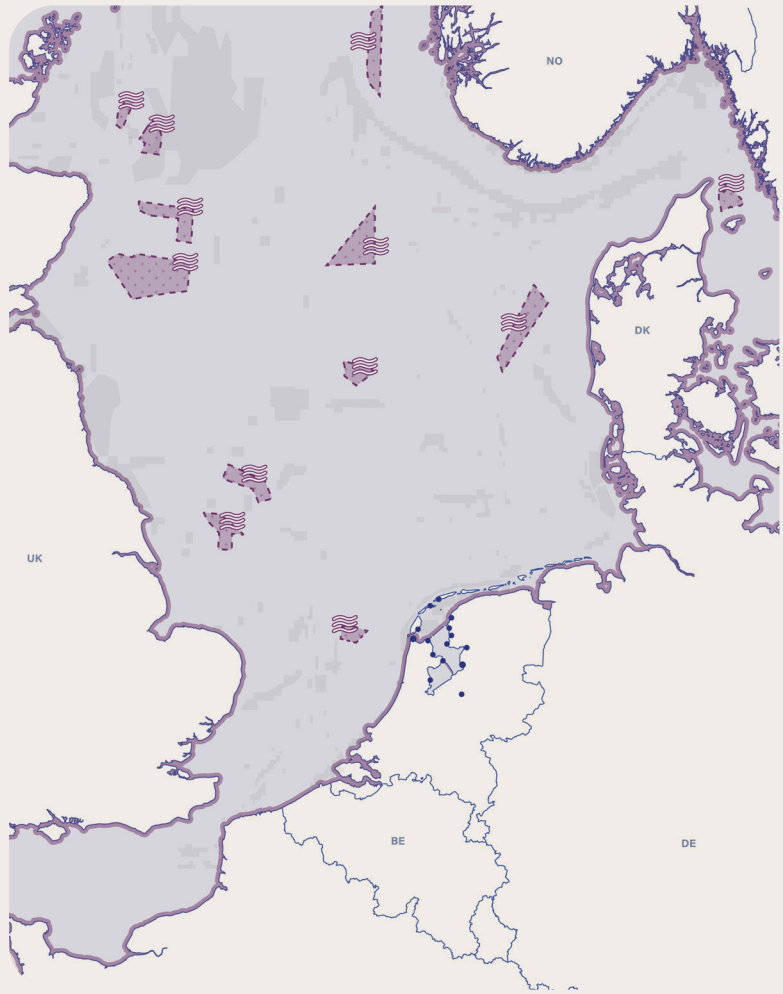


NSMSA

So far, most comparable projects are still in the research and construction phase (e.g., dolphyn hydrogen; NorthH2) (Lee et al., 2023). If floating hydrogen wind farms will be feasible in the future is still uncertain.

***Related spatial interventions**

- › Rapid response hub
- › Research and education centre



Where: Placement Criteria

- › Deep water and high sea
- › Close to existing fishing grounds ()

When: Timeline

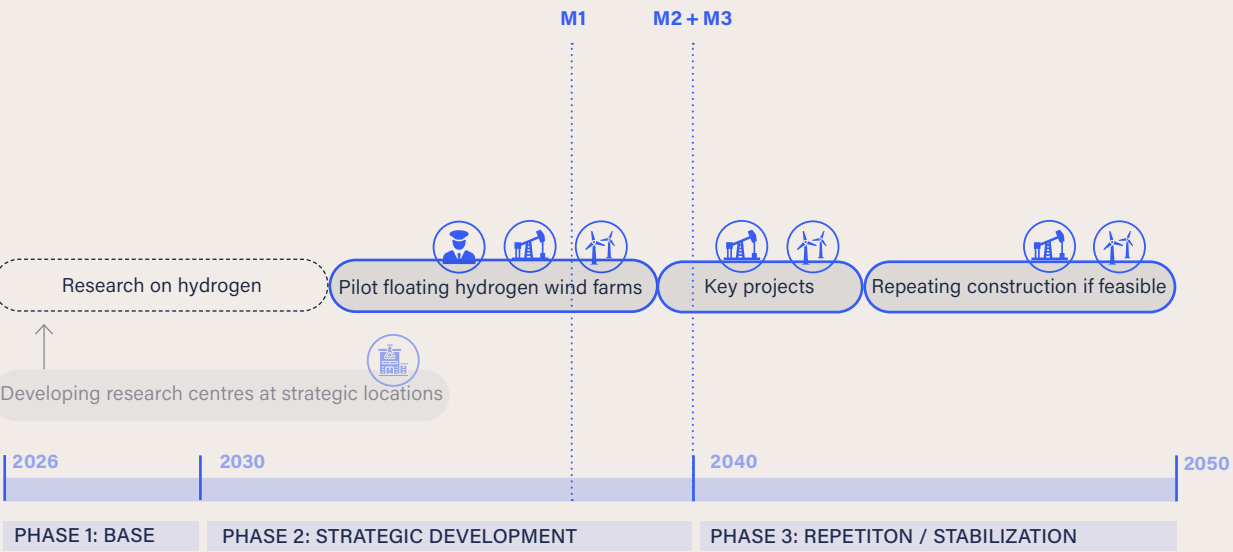
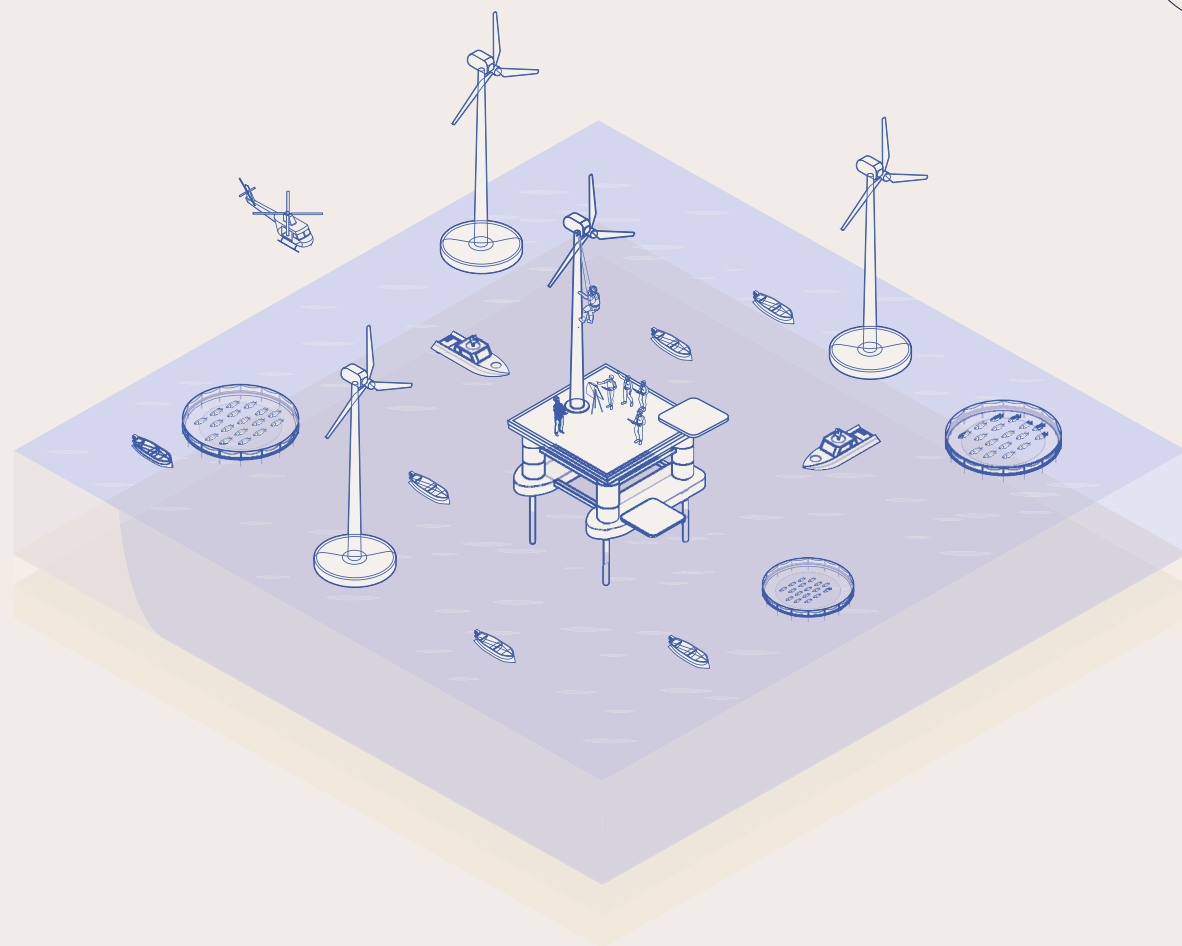


Figure 8.13:
Sources: The Noun Project; Flaticon

Training Facility Network



What: Definition

The training facility network consists of multi-use wind farms, mariculture sites, and floating hydrogen wind farms connected to re-skilling facilities. These facilities provide training for fishing activities between wind farms as well as for maintenance work. Rapid response units can also train how to operate within and protect offshore infrastructure.

Why: Key Functions

3): The training facility network supports the transition of the fishing sector towards mariculture, fishing between multi-use wind farms, and maintenance work. New skills can be trained and certification can be obtained – making re-skilling possible.

2) Facilitate establishment of NSMSA rapid response units (Goal 4): The training facility network prepares rapid response units to operate efficiently within offshore wind farms in case of emergency (Monaghan et al., 2023; Bueger & Edmunds, 2024).

Who: Involved Stakeholders

Renewable
Energy
Cooperations

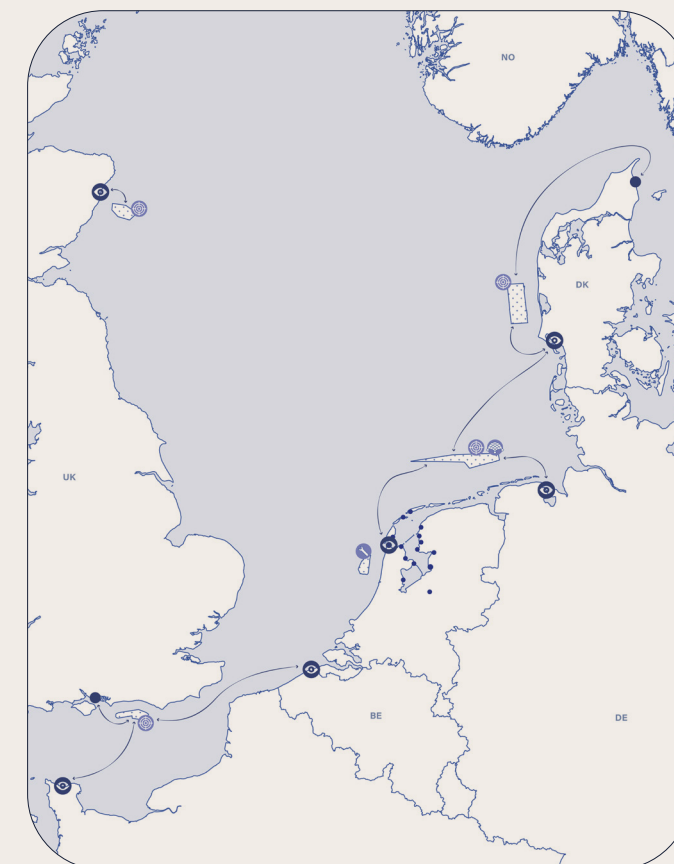
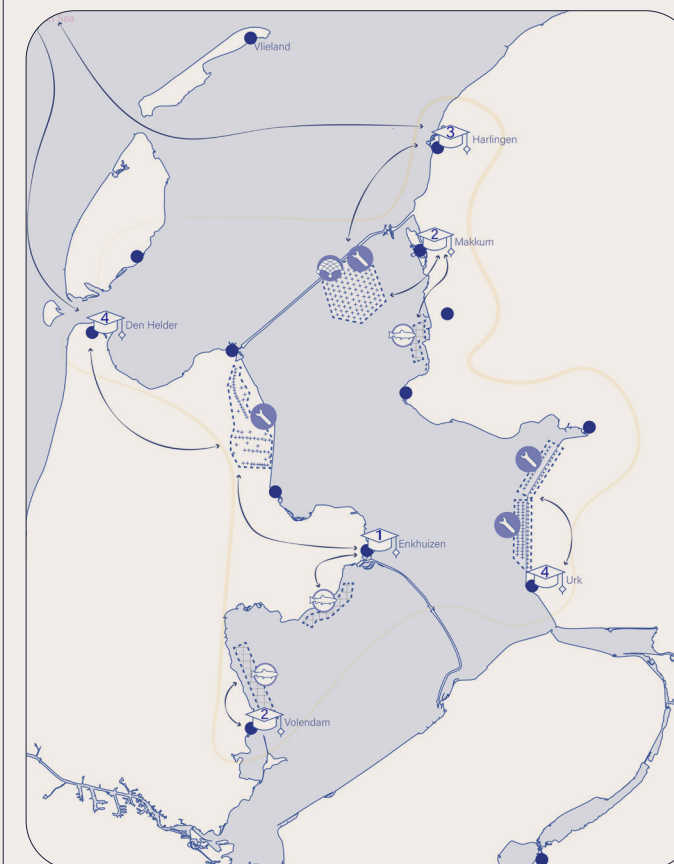
Fishing Communities

Research
Institutions

NSMSA

*Related spatial interventions

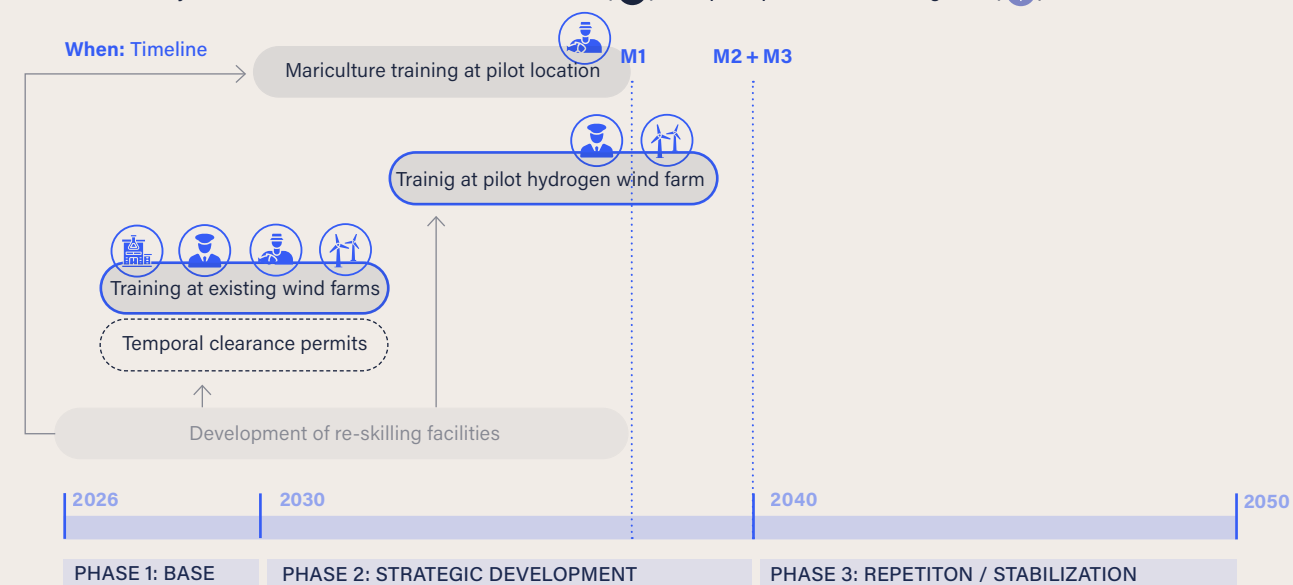
- › Re-skilling centre with training facility
- › Offshore multi-use wind farm
- › Aquaculture site
- › Floating hydrogen wind farm



Where: Placement Criteria

- › Proximity to re-skilling centres (🎓) for training sites concerning maintenance (🔧), fishing between wind farms (🌬️) and mariculture (🚢)
- › Proximity to naval bases with maritime information hub (📡) for rapid response unit training sites (🎯)

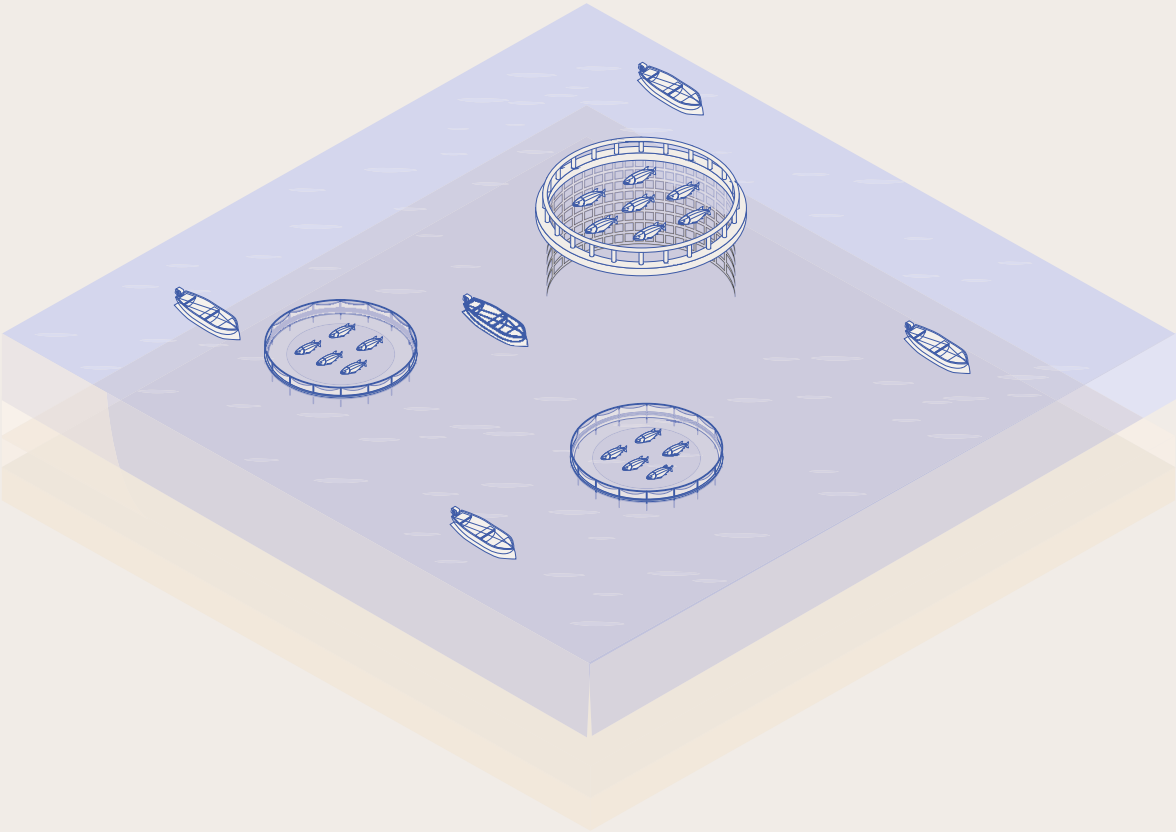
When: Timeline



Others

Figure 8.14:
Sources: The Noun Project; Flaticon

 Aquaculture Site



What: Definition

At aquaculture sites, mussels, algae, and fish are cultured in, for example, net cages (Krost et al., 2011). They are located in the North Sea as well as in inland waters such as the IJsselmeer to offer diversified and more sustainable fishing opportunities for Dutch fishers.

Why: Key Functions

1) Stabilize income for fisherman (Goal 1; 3): Aquaculture sites provide Dutch fishers with new opportunities beyond traditional fishing to stabilize their income, while still maintaining practices closely related to their profession. Species such as salmon, sea bream, and cod can be cultivated at local sites, which reduces fuel costs and makes the practice more economically feasible (European Union, n.d.).

2) Sustainable fishing practices (Goal 4): Aquaculture sites help preserve fish stocks by cultivating fish instead of further harvesting wild fish (EU, n.d.). Since production is local, transport-related emissions are also reduced (EU, n.d.). Therefore, aquaculture provides more sustainable fishing opportunities for the future.

Who: Involved Stakeholders



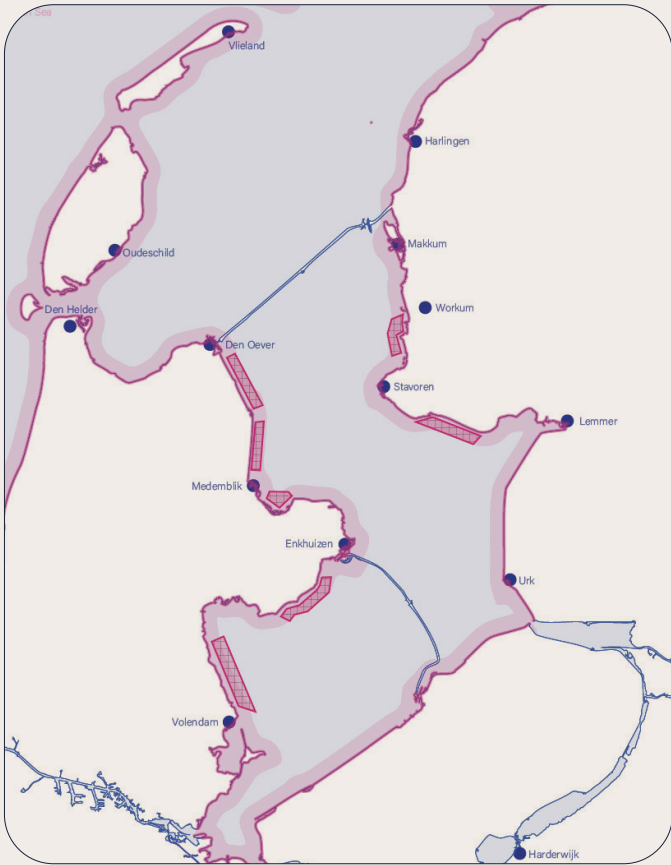
Fishing
Communities



Research
Institutions

***Related spatial interventions**

- › Re-skilling centre with training facility
- › Research and education centre



Where: Placement Criteria

- › Shallow water (Krost et al., 2011)
- › Shelter from wind, waves and currents (Krost et al., 2011)
- › Water quality (Krost et al., 2011)
- › Proximity to fishing communities (EU, n.d.)

› Search sites () and mariculture sites () close to shore

When: Timeline



2026	2030	2040	2050
PHASE 1: BASE	PHASE 2: STRATEGIC DEVELOPMENT	PHASE 3: REPETITON / STABILIZATION	

4 Overarching principles

Envisioning the North Sea Common (NSC) as the future governing structure for the contested marine space, four overarching principles are proposed to guide the North Sea towards a negotiable and regenerative commons. Aligning the commoners’ value system, the NSC establishes a foundation that subsequently enables spatial interventions across spatial scales.

Figure 8.15: 4 overarching principles governing the NSC
Source: Flaticon



1 Respect for Local Knowledge

Within the NSC, the local knowledge of fishing communities is acknowledged and prioritised in decision-making. This knowledge is a form of shared expertise deeply embedded in the lived experience of fishing communities, which is accumulated and transmitted across generations. However, the energy transition discourse has neglected such knowledge, despite its potential to inform energy infrastructure planning. Integrating local knowledge of fishing grounds and seasonal patterns with scientific data would facilitate more informed decisions that reduce burdens on other commoners.



2 Shared Ownership of Built Structures

Within the NSC, all built structures are collectively owned by commoners. The interest conflicts in the North Sea are primarily driven by disputes over the expansion of built structures, such as wind farms. While the North Sea has historically been shaped by temporal human activities and conceived spatial designations such as marine protection zones, the expansion of energy infrastructure, including oil rigs, gas fields and wind farms, has increasingly transformed the blue commons into extractive arenas. Commoning energy infrastructure at sea, therefore, would reduce the likelihood of the “tragedy of the commons” while cultivating a shared sense of identity and ownership, further contributing to restorative and regenerative justice.



3 Equitable Opportunities

Given the broad spatial scale of the NSC, localised commoners, including fishing communities and small-scale energy companies, may face difficulties in accessing resources beyond their reach. A lottery system, adapted from the Padu system employed by fishing communities in South India (Lobe & Berkes, 2004), is developed to distribute fishing grounds and offshore energy production areas among relevant commoners. The system incorporates criteria such as proximity to the home port and business scale to ensure equitable access to common resources.



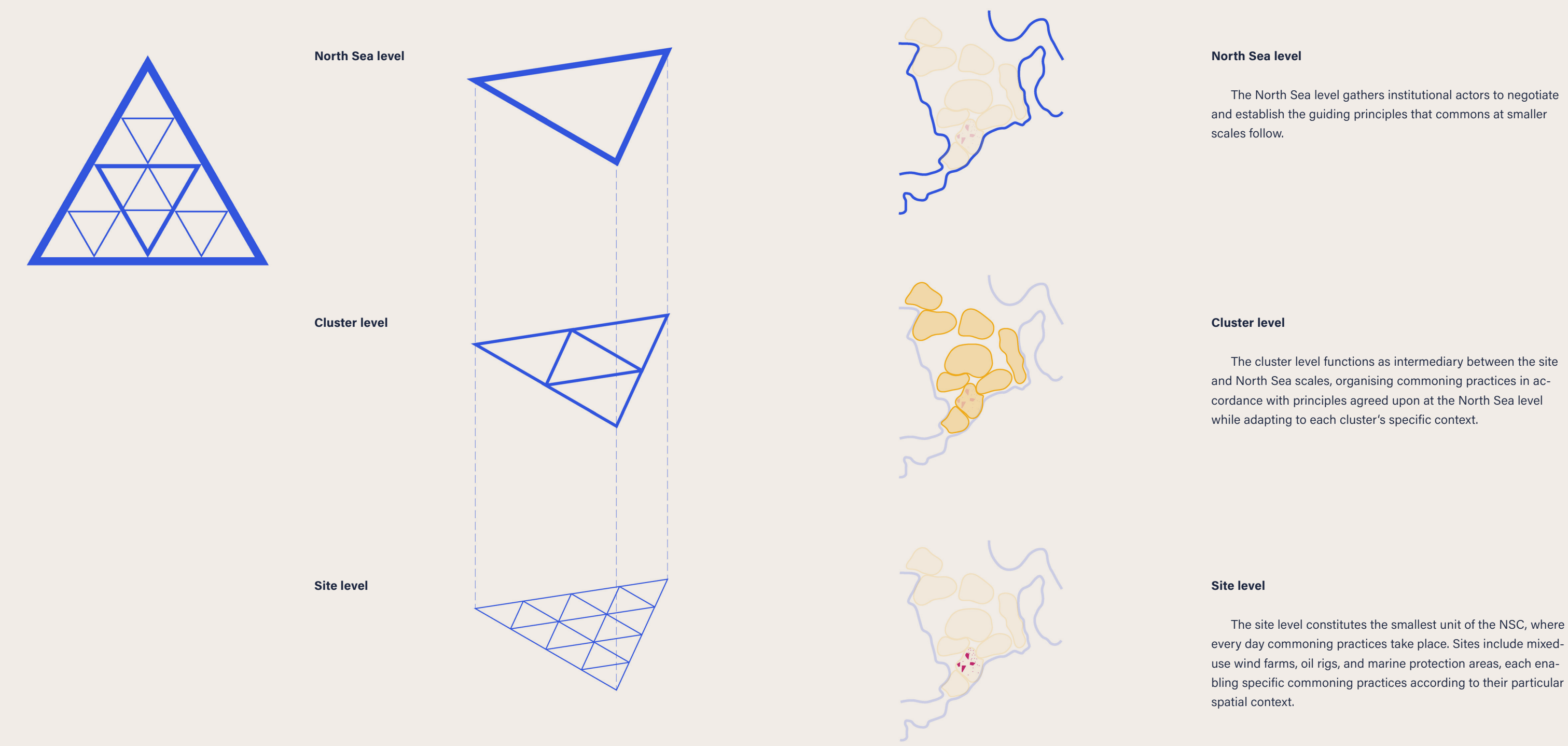
4 Reciprocity and Regeneration

Envisioning the North Sea as an entity with rights, the NSC establishes a common fund sustained by contributions from commoners’ production activities. This mechanism seeks to shift public culture from extractivist approaches towards restorative and regenerative practices. Meanwhile, the fund supports the operation of the NSC and finances collective initiatives. Contribution amounts are determined based on criteria such as income level and ecosystem impact.

The Common as a fractal system

The NSC operates as a three-layer fractal governance system, in which each layer functions through a consistent mechanism. This structure creates a streamlined and coherent pathway for transforming the North Sea from a contested, zero-sum arena into a negotiable, regenerative common. The NSC, therefore, advocates for a bioregionalist approach (Agzamov & Vanelli, 2024) that organises human activities according to ecological rather than geopolitical boundaries.

Figure 8.16: Mechanism of the fractal common system

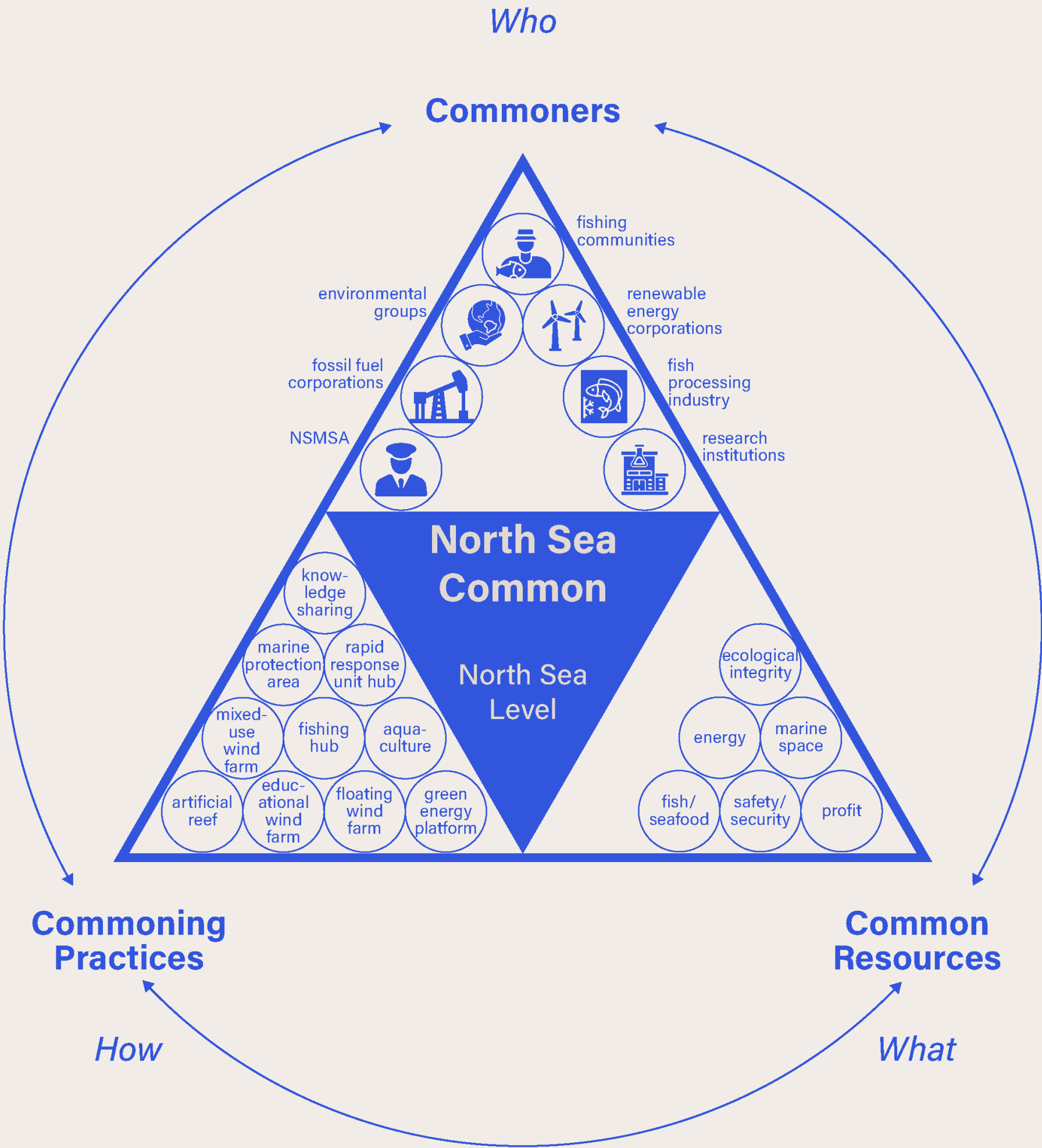
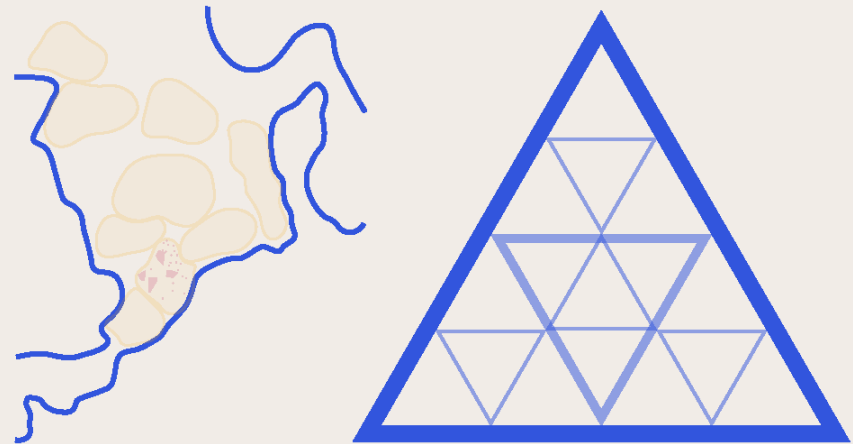


Commoning at the North Sea level

The commons are composed of three interrelated aspects: (i) commoners, (ii) common resources and (iii) commoning practices, as outlined in Kip et al. (2015).

Based on the stakeholder analysis and the proposed vision, stakeholders, their interests and the proposed spatial interventions are categorised accordingly. The North Sea level common provides an overview of who shares what and how. Following the fractal mechanism, the cluster and site levels replicate this structure, with variations depending on the available resources, commoners and commoning practices present at each scale.

Figure 8.17: The compositions of the NSC at the North Sea Level
Source: Flaticons



Commoning at the cluster level

Clusters are delineated according to the diversity of human activities and their proximity to fishing villages in neighbouring countries, ensuring that each cluster is shared by a comparable group of stakeholders. Figure 8.18 illustrates how the cluster operates within the common framework, including the specific commoners and commoning practices involved.

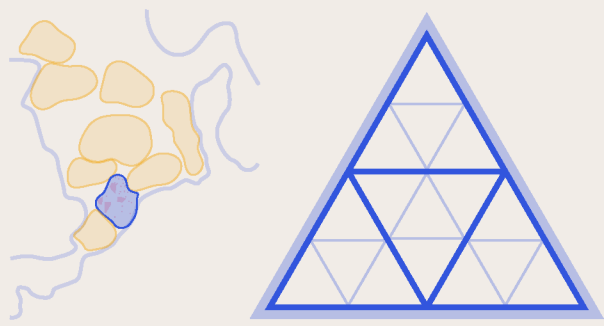
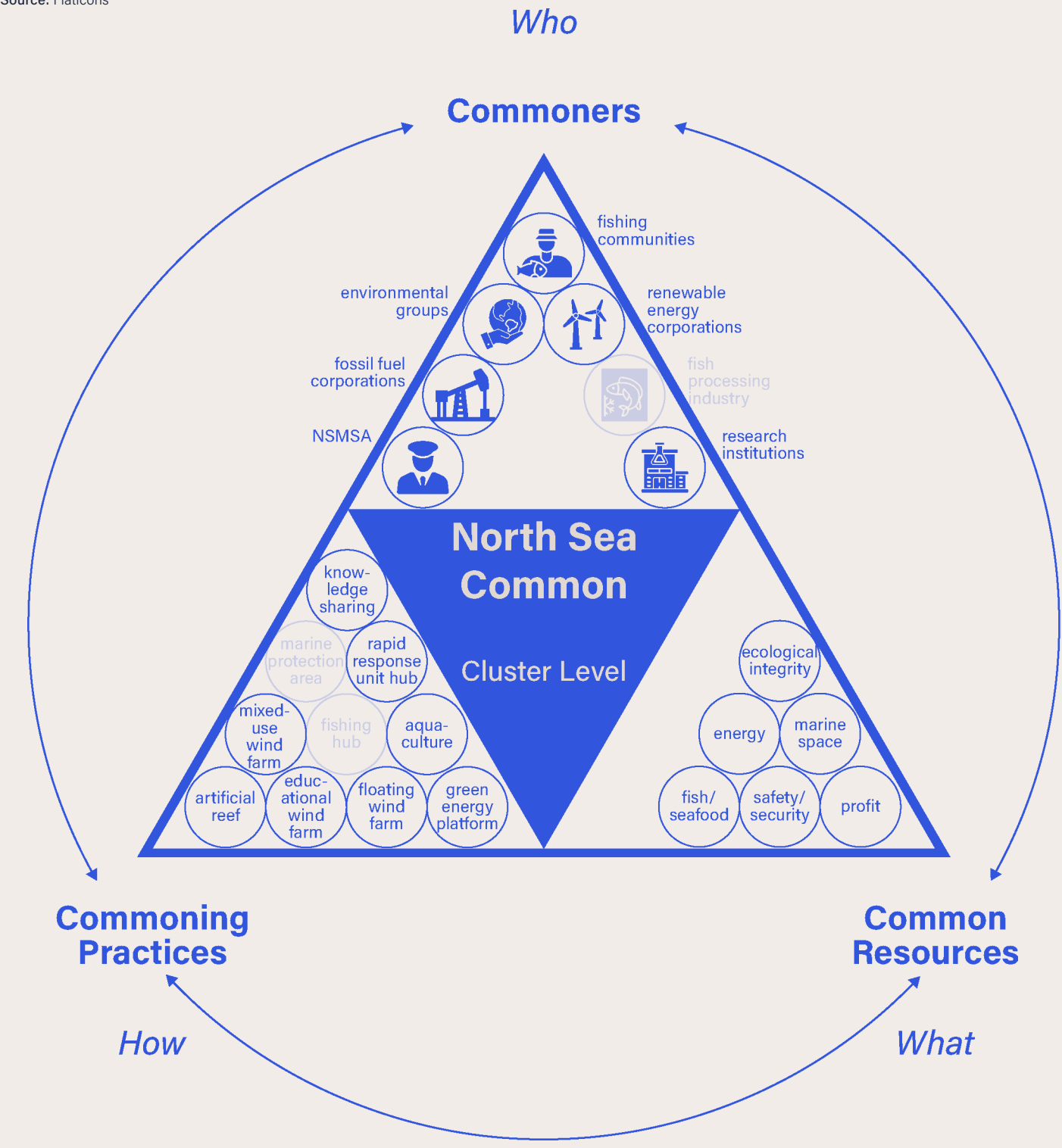


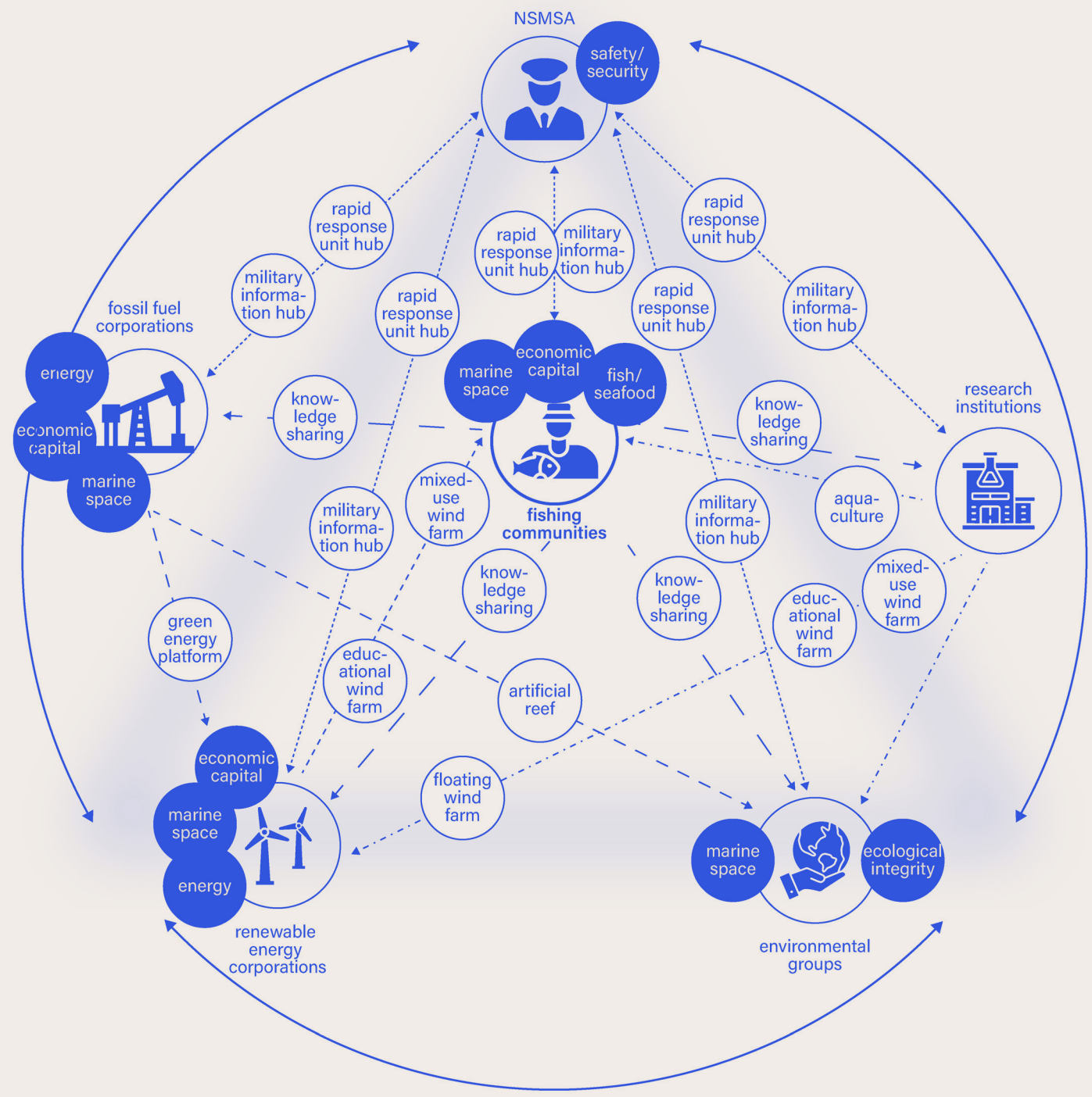
Figure 8.18: The compositions of the NSC at the Cluster Level
Source: Flaticons



Relations within the Common

Commoners within the cluster share interdependent relationships, which create grounds for negotiation. Recognising fishing communities as underrepresented actors in the energy transition discourse, they are positioned at the centre of the relational network. They are empowered to share their local fishing knowledge with other commoners, such as renewable energy corporations for future energy site selection and environmental groups for monitoring. Figure 8.19 illustrates these complex yet interdependent relationships, with emphasis on commoners' interests in common resources and the commoning practices through which resources are shared.

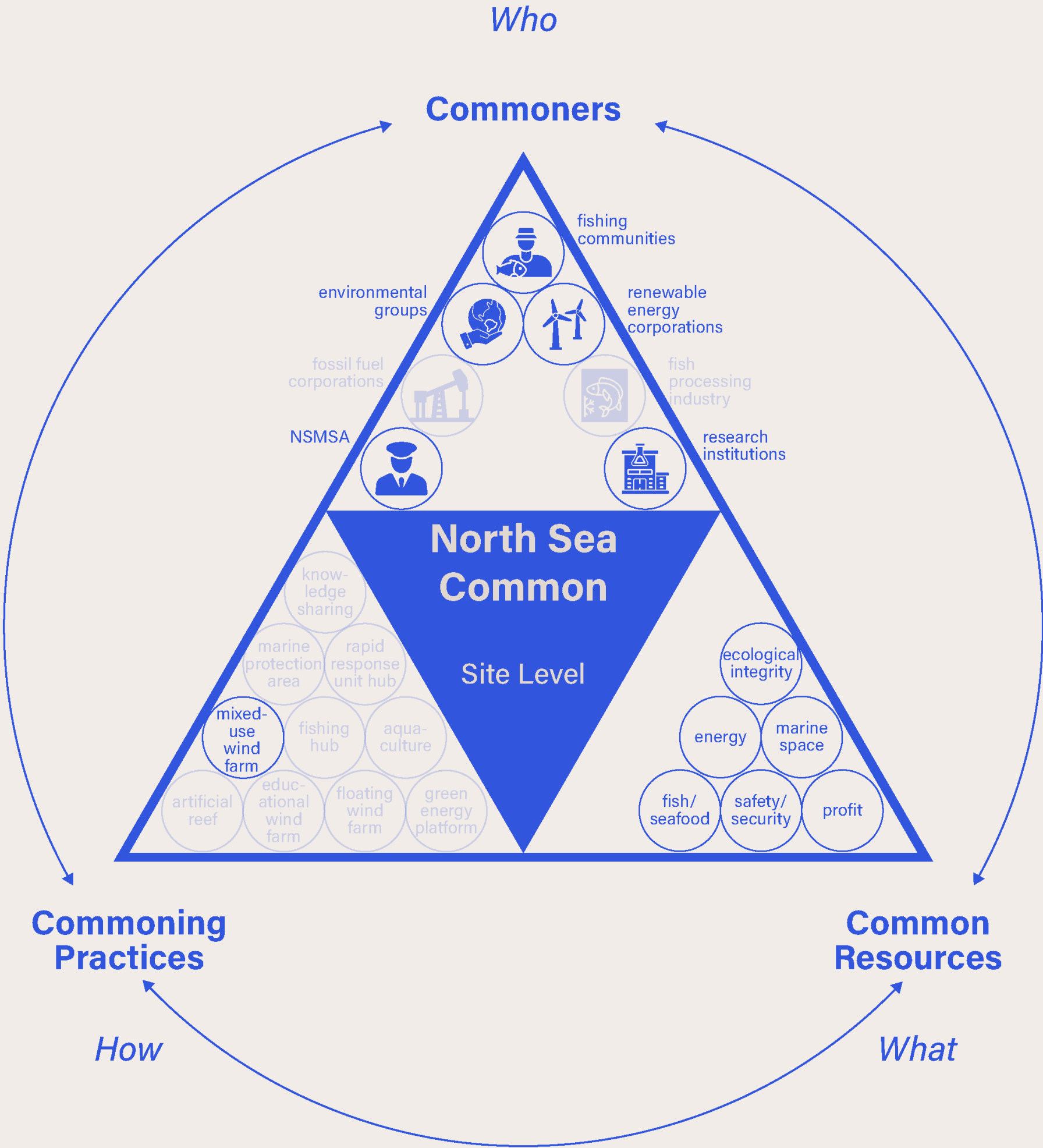
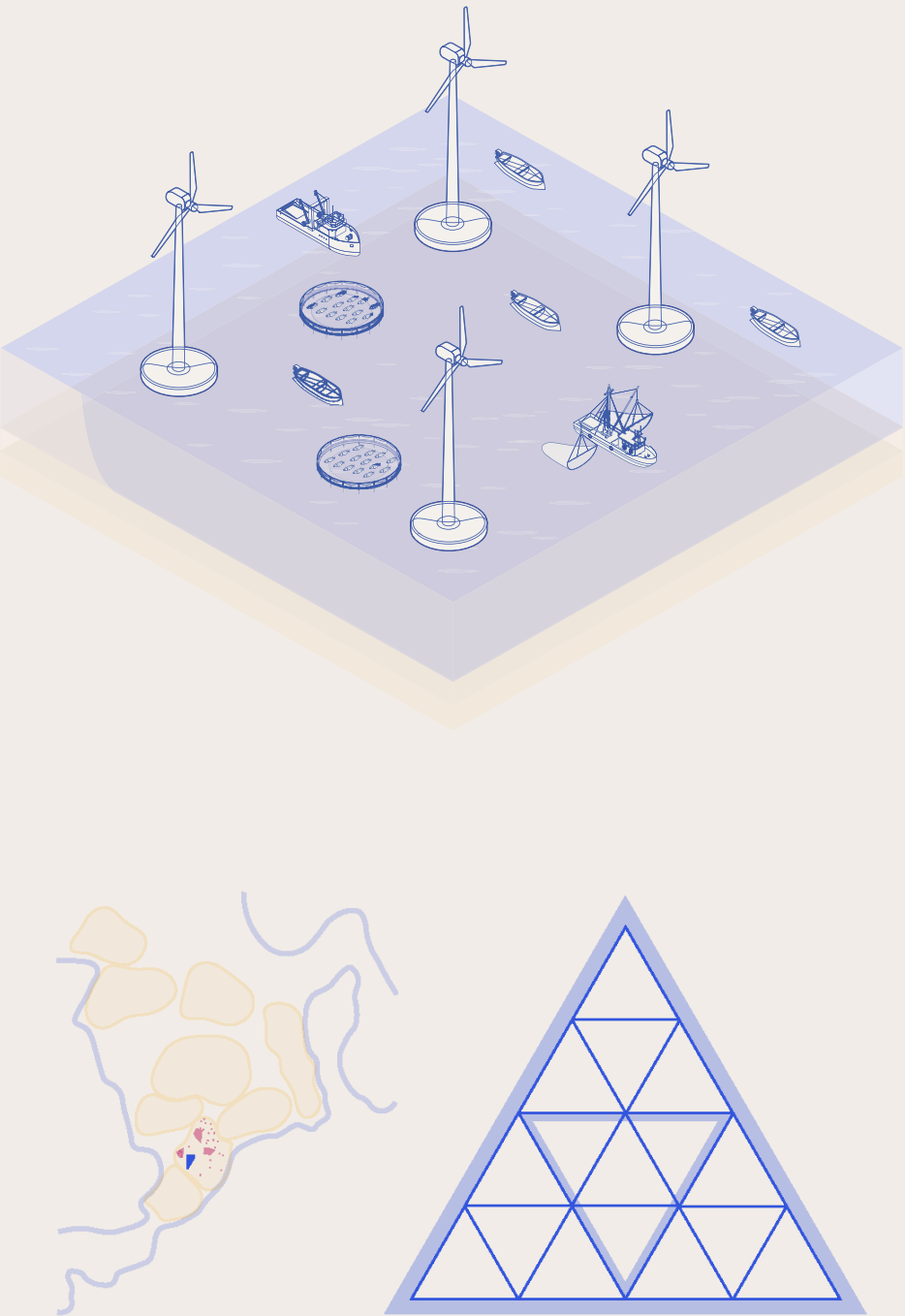
Figure 8.19: Interdependent relationships between commoners at the Cluster Level
Source: Flaticons



Commoning at the site level: Mixed-use wind farms

Within a cluster, several sites exist, including fishing hubs, artificial reefs, and floating wind farms. Each site involves specific commoners and enables specific commoning practices. Take mixed-use wind farms as an example, this spatial intervention allows fishing communities to engage in both active and passive fishing within wind farm areas, where fishing activities are currently prohibited. Commoning practices at this scale thus serve as a forum for negotiating diverse uses. This everyday sharing of common resources at the site level sustains and reproduces the interdependent relationships between commoners within and across scales.

Figure 8.20: The compositions of the NSC at the Cluster Level
Source: Flaticons



Governing the North Sea common in 8 Steps

Drawing on Ostrom’s (1990) design principles for long-lasting commons, an 8-step framework is developed to govern the North Sea Common. These steps constitute re-occurring processes that sustain a robust NSC across all three levels.

Figure 8.21: 8 Steps for designing long-lasting commons
Source: Modified from Ostrom (1990)

7 CONFLICT-RESOLUTION MECHANISM

In case of conflicts between commoners, they must have accessible and low-cost means to resolve disputes. Such mechanisms are effective in addressing free-rider issues within the common (Ostrom, 1990). The padu system in South India resolves conflicts between members through a sangham (association or society) leader serving as the arbitrator (Lobe & Berkes, 2004). In the NSC, the governing body at each level serves as mediator, enabling prompt intervention and preventing escalation.

Strategy

- Elect a leader to serve as mediator at each of the three levels
- Establish a rule-review mechanism in the event of disputes

6 GRADUATED SANCTION SYSTEM

Upon rule violation, sanctions are imposed on commoners based on the severity of the offense (Ostrom, 1990). An effective sanction system relies on internal enforcement to deter violations while facilitating quasi-voluntary compliance. Prompt intervention safeguards the integrity and trustworthiness of the commons, preventing a ‘broken window’ dynamic that could invite further violations.

Strategy

- Engage commoners in co-designing a graduated sanction system
- Establish a mechanism for reviewing the rules in response to violations

5 ACTIVE MONITORING

Active monitoring of commoner behaviours and resource conditions is essential to ensure that agreed criteria and rules remain effective. Commoners engaged in daily commoning practices, such as fishing communities and NSMSA, serve as frontline monitors. Meanwhile, environmental groups and researchers track resource conditions to assess whether the agreed rules respect the ecological ceiling.

Strategy

- Implement a feedback system for reporting irresponsible resource use
- Develop a data-sharing platform to facilitate environmental impact assessment

8 NESTED RELATIONS

The complex relationships and contexts of the North Sea require multi-level governance to sustain a coherent system with consistent rules across scales. The case of the Philippine Federation of Irrigation Systems demonstrates that a two-level governance structure effectively addresses cross-scale problems, illustrating the importance of layered structures in sustaining the commons.

Strategy

- Incorporate three-level governance to encompass territorial strategic planning, commons negotiation and commons operation
- Apply fractal logic to streamline governance and administrative processes

1 RECOGNITION OF THE RIGHTS TO ORGANISE

Given that the North Sea is currently divided into several Exclusive Economic Zones across multiple countries, the implementation of the NSC must first secure recognition of the right to self-organise under internally defined rules. While Ostrom (1990) recommends that external recognition be kept to a minimum, the NSC requires a strong governmental role to initiate the transition towards bioregionalism.

Strategy

- Establish a board composed of North Sea countries to ensure their concerns are considered
- Align the NSC with existing administrative structures of national governments and the EU to facilitate coordination

2 CLEAR BOUNDARIES

With external recognition secured, commoners can begin defining clear boundaries that specify who may use where, and what resources are managed for and by whom. The distinction between ‘outsiders’ and ‘commoners’ is crucial to preventing the exploitation of co-managed resources by external parties, which would diminish returns from commoners’ collective efforts (Ostrom, 1990). In the NSC, clear boundaries delineate clusters and sites for administrative purposes, ensuring that rules and overarching principles are contextualised.

Strategy

- Restrict resource use rights to registered individuals and organisations
- Demarcate North Sea, Cluster and Site boundaries on official maps

3 CONTEXTUALISED RULES

Overarching principles and rules must respond and adapt to local conditions, especially when each commons (cluster in the NSC) has varying ecological and social contexts and resource constraints (Ostrom, 1990). Within the NSC, conditions such as ecological value, wind farm typology, and fish breeding seasons inform the formulation of rules governing permitted fishing areas, timeframes and methods. Evaluations draw on both local knowledge and scientific data to prevent depletion of common resources.

Strategy

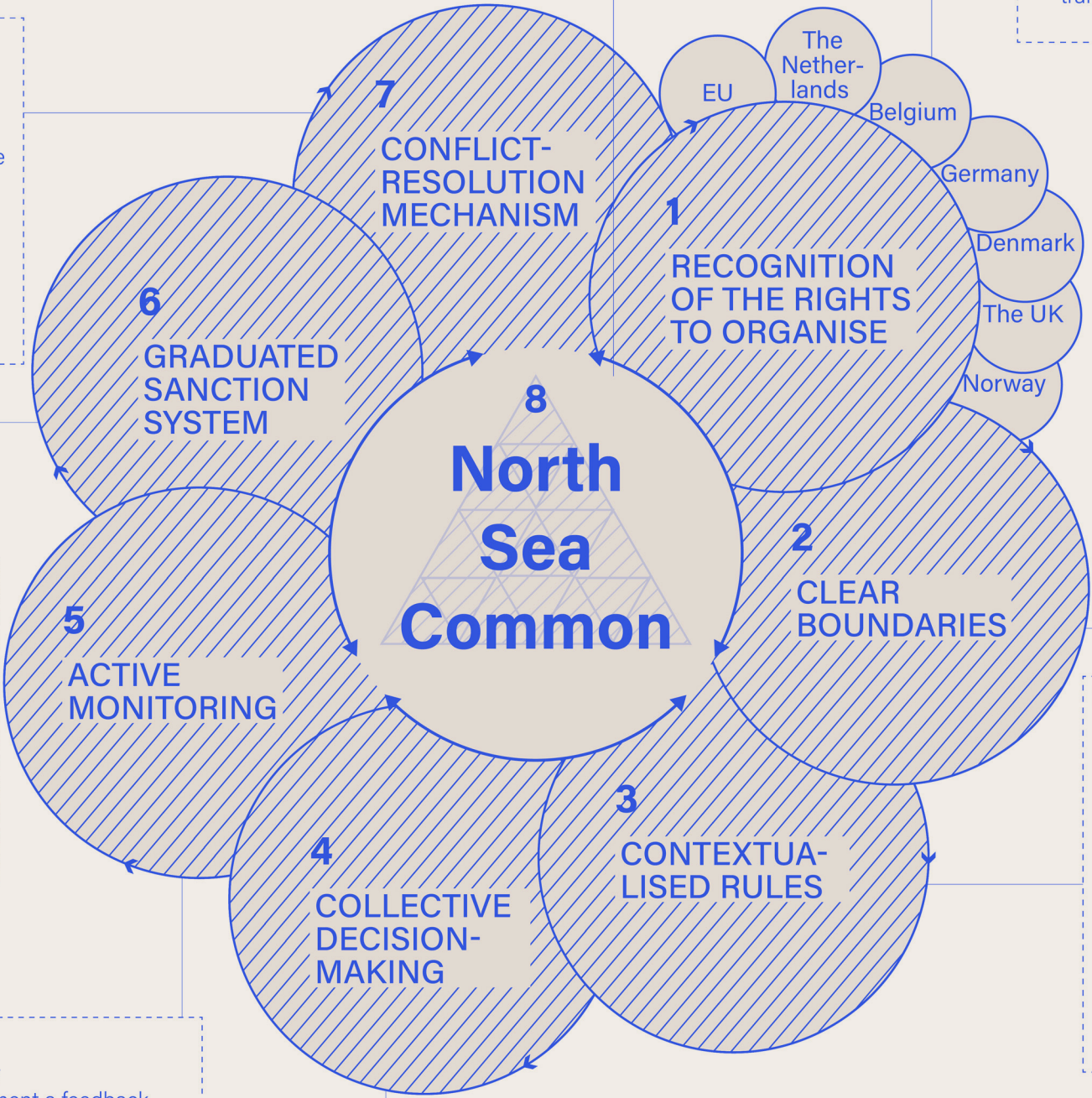
- Engage fishing communities in sharing their knowledge
- Develop a set of guidelines to support decision-making across different administrative levels

4 COLLECTIVE DECISION-MAKING

All commoners hold equal rights to participate in negotiating and modifying rules grounded in evidence and deliberation. Once consensus is reached, the agreed criteria and rules become effective at the cluster and site levels. The commons must establish effective communication mechanisms and inclusive participation methods beyond regular meetings to keep commoners engaged in rule development. Within commons where steps 2 – 4 are effectively implemented, rule adjustments can be made at low cost (Ostrom, 1990).

Strategy

- Establish real-time communication channels among commoners
- Maintain an open and transparent environment for rule modification



Governance structure

The governance of the NSC follows the fractal system across three spatial scales: the North Sea level, cluster level and site level, each with a coordination body. The structure is grounded in Ostrom’s eight steps of managing the commons and centres commoners as active decision-makers. The multi-layered governance structure facilitates cross-border coordination and cooperation among diverse stakeholders (step 8). Meanwhile, the democratic and transparent structure ensures that the NSC remains subject to public scrutiny.

NORTH SEA LEVEL

The North Sea Common Committee (NSCC) serves as the central governing body of the NSC. The North Sea Common Fund (NSCF) is established to sustain the operation and long-term financial viability of the NSC. Alternatively, Interreg North Sea would be an initial funding source. The NSCC is composed of stakeholders from the public sector, private corporations and civil society, forming a public-private-people partnership. Governments of the North Sea countries are first engaged to ensure the NSC is recognised as a legitimate mechanism for resource allocation (step 1). Relevant institutions, sector organisations and civil society organisations/individuals are then invited to collectively determine (step 4) the boundaries of the commons, the eligible commoners (step 2), and the overarching principles and rules (step 3). Drawing on the inputs from the Cluster Assembly, the NSCC also administers the lottery system. Additionally, it collaborates with researchers and environmental groups to monitor the conditions of the common in terms of environmental quality, biodiversity, energy production, and circularity (step 5).

CLUSTER LEVEL

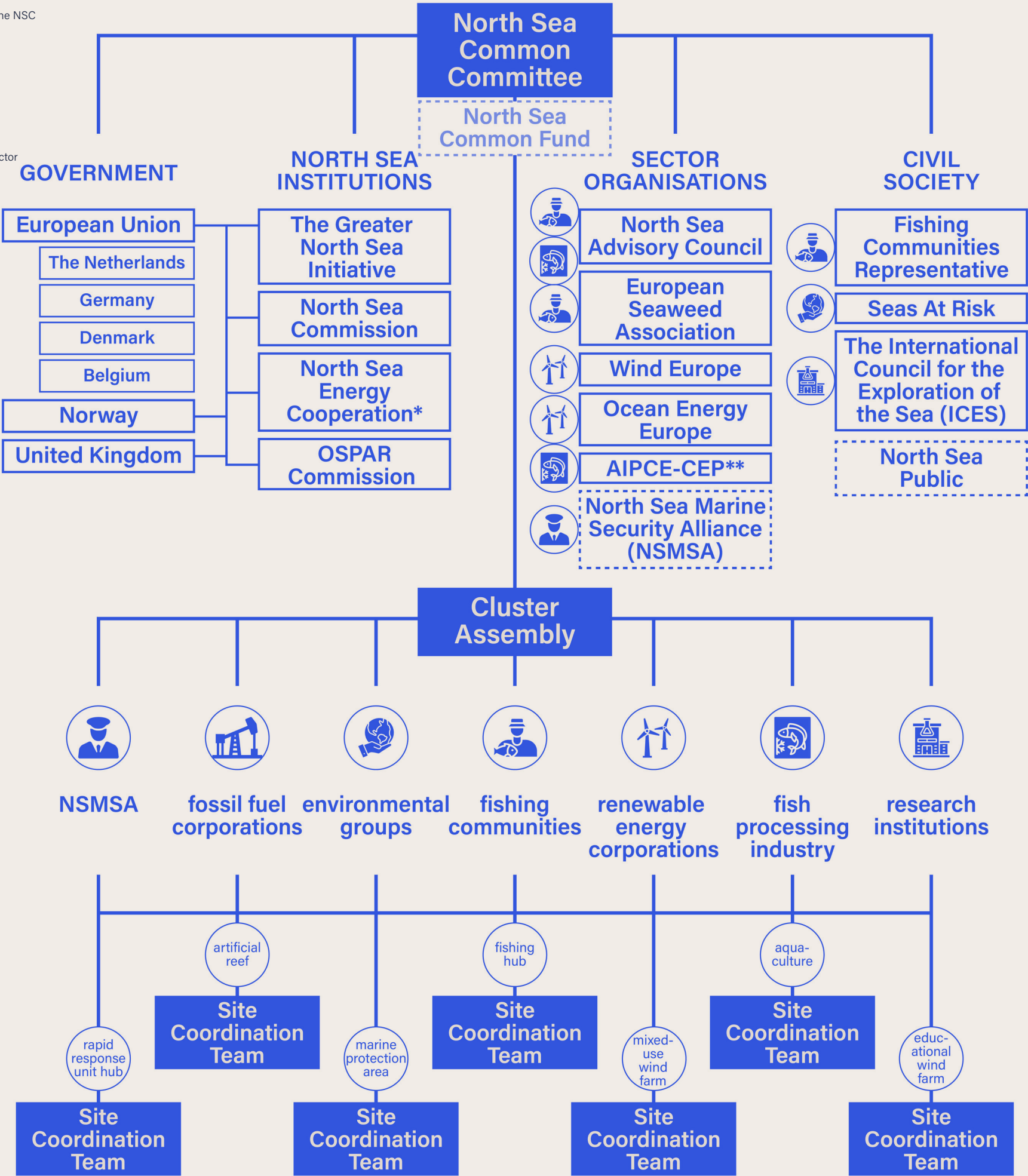
The Cluster Assembly (CA) is the governing body at the cluster level, guiding commoners in contextualising rules according to cluster-specific characteristics and context (step 3). The cross-sectoral collaboration within the NSCC provides the foundation for further negotiation within the CA. By centring the local knowledge of fishing communities, the CA ensures that these communities are empowered to actively participate in negotiation and decision-making (step 4). Representatives from Site Coordination Teams (SCTs) are involved in meetings and shape the cluster-wide criteria. Furthermore, the CA is responsible for imposing graduated sanctions (step 6) and facilitating conflict resolution (step 7) in response to rule violations or disputes. The CA would be initially funded through Integrated Territorial Investment (ITI), with a gradual transition to the NSCF in the long term.

SITE LEVEL

Site Coordination Teams (SCTs) are responsible for formulating site-specific rules (step 3) and overseeing daily operations (step 5). They facilitate communication among commoners sharing the same space and foster collective decision-making (step 4) to minimise everyday conflict in commoning practices. In cases of rule violation or dispute, SCTs hold the authority to issue mild penalties, such as warnings (step 6), and to mediate in conflict resolution (step 7).

Figure 8.22: Governance structure of the NSC
Source: Flaticons

- Existing Governance Actor
- Proposed Key Governance Actor
- Future Commoner
- Future Fund



* NSEC and the UK signed a Memorandum of Understanding after Brexit

**AIPCE (EU Fish Processors and Traders Association) and CEP (European Federation of National Organizations of Importers and Exporters of Fish)

8.4 The IJsselmeer Scale

At the scale of the IJsselmeer the strategy focuses on strengthening existing fishing communities through targeted point-based interventions that enhance both physical and socio-economic connectivity. These interventions aim to better link communities across the lake improve their relationship with the North Sea and reinforce inland connections through programmatic measures that facilitate mobility, access and exchange

Central to this approach is the development of a network of hubs rooted in the existing character and identity of villages and communities around the IJsselmeer. Rather than imposing new structures, the strategy builds on local identities, assets and traditions, using these hubs as platforms for a range of shared facilities. These include spaces that support fishermen in maintaining established fishing practices as well as opportunities for reskilling and transition into emerging sectors tied to the evolving energy landscape.

In this way the proposal goes beyond purely infrastructural improvements. It establishes a framework that integrates education, training and knowledge exchange as key drivers of long-term resilience. Educational institutions and research-oriented programs are embedded within the network, fostering collaboration between local communities, researchers and industry actors. This not only supports the socio-economic development of fishing communities but also positions them as active participants in broader regional and national transformations.

Ultimately the strategy redefines connectivity as both physical and social construct linking communities through infrastructure while simultaneously opening them up to new forms of engagement, innovation and identity building at national scale.

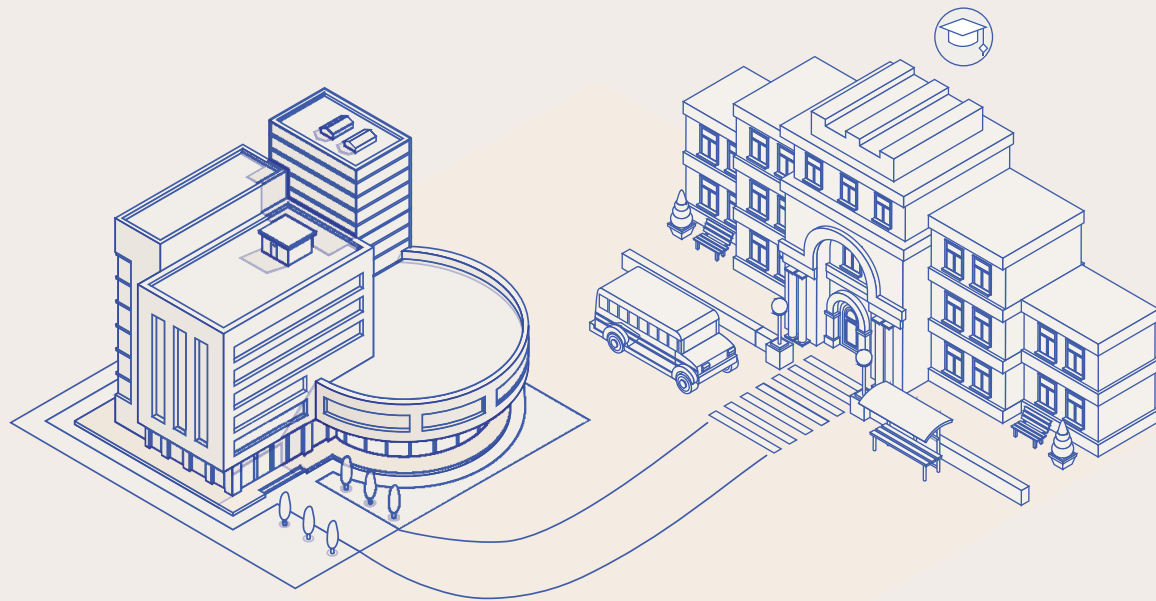
Figure 8.23: Windpark Fryslân



Figure 8.24:
Sources: The Noun Project; Flaticon

3/4

Research and Education Centre



What: Definition

Maritime research centres along the maritime education corridor develop new technologies such as hydrogen, biofuel production from fish and algae waste, and marine ecosystem research in collaboration with local knowledge initiatives to support a sustainable marine sector. Docked educational centres offer related study programmes, including marine mechanical engineering, chemical engineering, biotechnology, marine biology, and sustainable energy technology. Both are closely linked to practice: research centres develop pilot projects and conduct North Sea site analyses, while educational centres provide practical training in collaboration with re-skilling facilities along the corridor.

Why: Key Functions

1) New Professions for future generations in fishing communities (Goal 1; 3): Enables future generations to stay in their communities, have stable income and shape sustainable maritime practices.

2) Sustainable future marine sector (Goal 4): Supports and leads the transition towards a sustainable maritime sector.

Who: Involved Stakeholders

Research
Institutions

Fishing Communities

Renewable
Energy
Cooperations

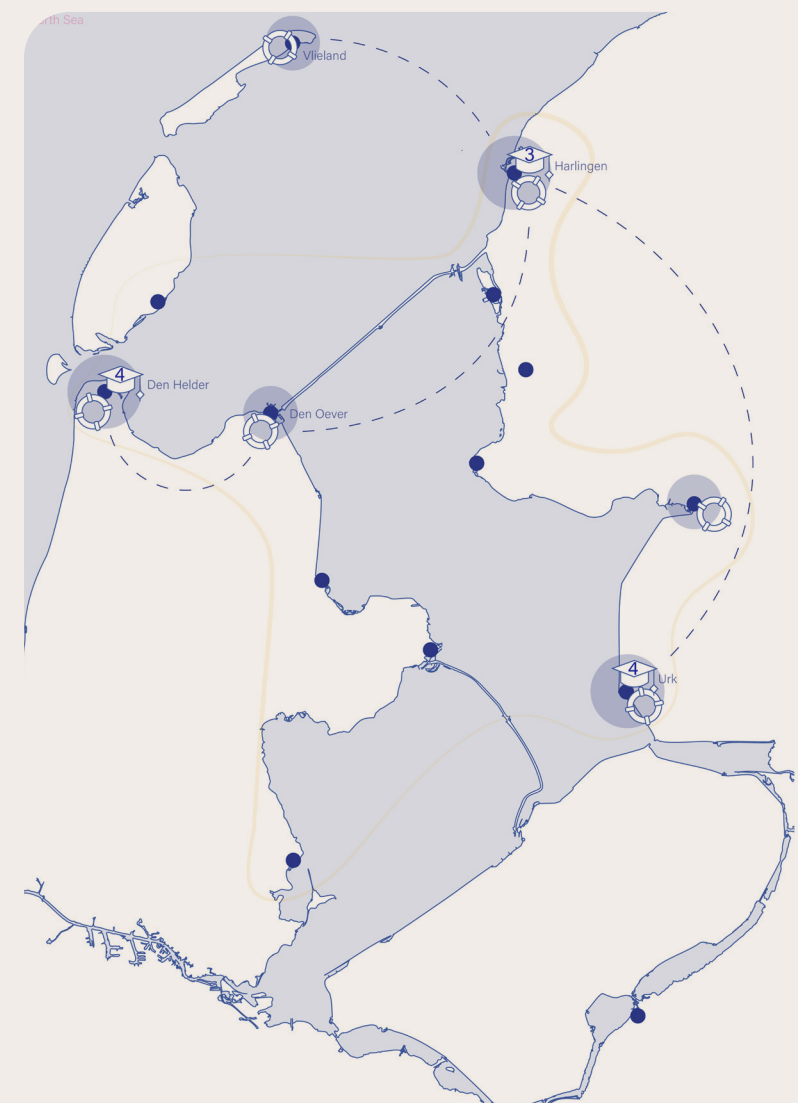
Fish Processing Industry



Environmental Groups

*Related spatial interventions

- › Training facility network
- › Boat making and repair facility
- › Fish processing and biofuel facility
- › Floating hydrogen wind farm
- › Aquaculture site
- › New public transport system



Where: Placement Criteria

- › Proximity to main maritime hubs (●) for higher education facilities (🎓)
- › Research/Education focus: marine ecology focussed facilities – located with direct access to the North Sea; facilities more focussed on boats and new fueling technologies – closely related to boat making and repair centres (🚢)

When: Timeline

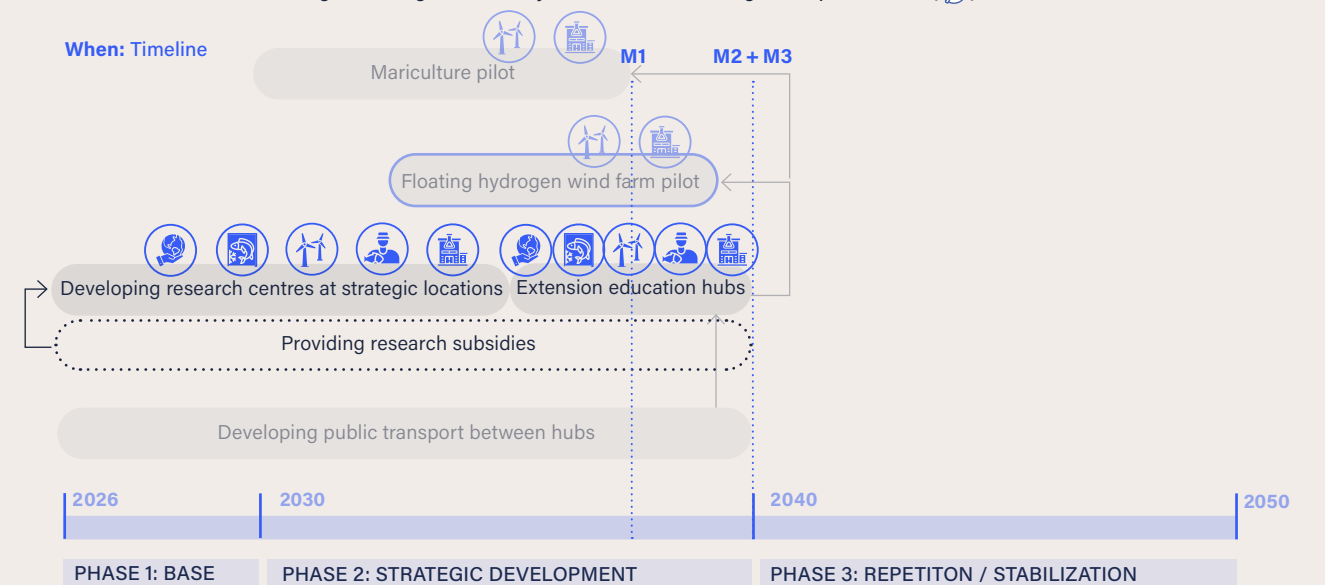


Figure 8.25:
Sources: The Noun Project; Flaticon

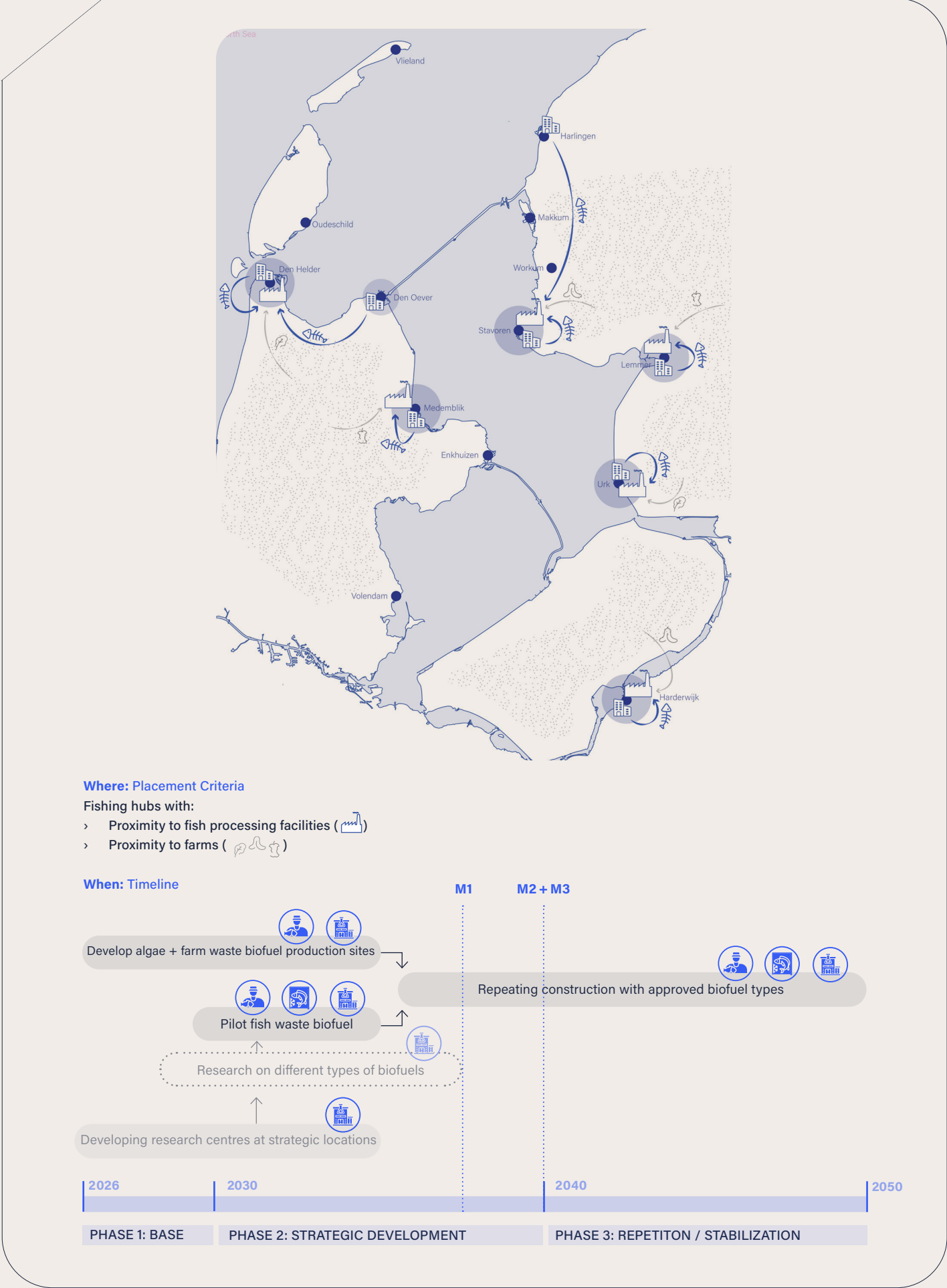


Figure 8.26:
Sources: The Noun Project; Flaticon

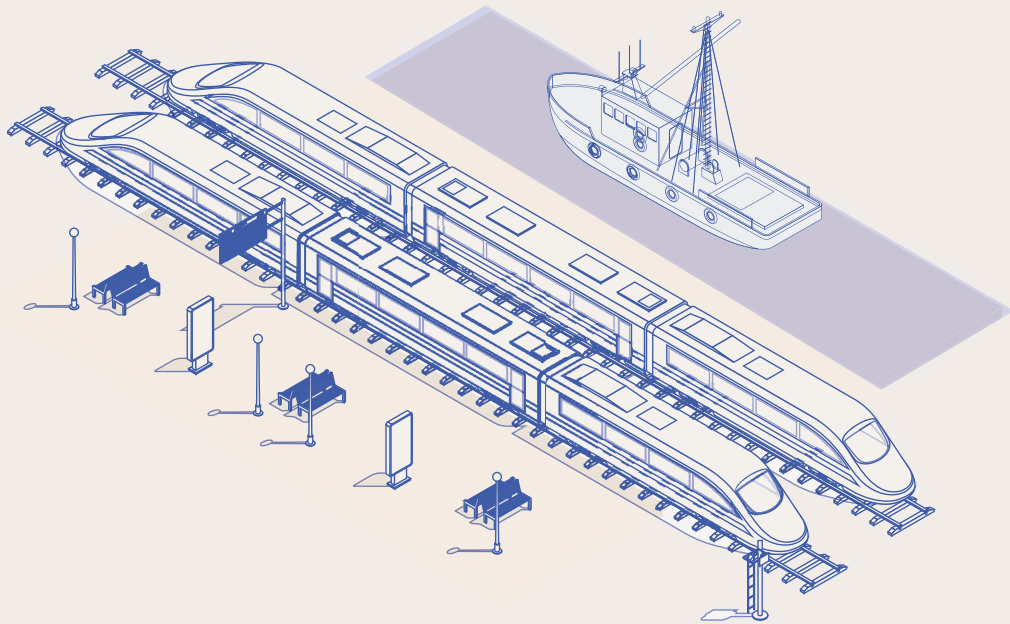


Figure 8.27:
Sources: The Noun Project; Flaticon



Figure 8.28:
Sources: The Noun Project; Flaticon

New Public Transport System



What: Definition
A new public transport system consisting of IJsselmeer ferries and a train ring line connecting all fishing communities around the IJsselmeer.

Why: Key Functions
1) Fast travelling between training, education and maritime business centres and fishing communities (Goal 2, 3): Ferry and train connections link educational, re-skilling, and maritime business hubs, enabling the functionality of the maritime education corridor. This allows for a network of facilities, rather than requiring each location to host all functions.

2) Transportation of goods between fishing communities (Goal 2, 3): The transport of goods between fishing communities becomes more efficient and sustainable. Fish can be transported to processing facilities by rail, as well as materials for boat building. Processed fish can be distributed via the railway network to other parts of the country.

3) Sustainable mobility (Goal 4): The new public transport system enables sustainable mobility around the IJsselmeer – reducing car dependencies.

Who: Involved Stakeholders

NS Train & Ferry

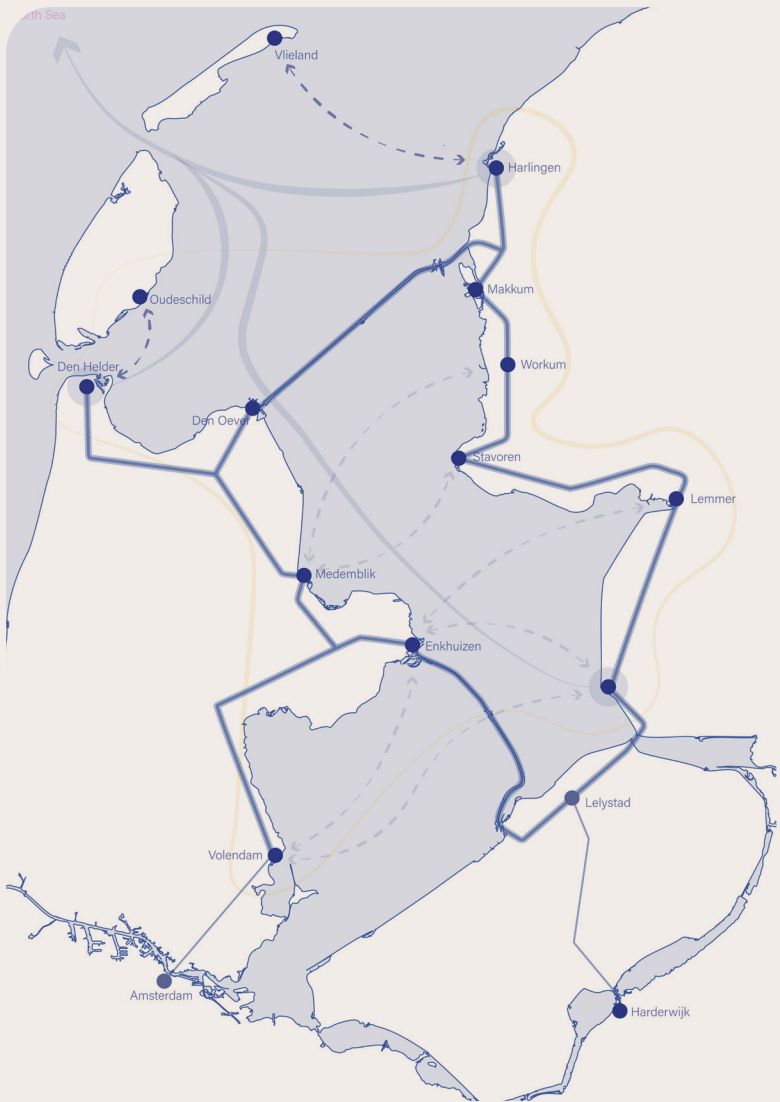
Fishing Communities

Research Institutions

Fish Processing Industry

Bus lines between the ferry stops are an alternative, if the projects becomes to expensive.

- *Related spatial interventions**
- Research and education centre
 - Fish processing and biofuel facility
 - Re-skilling centre with training facility
 - Training facility network



- Where: Placement Criteria**
- Stops at all fishing communities (●)
 - Roundway connction by train (—)
 - Across connections by ferry (- - -)

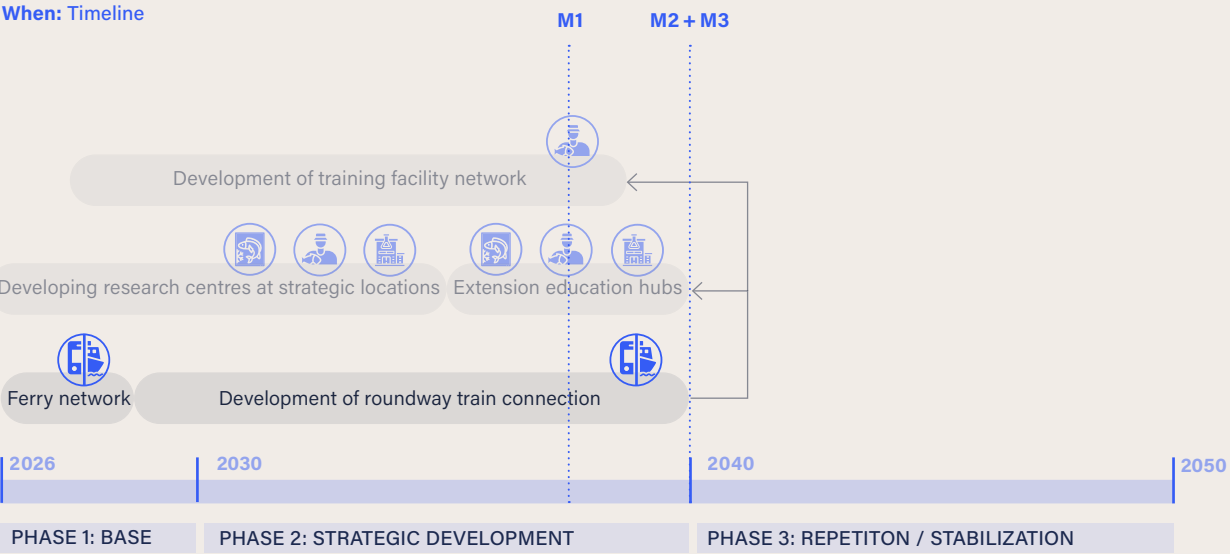
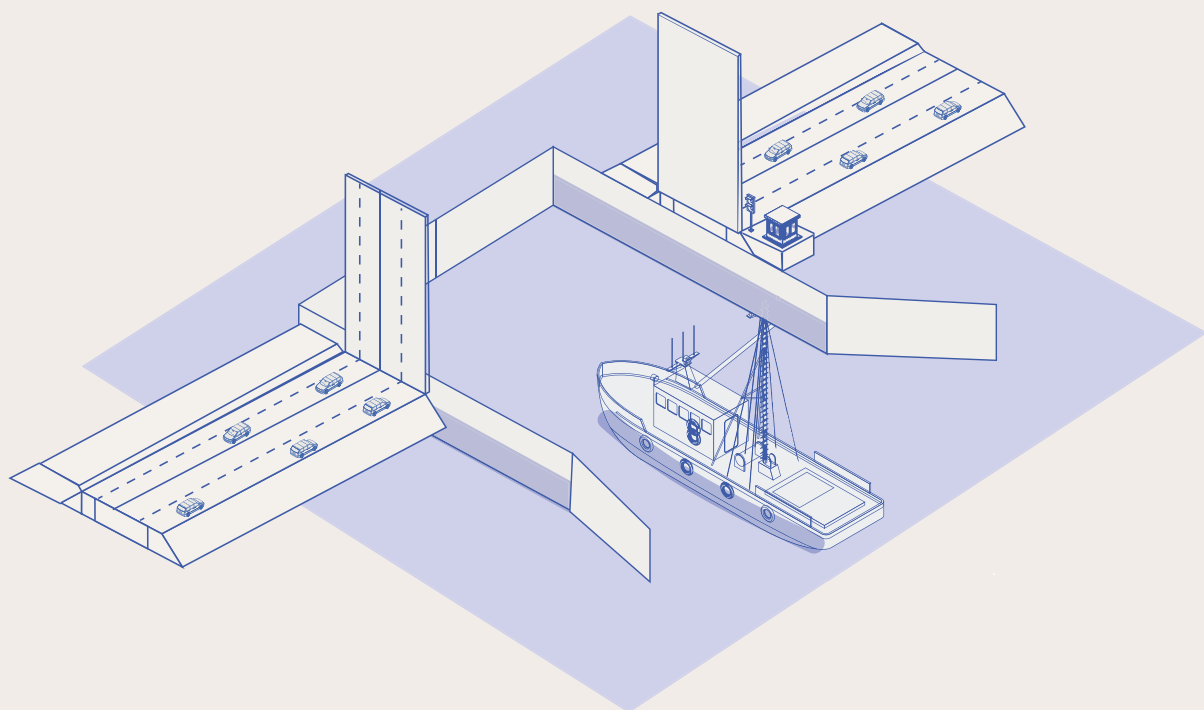


Figure 8.29:
Sources: The Noun Project; Flaticon

++++ Sluices Afsluitdijk



What: Definition

The open Afsluitdijk incorporates two widened locks (Lorentzsluizen; Stevinssluzen) with deeper channels to allow larger vessels to pass, re-establishing a direct connection to the North Sea (De Afsluitdijk, n.d.).

Why: Key Functions

1) Reconnect fishing communities with the North Sea (Goal 1; 3): Fishing communities regain direct access to the North Sea from their home harbours, re-establishing their connection to the sea. This can create hope and act as a catalyst for broader change within the sector.

2) Family support (Goal 3): The opening of the Afsluitdijk improves direct access to the North Sea, reducing the need for fishers to travel to distant harbours and saving time for family life. In addition, public transport connections to fishing hubs enable shift work, allowing fishers to spend more time at home.

3) Economic boost (Goal 3): The passage of larger transport vessels can boost economic activity in maritime, logistics, agricultural, circular, and food sectors (De Afsluitdijk, n.d.).

Who: Involved Stakeholders



NS Train
& Ferry

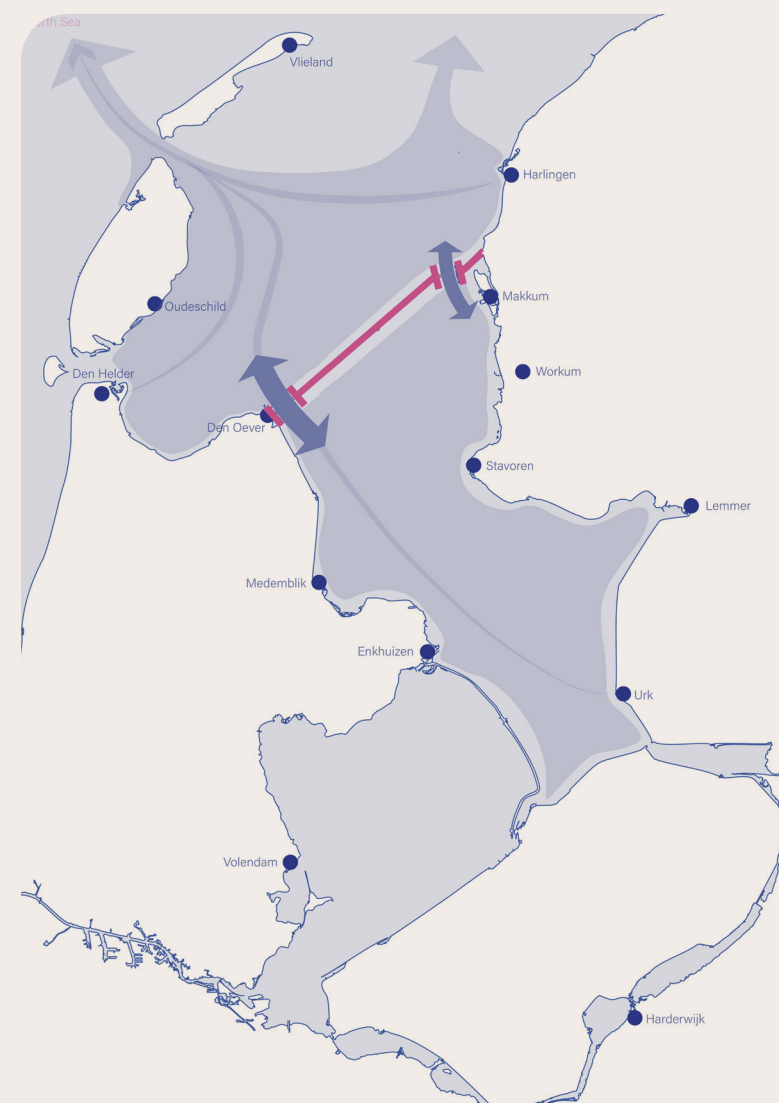


Fishing Communities

i The widening of the Lorentzsluizen is already under discussion (Afsluitdijk, n.d.). The provinces of Fryslân, Overijssel, and Flevoland, together with the municipalities of Súdwest-Fryslân, Meppel, Zwolle, Kampen, and Urk, as well as regional companies, are advocating for national government action (Afsluitdijk, n.d.). The discussions are still ongoing (Afsluitdijk, n.d.).

*Related spatial interventions

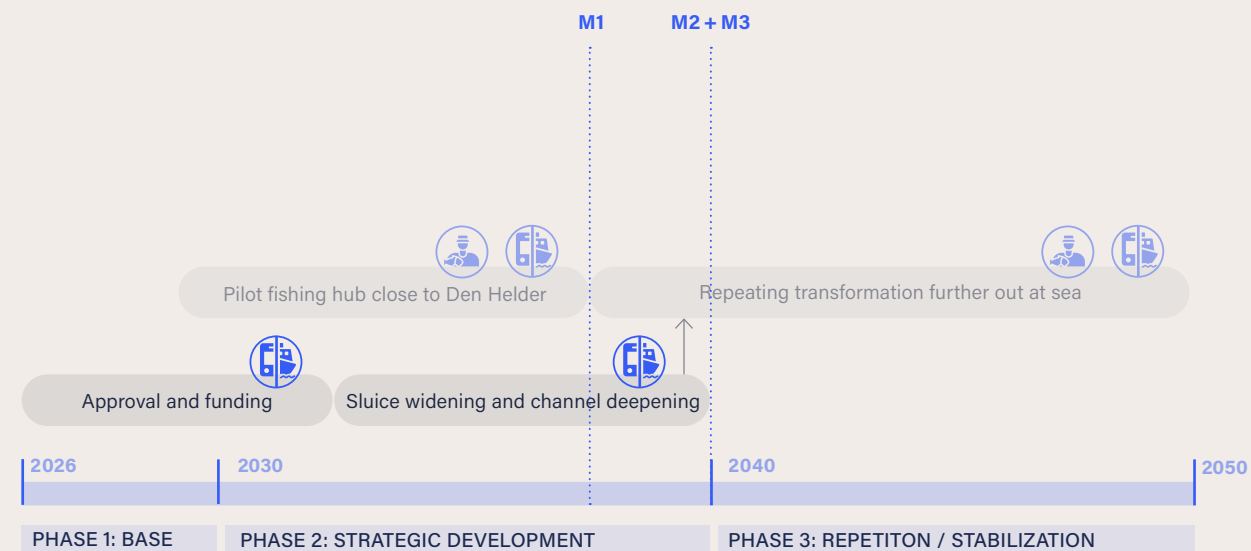
- › Fishing hub
- › Boat making and repair facility



Where: Placement Criteria

- Widening of existing sluices ()

When: Timeline



8.4.2 FISHING TOWN PROFILES

For the community vision and strategy, spatial interventions are introduced in the fourteen fishing communities around the IJsselmeer. To strengthen the resilience and future viability of the fishing communities, these towns are connected by a regional network. Rather than concentrating all maritime activities in a single location, key functions are strategically distributed across the different towns, based on current characteristic and spatial conditions. This allows each town to specialize based on its existing qualities, scale and position within the network.

For each of these towns a city passport is created, stating their role in the different fishing supporting functions and how much focus lies on each of these, defining the role and identity of each town within the system. Lager hubs, such as Urk, Harlingen, and Den Helder, focus on being a cluster of core fishing activities and this way act as anchors for the network. The other towns take on more specialized roles, including fish processing and distribution, boat building and repair, bio-fuel production, maritime research and reskilling and education. Each town is able to support multiple fishing activities from this list, but their main focus differs.

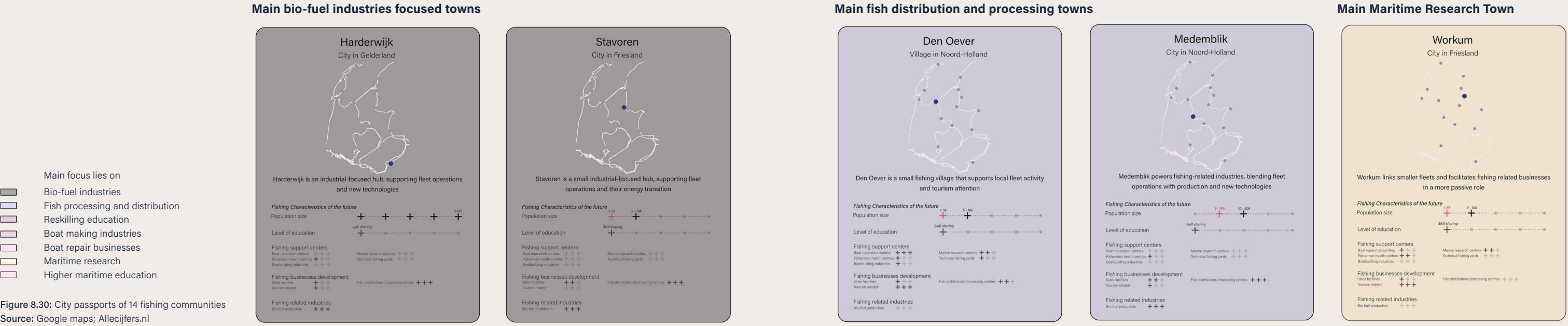
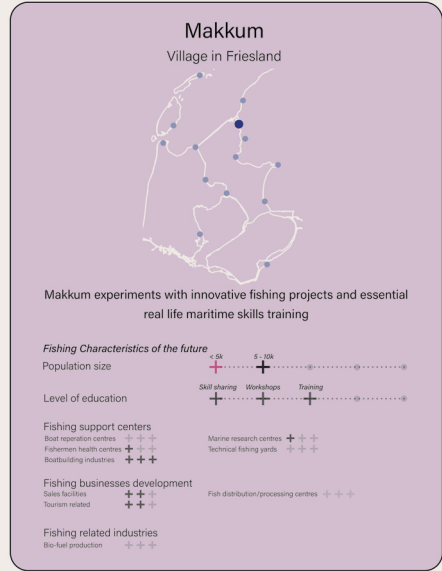
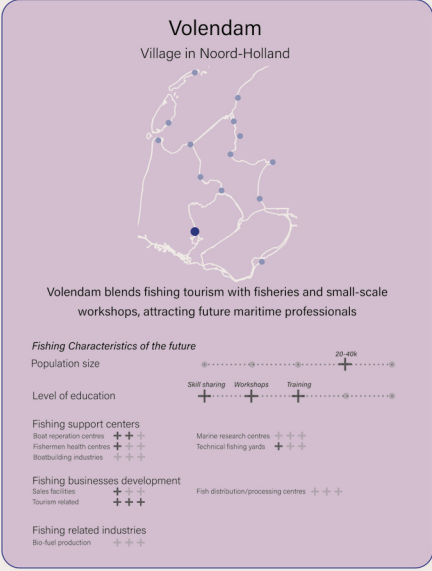


Figure 8.30: City passports of 14 fishing communities
Source: Google maps; Allecijfers.nl

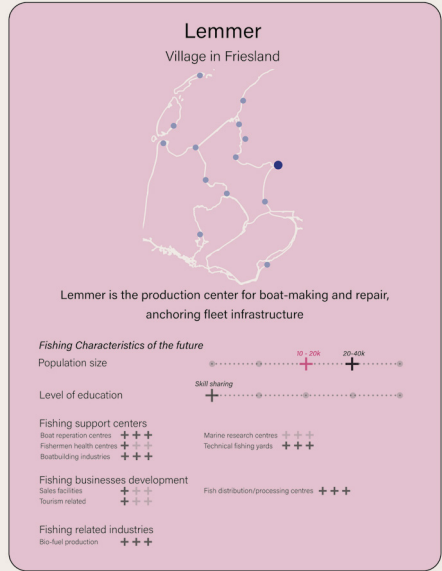
Main reskilling educational towns



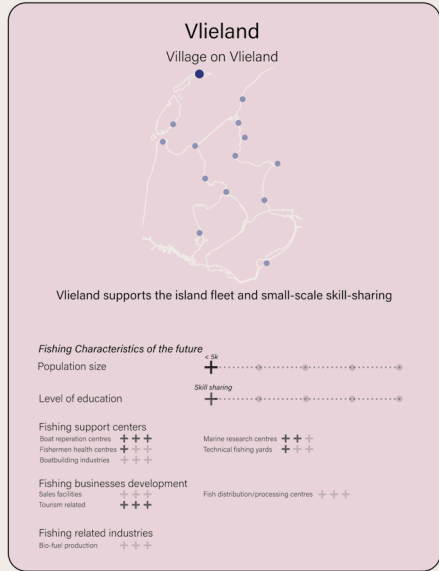
Main boat making town



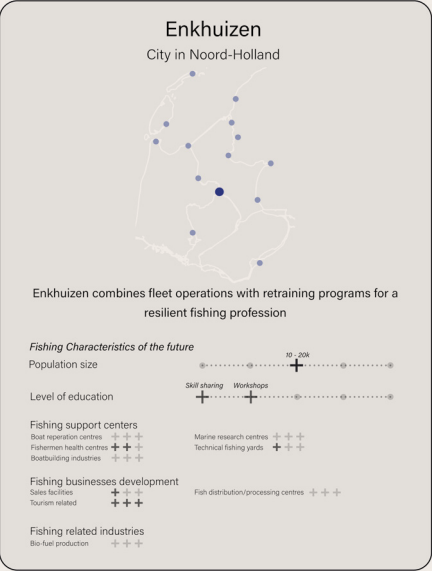
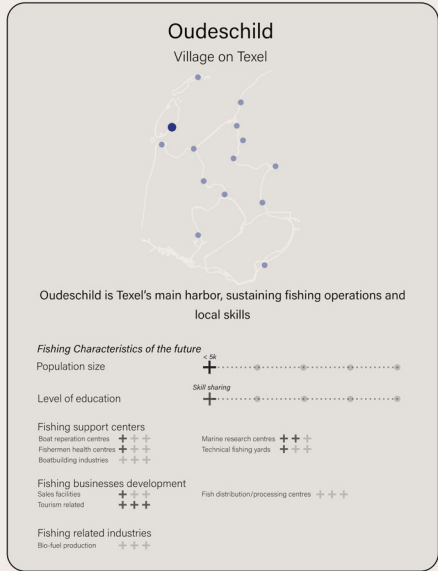
Main boat making town

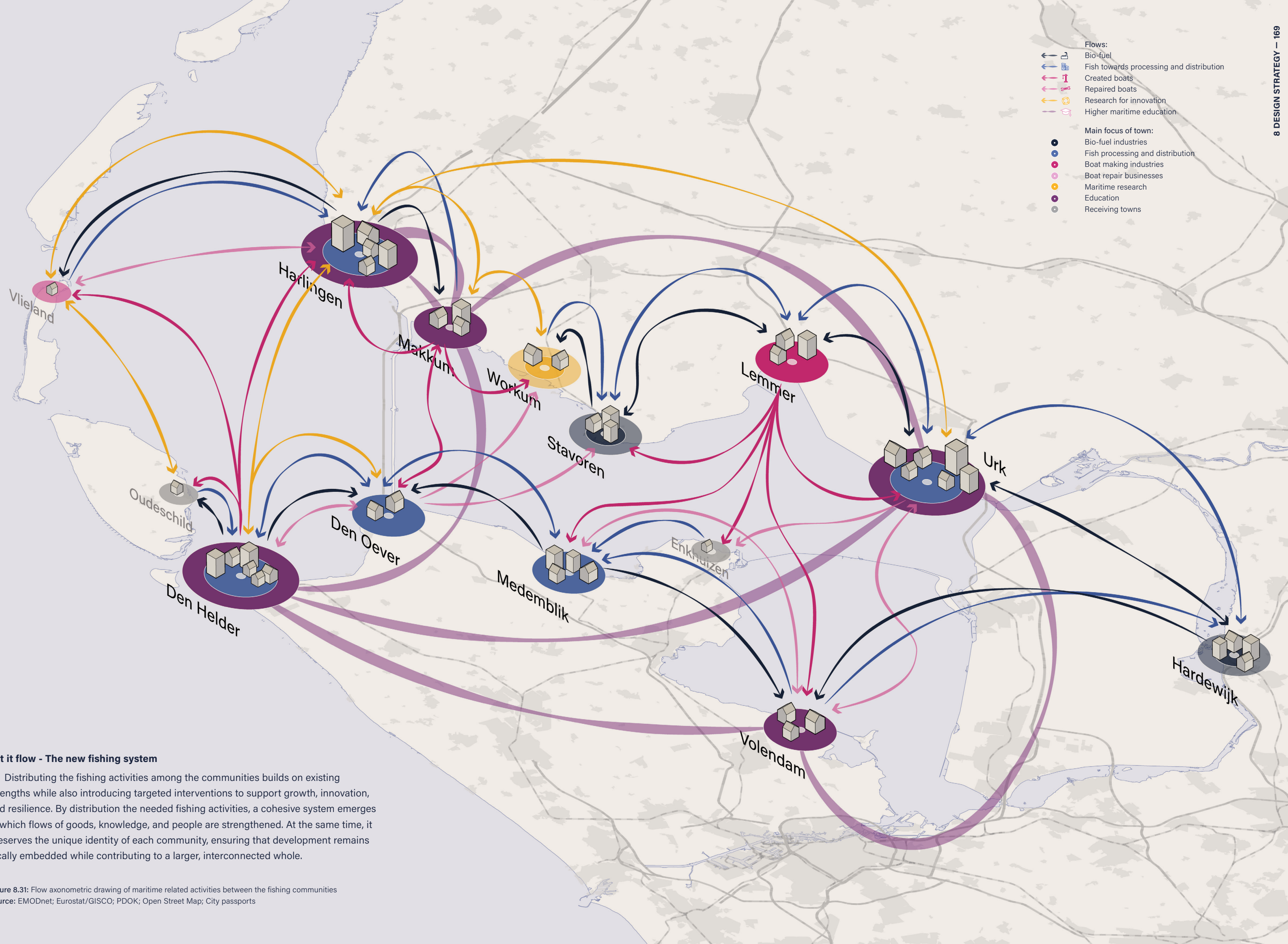


Main boat reperation town



Smaller towns with focus on tourism





Let it flow - The new fishing system

Distributing the fishing activities among the communities builds on existing strengths while also introducing targeted interventions to support growth, innovation, and resilience. By distribution the needed fishing activities, a cohesive system emerges in which flows of goods, knowledge, and people are strengthened. At the same time, it preserves the unique identity of each community, ensuring that development remains locally embedded while contributing to a larger, interconnected whole.

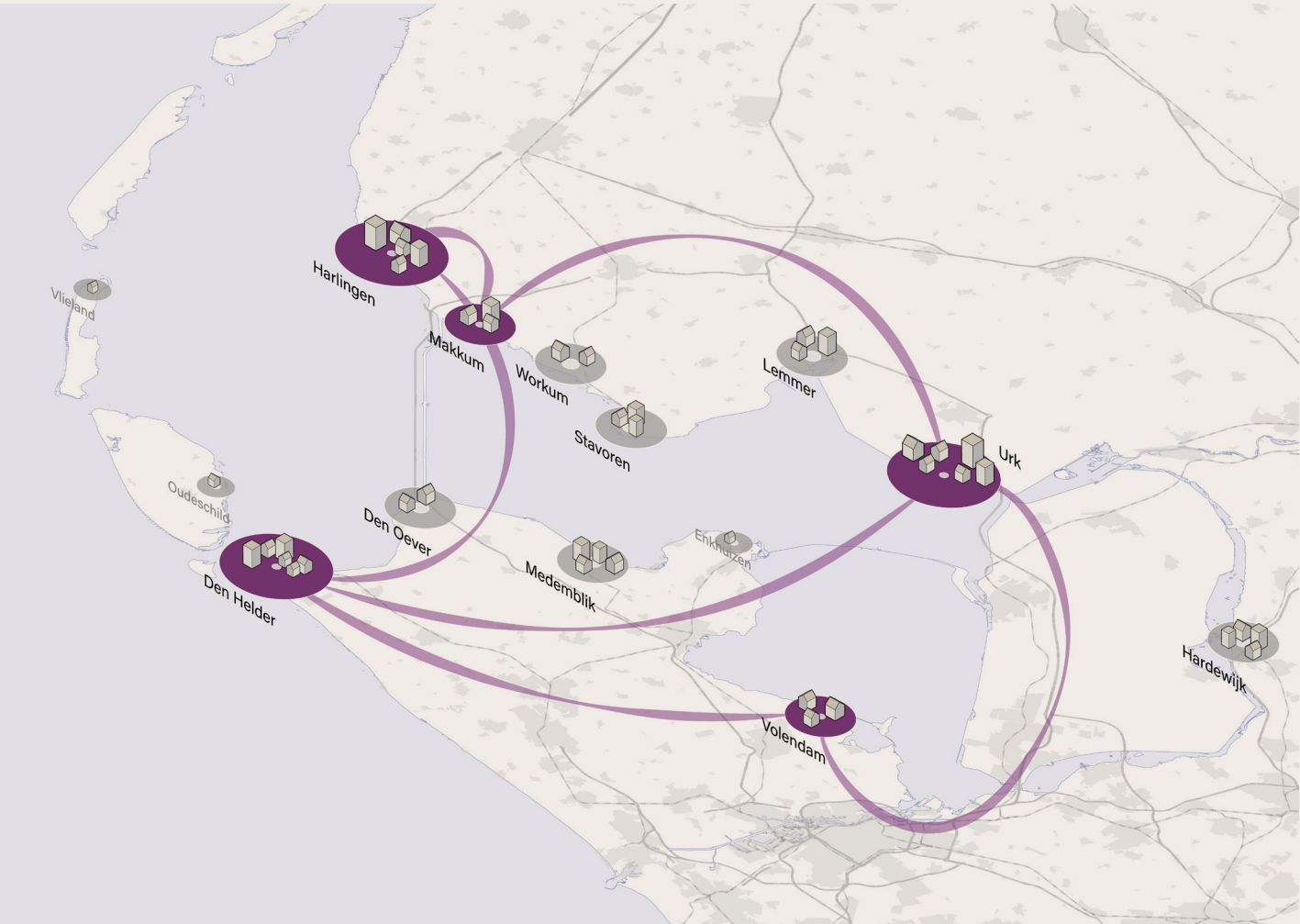
Figure 8.31: Flow axonometric drawing of maritime related activities between the fishing communities
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; City passports

THE FLOW OF EDUCATION AND RESKILLING

For the resilience of fishing communities educational corridors introduced providing pathways for both professional diversification and lifelong learning. The corridor connects communities through the systematic development of knowledge and skills, ensuring that educational opportunities are embedded within the regional maritime sector. Educational hubs are strategically distributed within larger fishing communities, such as Urk and Den Helder, offering HBO level maritime programmes, including programmes like engineering and maritime research. This helps broaden the professional prospects of the next generation while MBO institutions, including those in Harlingen, focus on preparing young maritime professionals with hand-on skills for sustainable and viable careers within the sector.

Smaller towns such as Volendam and Makkum, complement these efforts by providing reskilling opportunities for current fishing professionals, ensuring that workforce development addresses both present and future needs. By concentrating advanced education in larger hubs and targeted reskilling as well in smaller communities, the system maximises accessibility and efficiency, well fostering local expertise.

Figure 8.32: Flow axonometric drawing of the educational corridor activities between the fishing communities
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; City passports

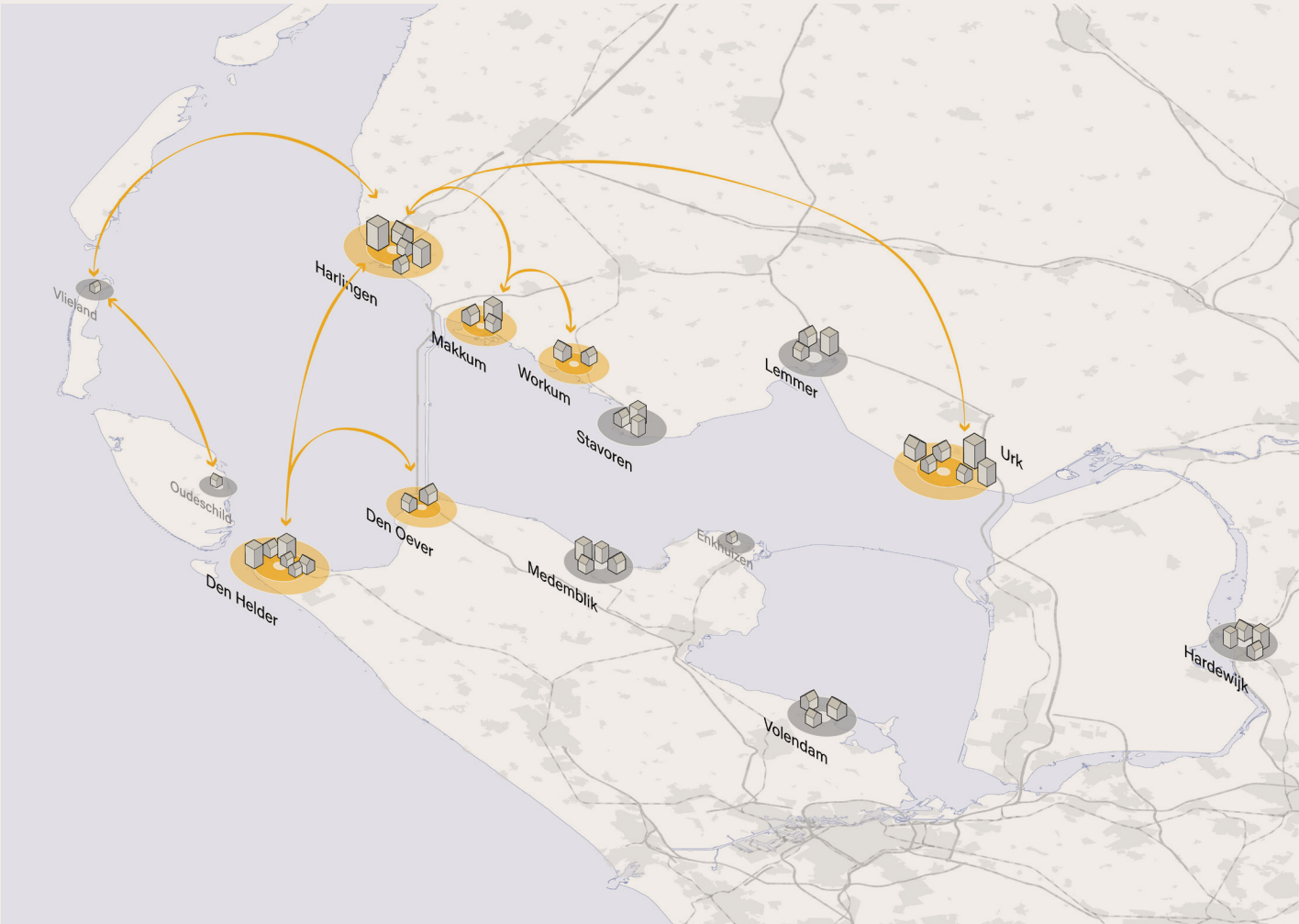


THE FLOW OF MARITIME RESEARCH

Maritime research plays a central role in supporting the innovation, sustainability, and the resilience of regional fishing communities. Specialized research facilities are strategically located in key hubs along the North Sea side of the IJsselmeer, where proximity to the open sea allows for studies that address the most pressing maritime challenges, including research management, vessel efficiency, fish patterns, and environmental impact. These hubs are closely paired with higher education institutions, providing students with opportunities to engage in applied research, internships, and collaborative projects that directly connect academic learning with real-world maritime practices.

Larger communities provide advanced research infrastructure and a broad scope of scientific programs, while smaller communities contribute local knowledge, pilot sites, and opportunities for field-based experimentation. This arrangement enables new insights to be generated and applied efficiently, supporting technical advancement, evidence-based decision making, and the development of skilled and meriting professionals.

Figure 8.33: Flow axonometric drawing of research sharing between the fishing communities
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; City passports

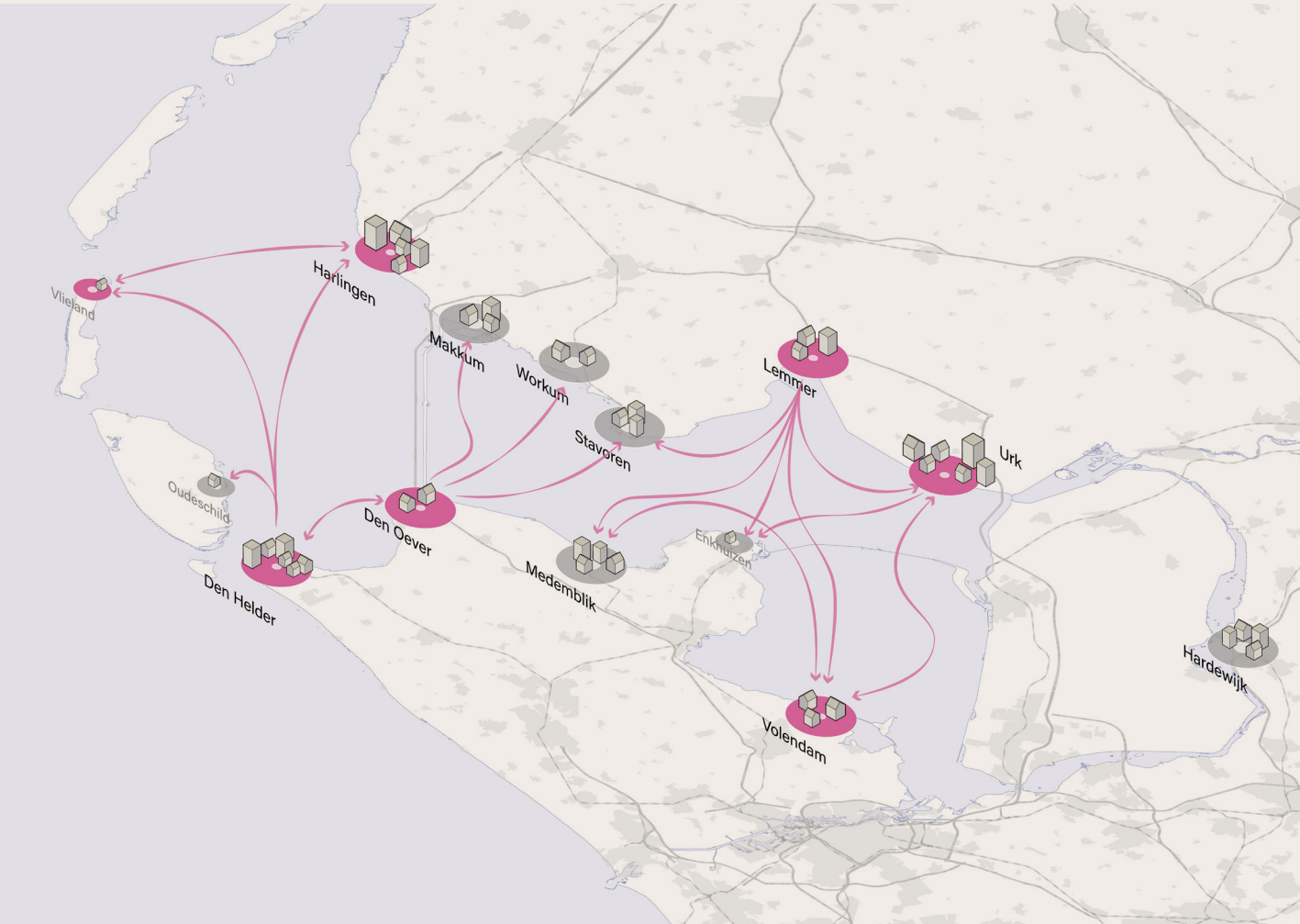


THE FLOW OF BOAT REPAIR

Within fishing communities, the availability of maintenance of fishing vessels is a critical component of the regional maritime system. To ensure the effective operation of the fishing sector, a network of boat repair facilities is established across both major and smaller fishing hubs. Primarily fishing communities, as well as towns with processing activity or locations where boat making take place, such as Den Oever and Lemmer, provide boat repair services, enabling vessels to remain operational and supporting local maritime activities.

Smaller communities, which may lack a fully active harbour or whose focus lies on alternative fishing activities, rely on neighbouring communities to access these repair services. By distributing repair facilities strategically across the region, the system not only maintains operational efficiency but also fosters inter community collaboration. This network ensures that vessels can be maintained locally where possible, while providing reliable access to essential services for communities with limited maritime infrastructure.

Figure 8.34: Flow axonometric drawing of boat making businesses between the fishing communities
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; City passports

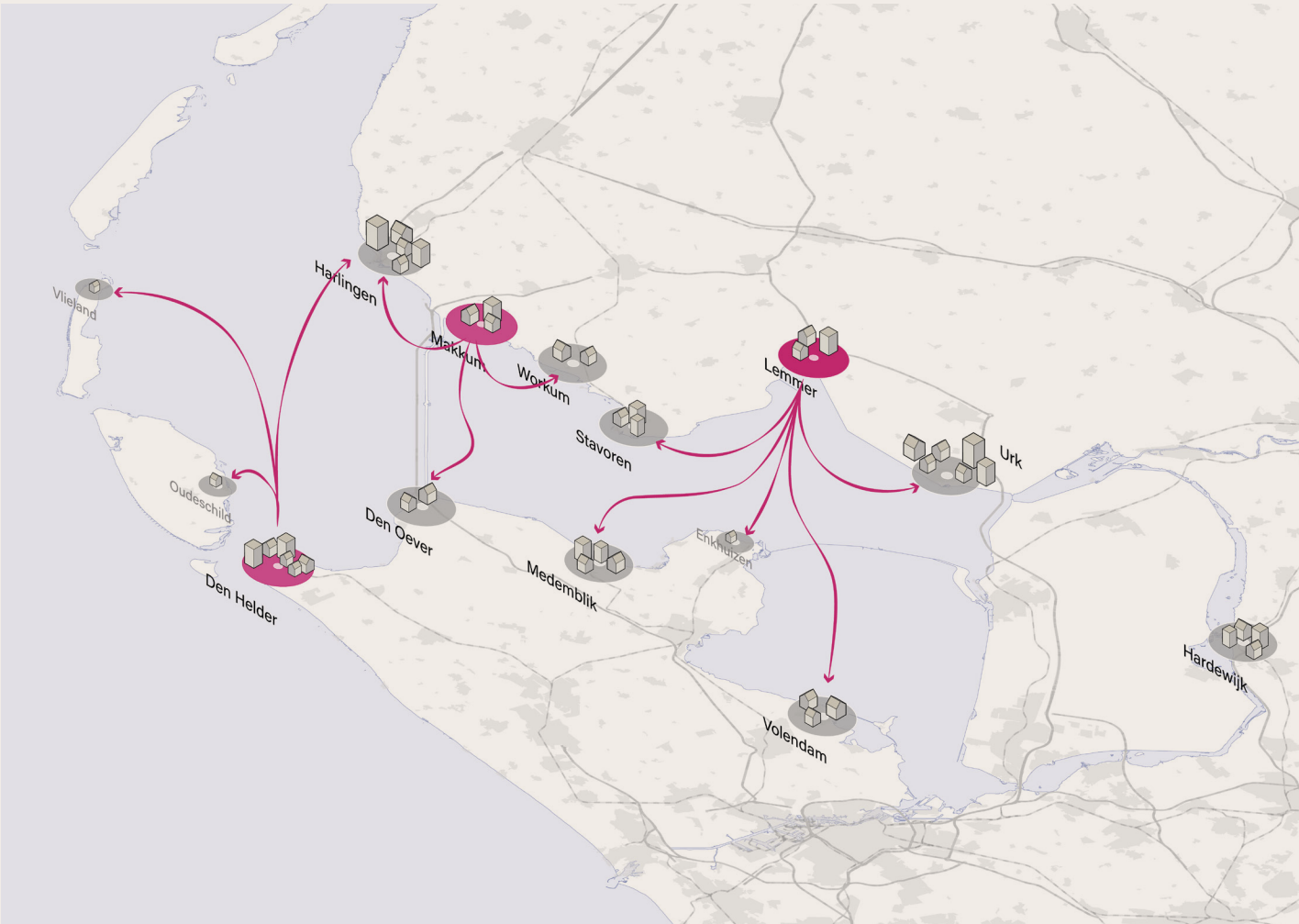


THE FLOW OF BOAT MAKING INDUSTRIES

Boat making industries form a critical pillar in the regional maritime system supporting both the operational capacity and long-term sustainability of fishing communities. To ensure a steady supply of functional vessels, specialised boat making facilities are concentrated in three strategic locations within the region, combining traditional craftsmanship with modern maritime engineering techniques. Lemmer serves as the primary HUB, providing advanced construction capabilities, producing high quality vessels designed for efficiency, durability, and compliance with evolving environmental standards. The two additional sites support the system by focusing on specific vessel types, specialized components, or complementary production tasks, ensuring that expertise and capacity are distributed across the region without unnecessary duplication.

This concentrated network allows smaller fishing communities to access new vessels and essential construction services without maintaining large scale facilities themselves.

Figure 8.35: Flow axonometric drawing of boat mkaing businesses between the fishing communities
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; City passports



THE FLOW OF BIOFUEL

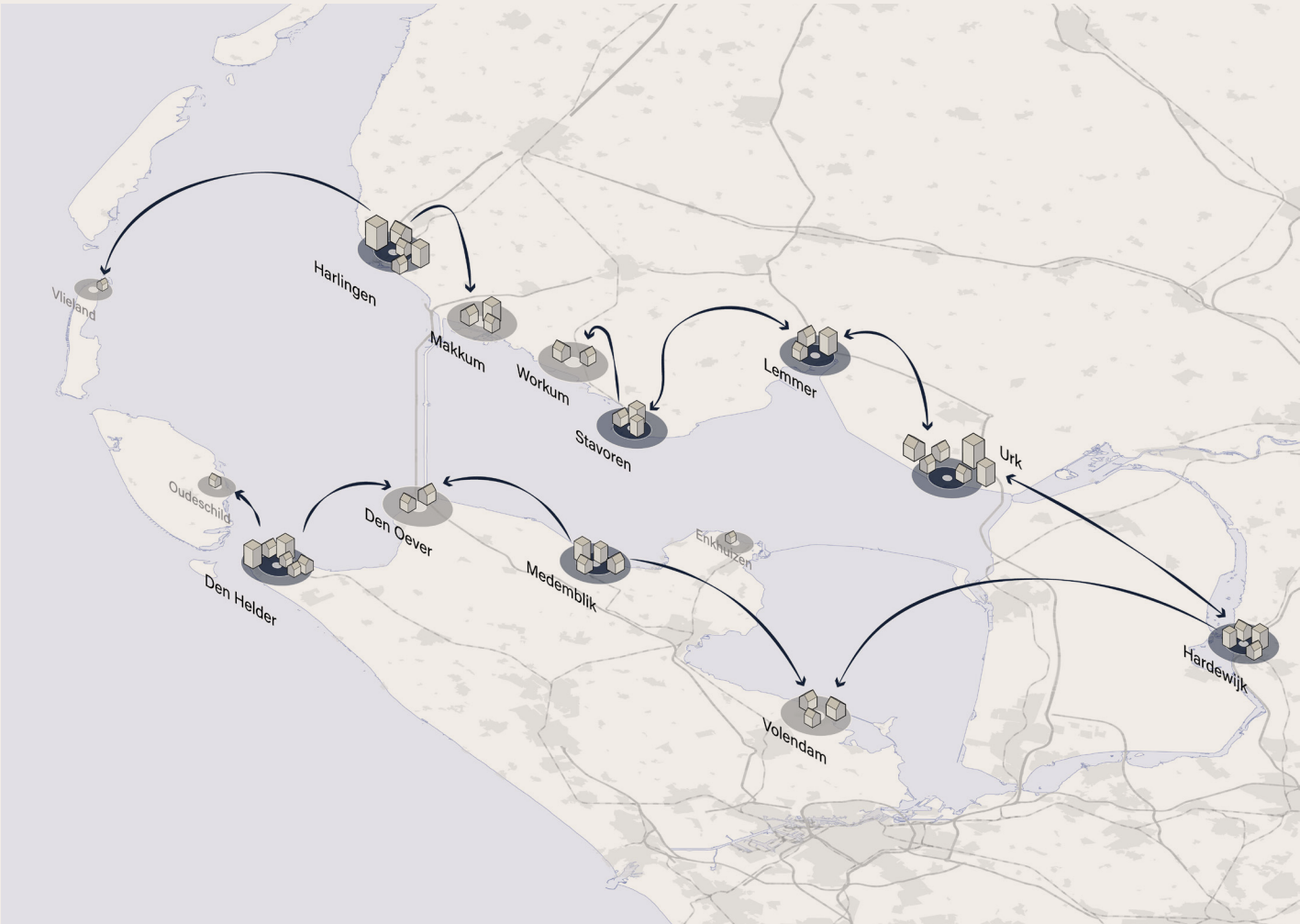
For the energy transitions of the fishing fleets a shift towards biofuel derived from fish and agricultural waste is introduced. Biofuel is produced by transforming organic waste streams from fish processing and farming into renewable energy, creating a direct link between waste production and energy generation.

The biofuel-oriented towns are strategically located in close proximity to fish processing centres, and agricultural areas, ensuring a continuous and efficient supply of raw materials. In this system Harderwijk and Stavoren primarily focused on biofuel production, with fewer other fishing related activities allowing them to operate as specialised energy nodes within the network. In addition, other communities, including the main hubs and Medemblik, also contribute to the bio-fuel production, without it being their main focus. Due to their proximity to large volumes of fish waste, and existing infrastructure, these towns can locally process part of their waste streams reducing transport distances and increasing efficiency.

Once produced the biofuel is distributed to fishing communities across the IJsselmeer region, where it supports maritime operations and local energy demands. This establishes a circular and regional embedded system in which waste streams are reintegrated as a valuable resource.

As a result, the biofuel flow not only reduces environmental impacts but also strengthen the economic and functional interdependence between communities, by decreasing reliance on external and fluctuating fuel markets, it enhances both the resilience and long-term sustainability of the regional fishing system.

Figure 8.36: Flow axonometric drawing of bio-fuel between the fishing communities
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; City passports

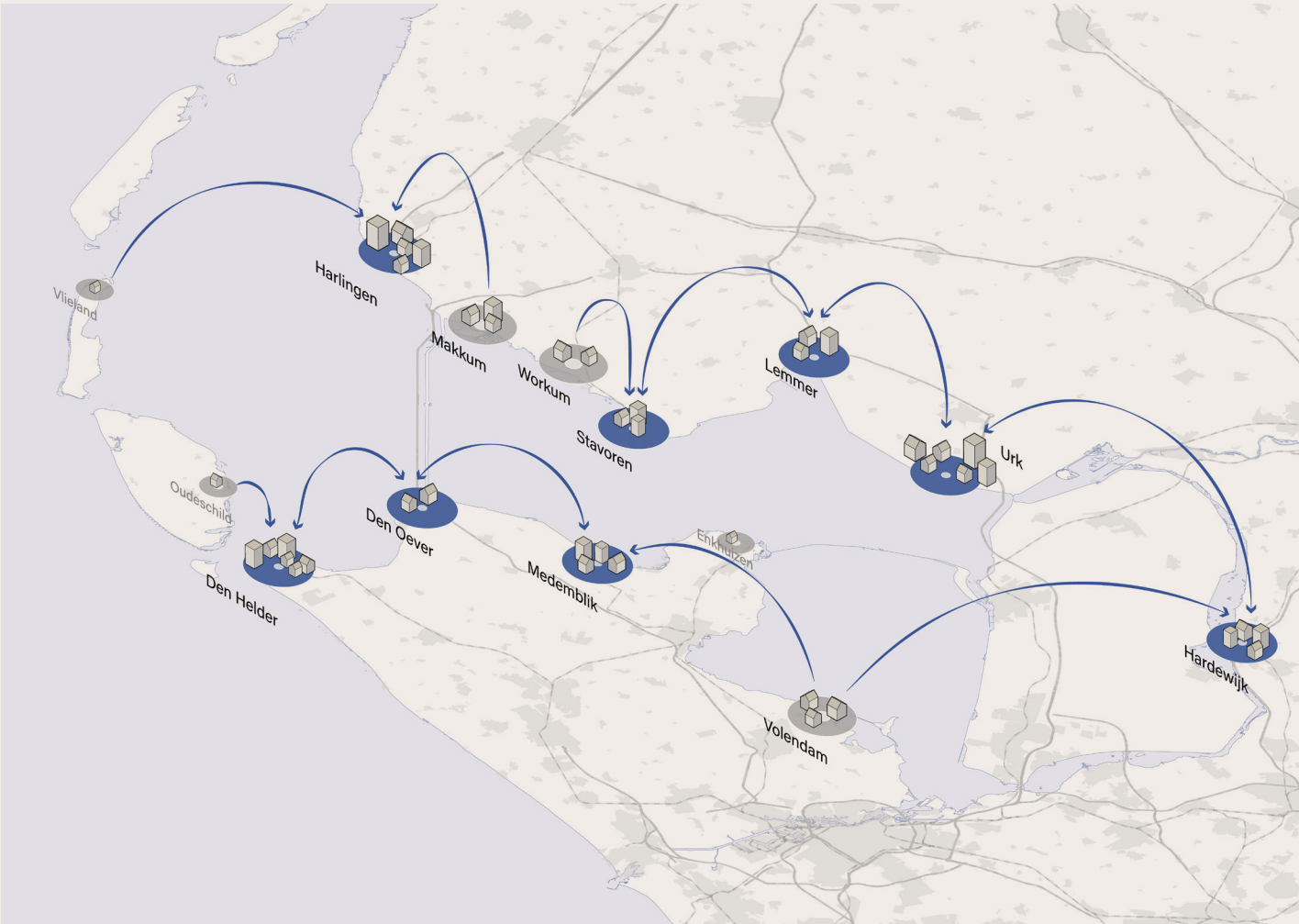


THE FLOW OF FISH PROCESSING AND DISTRIBUTION

Fish distribution and processing facilities are essential for maintaining the efficiency, quality, and economic viability of regional fishing communities. These facilities are strategically located near both fishing hubs and major transport routes to ensure timely handling of catching and minimize spoilage. The three main hubs serve as the primary centre for fishing processing, handling the largest volumes and offering a full range of services, including cleaning, filleting, freezing, and packaging. Other towns also contribute to processing and distribution, though on a smaller scale or with more specialised product lines.

By efficiently linking harvesting, processing, and distribution, these facilities enable fishing communities to respond rapidly to market demands and maintain high standards of food safety and product quality. The system ensures that fish products are processed and delivered effectively, supporting both local consumption and broader regional and national markets, while reinforcing the operational and economic resilience of the regional fishing sector.

Figure 8.37: Flow axonometric drawing of fish to fish processing businesses, between the fishing communities
Source: EMODnet; Eurostat/GISCO; PDOK; Open Street Map; City passports



8.4.3 GOVERNANCE STRUCTURE: FISHING COMMUNITY COOPERATIVE NETWORK

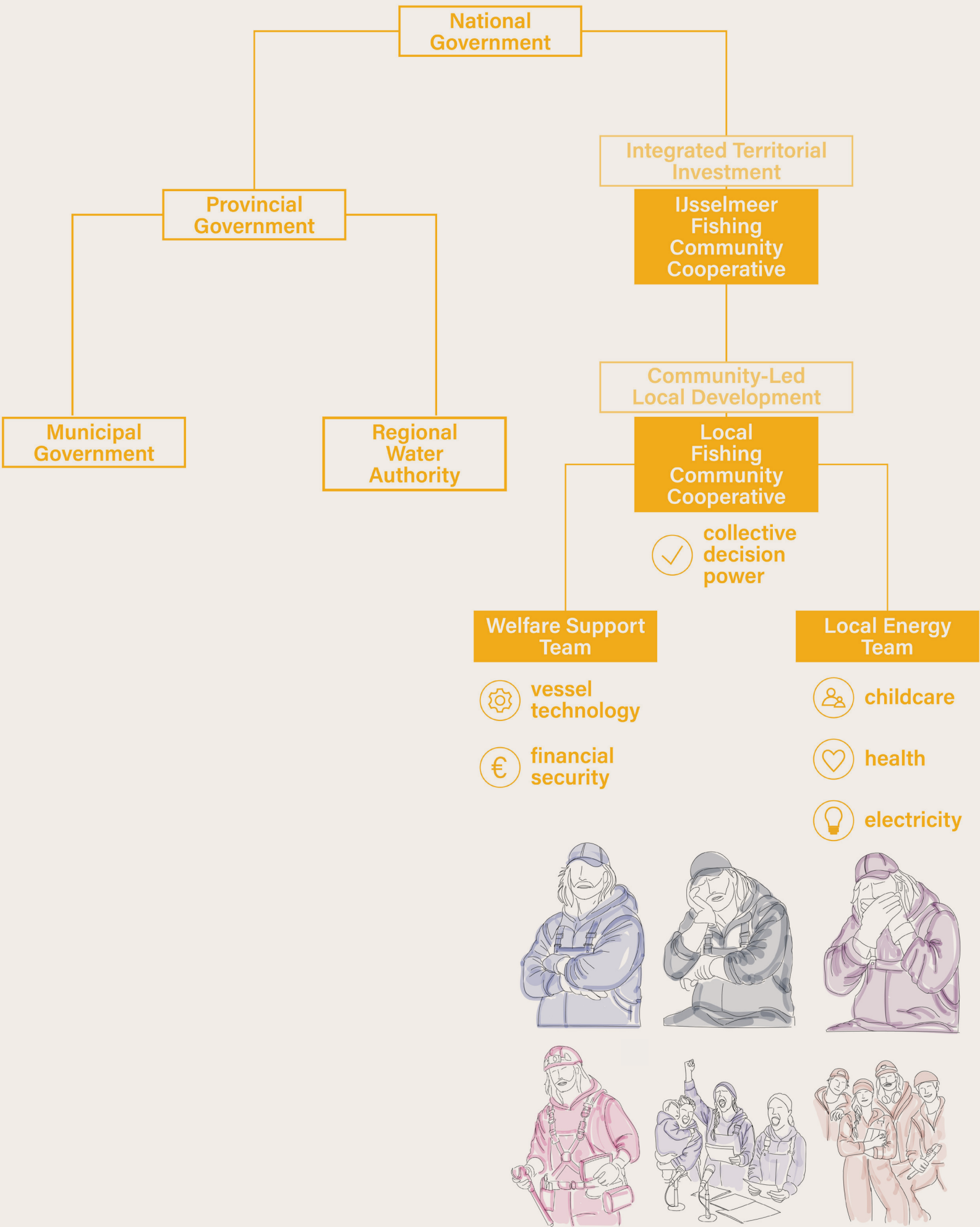
The IJsselmeer Fishing Community Cooperative (IFCC), comprising 14 fishing towns along the IJsselmeer, aims to strengthen coordination and collaboration among fishing towns in sharing energy, financial, and social resources. Integrated Territorial Investment (ITI) will be applied to support the cooperative.

The IFCC enables fishing communities to represent themselves within the governance structure, parallel to the provinces, thereby reducing administrative processing time for communication and subsidy disbursement. In doing so, communities gain a more direct channel to voice their needs and policy recommendations. For instance, the cooperative network could facilitate advocacy for opening the Afsluitdijk by channelling community positions directly to the national government.

At the fishing-town level, the Local Fishing Community Cooperative (LFCC) aims to support the implementation of transition measures at the community level, including subsidy disbursement and the provision of childcare and health-related services. This ensures that the diverse needs of fishing communities, including fisherwomen and future generations, are considered. Meanwhile, Community-Led Local Development (CLLD) will be applied to support local energy production, ensuring that energy infrastructure positioned around fishing towns generates returns for the community. This arrangement prevents the unequal distribution of burdens and mitigates NIMBY behaviours. Furthermore, the cooperative amplifies community voices at the local scale, facilitating negotiation in future energy infrastructure projects.

Figure 8.38: Governance structure of the Fishing Community Cooperative Network

- Existing Governance Actor
- Proposed Governance Actor
- Existing Eligible Funding

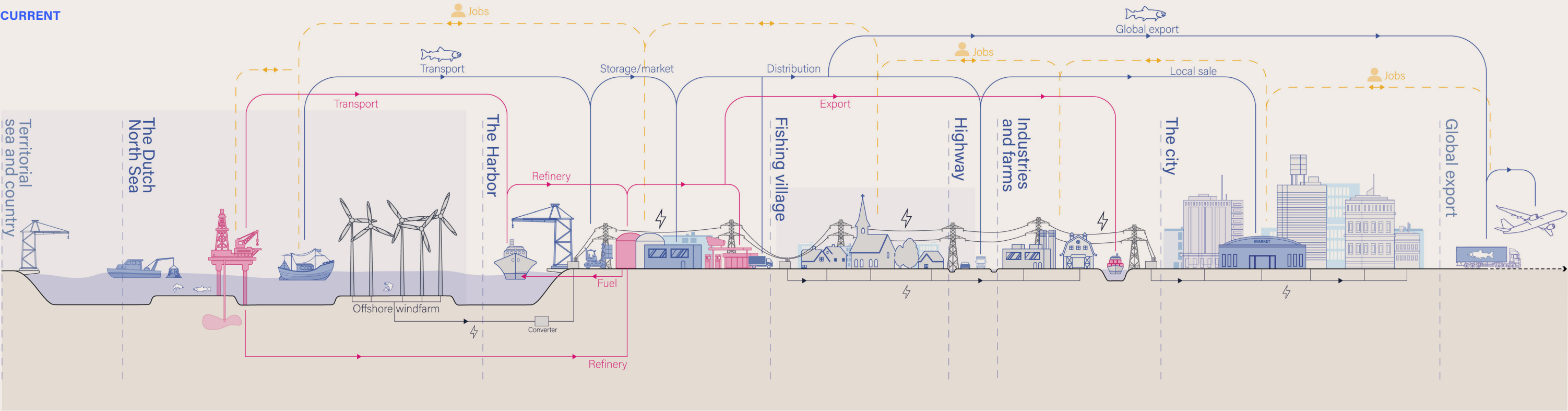


8.5 Connected North Sea and IJsselmeer

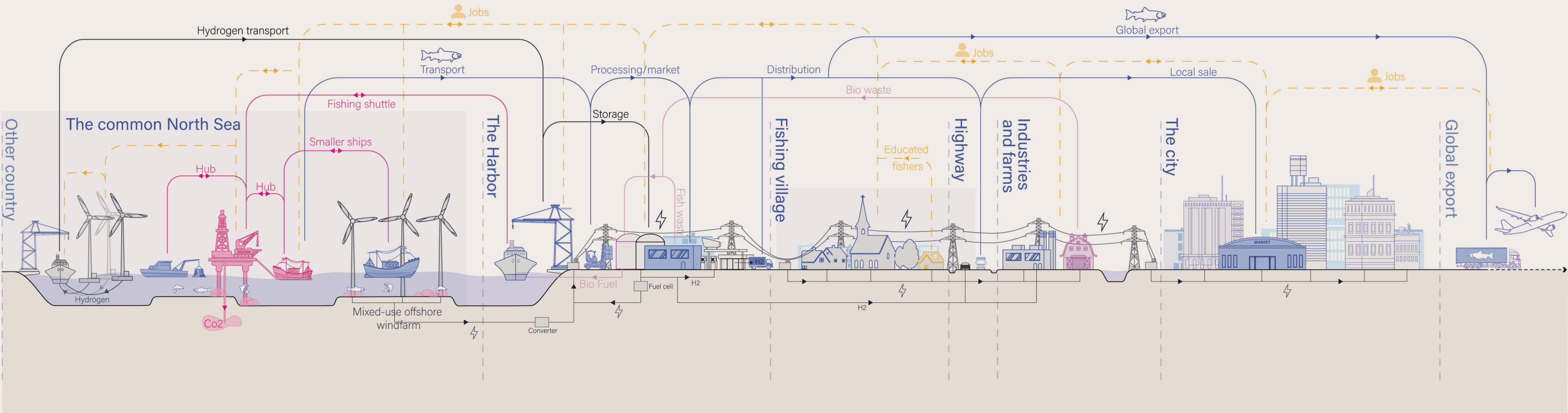
By implementing the strategies, the energy system around the North Sea and IJsselmeer is transformed from a carbon-intensive to renewable energy system integrated in a more circular society. This is achieved through adding hydrogen and a circular system of biomass to the system of flows, while strengthening the fishing professions by creating opportunities for fishers to access new fishing grounds, including areas between offshore wind farms, and more opportunities on land through education and expanded fishing businesses.

Figure 8.39: Systemic sections comparing energy system in current and future conditions
Sources: Freepik

CURRENT



FUTURE



8.6 Case Study Urk: Fishing Community Scale

From the fourteen fishing communities around the IJsselmeer, Urk was selected as an exemplary case study to showcase how the regional interventions of the strategy land in the community landscape. Urk currently forms a real fishing community, with its main focus on fish distribution and processing, while actively contribution to the fisher-men population. Through the conducted street interview with a resident of Urk, on the 16th of February 2026, it became clear that Urk depends on the fishing practices, while forming one close bonded community¹⁷. Due to its location, with the harbour on the IJsselmeer that now forms a new connection to the North sea, and its real community focus on fishing, Urk offers ideal conditions to be formed into one of the main three fish-ing hubs around the IJsselmeer.

The city passport of Urk shows that Urk trough the strategy mainly focusses on fish distribution and processing, while also supporting the fishing fleet with technical inter-ventions like boat making and repair and bio-fuel production. By implementing these new roles in the village, its urban fabric changes.

17 The interview memory transcript as well as further information on Urk (numbers) can be found in the Appendix: Appendix D (In-terview) & Appendix G (Urk numbers)

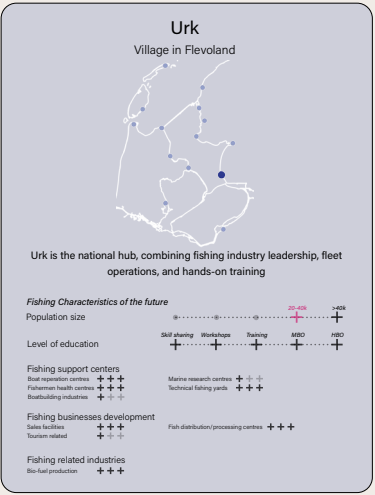


Figure 8.40: City passport of Urk
Source: Google maps; Allecijfers.nl



8.6.1 CURRENT SITUATION

Urk is characterized by a functional interplay of urban, industrial and religious structures. The harbour is located on the west edge of the village, surrounded by key support industries such as shop repair. While it continues to serve as aa active fishing hub, it also attracts tourists through its distinctive character as a historic fishing town.

The harbour is closely linked to the larger industrial estate in the south, where fishing related businesses, including processing, distribution and cold storage facilities are clustered. This spatial organization allows the northern and eastern parts of the village to accommodate primarily residential areas.

At the core of Urk, tow community clusters bring together essential functions such as religion, healthcare and daily necessities. With these elements Urk forms a system in which residents, tourists, fishermen, women and children interact, connected trough shared spaces shaped by fishing, care and ongoing transformation.

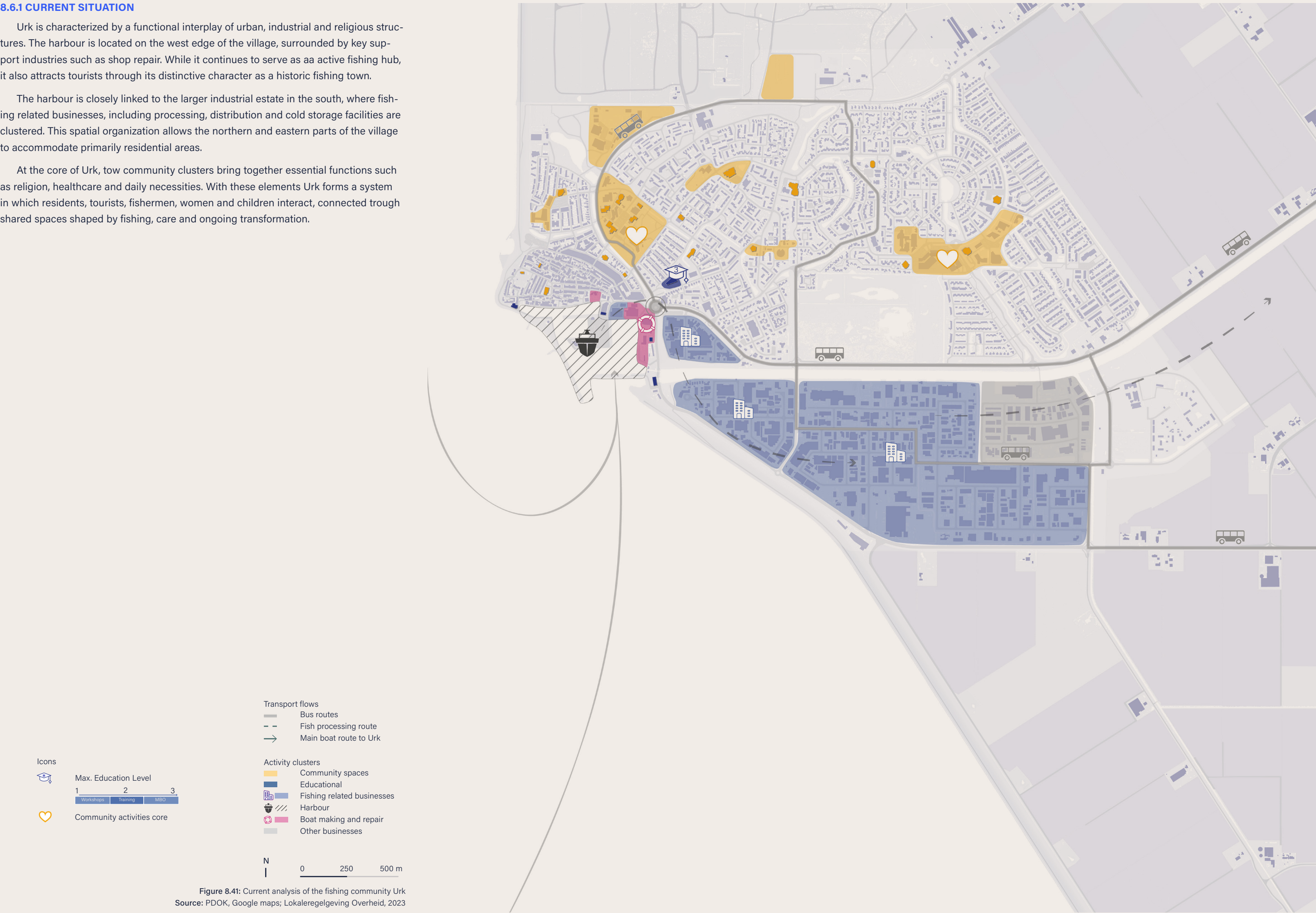


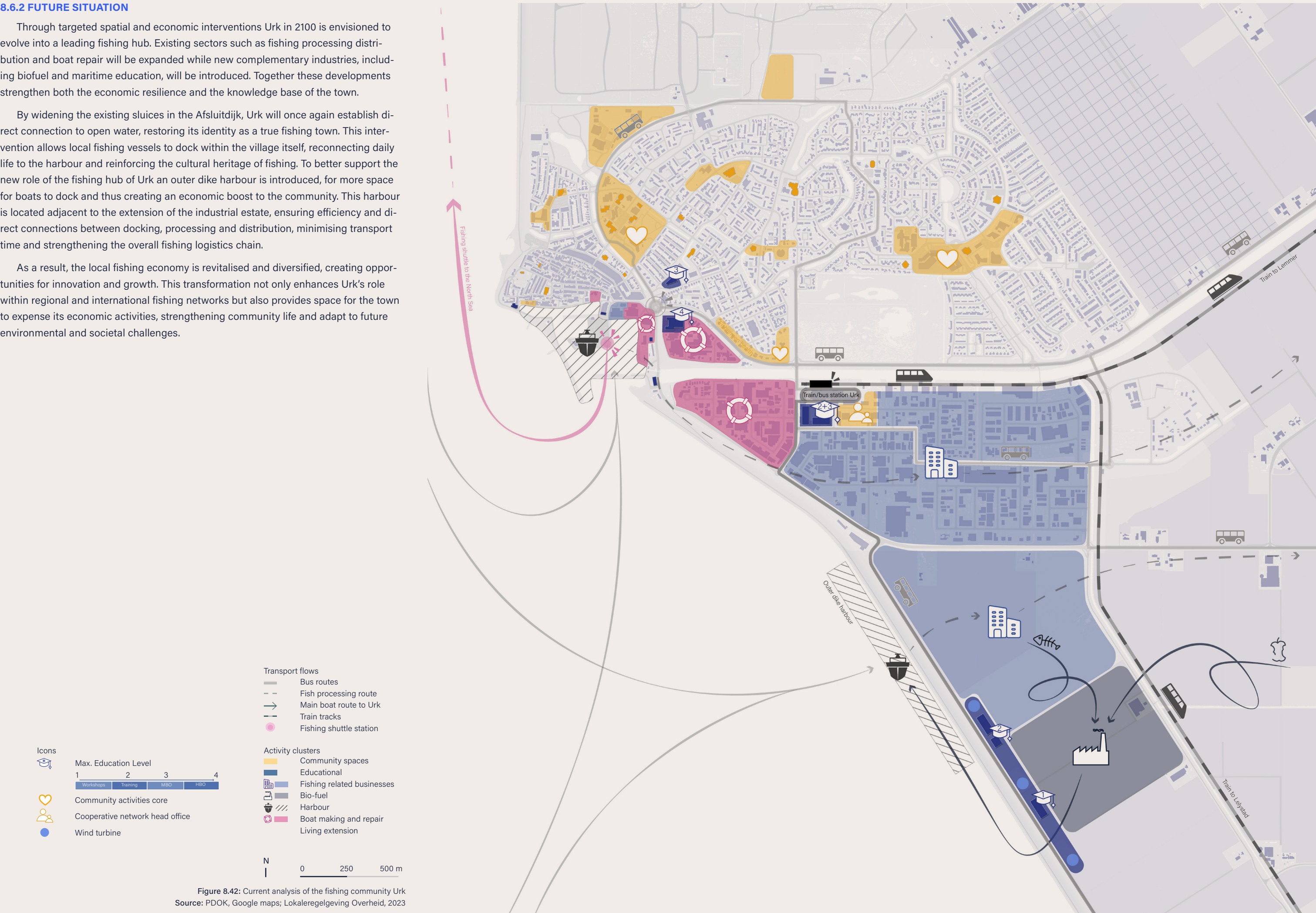
Figure 8.41: Current analysis of the fishing community Urk
Source: PDOK, Google maps; Lokale regelgeving Overheid, 2023

8.6.2 FUTURE SITUATION

Through targeted spatial and economic interventions Urk in 2100 is envisioned to evolve into a leading fishing hub. Existing sectors such as fishing processing distribution and boat repair will be expanded while new complementary industries, including biofuel and maritime education, will be introduced. Together these developments strengthen both the economic resilience and the knowledge base of the town.

By widening the existing sluices in the Afsluitdijk, Urk will once again establish direct connection to open water, restoring its identity as a true fishing town. This intervention allows local fishing vessels to dock within the village itself, reconnecting daily life to the harbour and reinforcing the cultural heritage of fishing. To better support the new role of the fishing hub of Urk an outer dike harbour is introduced, for more space for boats to dock and thus creating an economic boost to the community. This harbour is located adjacent to the extension of the industrial estate, ensuring efficiency and direct connections between docking, processing and distribution, minimising transport time and strengthening the overall fishing logistics chain.

As a result, the local fishing economy is revitalised and diversified, creating opportunities for innovation and growth. This transformation not only enhances Urk's role within regional and international fishing networks but also provides space for the town to expense its economic activities, strengthening community life and adapt to future environmental and societal challenges.



Changes in community spaces

To strengthen the community of Uk and its economy, the strategy focused not only on the introduction of new fishing-related businesses, but also on improving the health of the community itself. New community spaces are therefore integrated into the plan with a focus on healthcare for fishers, childcare facilities, and dedicated spaces for the cooperative network to meet and collaborate.

In addition, a new railway line is introduced to strengthen regional accessibility and collaboration. By strategically placing the train station in the core of the town, it serves both residents and businesses, enhancing mobility and economic exchange. Locally the system is supported by an improved bus network ensuring that all parts of the town remain well connected.

Figure 8.43: Current analysis of community spaces in Urk
Source: PDOK, Google maps; Lokale regelgeving Overheid, 2023

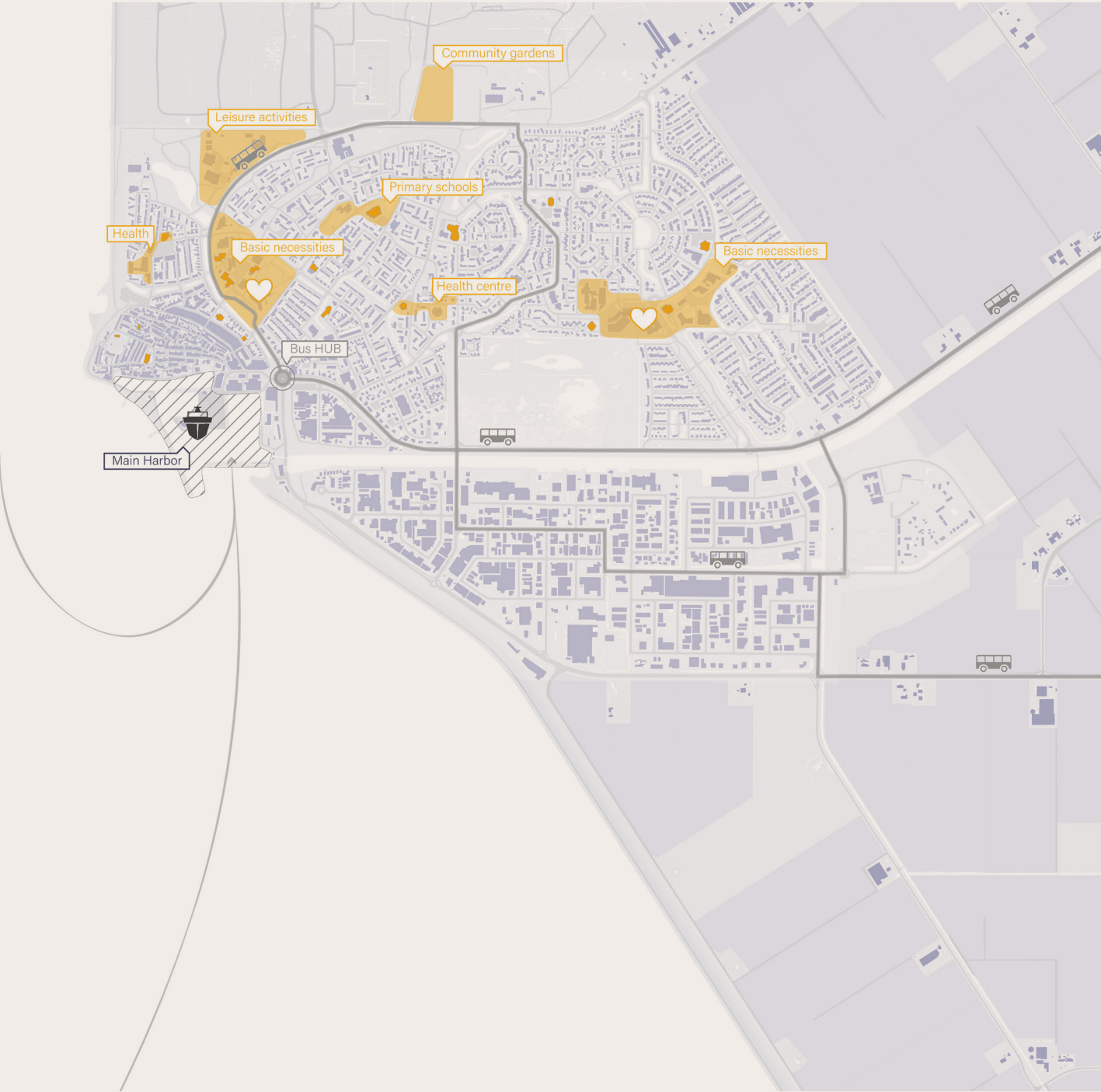


Figure 8.44: New situation of community spaces in Urk
Source: PDOK, Google maps; Lokale regelgeving Overheid, 2023



Changes in maritime education

To further support Urk’s development as a leading fishing HUB education and knowledge exchange are strengthened through the introduction of a layered educational system. This includes a maritime HBO and two MBO programmes closely aligned with the needs of the local fishing industry.

The HBO focuses on innovation and sustainable maritime practises, in close relation with research centres, while the MBO’s provide practical training in areas, such as processing, logistics and vessel maintenance. In addition, training programmes/workshops supports the re-skilling of fishermen, enabling them to adapt to the changing fishing profession.

By embedding education within the community Urk evolves into a centre of maritime knowledge, where learning and working are closely connected, strengthening both its economy and resilience.

Figure 8.45: Current analysis of maritime education in Urk
Source: PDOK, Google maps; Lokalieregelgeving Overheid, 2023

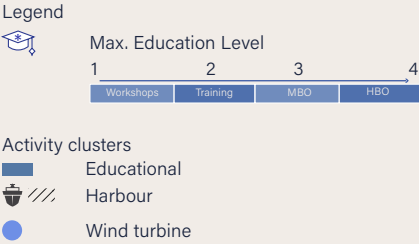
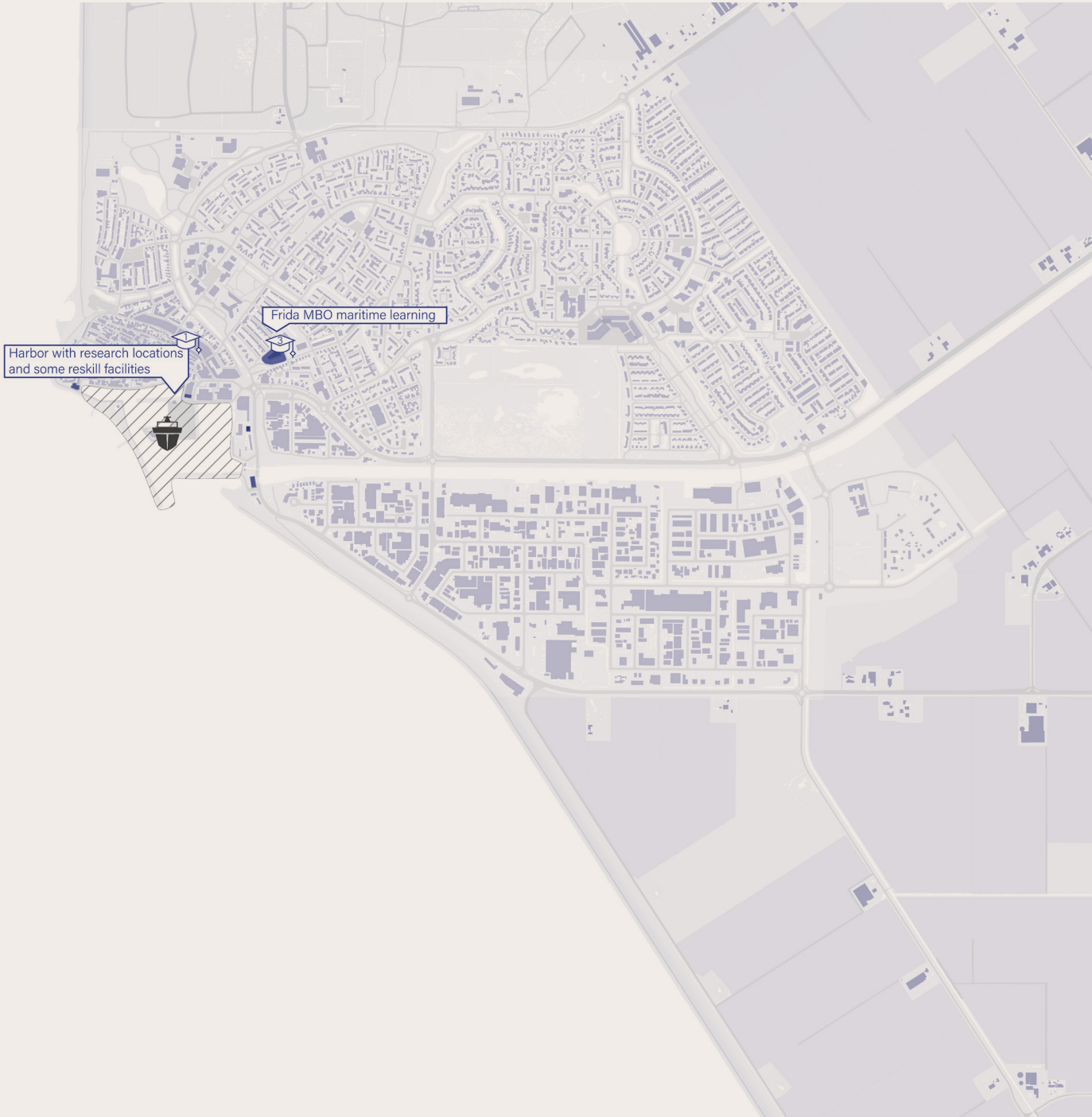
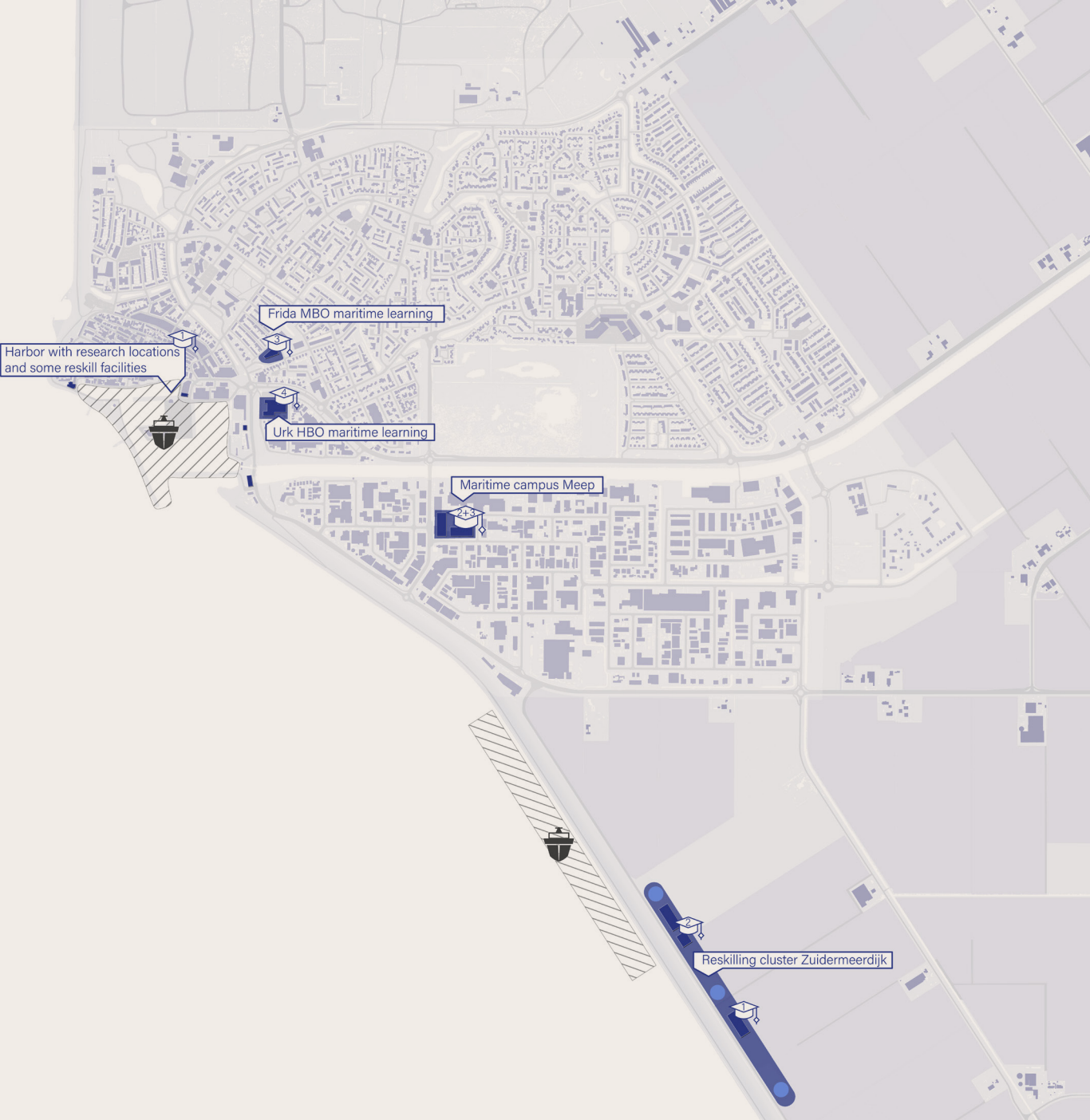


Figure 8.46: New situation of maritime education in Urk
Source: PDOK, Google maps; Lokalieregelgeving Overheid, 2023



Changes in fishing related businesses

The southern industrial estate of Urk is expanded into a productive industrial landscape where maritime industries and fishing related businesses are brought together. This zone accommodates boat repair and shipbuilding facilities in the north, closer to the old harbour, alongside fish processing, packaging and distribution centres forming a continuous an efficient production chain.

Complementing these activities biofuel facilities are introduced to convert organic and fish waste, from the processing facilities, into vessel fuel. This circular approach enhances sustainability while adding a new economic dimension to the existing industries.

Together these interventions create a future oriented industrial system where traditional fishing practises are supported by innovation efficiency and sustainable resources.

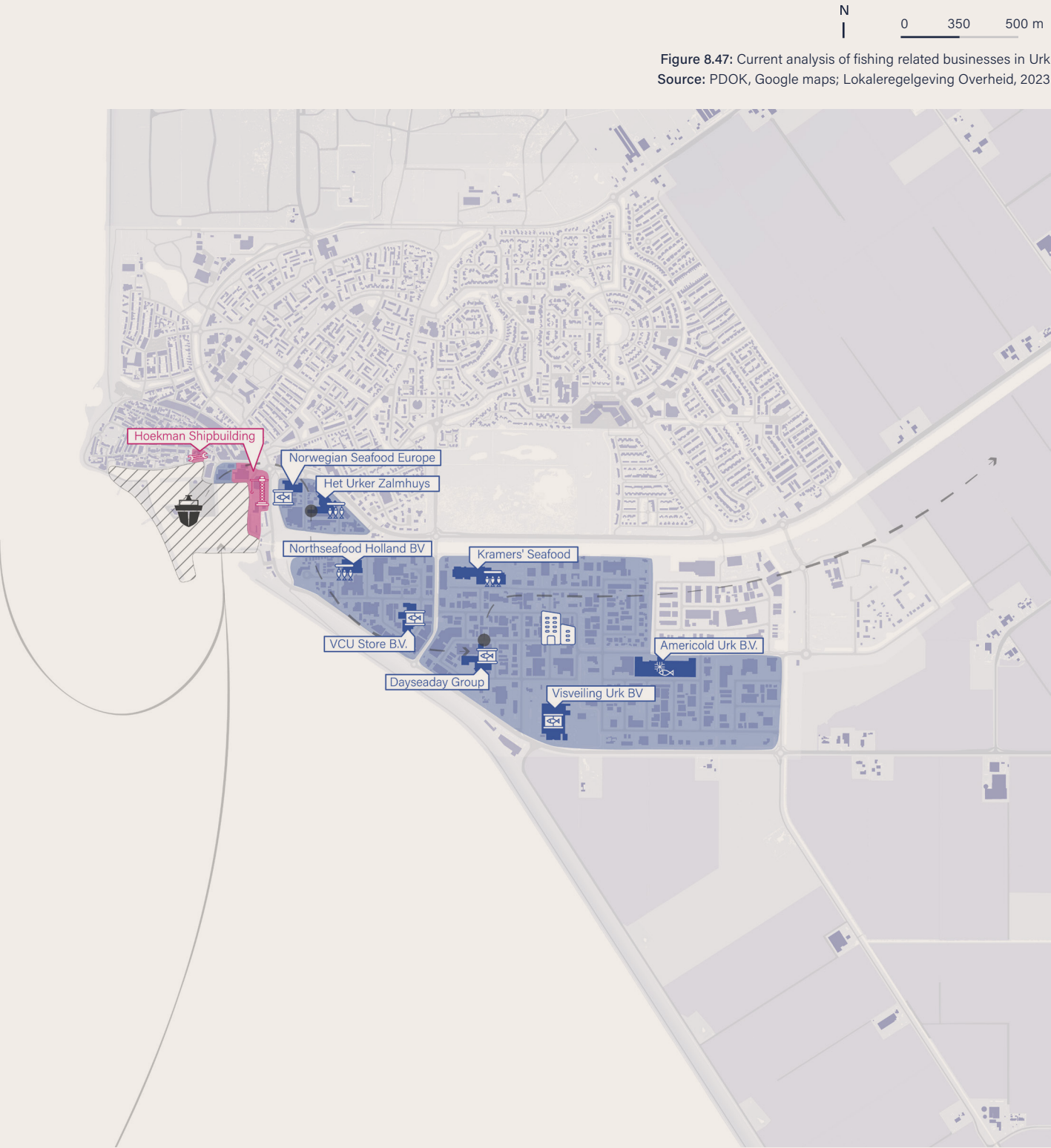


Figure 8.47: Current analysis of fishing related businesses in Urk
Source: PDOK, Google maps; Lokalieregelgeving Overheid, 2023

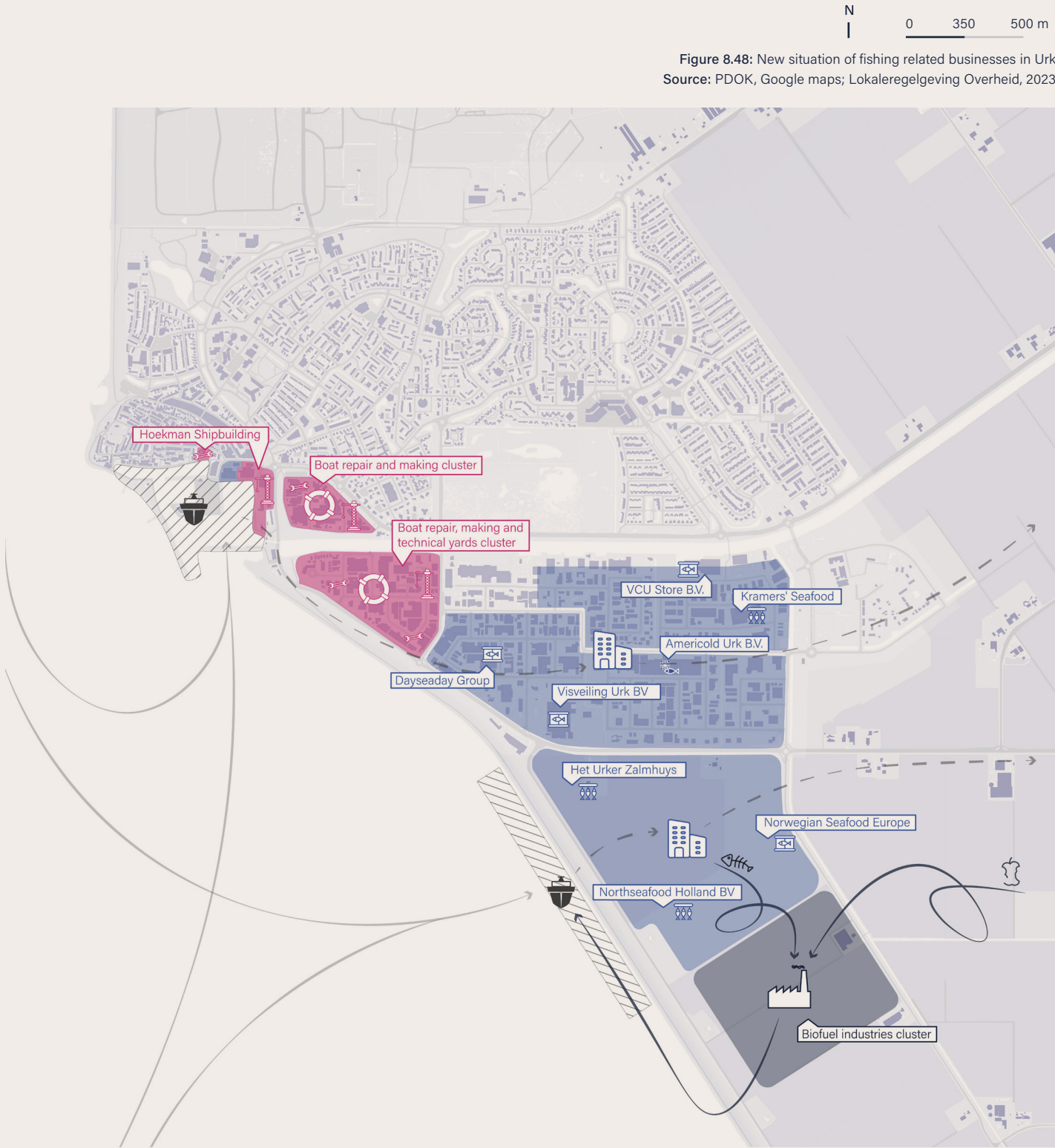


Figure 8.48: New situation of fishing related businesses in Urk
Source: PDOK, Google maps; Lokalieregelgeving Overheid, 2023

8.7 Conclusion: Fishing of the Future

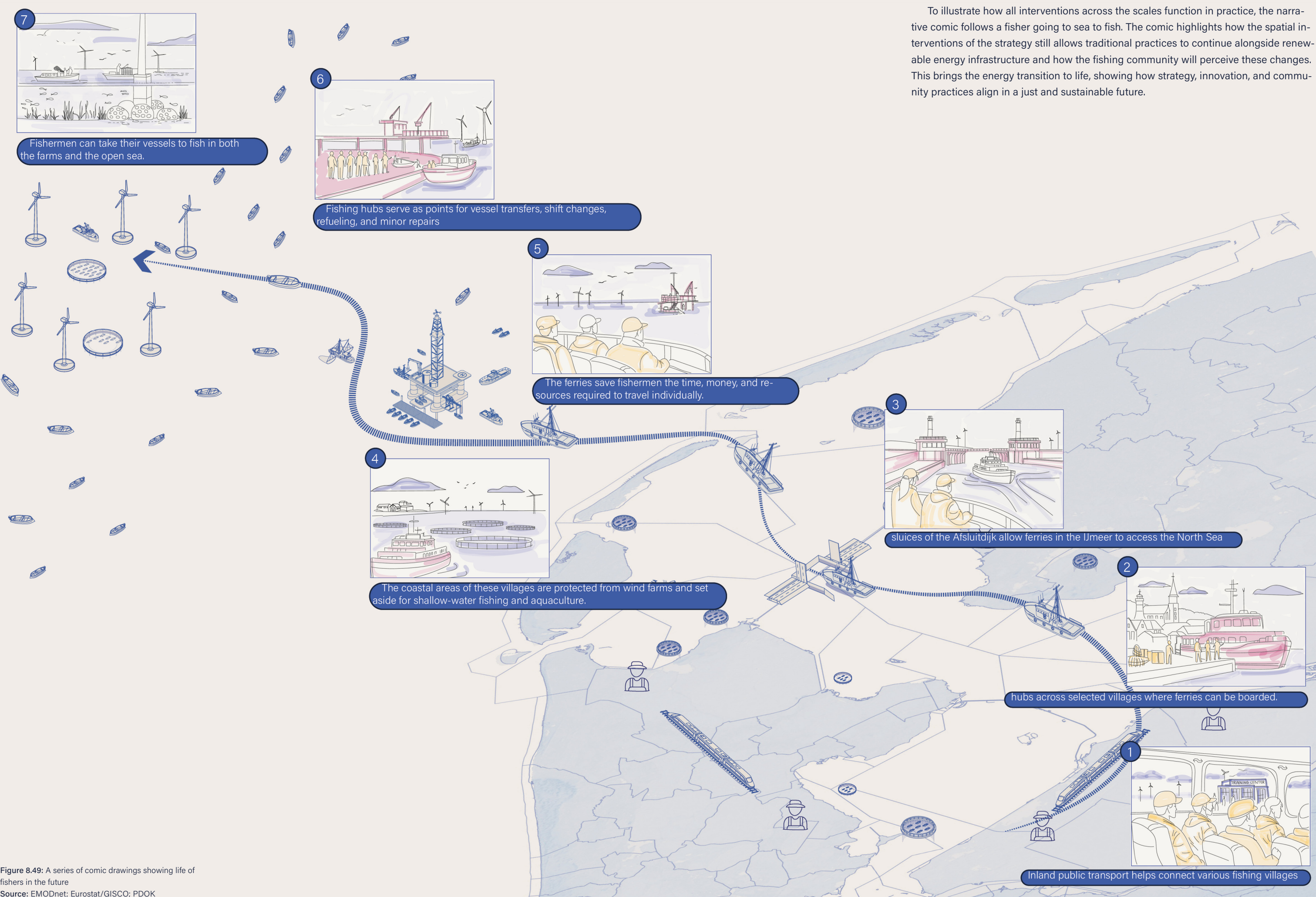


Figure 8.49: A series of comic drawings showing life of fishers in the future
Source: EMODnet; Eurostat/GISCO; PDOK

8.7.1 COMIC: A DAY IN THE LIFE OF A FISHER

To illustrate how all interventions across the scales function in practice, the narrative comic follows a fisher going to sea to fish. The comic highlights how the spatial interventions of the strategy still allows traditional practices to continue alongside renewable energy infrastructure and how the fishing community will perceive these changes. This brings the energy transition to life, showing how strategy, innovation, and community practices align in a just and sustainable future.

8.7.2 FINAL STRATEGY OVERVIEW

Through all of this, the initial research question [MRQ], of how the energy transition towards renewable energy can enable a just future for fishing communities in the Netherlands, can be answered. The project brings together the key findings into a comprehensive strategy. It tackles this challenge at regional, national, and EU scales, actively engaging diverse stakeholders and fostering collaboration between fisheries and other actors across these interconnected levels.

Centred on the IJsselmeer region, it establishes a network of inland hubs that integrate spatial planning with the social and economic fabric of local villages. These hubs not only serve as points of physical connectivity but also act as socio-economic anchors, reinforcing traditional fishing practices while opening avenues for new opportunities within the evolving maritime and energy landscape. By linking local communities to broader regional and North Sea dynamics, the project creates a framework where small-scale fishing can thrive alongside large-scale infrastructural developments.

At a larger scale, the project constructs an inclusive arena in which fishing communities actively engage with a diverse set of stakeholders including oil and gas companies, offshore wind developers, military institutions, and environmental organizations. Within this framework, each actor contributes and benefits from shared financial, infrastructural, and technological resources. This interaction is structured through a commoning system, where responsibilities, risks, and benefits are distributed proportionally according to each stakeholder’s capacities and operational strengths.

Rather than treating the North Sea as a fragmented or contested territory, the project reimagines it as a collectively governed and negotiated space. The sea becomes a platform for dialogue, where guidelines, spatial strategies, and operational protocols are continuously developed and adjusted to accommodate overlapping interests. Mechanisms of cooperation such as shared infrastructure, co-location of activities, and knowledge exchange allow stakeholders to adapt to one another while maintaining their individual objectives.

This approach not only enhances efficiency and reduces conflict but also builds long-term resilience. By fostering active interdependence, the project ensures that stakeholders are better equipped to respond to large-scale continental and global shifts in energy production, environmental regulation, and economic change. Importantly, it safeguards the livelihoods of small-scale fishing communities by embedding them within these transformations rather than displacing them.

Ultimately, the project proposes a model in which local practices and large-scale infrastructures are no longer in opposition but are integrated into a mutually reinforcing system. Through collaboration, shared governance, and adaptive use of resources, the North Sea emerges as a dynamic and resilient commons capable of supporting both sustainable energy transitions and enduring cultural and economic practices.

9 Conclusion and Evaluation

Bringing together these spatial strategies, governance models, and community-driven interventions, the project outlines a comprehensive pathway toward a more just and sustainable future. Yet the significance of this approach lies in how it response to the core challenges identified throughout the study. The following section reflects on these insights, articulating how the proposed strategy addresses the injustices of the current energy transition.

9.1 Conclusion

The Netherlands is pursuing its 2050 net-zero target through an energy strategy focused on offshore wind farms, combined with hydrogen production, making use of the North Sea's strong wind potential.

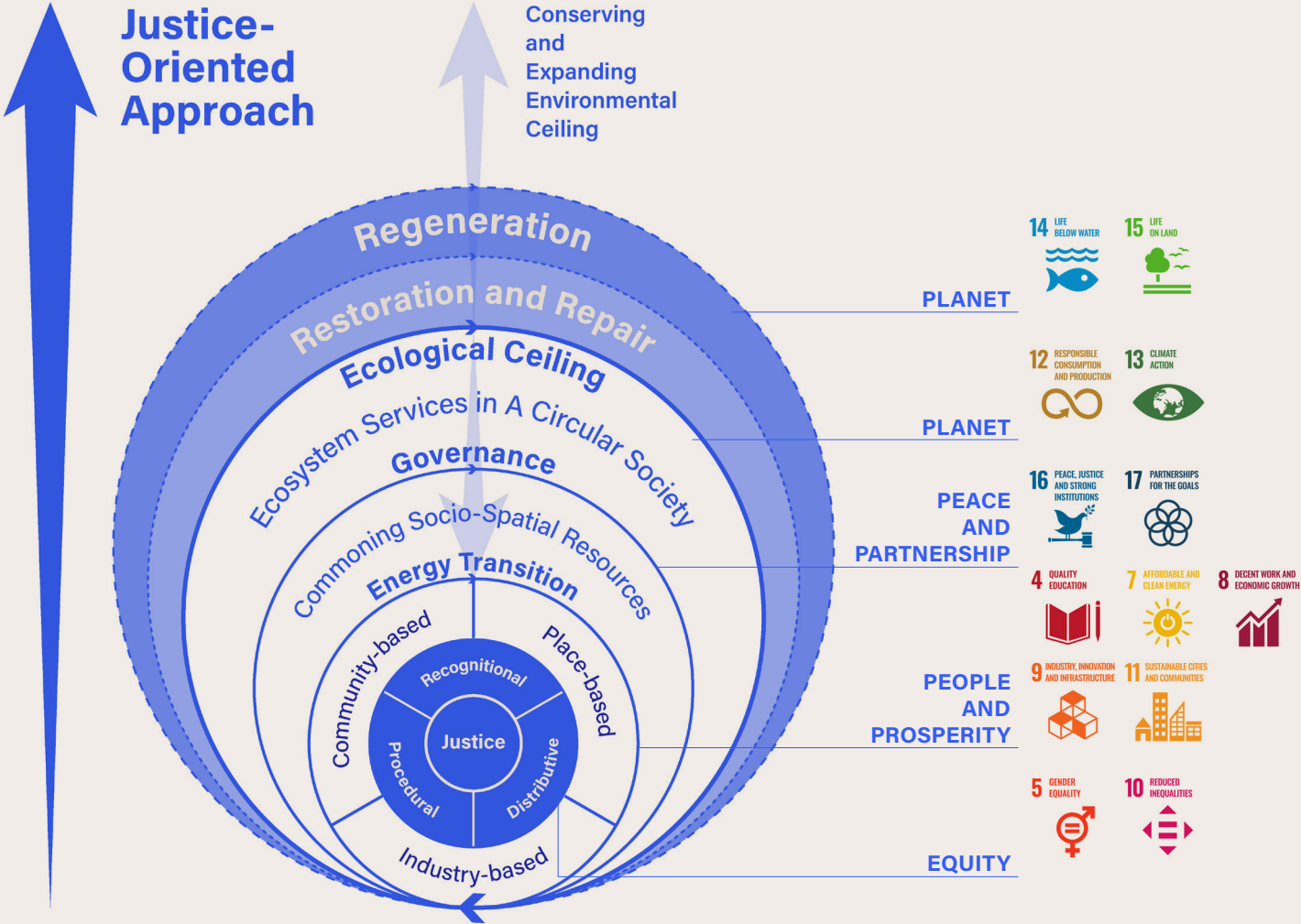
However, this strategy creates significant injustices for fishing communities across procedural, distributive, and recognitional dimensions. The already contested space of the North Sea is increasingly allocated to wind farms, limiting access to main fishing grounds, while rising fuel costs and the need for more sustainable vessels add economic pressure to fishers. This leads to an unequal distribution of burdens compared to other stakeholders such as the shipping industry, energy corporations, and the military (distributive justice).

Beyond economic impacts, fishing is not only a profession, but a way of life tied to cultural identity and tradition. These changes, therefore, threaten both livelihoods and cultural foundations (recognitional justice), while fishers often feel insufficiently included in decision-making processes, highlighting ongoing procedural injustices.

In response, this project rebalances these inequalities by integrating the perspectives and future visions of fishing communities, with input from other key stakeholders of the North Sea, into an alternative energy transition strategy. The result is a strategy through which fishing communities can continue to thrive, while remaining connected to their cultural practices and contributing to broader sustainability and transition goals.

The strategy achieves this, supported by the 5P principles of sustainable development, with equity as the core, as reflected in the conceptual framework (Goals 5 and 10). This equity-centred framework guides a just transition that extends beyond the shift to renewable energy, incorporating transitional support mechanisms, such as subsidies (Goals 7 and 8), upskilling (Goal 4), and diversified maritime industries (Goal 9). These measures preserve a strong local maritime identity while ensuring fishing communities remain capable of adapting to broader societal changes (Goal 11). Central to enabling socio-spatial transformation within an arena of conflicting interests is the introduction of a commons governance system, which fosters partnerships between actors with diverse interests across the North Sea (Goals 16 and 17). The commons framework serves as an effective governance mechanism that safeguards future development within the ecological ceiling, supported by the transition towards a circular society (Goals 12 and 13). In the long-term, the proposed framework facilitates the restoration and regeneration of ecosystems, reversing the trend of overshooting planetary boundaries (Goals 14 and 15). The project contributes to spatial justice in two ways: firstly, by recognising the needs of underrepresented fishing communities, empowering them in governance mechanisms, distributing benefits and burdens equitably; secondly, by reconnecting human and non-human beings, pursuing a conception of spatial justice that is more-than-human.

Figure 9.1: The conceptual framework aligns with Sustainable Development Goals and the 5P principles
Source: United Nations, n.d.



9.2 Societal and Scientific Relevance

In this way, the project holds both societal and scientific relevance. It highlights the perspectives of Dutch fishing communities within the energy transition, not only identifying existing challenges but also proposing an alternative pathway for the ongoing debate surrounding the IJsselmeer region and the North Sea. By integrating these perspectives with those of other North Sea stakeholders, the project further strengthens the legitimacy of its approach.

The introduction of the marine education corridor and its new mobility network along with the fishing cooperative network, advocates for an alternative plan to leverage the energy transition in the North Sea as a catalyst for diversifying economic activities and safeguarding social vitality in fishing towns. Rather than focusing on universal public goods, these interventions are tailored to the needs of particularly vulnerable groups, reflecting an ethics of care rather than a purely consequentialist approach. In this sense, the project aims to cultivate hope and encourage both practitioners and communities to explore alternative responses to the ongoing polycrisis.

Furthermore, the regional design proposals for conceptualising the North Sea as a commons and strengthening socio-economic resilience in fishing towns offer a potentially transferable model for other regions where marine spaces are contested. In the absence of large-scale reference projects for blue commons, this work explores how such systems could be approached, promoting ideas of blue degrowth through a fractal governance structure.

This approach frames the marine environment as a negotiable and regenerative commons, where interdependent relationships generate mutual benefits for both human and non-human actors. Its societal relevance, therefore, also lies in fostering co-ownership, co-management, democratic processes, and cross-border governance structures that connect stakeholders beyond geopolitical boundaries. In this sense, the bioregional approach supports the emergence of new collective identities in the North Sea region and challenges dominant nationalist narratives.

Scientifically, beyond contributing to the broader discourse on global commons, this project advances existing research by differentiating between sub-communities within fishing communities and explicitly including fisherwomen, who have often been overlooked. In doing so, it expands the empirical basis by incorporating previously neglected groups.

9.3 Limitations and Recommendations

It must be acknowledged that transforming the prevailing market-driven nation-state system toward one based on commoning extends far beyond what a single-semester design project can resolve. The application of commons principles at a global scale remains an ongoing challenge across multiple disciplines, for which satisfactory solutions have yet to be found. What this project offers, therefore, is a spatially grounded vision of how a commoning system could be structured at a larger scale. How such a system could function effectively in practice, and how nations could be brought together, negotiating sovereignty to enable a transnational framework, remains a question requiring further investigation.

Additionally, the project drew heavily on knowledge of the Netherlands and its specific plans for the energy transition and fishing communities. This knowledge was upscaled and transferred to other North Sea countries without an in-depth research of their respective socio-economic, governance, and energy transition contexts. To assess whether the proposed interventions at the North Sea scale would be viable, the methodology outlined in Chapter 2 must be applied to all nations involved in the North Sea Commons. Only then can this knowledge be meaningfully integrated and the project upscaled to the full North Sea dimension.

Furthermore, the energy systems introduced in this project remain largely centralised. Although the commons governance framework makes them more democratic, individual households continue to depend on large infrastructure projects rather than benefiting from more decentralised and individually manageable solutions. Going forward, the project should therefore be expanded to incorporate greater research into decentralised solutions. This would enrich the strategy given the project’s strong focus on wind energy and hydrogen storage, with comparatively limited attention to solar energy and other forms of decentralised energy production. Acknowledging the cross-disciplinary nature of energy transitions, further research is called for mixed-use wind farm typologies, alternative energy sources such as hydropower and biofuels, and pathways toward a more socially and ecologically just transition trajectory.

Lastly, it is important to recognise that participation is not a solution to all problems. Some of the resistance encountered in the energy transition is not just about feelings of exclusion, but is more deeply rooted. Right-wing populism is driven by a range of factors that spatial design alone cannot address. Certain challenges are embedded in institutions or structural injustices that require responses beyond design. Incorporating policy within the design process is a first step toward moving beyond purely spatial interventions. Nevertheless, future work should seek even closer collaboration with disciplines such as political science, sociology, and law, recognising the need for integrated design that drives both spatial and systemic transformation.

10.1 GROUP REFLECTION

As urban designers, during this course, we acted as representatives of smaller communities, which offered us a fresh perspective on design and challenged us to let our work reflect their vision. Choosing our community in the first week required quick decision-making, but fortunately, we quickly found common ground. This allowed us to dedicate time to understanding their wishes and needs in depth, making our vision and strategy as realistic as possible within the ten-week time frame.

Working with the fishing communities, however, proved particularly challenging due to the scale of their activities. Their work spans the fast North Sea, which contrasts with the smaller-scale environment of the IJsselmeer. Translating these large-scale operations into a spatially coherent design was a difficult but valuable exercise, forcing us to think across multiple scales while maintaining a clear interpretation of the community's vision.

Additionally, our extensive media analysis generated many ideas, making it challenging to integrate them with both the spatial scales and the narrative. This process demanded significant collaboration among the four of us, which ultimately strengthened our group work. By clearly making clear plans and a good working plan with the four of us, and then distributing the work, we made our group work stronger and fair, while giving us opportunities of learning from each other.

Despite these challenges, our design has the potential to serve as a catalyst for meaningful change, inspiring stakeholders to take action and demonstrating how thoughtful design can represent and empower community needs. Especially the commons part of our design is a new perspective that these communities might desperately need.

Figure 10.1: The group



Lize Knol

Coming into this project, I brought my background in architecture and a strong interest in smaller scale, neighbourhood focused design. I am driven by research by design, using the design process itself to explore and understand a space and the best way forward. At first, this approach clashed with my teammates way of working, they focused on the research for design, gathering information to later transform into spatial interventions. This made the projects very challenging in the beginning, as I had to navigate different methods and expectations, but overtime I found my role: integrating fast moving information into spatial design and helping translate our insights into a cohesive vision. This helped getting our narrative in order, without drowning in too much information.

Working with fishing communities, whose activities operate on a much larger scale than I am used to, pushed me to think beyond the familiar, smaller-scale frameworks I enjoy. It challenged me to consider multiple scales simultaneously and find ways to make large-scale processes spatially legible. Through this process, I became more aware of my assumptions about what "effective" design looks like and learned the important of clear storytelling, visualization, and collaboration in turning research into actionable strategies. There is not one way to design, there are multiple and connecting them in one design strengthens the final product.

Ultimately, this project reinforces my desire to work as an urbanist who combines research by design with ethical responsibility, creating solutions that are both innovative and grounded in the real needs of communities, whether at the neighbourhood scale or beyond.

Franca Luft

For me, this quarter was particularly inspiring and instructive for two reasons: one methodological, the other thematic.

I chose to study Urbanism in Delft primarily to explore how sociology and design can be brought together. This quarter allowed me to engage with this question more concretely. It was interesting to see how sociological explanatory models such as Coleman's Boat can help visualize complex problems and serve as a basis for decision-making in the design process. This raises the question of whether such models could be further developed to better represent spatial relationships, dependencies, and flows.

I also found it valuable to use media analysis not only for writing analytical texts, as I had done before, but to derive design principles and a vision for fishing communities. This process showed me that sociological tools are not only descriptive, but can also be applied in Urbanism to initiate change. At the same time, the transition from analysis to design was not always seamless. I also realized the importance of using context-sensitive sources in Urbanism, as they provide insights closer to people's lived realities. Before this quarter, I would have relied more heavily on literature reviews alone.

Additionally, both the lectures and the seminar introduced me to new methods, such as typology construction and stakeholder analysis. I found it particularly interesting that typology construction is still being explored in terms of how it can best be integrated into the design process. This not only demonstrated the productive connection between humanities and design, but also sparked my interest in adapting and experimenting with methods for Urbanism. I also appreciated being encouraged to use representation techniques beyond traditional maps, highlighting the importance of choosing formats that best communicate specific content.

The group work was especially valuable for understanding the complexity of regional dynamics. Continuous discussion and exchange allowed for the integration of multiple perspectives. This showed me that collaborative work can be more dynamic and insightful than individual work, as it exposes you to different approaches and ways of thinking. I would describe my role as primarily conceptual and theoretical, often questioning ideas to encourage deeper engagement. At times, this made it challenging to balance research and design. However, roles within the group were fluid, and depending on the project phase, we shifted between conceptual and more drawing-oriented contributions.

Overall, this quarter reinforced my interest in methodological questions and in participatory design that goes beyond tokenism. It strengthened my conviction that good design is closely tied to research and communities, rather than individual designers' beliefs. It also showed me how participatory approaches can contribute to greater equity, reinforcing my interest in social sustainability and the design of just spaces.

Sanyukta Raul

Personally, this quarter has been the most enriching one so far in my journey at BK. Although the scale of the project initially felt daunting being something I had never tackled before, the structure of the course allowed me to gradually ease into the process and develop a clearer approach to the study.

Working collaboratively also played a significant role in shaping my experience. It gave me the flexibility to occasionally step back and focus more deeply on research when needed, something that was only possible because of my incredibly dedicated and supportive team. The diversity within our group enabled us to approach the project not just from a regional design perspective, but also through a broader social lens, acknowledging the multiple forces that shape such landscapes.

The topic we explored “fisheries in the North Sea” revealed to me how sustainability is interpreted and implemented differently across stakeholders, and how its benefits and burdens are unevenly distributed. This raised important questions about justice and equity within large-scale transitions, particularly whether the cost of achieving the “greater good” should disproportionately fall on smaller, directly affected communities.

In terms of personal learning, I discovered a strong inclination toward the role of the researcher, engaging with topics that run parallel to design and inform decision-making in meaningful ways. This is why I especially appreciated being introduced to the DUST project, where I found it fascinating to understand how public participation and discourse are actively integrated into design processes. Similarly, the emphasis on media analysis throughout the quarter was particularly valuable, as it helped shape our research questions and design strategies in a grounded and responsive way.

Ultimately, this experience has reinforced my belief that design should not be driven solely by the vision of the designer, but should instead be informed by and accountable to the people it affects. For me, the most meaningful and satisfying projects are those that engage with public perspectives, embrace complexity, and strive toward more inclusive and equitable futures.

Osbert Leung

This quarter has been an intensive yet inspiring journey. It made me realise my role as an advocacy urbanist in counteracting the increasingly prominent technocratic approach towards socio-spatial problems. When I first encountered energy transition at the beginning of the quarter, I assumed it was solely about technological solutions to climate change, and my role would be predominantly planning spaces for energy infrastructure. Through lectures and studio sessions, I was gradually exposed to the complexity of energy transition. Using fishing communities as our entry point, I realised how benefits and burdens can be distributed disproportionately. This motivated me to envision an alternative future with these communities and to utilise this project as a means of challenging the dominant energy transition discourse. I believe there is always room for us, as urbanists, to intervene and leverage our agency to foster alternative spatial imaginaries.

I enjoyed my role as a critical thinker in challenging taken-for-granted concepts through interdisciplinary and critical lenses. My interest in socio-spatial justice steered our project towards a justice-oriented approach. From the selection of the transition community to the design of engagement strategies, justice played a leading role in deciding how benefits and burdens are distributed and who needs more power. However, I also noticed my blind spots as a cisgender young man. When we were exploring our subcommunities, I did not realise our understanding of fishing communities tends to be male-oriented. It was only when Franca pointed out that fisherwomen are an even more underrepresented and neglected group in energy discourse that I realised how my own positionality could make me insensitive to the overlooked roles of women in fishing communities. That was an aha moment, when I realised our discussion had been guided by fishermen's perspectives, and neglected the ‘less vocal’ fisherwomen who support fishermen behind the scenes. Moving forward, I should be more aware of my positionality and actively draw on frameworks such as intersectionality and pluriverse to critically reflect on the assumptions I may otherwise take for granted.

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III Appendix

1. SOLAR

Solar energy plays an increasingly important role in the Netherlands' energy transition (figure 3.1 and 3.2), driven by rapid technological development and declining costs (Solar Energy International, n.d.). Photovoltaic (PV) systems are widely deployed across the country, ranging from small-scale rooftop installations to large-scale solar parks (Ministerie van Algemene Zaken, 2024). As a relatively flexible and modular energy source, solar energy can be integrated into both urban and rural environments. In recent years, national support schemes have accelerated deployment, with large-scale ground-mounted, rooftop, and floating solar projects collectively adding significant capacity to the system (Ministerie van Economische Zaken en Klimaat et al., 2026).

The spatial impact of solar energy is particularly visible on land. Larger solar parks require significant surface area and are often located on agricultural land, former industrial sites or along infrastructure corridors such as highways and railways (Solar Energy International, n.d.). At the same time, rooftop solar installations make use of existing built surfaces, reducing the need for additional land while contributing to decentralized energy production.

Solar energy production in the Netherlands is highly dependent on seasonal and daily weather patterns, leading to fluctuations in output. Despite this variability, the Netherlands ranked highest worldwide in solar energy production per resident in 2023 (Solar Energy International, n.d.). These fluctuations, however, do require careful integration into the energy system, including storage solutions and coordination with other energy sources, to be a reliable source of energy throughout the year.

At the same time, new pilot projects are exploring how solar energy can be deployed beyond traditional land-based systems. Floating solar farms on inland water bodies are already being scaled up, such as the large Skûlenboarch project in Friesland (GroenLeven, 2026), which shows the potential for solar energy on water. Offshore, experimental projects are testing solar arrays within wind farms, such as the Hollandse Kust Noord pilot (Oceans of Energy, 2025), where floating solar is combined with offshore wind energy. These hybrid systems represent a new energy generation with layers of energy in the same spatial footprint.



Figure A.1: Solar field
Source: Freepik

Hollandse Kust Noord pilot (Oceans of Energy, 2025):
The first and largest offshore solar farm within an offshore wind farms to be installed, is done by Crosswind, a venture consisting of Eneco and Shell in the North Sea. The project will consist of 1500 solar panels, in a water depth of 25 meter, making use of the space taken in by the offshore wind farm, for an efficient combining of sea space. The commission of the project is to be expected in the end of 2025.

Skûlenboarch project (GroenLeven, 2026):
A large inland floating solar park, located on the sand quarry Skûlenboarch, will be realized in 2026 initiated by Groen Leven. The solar park will be around 35 hectares, generating 46 megawatts, contributing to the livability of the surrounding villages, around 16.500 households. The local ownership by an energy cooperation and the municipality of Tytsjerksteradiel, makes sure the energy will be dedicated to local distribution and usage.

2. BIOMASS

Biomass energy plays a complementary role in the Netherlands energy transition, offering a renewable alternative to fossil fuels by converting organic materials into usable energy (Rijksdienst van Ondernemend Nederland, n.d.-a). Biomass includes a wide range of feedstocks such as agricultural residues, wood, organic waste, and industrial byproducts (Energy.nl – TNO, 2024). Through processes such as combustion, gasification, and anaerobic digestion, these materials are converted into heat, electricity, or biofuels (Energy.nl – TNO, 2024). In the Dutch context, biomass is used across multiple scales, from industrial energy generation to localised waste to energy systems (Rijksdienst van Ondernemend Nederland, n.d.-a).

The spatial characteristics of biomass energy differ from wind and solar, as its spatial structure is often closely linked to existing industrial and agricultural systems. Facilities are typically located near sources of organic material, such as ports, agricultural areas, or waste processing sites, in order to reduce transportation distances and increase efficiency (Jayarathna et al., 2020). This results in a more distributed network of installations embedded within productive landscapes

A key advantage of biomass is its ability to provide energy on demand, making it a valuable component in balancing the energy system. Increasingly, innovations focus on utilising residual waste streams rather than dedicated crops. One emerging development is the conversion of fish processing waste into biofuels and biogas. Fish waste, including oils, fats, and organic residues, can be processed through anaerobic digestion or other refining techniques to produce renewable fuels (Jaiswal et al., 2024). This type of biomass is particularly suitable for fuel production due to its high lipid (fat) content, and high organic content, which can be efficiently converted into biodiesel or biogas (Jaiswal et al., 2024). Projects in the Netherlands and northern Europe are exploring how residues from the fish and aquaculture industries can be integrated into circular energy systems, reducing waste while generating energy (European Commission, 2020).

These developments are particularly relevant for sectors that are difficult to electrify, such as maritime transport. In the Netherlands, biofuels are increasingly being tested as alternatives to conventional marine fuels, especially in inland and short sea shipping. For example pilot projects in the port of Rotterdam are exploring the use of biofuels created from waste streams, including animal and fish residues, to reduce emissions in existing vessel fleets (GoodFuels, n.d.). Also in the UK the SALMO is set up to use a circular waste system of fish processing waste, as a sustainable fuel for maritime activities (Bioenergy International, 2020). These applications highlight how biomass-based fuels can provide a near-term solution for reducing carbon emissions in transport.



Figure A.2: Bio-fuel production site
Source: Freepik

SALMO project (Bioenergy international, 2020):
SALMO is a pilot project that converts fish processing waste into marine biofuel, led by Green Fuels Research Ltd in collaboration with Cardiff University and London South Bank University. The project was launched in 2021, with the focus of transforming salmon farming residues, like fish heads, guts and processing leftovers, into sustainable drop-in fuel for diesel marine engines.

3.WIND ENERGY

Wind energy is a key pillar of the Netherlands renewable strategy, providing large scale electricity across onshore, inland- and offshore installations. Wind turbines converted the kinetic energy of wind into electrical power, feeding the grid and supporting both residential and industrial energy needs (a more in detail explanation is added on the next page). In the Netherlands, wind energy is deployed in a variety of contexts, from large offshore farms in the North Sea to onshore installations and significant inland water the developments suggest those on the IJsselmeer (CBS, 2022).

The spatial characteristics of wind energy differ from solar and bio mass, as turbines require extensive physical spacing to capture wind sufficiently and avoid wake losses. In utility-scale wind farms, turbine layout studies regularly use spacing expressed as multiples of the rotor diameter (for example three to 10 times the rotor diameter) to reduce wake losses and improve downstream performance, since turbines operating too closely experience reduced wind speeds and turbulence from each other (Son, 2014). Larger offshore and inland water farms often adopt even more generous distances to optimize capture and minimize interference between turbines, resulting in wind farm that cover large surface areas when considering turban spacing, access infrastructure, and exclusion zones (Son, 2014).

Large wind installations also need buffer zones, access roads, substations, and connection corridors to transmission infrastructure, extending their spatial footprints beyond just turbine locations. In inland water such as the IJsselmeer, wind farms occupy extensive shallow areas, often spending dozens of square kilometres, where turbine spacing and navigation corridors interfere with fishing and recreational zones (Wind-park Fryslân, n.d.).

Innovations in turbine design, floating offshore platforms and hybrid systems, that combine wind with solar or hydrogen production, are expanding both the efficiency and spatial flexibility of wind installations (Rijksdienst van Ondernemend Nederland & Ministerie van Buitenlandse Zaken, 2026). For example the Hollandse Kust Noord offshore wind farm, operational since 2023, is a large innovator and research location for wind innovation on the North Sea. Pilot projects about mix-use windfarms in combination with solar energy have for example already been introduced here. Besides combining energy productions sites research is also done for floating offshore windfarms, to make wind energy production a possibility in less shallow waters, although this is still a very new innovation. A pilot project in the Taiwan Strait (part of the sea between Taiwan and China) is being commissioned to build an offshore floating wind farm off the coast of Taiwan (Rui Li 1 Floating Offshore Wind, 2024), one of the first offshore floating developments.

Together, these projects show how wind energy infrastructure in the Netherlands and across the world is evolving across diverse spatial environments, from lands to inland waters to offshore seas, shaping energy landscapes that are both technical optimised and territorially integrated.

Windpark Fryslân project (Windpark Fryslân, n.d.):
Windpark Fryslân is the Largest inland water wind farms in the world, located in the Friesland part of the IJsselmeer. The park closest out of 89 turbines, with a total electricity production capacity of approximately 1.5 terawatt-hours (TWh) per year. The park has been operational since 2021, powering 500.000 households. The turbines are arranged in a hexagonal cluster layout with about 600 metres between turbines to optimise wind capture while maintaining sightlines.

The Hollandse Kurst Noord project (Crosswind Hollandse Kust Noord, n.d.):
This project is located at around 18,5 km away from the Dutch coast from the height of Egmond aan Zee, consisting out of 69 wind turbines that are each 1 km away from each other. Originally in 2020 where 100 wind turbines planned, but with better and more powerful equipment knew Cross Wind create the same amount of power with only 69 turbines. Creating a high efficient farm, with low costs and limited impact on the ecosystem.

Rui Li 1 project (Rui Li 1 Floating Offshore Wind, 2024):
Rui Li 1 is a floating offshore wind project in Hsinchu County, Taiwan, planned to install 12 turbine, responsible for 833 GWh electricity per year. The wind farm will be located 21 km offshore in water depths of 70-95 m, now possible because of new floating wind farms techniques. Ru Li 1 seeks to demonstrate the feasibility of deepwater wind technology and stimulate new sector development.

- Key characteristics of wind energy**
- Wind speed increases with height, which is why modern wind turbines are built increasingly taller to access stronger and more consistent winds.
 - Most large scale wind turbines are upper wind turbines, meaning they face into the winds to maximise efficiency and reduce turbulence on the blades.
 - Offshore wind turbines can be more efficient than onshore ones due to stronger and more stable wind conditions at sea.

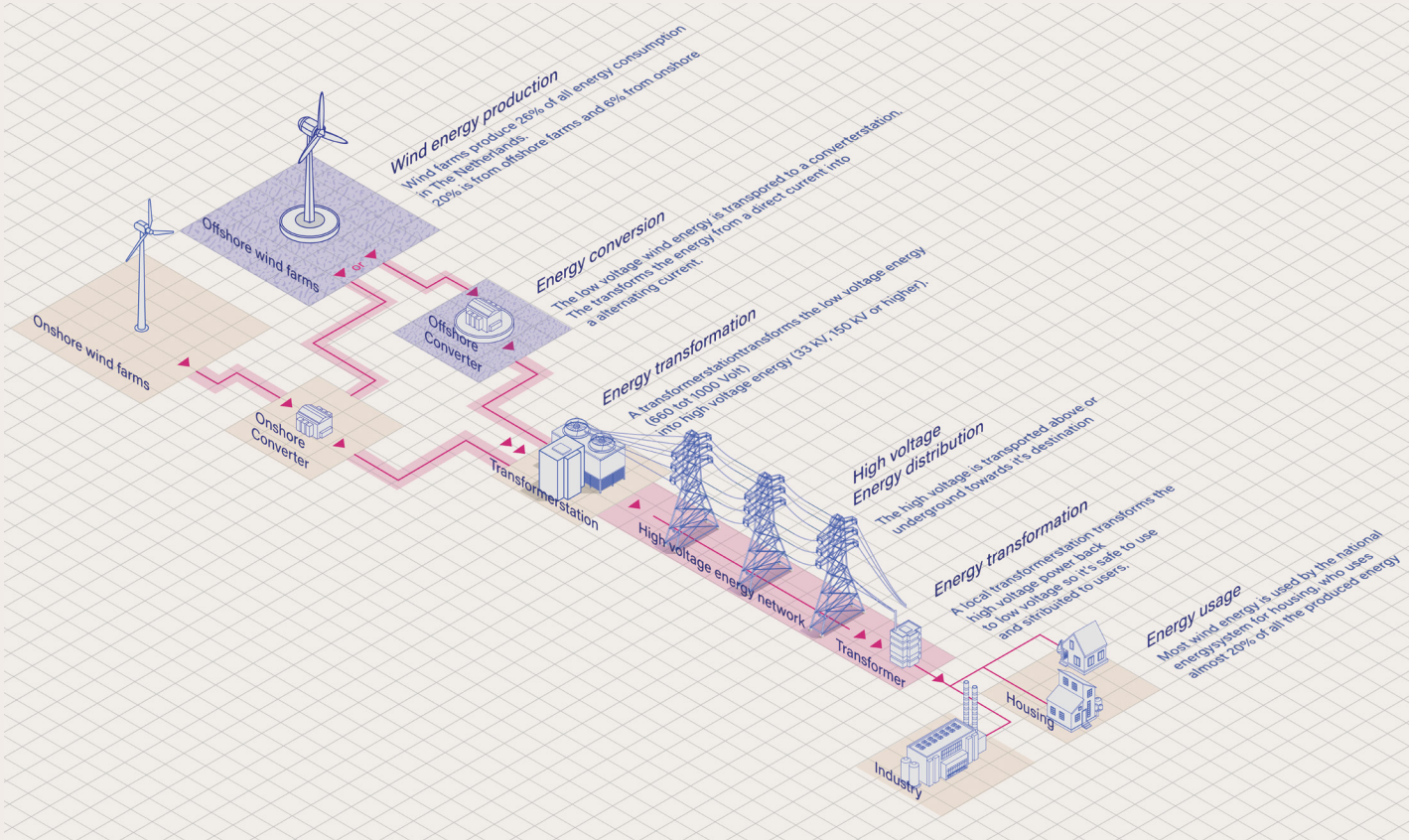


Figure A.3: Explanatory axonometric of wind energy production tuned into electricity, flow.
Source: Freepik, Rijksdienst van Ondernemend Nederland & Ministerie van buitenlandse zaken (n.d.-b)

The specifics of Wind Energy Production (figure 3.7)

Wind energy harnesses the kinetic energy of moving air and converts it into electricity. In modern wind turbines, wind rotates the rotor blades, which transformed the kinetic energy into rotational energy. This energy is transferred through a shaft to a generator, producing electrical energy that initially comes out as low-voltage direct current (DC).

Each turbine is connected via underground or seabed cables, which may carry energy from multiple turbines towards the wider energy system. Low-voltage DC is first sent to and converter station, located either on land or offshore depending on the wind farm. Here, the direct current is converted into alternating currents (AC), this form of electricity is used in Dutch homes and businesses.

From the converter station, the AC is transported to a substation with a transformer, which increases the voltage from low levels (typically 660-1000 V) too high voltage (33 kV, 150 kV, or higher). High-voltage transmission reduces energy losses, keeping cables cooler and enabling efficient transport over long distances.

Finally, the high-voltages electricity travels through the national grid, via overhead lines and underground cables, to reach its destination. Local transformers then reduced the electricity back to standard levels (230/400 V) before it enters and will be used in homes, officers, and industries.

(Rijksdienst van Ondernemend Nederland & Ministerie van Buitenlandse Zaken, n.d.).



Figure A.4: Wind farm Fryslan windturbines

4. HYDROGEN

Hydrogen is emerging as a key energy carrier in the Netherlands’ transition to a low carbon energy system, particularly for sectors that are difficult to electrify. Unlike wind or solar energy, hydrogen is not a primary energy source but a second energy carrier, meaning it must be produced using other forms of energy (International Energy Agency, n.d.). The most sustainable form, green hydrogen, it’s produced through electrolysis, a process in which electricity from renewable sources splits water into hydrogen and oxygen, during which electrons come free that produce electricity (Detz et al., 2020).

The spatial characteristics of hydrogen differ from other renewable energy systems, as its infrastructure is closely tied to existing industrial clusters, ports, and energy networks. Electrolyzers are often located In areas where renewable electricity is readily available or where energy demands is concentrated, as the special alignment between production and consumption plays a key role in the efficiency of the hydrogen system (Wolf, 2023). Locating hydrogen production close to renewable energy sources can reduce growth pressure and support system integration while proximity to demand centres minimise transport needs (Wolf, 2023). This results in a network of production, storage, and distribution facilities embedded within accessing energy and industrial landscapes.

A key advantage of hydrogen is its ability to store energy over longer periods, helping to balance fluctuations in renewable energy supply. When there is a surplus of wind or solar energy, this electricity can be converted into hydrogen and stored for later use (Detz et al., 2020). Hydrogen can be transported via pipelines, ships, or trucks and used for electricity generation, industrial processes, or as a fuel.

Innovations in hydrogens are increasingly focused on integrating production directly with other energy infrastructure. For example electrolyzer is located near wind farms, whether on land or offshore, like the Duwaal project in North Holland, can convert electricity from turbines immediately into hydrogen, minimising energy losses and supporting grid stability (Roland Berger, 2022). By linking hydrogen production to wind energy, the Netherlands is developing a system in which renewable electricity, storage, and end-used amounts are closely coordinated.



Figure A.5: Hydrogen infrastructure
Source: Freepik



The Duwaal project (Hydro, n.d.):
Duwaal is a Dutch green hydrogen initiative in Noord Holland, that integrates wind energy with hydrogen production, storage, distribution and refuelling on site. The core of the project focuses on combining the electrolyzer directly in our close to a wind turbine, to directly convert electricity into green hydrogen. Duwaal aims to demonstrate an efficient, scalable hydrogen chain as groundwork for a regional network of hydrogen fuelling and transport infrastructure.

5. CONNECTED INFRASTRUCTURE

The Dutch energy transition is increasingly shaped by the spatial interaction between production sites, infrastructure, and energy users (Ministerie van Algemene Zaken, 2024; Jayarathna et al., 2020). Rather than functioning as isolated systems, renewable energy technologies are embedded within a network that connects landscapes, seascapes, and urban environments. Both onshore and offshore windfarms and solar parks are linked through a shared infrastructure that distributes energy across the country (Rijksdienst van Ondernemend Nederland, n.d.-b).

As illustrated in the complete energy distribution flow axonometric, energy flows through a sequences of cables, converter station and transformer stations, forming a layered network that connects dispersed production locations to areas of demand (Rijksdienst van Ondernemend Nederland, n.d.-b). This network is physically visible in the landscape through underground cables, offshore connections, and high voltage transmission lines that structure the territory. The national high- voltage grid plays a central role in this system, acting as a backbone that links offshore zones, rural productions areas and urban and industrial regions (CBS, 2022).

To balance fluctuations in renewable energy supply, this network is increasingly extended with systems for storage and energy conversion, linking moments of production to moments of demand (Detz et al., 2020). Storage solution and energy conversion processes therefore reshape the landscape by introducing new facilities such as electrolyzers, storage sites, and energy hubs (Wolf, 2023). Together with the grid infrastructure, they form a distributed yet interconnected system, resulting in a multi-layered energy landscape, in which land, water and infrastructure are interwoven.



Figure A.6: High voltage pylon
Source: Freepik

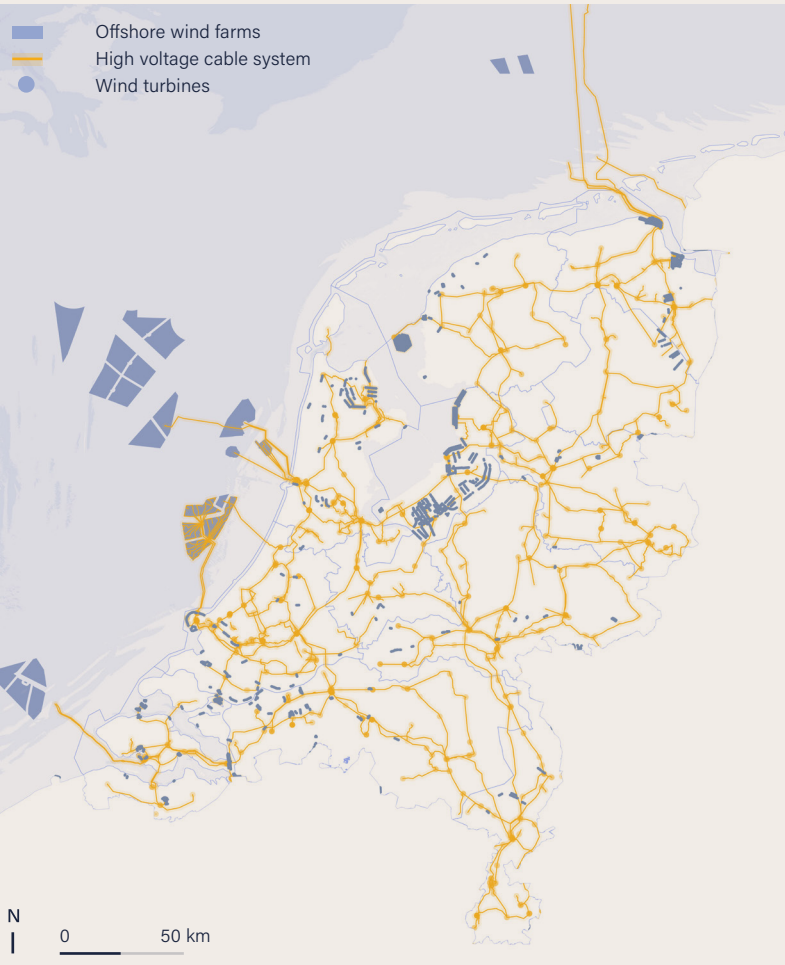


Figure A.7: High voltage system of the Netherlands
Source: EMODnet, Eurostat/GISCO, PDOK, Course Material AR2U086

NEWSPAPER	Kind of newspaper	Number of articles used
nrc.nl	National	2
Algemeen Dagblad	National	3
De Volkskrant	National	3
IJmouder Courant	Regional	3
Noordhollands Dagblad	Regional	2
De Telegraaf	National	2
De Verdieping Trouw	National	4
Reformatorisch Dagblad	National	1
Provincial Zeeland Courant	Regional	1
BN/DeStem	Regional	1
Haarlems Dagblad	Regional	1
De Stentor	National	3
FACEBOOK GROUPS		2
Nederlandse Visserbond		
EMK-visser		
STUDY ABOUT FISHING COMMUNITIES AND WIND PARKS		4
		33 Sources

Category	Quotes
LOSS OF ECONOMIC FEASIBILITY FISHING	
LOSS OF FISHING GROUNDS DUE TO WIND PARKS WITH ACCESS PROHIBITIONS:	“The North Sea off the Walcheren coast used to be one of the better spots for sole fishing. That was, because when 173 wind turbines were built, a large part of the area was closed off. As a fisherman, you can get angry or depressed about it.” (Wisse, 2024) “Wind turbines are far from the only problem facing the fishing industry— alongside Brexit, high fuel prices, or the closure of nature reserves—but they are the most hated. In the coming decades, when their children should normally be taking over, fishermen will lose much of their fishing grounds to wind farms.” (Witteman, 2023) “In that scenario, up to 26 percent of the Dutch North Sea would be lost to fishing due to wind farms.” (Witteman, 2023) “Dutch and foreign fishermen are also facing challenges elsewhere in the North Sea. In April, all North Sea countries signed an agreement aimed at making the North Sea Europe’s „largest power plant.“ Following the European Commission’s Green Deal, the nine countries aim to harvest 300 gigawatt’s of offshore wind energy by 2050, equivalent to approximately 21,000 turbines.” (Witteman, 2023) “First came the oil rigs, each with a 500-meter safety zone. Then came the tangle of traffic separation schemes, the „highways of the sea“ for the large container ships that now transport 90 percent of our goods, from cars, jeans, and laptops to pineapples in the winter and farmed fish from Vietnam. „We’re only allowed to fish in the lane, not against shipping traffic,” says Van der Vis. „And crossing a highway like that is only allowed at a 90-degree angle.“ Even crossing at a slight angle, because their stubborn prey swims at about a 70-degree angle, can result in a fine. „Even if there’s no freighter nearby.“ Besides container ships and now 160 drilling plat-forms, fishermen also compete with the Ministry of Defence, which uses 7 percent of the water for military exercises. They also compete with sand extraction for coastal defense and raising the level of new homes. While the North Sea continues to industrialize, other areas are being closed to „protect the quality of the ecosystem.“ This is the motto of the North Sea Agreement, which the government concluded with the energy sector and envi-ronmental organizations in 2020. It stipulates that by 2030, 15 percent of the sea must be off-limits to „bottom-disturbing fishing,” such as flatfish and shrimp trawlers, which use beam trawls (also known as trawls) to trawl the seabed. The European Union also recently reached an agreement on the Nature Restoration Act, intended to protect nature on land and at sea. Eighty percent of European nature is reportedly in poor condition. Countries must therefore repair 30 percent of this damage by 2030, 60 percent by 2040, and 90 percent by 2050. It is highly likely that this nature restoration will result in even more North Sea areas becoming closed to fishing. And then there’s Brexit. Before Brexit, Dutch fishermen caught 23 percent of their plaice and 29 percent of their sole in British waters. Between 2021 and 2026, European fishermen will gradually transfer a quarter of their fish-ing rights in British waters to their British counterparts. From 2026 onward, when London and Brussels resume negotiations, they will likely lose even more. To make matters worse, Norwegian waters have also been closed since last year. „If this is the North Sea,” says ship captain Fup Krijnen, running his hands, as big as oven mitts, over the cabin table, „then we’re left with only a tiny piece.“ The 83-year-old co-owner of the TX-19 circles an area smaller than the coffee ring under his mug. „We fishermen are the oldest users of the North Sea, yet we’re being kicked out everywhere!“ (Witteman, 2023) “Fishermen are watching with dismay as more and more newcomers encroach on their fishing grounds. Wind farms, protected nature reserves, and shipping lanes are creating ever-shrinking fishing grounds. Fishermen fear that their prime fishing grounds will soon be filled with wind turbines, making it impossible for them to work.” (Giele, 2021) “Look, we’re not allowed here anymore.” Aboard his trawler on the IJsselmeer , shrimp fisherman Johan Daalder (41) points out dozens of orange dots on a radar screen. „These are all wind turbines. We have to stay five hundred meters away. So, what’s left for us then?“ (Basir, 2021) “Fuel, however, is the single largest expense for fishermen. A bank survey of over a hundred fishermen shows that over 30 percent expect to face liquidity problems next year. (deVolkskrant, 2022) “Since Brexit, which led to the United Kingdom leaving the European Union in 2020, strict quotas have been in place. As a result, European cutter fishermen are allowed to catch less fish from British waters. (deVolksk-rant, 2022) “Even in the remaining areas, fishermen faced fierce competition. The bank counted 155 oil and gas drilling platforms in the North Sea.” (deVolkskrant, 2022) “We’re going to lose fishing grounds again. This is a huge area that’s being withdrawn from fishing,” says Derk Jan Berens, secretary of the Dutch Fishermen’s Association. (Vogels, 2022)
HIGHER FUEL PRICES:	“The price of the diesel fuel ignited in their engines often makes the difference between profit and loss.” (Witteman, 2023) “Due to the ban [of pulse fishing] and high diesel prices, fishing is often barely profitable. „With the pulse, we needed much less horsepower,” says Fup Krijnen. „Earlier this year, we paid €1.10 per litre of fuel. While we use 40 tons of diesel per trip. You have to catch a lot of fish to make it through that.”” (Witteman, 2023) “Dutch cutter fishermen have been idle for months, as high fuel prices have made it financially impossible to sail. This week, the sector is sending its third urgent letter to the cabinet. Despite approval from Brussels, the cabinet is refusing fuel compensation. „I’m quitting for good; it’s pointless.”” (DeTelegraaf, 2022) “If I want to continue, I have to invest €1.5 to €2 million in the cutter. That’s pointless, especially with current fuel prices and the government’s refusal to provide compensation for the expensive diesel. Every week you sail, you have to pay €10,000 anyway.”” (DeTelegraaf, 2022) “Despite the European Commission’s approval, Dutch fishermen haven’t received a cent. Dutch Minister of Agriculture Henk Staghouwer (Christian Union) is tightening his belt, and since March, between 40% and 60% of the nearly one hundred cutter vessels have been moored at the quay. Their owners simply can’t afford to go out to sea. A week at sea costs a fisherman between €25,000 and €30,000 in diesel, while the catch yields a maximum of €15,000, according to calculations by fishing industry organizations. „If there is no support, many fishermen will go bankrupt,” says Jacob van Urk, chairman of the PO Urk/VisNed interest group.” (DeTelegraaf, 2022)

Category	Quotes
LOSS OF ECONOMIC FEASIBILITY FISHING	
HIGHER FUEL PRICES:	“However, fish auction director Visser openly questions whether the fuel compensation will benefit the sector. „It'll keep us going for three to four weeks, and who guarantees that fuel prices will drop, and when they will drop?“ (DeTelegraaf, 2022)
CATCH DISPLACEMENT:	““The frustrating thing is that fishermen have repeatedly urged the government not to build wind turbines in our prime fishing grounds,” says Marco Drijver. To no avail. So far, wind turbine manufacturers have only been able to install their turbines in shallow areas of the North Sea, precisely where sole and plaice thrive. „Wind farms are constantly being built in the places where we fish the most.“ (Witteman, 2023)
INCREASED COMPETITION:	“As fishermen , we have to anticipate catches and have the opportunity to visit different fishing grounds. If you lose more fishing grounds to wind farms and nature reserves, then we have to work with more fishermen on shrinking fishing grounds.” (Basir, 2021)
OPERATIONAL AND NAVIGATIONAL COSTS:	Wind farms act as physical barriers, often forcing vessels to take longer routes to reach fishing grounds, which increases travel time and fuel costs. Also losing operational flexibility required to move gear during wind farm maintenance activities: „The fishing industry representative stated that fishermen usually track and follow the fish, and the wind farms acts like a wall that they have to go round.“ (van Hoey et al., 2021)
INSURANCE AND LIABILITY:	It is difficult and expensive to insure fishing activities inside OWFs because of the potential for catastrophic financial liability if a vessel damages a sub-sea cable: „Wind farm developers also pointed out that the space between the turbines does not belong to the developer. There is no fence around a wind farm. As such, if you can show that multi-use would lead to benefits, it is possible to have other activities inside OWFs. In terms of insurance, fishing in OWFs is risky, and it is very difficult to insure against these risks. Damage to a cable, for example, is very expensive. Compensation for fisheries is dealt with in the Noordzeeakkoord (NL), which includes a transition fund that is partly meant to help fisheries become more sustainable or use sustainable techniques. Although the fisheries sector did not sign the Noordzeeakkoord in the end, these compensation measures are still in place.“ (van Hoey et al., 2021)
LACK OF MULTI-USE DESIGN:	Most current OWFs were designed solely for energy production. This results in turbine spacing and cable layouts that make the installation and operation of commercial-scale aquaculture systems technically difficult or economically unfeasible: „The key principles and success criteria in managing stakeholders of a wind farm provided by aquaculture stakeholders is that all activities need to be managed in a suitable and optimal way to ensure coexistence. There should be transparency and clear communication of legislative requirements. OWFs should therefore be designed for a multi-use setting. For example, cables should be laid in a way that ensures potential co-use. Some respondents stated that, because wind farm owners are given licences first, all other potential users of that area are risk bearers. The question is, can all these actors take those risks? Respondents thought that governments have prioritized wind energy over (sustainable and healthy future) food, so wind farms are all designed solely for wind energy production. Wind turbines are close to each other and cables are all over the seafloor. This makes aquaculture very difficult. Other users also need anchorage places. These kinds of conditions were not discussed when the wind farms were designed. Some stated that the aquaculture sector was not heard or consulted even though the OWFs are meant for co-use while others stated that they were not consulted since the nearest OWF to any aquaculture site is greater than 100km.“ (van Hoey et al., 2021)
NEW REGULATIONS ON FISHING TECHNIQUES AND EQUIPMENT:	“The frustrating thing for fishermen is that there was a fishing technique that even Greenpeace could accept: pulse fishing, where electric shocks of up to 15 volts drove the fish into the net. Tickler chains were no longer necessary. Pulse fishing resulted in 20 percent less bottom disturbance and halved the bycatch. It also resulted in a 45 percent fuel saving, as far fewer heavy nets had to be dragged across the seabed. A godsend for fishermen, for whom the element of fire—in the form of the combustion engines in their trawlers—is paramount. The price of the diesel fuel ignited in their engines often makes the difference between profit and loss. [...] In 2019, however, the European Parliament banned pulse fishing after the Dutch government lost a lobbying battle to France. French fishermen felt threatened by their rivals in the Netherlands, where the government, it later emerged, had secretly granted far more fishermen pulse fishing permits than had been agreed upon in the European Union.“ (Witteman, 2023)
DISPLACEMENT OF FISH FROM CURRENT FISHING SIDES:	“You're going to turn a nature reserve into an industrial area.” The fishermen want to know what effect this will have on marine life. „The ocean currents are changing. That could prevent fish larvae from swimming with the current to their feeding grounds. And we don't know what effect the vibrations from the wind turbines have on marine life. And that needs to be investigated first, says Berens. „The mood now is: put them up as quickly as possible. I'm afraid we'll regret it in a few years.“ (Vogels, 2022)
PLEASURE BOATING	““While,” grumbles Kraak from Den Helder, „no problem is made when colossal ships come to or from Rotterdam. Those ships that are just for fun. They're much more environmentally unfriendly than the entire fishing industry. But we have to comply with one rule after another. It's becoming increasingly impossible for us to do our work.“ (Vink, 2021)

Category	Quotes
LOSS OF ECONOMIC FEASIBILITY FISHING	
THREAT FROM ENVIRONMENTAL AGENCIES:	“Environmental organizations and political parties like GreenLeft, the Party for the Animals (PvdD), and Democrats 66 (D66) have been creating the impression for years that fishermen are destroying the entire North Sea ecosystem.” They’re exaggerated, dramatic stories, if you ask them. A banner reads, „With the Greens in power, a fishing ban is in effect.” (Vink, 2021)
LOSS OF PROFESSION AS A WHOLE	“The demolition is a result of the „restructuring scheme,” an EU-funded subsidy for „entrepreneurs who no longer see a future in the fishing industry.” „Normally, we scrap one, or at most two, fishing vessels per year,” says Steenhuis. „38 this year.” Next to him on the quay are cutters from Urk, Katwijk, and Tholen, ready to be cut to pieces.” (Witteman, 2023) “In the late 1980s, when Texel fishermen still saw a future, the harbour of Oudeschild boasted at least fifty large fishing vessels, moored three deep along the quay on weekends. Now, eleven remain: three flatfish cutters, six shrimp boats, and two cockle boats. The rest have been scrapped, sold, or converted into tour boats for tourists.” (Witteman, 2023) “Our own catch is completely gone because of the restructuring, making us even more dependent on imports,” says Maarten Drijver, chairman of the Texel fishing cooperative. „The fish auction in Den Helder had to close its doors in January. And people don’t give a damn. Zero, nothing, nothing.” (Witteman, 2023) “Texel’s fishermen were already earning a living from fishing before Texel became an island at all, thanks to the All Saints’ Flood of 1170. Texel’s fishermen survived Napoleon, who blocked trade with the English. They survived the Afsluitdijk, which caused herring and anchovies to disappear from the Zuiderzee. They survived the Nazis, who confiscated their cutters and converted them into minesweepers. But rarely have they been so pessimistic about the future of their trade as they are now.”” (Witteman, 2023) “”Then I think: what do you, as a government, want? If you want to get rid of me, just say so. Then I’ll hand over my stuff.” But please give some clarity: do we even have a right to exist as a fishing industry?” (Witteman, 2023) “Meanwhile. The letter is now being signed not only by the fishing organizations, but also by the trade sector, such as the fish auction, because they are also suffering greatly from the current situation.”Pim Visser, director of the Hollands Noorden fish auction, which includes Den Helder and Den Oever, agrees that the trade is suffering enormously from the downturn. „Because so many ships are idle, we’ve had an average 45% drop in fish supplies for weeks now, so there’s considerably less work to do. Fish prices are relatively good for this time of year, but that doesn’t compensate for the loss of revenue. Turnover is significantly lower than usual. We do have permanent employees whom we have to continue paying.”” (DeTelegraaf, 2022) “Urk commissioned the accountants and advisors at Flynth to find out. Their conclusion is clear: there is no long-term vision for the sector and individual companies. They come up with alternatives.” (van Dillen, 2024) “I’m not beating around the bush: the fishing industry will disappear from Urk. Some will still be sailing in the future, but the fleet will practically disappear.” Jurie van den Berg was a fisherman himself and now works at a concrete plant. [...] „”The fish processing industry is doing well. It relies on imports. Salmon, for example. That will continue and even grow. „But the soul of the village, the fleet, that will disappear.” Van den Berg says he finds it a shame, but also sees that things change over time: „That’s just the way it is. But that doesn’t mean the end for the village. The maritime sector is large. Young people still want to go into shipping. There’s plenty to do: coastal shipping, inland shipping, offshore. I’m not worried about that. I left the fishing industry two years ago. I think it’s a dying breed.” (Boelens, 2022) “I have three brothers who are fishermen. One is ashore because it can no longer operate. One is still sailing, and the third is trying to sell his ship with a plan. All three used to be at sea, now only one. That’s telling.” (Boelens, 2022) This is an urgent appeal from someone who has seen the fishing industry in her hometown decline over the past decades. In 1910, the Spakenburg fishing fleet still had almost 210 vessels; now there is just one eel cutter sailing under the flag of nearby Putten. The Spakenburg fishing fleet is no more. And the fishermen of <u>Urk</u>, Stellendam, and Yerseke are facing the same fate. This situation is close to the hearts of MEPs Bert-Jan Ruissen of the SGP and Ladislav Ilcic of (Boon, 2024) “I left the fishing industry two years ago. I think it’s on the way out. I’ll be fifty soon, and who will want me then? I’m currently working in a stonemasonry. There will still be work there. I see it around me too: many colleagues are moving to construction, the carpet industry in Genemuiden, or the transport sector.” (Boelens, 2022)
LOSS OF REPUTATION	“A champagne bottle was once smashed against the bows of all those demolition ships. A minister blessed the cutters and donated a ship’s Bible. During the sea trials, family and friends tore their hands.” (Witteman, 2023) “For many, wind turbines symbolize a green future. For fishermen, they have a different symbolism: giant middle fingers raised to their profession.” (Witteman, 2023) “The fact that the Dutch have little connection to their own fishing industry doesn’t help the sector in the maritime conflict. The Dutch primarily eat imported fish – canned salmon and tuna have been the top two for years – while their own flatfish is primarily shipped to Italy.” (Witteman, 2023)

Category	Quotes
LOSS OF REPUTATION	“Our own catch is completely gone because of the restructuring, making us even more dependent on imports,” says Maarten Drijver, chairman of the Texel fishing cooperative. „The fish auction in Den Helder had to close its doors in January. And people don’t give a damn. Zero, nothing, nothing.” (Witteман, 2023) ““We’re really stuck,” says Pieter Trap. In the past, when there was still confidence in the fishing industry, Texel skippers would buy a new cutter almost every decade. Now, the few remaining cutters are almost all over twenty years old, or, in the case of Trap’s TX-14, thirty. Our ships are outdated, and new fuel-saving technologies, such as methanol, hydrogen, or electrification, aren’t yet mature. In any case, it’s practically impossible to get bank financing for innovation now, because trust has vanished. And why is trust gone? You’re talking about the government.” (Witteман, 2023)
LOSS OF VOICE	““The frustrating thing is that fishermen have repeatedly urged the government not to build wind turbines in our prime fishing grounds,” says Marco Drijver. To no avail. So far, wind turbine manufacturers have only been able to install their turbines in shallow areas of the North Sea, precisely where sole and plaice thrive. „Wind farms are constantly being built in the places where we fish the most.”“ (Witteман, 2023) “For fishermen, the government is a fifth element, almost as fickle as the other four. Take the 30 million Euros the government promised to fishing communities in June, intended to support fish auctions and preserve „so-cio-cultural heritage and employment“ in fishing villages, according to Adema. Pieter Trap thinks it’s like throwing a lead lifebuoy to a drowning man. „First you kick all the legs off our chairs. And now that we’re flat on the ground, you come up with a pot to keep fishing communities alive!” (Witteман, 2023) ““Then I think: what do you, as a government, want? If you want to get rid of me, just say so. Then I’ll hand over my stuff.” But please give some clarity: do we even have a right to exist as a fishing industry?” (Witteман, 2023) “We’re largely ignored in the North Sea Agreement. The energy transition challenge seems more important than the relatively small fishing sector.” (Akinci, 2023) “It doesn’t happen very often,” says Daalder as he adjusts his boat, “that you see so many fishermen together.” Fishermen according to him, they rarely demonstrate. „A fisherman is very much like, „Let others do it first, we’ll go to work.’ But now we have no choice. It’s time we made ourselves heard.”(Basir, 2021) “I don’t want my name in the newspaper. But it’s terrible. Everything is destroyed by Europe and the government. For the environment.” He looks at the many wind turbines along the dikes of Urk . “Did you know that every week a little truck from the energy company goes up the dike to clear away dead birds? They’re there for the taking. They’re being crushed by the blades. For the environment.” (Boelens, 2022) Hennie de Graaf, an interested party from a former fishing family in Bunschoten-Spakenburg, is disappointed. "What will Brussels do to regain our trust? For more than 40 years, we have been faced with an increasing number of rules that make our work impossible: fewer fishing days, lower quotas, and smaller fishing areas. Not to mention the additional regulations coming from Brussels. How many more hoops do we have to jump through to be able to continue our work?" (Boon, 2024) However, <u>Urk’s</u> alderman for fisheries, Nathanaël Middelkoop (SGP), remains cautious. In February, the Commission decided to cut the budget for the Maritime Affairs, Fisheries, and Aquaculture Fund (EFMZVA) by €105 million, or 13 percent of the total EFMZVA budget, for the period 2025 to 2027. Middelkoop: "This sends the wrong signal to the sector from Brussels. The Commission still seems to be insufficiently aware of the serious concerns that exist within the sector." (van Dillen, 2024) The vice-chairman of the Administrative Platform for Fisheries, which represents six provinces and sixteen municipalities, is also witnessing the decline of the fishing industry in his own hometown. On Monday, he will be in Brussels to tell the story of <u>Urk</u>: how a fishing village on a small island in the Zuiderzee turned into a leading fishing and fish trading center on the edge of the Noordoostpolder. Around 40 percent of Urk’s economy still revolves around fish.After the construction of the Afsluitdijk in 1932, it was thought that fishing would disappear completely due to the reclamation of the Zuiderzee. But with the "miracle of <u>Urk</u>," fishermen moved to the North Sea and trade only grew. Even after the reclamation, many Urkers remained loyal to fishing. But now, a combination of regulations, the consequences of Brexit, and higher diesel prices are ruining many fishermen. The result in recent years has been devastation. Last year, 52 cutters were scrapped in the Netherlands, 26 of which were from <u>Urk</u>. The entire Urk cutter fleet now consists of about 65 ships. Middelkoop: "When a <u>fisherman</u> stops fishing, it affects not only himself, his family, and his crew, but the entire chain and the community of <u>Urk</u>." His appeal to Brussels: "Give fishermen your trust. Don't try to dictate everything from Brussels. Work with guidelines instead of regulations. In <u>Urk</u>, many young people still want to become <u>fishermen</u>." (Boon, 2024) "Here in Brussels, fishermen are sometimes seen as enemies of the environment," said co-host Ilcic prior to the conference. Wrongly so, according to the discussion. Daniel Voces, director of Européche, the representative body for fishermen in the EU, showed that fishing is actually one of the most sustainable sectors. "Fishermen produce some of the healthiest products on earth, with a very small footprint." According to Voces, Brussels regulations are only slowing down the sector's transition to sustainability. (Boon, 2024)
UNJUST TREATMENT COMPARED TO OTHER INDUSTRIES AT SEA	“In December 2022, shrimp fishers were told they had to install a new catalytic converter by October 1st, which would reduce their nitrogen emissions by 80 percent. Refusal would mean the end of their business. They would no longer be permitted to fish in Natura 2000 areas like the Wadden Sea. Class justice, the shrimp fishermen thought: all those container ships laden with clothes, computers, and televisions emit far more nitrogen, yet don’t have to comply with all sorts of regulations. „And while we did receive a 40% subsidy for that catalytic converter, we had to upfront pay that €100,000 first. There are only two of us, so that’s a huge sum.” (Witteман, 2023)

Category	Quotes
LOSS OF IDENTITY	“It’s your child, it’s your home,’ says former skipper Marco Drijver (61) about his TX-29, one of the three Texel cutters that ended up as scrap this year.” (Witteman, 2023)
	“A sad funeral,” the Texelse Courant wrote at the end of March, alongside a photo of Drijver’s wife waving goodbye to the TX-29 in the harbour as it departed for Kampen.” (Witteman, 2023)
	“When the engine stops for the last time, and you step off the boat—yes, that really hits home,” says Drijver. He later saw footage of the demolition in a Nieuwsuur report. „There goes your stuff, you think, there goes your cutter, in which you’ve spent more time than your house for 27 years.” (Witteman, 2023)
	“The sea is not an energy-industrial park, but a long-standing source of life and work for fishermen.”” (van Hove, 2025)
	“Dozens of fishermen are giving up. But staying home? Never.” (Boelens, 2022)
	“My brother now sails under the German flag. Fewer rules. Just imagine. Fishing in the same waters, but under the German flag to make some money.” (Boelens, 2022)
LOSS OF HERITAGE	“But Urk is strong. We support each other. We help each other, and there’s always work to be found. But fishing is part of our history. When the Afsluitdijk closed, they thought we’d go under too. No way. And we’ll over-come this too. Together. For example: every Saturday morning we get a big bucket of fish from the fishermen. We fry it, and everyone who comes here can join us for lunch. There are truly great concerns in Urk. But no mat-ter how desperate some fishermen are, we trust in God. That’s important. And the community.” (Boelens, 2022)
	Fishermen report that OWFs lead to a loss of historic fishing grounds used for generations. This creates an emotional impact that is a primary driver of resistance toward wind farm development (van Hoey et al., 2021)
	“The 83-year-old co-owner of the TX-19 circles an area smaller than the coffee ring under his mug. „We fishermen are the oldest users of the North Sea, yet we’re being kicked out everywhere!”” (Witteman, 2023)
	“When Van der Vis and Drijver first went sailing with their fathers as children, fishermen still had the North Sea practically to themselves. Now they feel like an Amazonian tribe whose territory is gradually being snatched away.” (Witteman, 2023)
	“I’m 51 years old and I’m a bit of a stay-at-home dad now. I’m applying, but for jobs on the water, like towing or something like that. I’ve been at sea all my life. You shouldn’t put me behind a computer in an office.”” (De-Telegraaf, 2022)
	“Jan de Boer wants to witness first-hand how his UK-33 is crushed to pieces by large clamps on a quay in Kampen. Once the final formalities are completed, 35 years of sailing history will be shipped off to the scrapyard in pieces. Not everyone handles it as well as De Boer. His fellow fisherman, whose cutter was being shipped off to the scrapyard at the same time as his, refused to witness that final voyage. „He couldn’t handle it and stayed home that day.” (Akinci, 2023)
	“In December, I worked for my cousins in their smoke house, but I don’t aspire to that. I’m used to the view. You’re not just a shoreman, I’m realizing now.”” (Akinci, 2023)
	“But stopping is an emotional decision. No one will be proud of that, because families have often been active in the fishing industry for generations.”” (Akinci, 2023)
	“But not everyone will make it through this period. Among those applying for the restructuring program are fishermen whose needs Visser never imagined were so dire. „Although no one here shares his suffering. During previous difficult times, the entire family fortune was often used to keep going. There’s probably too little prospect of improvement for that now.” (Akinci, 2023)
	„De Boer: “People now say I was right to downsize my ship. While last year they thought I’d gone crazy. Many people are ashamed to quit. There are fishermen who would rather go bankrupt with their flag flying high. I’m glad I’m not like that and decided differently.” (Akinci, 2023)
	“Van Dalen therefore believes that fishermen should have a significant voice in plans for future wind farms. „Fishermen earn their living on the water, and so it’s only logical that this sector should have a decisive voice in the form of participation. This is more than just consultation,” says Van Dalen. The European Parliament agrees with him.” (Giele, 2021)
	“We are incredibly proud of the sector. That’s where we come from. But there’s no denying that a lot has changed,” says Urk alderman Nathanaël Middelkoop (SGP). He has a point: fishermen and related businesses are having a tough time in the Netherlands.” (van Dillen, 2024)
	“Besides his colleague Nick, the shrimp fisherman’s family is also present on the cutter: his wife Karin (also 41) and his two children Dirk (11) and Yet (15). Grandpa Hans (75), Grandma Tiny, niece Tess (12), and two family friends are also there today to support the fisherman. They are all from Texel. Daalder, wearing black clogs under his shorts, comes from a fishing family. His father and uncle started the family business sixty years ago. „I liter-ally grew up surrounded by fishing. My two children can be whatever they want, and if they want to be fishermen, it should be possible.” (Basir, 2021)
	“In the harbour lies a large ship belonging to the Urk Sea Cadet Corps: the Noorderkroon. Boys and girls between 11 and 18 can experience the maritime world here. A man steps off the boat. He’s the youth counsellor. His name doesn’t need to be in the newspaper, but he’s willing to talk.” (Boelens, 2022)
	“None of the young people here on board actually want to go into fishing anymore. They hear too many stories, of course, about how hard it is to earn a living. They do want to sail. So they look for work in inland shipping or freight shipping at sea.” (Boelens, 2022)

Category	Quotes
LOSS OF IDENTITY	
GENERATIONAL DECLINE	Because the future of fishing appears increasingly uncertain due to spatial restrictions, representatives note that fewer young people are entering the profession, leading to fears of a future skill shortage: “A total of 51 cutters were scrapped this year. From Texel and Wieringen to Arnemuiden and Goedereede, centuries-old family businesses sometimes ended. The hardest hit was the flatfish fleet, the most iconic Dutch fishing industry. In a single year, the fleet shrank from 90 to 46 cutters. In the late 1980s, there were still over three hundred.” (Witteman, 2023) “Drijver, the fifth generation of a Texel fishing family, is trimming the hedge at St. Martin’s Church in Oosterend, where he has been a volunteer cemetery caretaker since his sudden retirement. „A sad funeral,” the Texelse Courant wrote at the end of March, alongside a photo of Drijver’s wife waving goodbye to the TX-29 in the harbour as it departed for Kampen.” (Witteman, 2023) “Marco and his brother quit because they had no successors. „Our own children didn’t go sailing, and their peers don’t see a future in fishing either. When I was young, 20 to 25 young men joined the fleet on Texel every year, but now there’s none left. Without new members, it’s over.”” (Witteman, 2023) “Wind turbines are far from the only problem facing the fishing industry— alongside Brexit, high fuel prices, or the closure of nature reserves—but they are the most hated. In the coming decades, when their children should normally be taking over, fishermen will lose much of their fishing grounds to wind farms.” (Witteman, 2023) “For several months now, the UK33 has been moored in the port of Urk, waiting to be dismantled. Fisherman Jan de Boer’s trawler will no longer sail. „I’m quitting. Two of my three sons were willing to take over the business, but with pulse fishing (fishing with electric pulses instead of trawling along the bottom, ed.). When that was banned, they backed out. If I want to continue, I have to invest €1.5 to €2 million in the cutter. That’s pointless, especially with current fuel prices and the government’s refusal to provide compensation for the expensive diesel. Every week you sail, you have to pay €10,000 anyway.” (DeTelegraaf, 2022) “But not everyone will make it through this period. Among those applying for the restructuring program are fishermen whose needs Visser never imagined were so dire. „Although no one here shares his suffering. During previous difficult times, the entire family fortune was often used to keep going. There’s probably too little prospect of improvement for that now.” (Akinci, 2023) “Downstairs in the galley, Grandma Tiny is making vegetable soup and croquette sandwiches for lunch. „It’s all quite something,” she says. „It’s impressive that my son is still holding on. You have to swallow everything as a fisherman. There are so many limitations, and they’re only increasing. And luckily, his wife, Karin, is supportive.” Karin is a nurse but feels like „a real fisherwoman.”” (Basir, 2021) “The vice-chairman of the Administrative Platform for Fisheries, which represents six provinces and sixteen municipalities, is also witnessing the decline of the fishing industry in his own hometown. On Monday, he will be in Brussels to tell the story of Urk: how a fishing village on a small island in the Zuiderzee turned into a leading fishing and fish trading center on the edge of the Noordoostpolder. Around 40 percent of Urk’s economy still revolves around fish. After the construction of the Afsluitdijk in 1932, it was thought that fishing would disappear completely due to the reclamation of the Zuiderzee. But with the „miracle of Urk,” fishermen moved to the North Sea and trade only grew. Even after the reclamation, many Urkers remained loyal to fishing. But now, a combination of regulations, the consequences of Brexit, and higher diesel prices are ruining many fishermen. The result in recent years has been devastation. Last year, 52 cutters were scrapped in the Netherlands, 26 of which were from Urk. The entire Urk cutter fleet now consists of about 65 ships. Middelkoop: „When a fisherman stops fishing, it affects not only himself, his family, and his crew, but the entire chain and the community of Urk.” His appeal to Brussels: „Give fishermen your trust. Don’t try to dictate everything from Brussels. Work with guidelines instead of regulations. In Urk, many young people still want to become fishermen.” (Boon, 2024) “I have three brothers who are fishermen. One is ashore because it can no longer operate. One is still sailing, and the third is trying to sell his ship with a plan. All three used to be at sea, now only one. That’s telling.” (Boelens, 2022)
ALTERANTIVE LIVELIHOODS	“Job opportunities created by multi-use are sometimes raised as a positive effect of wind farms. Fishermen can be employed to maintain and inspect devices. Four of the seventeen fishermen from the study by Alexander et al. (2013) suggested this. Fishing association representatives point out that wind farm developers promote this idea. However, the majority of the fishermen disagreed that this would be an opportunity. “Fishermen have a skill, and that’s fishing ..it’s really not possible to take a skilled fisherman and turn him into a wind farm engineer or a tidal turbine engineer, it’s not going to happen.” one fishing association representative stated. One of the main reasons that there will not be alternative employment is the belief that fishing boats are not suitable for marine renewable energy devices (or OWF) work. Eight out of seventeen fishermen also pointed out the lack of qualifications, which would prevent them from undertaking alternative employment.” (van Hoey et al., 2021)
COMMUNITY WELL-BEING	Because many fishing communities are in rural areas with limited alternative employment, the loss of fishing opportunities can impact the long-term well-being of the entire community: “Urk is the main supplier to the Dutch cutter fleet. Of the 300, 75 come from Urk. The fish processing industry, along with the fleet, is the lifeblood of Urk.” (Boelens, 2022) “But Urk is strong. We support each other. We help each other, and there’s always work to be found. But fishing is part of our history. When the Afsluitdijk closed, they thought we’d go under too. No way. And we’ll overcome this too. Together. For example: every Saturday morning we get a big bucket of fish from the fishermen. We fry it, and everyone who comes here can join us for lunch. There are truly great concerns in Urk. But no matter how desperate some fishermen are, we trust in God. That’s important. And the community.” (Boelens, 2022)

Category	Quotes
LOSS OF IDENTITY	
GENERATIONAL DECLINE	“The vice-chairman of the Administrative Platform for Fisheries, which represents six provinces and sixteen municipalities, is also witnessing the decline of the fishing industry in his own hometown. On Monday, he will be in Brussels to tell the story of Urk: how a fishing village on a small island in the Zuiderzee turned into a leading fishing and fish trading center on the edge of the Noordoostpolder. Around 40 percent of Urk’s economy still revolves around fish. After the construction of the Afsluitdijk in 1932, it was thought that fishing would disappear completely due to the reclamation of the Zuiderzee. But with the „miracle of Urk,” fishermen moved to the North Sea and trade only grew. Even after the reclamation, many Urkers remained loyal to fishing. But now, a combination of regulations, the consequences of Brexit, and higher diesel prices are ruining many fishermen. The result in recent years has been devastation. Last year, 52 cutters were scrapped in the Netherlands, 26 of which were from Urk. The entire Urk cutter fleet now consists of about 65 ships. Middelkoop: „When a fisherman stops fishing, it affects not only himself, his family, and his crew, but the entire chain and the community of Urk.” His appeal to Brussels: „Give fishermen your trust. Don’t try to dictate everything from Brussels. Work with guidelines instead of regulations. In Urk, many young people still want to become fishermen.” (Boon, 2024)
MANAGING NEW REGULATIONS	“I thought: there’s enough time to get the nets on deck before we get within 500 meters of those wind turbines. A half-kilometre safety zone is in place around wind farms, where ships are not allowed. „However, the wind and current were so strong that we only just entered that zone. Well, that was what we saw from the shore.” [...] „Wow, a ticket. Whether you can just hand over 1,500 Euros.’ These are amounts that, due to the slim margins in the fishing industry, can turn a good week into a bad one.”” (Witteман, 2023) “The shrimp fishermen are still faced with the issue of having their trawlers equipped with CO2-free engines in the future. If this isn’t achieved, they will no longer be permitted to sail from 2023 onwards. „Converting the ships requires an investment of many thousands of Euros. Without any subsidies.”” (van Hove, 2021) “In recent years, the Dutch fishing industry has been hit hard. Not only because of the consequences of Brexit, the construction of offshore wind farms, and sky-high diesel prices, but also increasingly because of regulatory pressure from Brussels—including the landing obligation, the abolition of pulse fishing, and the plan for camera surveillance on cutters.” (Boon, 2024) “Hennie de Graaf, an interested party from a former fishing family in Bunschoten-Spakenburg, is disappointed. „What will Brussels do to regain our trust? For more than 40 years, we have been faced with an increasing number of rules that make our work impossible: fewer fishing days, lower quotas, and smaller fishing areas. Not to mention the additional regulations coming from Brussels. How many more hoops do we have to jump through to be able to continue our work?” (Boon, 2024)
FISHERWOMEN ISSUES	
UNPAID LABOUR	Shore based contributions (getting Diesel; Delivering Fish; Picking up parts for the boats; Processing, Sales, Accounting, Net Mending...) considered HELP instead of WORK since they reduce financial strains (work would otherwise be done by other people that have to be paid): “It is the women that keep everything moving, keep everything going.” „The women have always been the support network, really.” (Szaboova et al., 2022) “I’m backing up with things like, and this sounds silly, but just doing the laundry all the time, getting that shirt or that set of long johns or whatever ready for when they get out. ...Doing shopping for them as well. Things like that. (FG1)” (Szaboova et al., 2022) “I would help [my husband] with picking stuff up, picking parts up, I would go and get bait when I was at home with the kids. [...] I’ll help out when I can, but I’m more of a taxi service [laughter]. (interview Karen)” (Szaboova et al., 2022) Second source of income that is more stable to keep family business alive at all costs and during unstable times: “Well yes, because the boat costs a lot to run and sometimes, they don’t earn that amount to run it, so I subsidise that really.” (Szaboova et al., 2022) “[M]um has had to work all her life doing whatever she can do – clean and everything – because if there is no money in the fishing or there is no building work going, she has had to try and keep us all, pay for all the bills and things. She has literally worked all her life. Three jobs at one point just to try and keep the money coming in.” (Szaboova et al., 2022) Emotional labour: “And he’s coming from sea and I’ve been in hospital for week and I haven’t told him because there’s no point... Well, it just adds to the stress then, doesn’t it? The bills won’t get paid with him being in with me, you know.” (Szaboova et al., 2022) “He always said that he was married to the sea and I was the affair because the sea always comes first. You can never plan anything because it all depends on whether the boat is at sea or not and what the weather is like. You could plan to do something for your children’s birthday or something like that, but if it turned out to be a fine day, they would go to sea instead because you have to go. You can’t get back that day that you miss. That is a missed day of earning and you can’t afford to give up days because you know there is going to be rough weather.” (Szaboova et al., 2022) Son: “We just miss him really. We don’t spend much time with him. Just don’t feel like he’s around” Mother: “You crave that time with him though” Son: “Yes” (Szaboova et al., 2022) “If it’s windy weather and they go to sea I’ve got [a daughter] who’s 11 years old and she’s screeching here heart out because her daddy and uncle [...] are out there, and they’re out there in this weather. And I’ve got her breaking her heart to the point where I’ve actually rang [husband] up and gone ‘you’re going to have to speak to her, because she’s in bits here.’ Like actual bits.” (Szaboova et al., 2022)

NEWSPAPER AND PAPER ANALYSIS

Category	Quotes
FISHERWOMEN ISSUES	
UNPAID LABOUR	Mother: “That’s another reason why they are taken down [to the harbour]. Well the same reason I used to go down, spend time. And yes I ended up taking my boys down, help land and, you know. [...] It’s a way of getting that extra bit of time and seeing how it works, understanding a bit of what they do as well. (Interview Amanda and her son who joined the interview) (Szaboova et al., 2022) “I think, my husband he gets a bit depressed because obviously the hours he works he doesn’t see his children a lot. So by the time he gets in from sea the kids are in bed, so he misses. Sometimes he goes three, four, five days without seeing them, so then he gets really upset at that because it’s not a nine-to-five job.” (Szaboova et al., 2022) “I think women are more rational about their health and they know when something needs done, because they’ve got the responsibility of looking after the rest of the family. I think men see it as a sign of weakness and they are afraid of what they might find out.” (Szaboova et al., 2022) “Informal: the role of women as support to seagoing spouses (“collaborating spouses”) was found to be both very important and highly undervalued by the fishing community. This was seen as providing the most relevant and potentially productive avenue to explore in order to better women’s’ position in fisheries.” (Yemaya, 2002) “The study found that there was economic discrimination against women in the sector. Women are paid 12 per cent less than men for what appears to be the same work, though given the limited data, like may not have been compared exactly with like. However, this is much less than the overall earnings discount women face across the EU economies of around 22 per cent.” (Yemaya, 2002)
OWN WELL-BEING	“It’s hard. I’m the master chef, the cleaner. [...] The wife, mum, the dad. [...] Labourer.” (Szaboova et al., 2022) “We have a lot of stress as well. We have stress that comes from paperwork and ridiculousness that goes on around all that.” (Szaboova et al., 2022) “I think that’s the other thing I’ve found that’s been really hard through the years, has been lack of financial planning. Because you don’t know what they’re going to be earning or when they’re going to be earning it ... that causes a lot of stress.”” (Szaboova et al., 2022) “[W]hen the children go to bed that’s when I get a bit lonely and a bit down because I think, well, just want him home and obviously with the weather and stuff, I worry.” (Szaboova et al., 2022)

FACEBOOK POSTS

Group: Nederlandse Visserbond

I've regularly encountered BBB, even peeked behind the scenes. Everyone ignored fishing, but these people have worked hard to keep this sector on the map. Many people don't realize this, judging by their voting behavior. We can still buy fish and Dutch agricultural products, but I wonder, for how much longer?

This, along with the farmers, has helped make the Netherlands great, and they're tearing it down like crazy. Don't believe it's about the environment, because nothing could be further from the truth. We've seen that pulse fishing is much more economical and cleaner for the sea, but the EU didn't allow it, so what's the point?

If they're no longer allowed to fish there, and other nationalities jump in, is that even allowed? What does the government say? Absolutely nothing, surely. Everything must be destroyed for that Green Deal.🙄

EMK-visser



EMK fishermen

1月27日下午3:00 · 🌐

Piece of windmill fished up by the SCH 63.

For those who still read nature and recognize #signs , it's a special week. First, a beluga that had strayed from its course visited our waters. Today, this was 🐟 fished up.

We see a red traffic light for the new cabinet's offshore energy plans.



Henny van den Brink

We know it's not right, it causes too much animal suffering, but yes, the large power plants that are allowed to be built cost a lot of water and energy. That has to come from somewhere.

👍👍👍

3週 讚 回覆 翻譯年糕



Marco Westerborg

Henny van den BrinkAnd at the fish auction and processing plants, among other places, they need a lot of power, so the wind turbines are very much needed.

3週 讚 回覆 翻譯年糕



Henny van den Brink

Marco Westerborg🤔🤔🤔🤔 Nuclear energy is the future, but you don't see it. But that doesn't matter to you that our good agricultural land is being filled with solar panels, that marine life is being destroyed, and that the horizon is being polluted. Your eyes will open one day (I hope).

This is so pathetic! Wind turbines cause more damage than you'd like. Microparticles are released when they rotate, marine life becomes disoriented from the vibrations, the foul oil in the turbines used to lubricate the blades, birds are executed by the blades, the low efficiency they generate, landscape pollution, and finally, once they're written off, they don't know what to do with them and are buried somewhere (?). I'm sure I've forgotten something in this list. It's all very "environmentally friendly."🙄
#FollowTheMoney

When the first offshore wind farms were demolished, the foundations were left underwater, it was too expensive to remove them. This will also happen in the future with all the wind farms in the North Sea. The wind turbine lobby will surely convince us soon that they'll use the discarded polyester blades to create artificial reefs in the sea.

Yes, we Dutch people who work hard and try hard to make things better, the Netherlands was a prosperous country and is now dependent on Brussels because of a bunch of idiots in The Hague.

4天 讚 回覆 翻譯年糕 8👍🙄

Ernst Kuiper
Deeply sad and just the stupidest thing they can do, we will soon be dependent on other countries🙄🙄

4天 讚 回覆 翻譯年糕 7👍🙄

It is a sad sight to see so many ships being destroyed while they were still perfectly good for fishing, for reasons that are still unclear.

Pure capital destruction; this must be stopped. After all, taxpayers have to foot the bill for this, just for a little bit of nature. Which is being trampled underfoot by all those offshore wind turbines. And which only generate wobbly currents. And massive pollution.



EMK fishermen

2月18日下午12:12 · 🌐

Ready for the scissors🔪 Spotted this morning: former fisherman Koos de Visser mooring his stripped cutter to the jetty in Stellendam for the last time.

Tomorrow awaits the last journey with a demolition company as destination.

Koos has provided us with beautiful photos of the sea over the past few years and was always available for an interview or a current fishing question.

The absence of his photo series has already been palpable here in recent months.

There's also good news. Koos de Visser has joined the staff of the Fisheries Innovation Network (VIN), where he will be working twenty hours a week to guide the remaining Dutch cutter fisheries into a new era.

We trust that his practical knowledge, fishing experience and down-to-earth view of the matter will contribute to this mission.

Good luck Koos!

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FACEBOOK POSTS

EMK-vissers

Normally you're 'proud' of a place you live...since these fishing boats are being scrapped there...it makes me deeply saddened...

My father came from a family of skippers; a ship he sailed on was also demolished...
Your life's work....

Drama....more and more fishermen are leaving...just like the farmers, whose work has been made impossible by the left...

Good luck Koos
It's such a shame that it has to be this way in the Netherlands
What are they doing
The pride of the Dutch fishing industry in the 70s, 80s, 90s and 2000s
Completely destroyed in 5 years

5天

讚

回覆

翻譯年糕

21





EMK fishermen

2月13日上午10:13 · 公开

"We're scrapping the ships and importing our vegetables. The shelves are empty, the quays are littered with scrap metal. The decadence is unbearable. It's unbearable to watch a rich and capable country orchestrate its own hunger."

Read Marianne Zwagerman's column in the Telegraaf 📖
[#workingtogether](#)

翻譯年糕

I wonder as I look at his well-fed face during the interview. Just cake, no milk or eggs?

He probably doesn't eat shrimp either. Kampen's harbor is full of shrimp trawlers. Next to them, on the quay, is a large scrap heap. Dutch fishing boats are being scrapped.

A waste of capital for which the government is allocating €40 million in taxpayer money. We are a maritime nation and for centuries have cherished any ship that could gather food from the water or from distant lands. Now we pay to shred them, while elsewhere in the world, fishermen would kill for such a ship.

We build swamps, demolish the ships, and import our vegetables. The shelves are empty, the quays are littered with scrap metal. The decadence is unbearable. It's unbearable to watch a rich and capable country manage its own hunger.



FACEBOOK POSTS

EMK-vissers

It's too sad for words, we have the best farmers in the world and one of the most prominent shipping companies in the world, but it all has to be demolished by the EU.
I fear for my children and grandchildren what their future will be in this

And the power grid is overcrowded, so we are building huge amounts of energy-guzzling data centers and making heat pumps mandatory.
Where did these guys go to school?

頭號粉絲

Jan Vrijvogel

Couldn't we buy them back from the scrap yard through groundfinding and then establish a foundation? Just an idea. We could turn them into a floating museum. They'd be much cheaper now that they're scrap metal-priced. Please let me know if you share your thoughts.

1週 讚 回覆 翻譯年糕 2

Disco Lovijf

Jan VrijvogelYou're not going to make it... It's watertight... The scrap yard has to prove the ship was scrapped... There's no room for error...
We're being forced to install nitrogen filters... If you refuse, you won't get a fishing license... The installation and engine room renovation costs around €100,000. If you don't have the money, or age is a factor, or you can't scrape that money together, you're up against the wall... and there's only one thing left... and that's the shredder.

1週 讚 回覆 翻譯年糕 3

頭號粉絲

Jan Vrijvogel

Disco LovijfIt was just an idea based on the principle of scrapyards, where all cars should be destroyed. But only the license plate is destroyed, and the salable items go to the former Eastern Bloc or Africa. So I assumed, like the fishing license or the boat's registration, that the scrapyard could do with it as he pleased. He's not going to scrap engines or usable parts, is he? Or is he?

1週 讚 回覆 翻譯年糕

Disco Lovijf

Jan VrijvogelYou can buy the parts separately from the ship at the scrapyard....The ship must be scrapped....That wasn't the case before, and they were sold abroad (outside Europe)...or went into recreational use...But there are examples of them being tampered with....and that's no longer possible.
That must be the reason.

1週 讚 回覆 翻譯年糕

頭號粉絲

Jan Vrijvogel

Disco LovijfOkay. Clear. Learned something new.

1週 讚 回覆 翻譯年糕

It's truly unbelievable, and it seems this country is deliberately being destroyed. Politicians (including their followers) forget that there are 18 million of us, and that we still need to consume. And besides, I haven't seen many discarded fishing boats in Spain and Portugal, and I fear we're once again playing the "Crazy Henkie" of Europe. Worse still, it borders on criminal, because Greenpeace is also an extension of a certain section of our government.

1週 讚 回覆 翻譯年糕 41

It's incomprehensible. The Netherlands has everything of its own. Fish, vegetables, potatoes—it's all being destroyed. It's so sad.

1週 讚 回覆 翻譯年糕 12

Category	Quotes
STAYING IN FISHING RELATED INDUSTRIES	“But Urk is strong. We support each other. We help each other, and there’s always work to be found. But fishing is part of our history. When the Afsluitdijk closed, they thought we’d go under too. No way. And we’ll over-come this too. Together. For example: every Saturday morning we get a big bucket of fish from the fishermen. We fry it, and everyone who comes here can join us for lunch. There are truly great concerns in Urk. But no mat-ter how desperate some fishermen are, we trust in God. That’s important. And the community.” (Boelens, 2022)
FISHING BETWEEN WIND FARMS	Passive fishing (test already underway): “Because only passive fishing will possibly be permitted in the future. This involves the use of baskets and nets that are anchored in the wind farm with small anchors. Anchored to the ground, but not causing any dam-age to the ground itself. This is a key requirement for the wind farm owners; they want to prevent any damage to the cables connecting the wind turbines.” (Wisse, 2024) “Passive fishing requires much more work than traditional beam trawling and the yield is considerably lower. Mass doesn’t mean cash doesn’t work here. To be profitable with small quantities, you have to catch species that are relatively profitable,” Neitzel explains. The costs are also lower, she says: „We’re talking about smaller vessels that use less fuel and require fewer crew.”” (Wisse, 2024) “Where large wind turbines are now being erected, there is room for large ‚fish basins’. Fishing is not possible there at present, so according to Flynth director Auke Hoefnagel, young fish could be raised there. He cites Norway as an example, where salmon are already being farmed on a large scale in fjords. [...] Flynth calls it ‚semi-wild fish’. Whether fish farms are feasible remains to be seen. According to the consultancy firm, more (scien-tific) research is needed, for example into how to feed the fish and how to prevent disease in a limited fishing area.” (van Dillen, 2024) Experimentation with new fishing technology that fits changed conditions/regulations: “Last summer, for example, he was in Zeeland, aboard fellow fisherman Daniël Zoetewij’s YE-152, placing plastic milk bottles in special „sepia pots.” He explained that it was an experiment to catch squid during research among the turbines of the Borssele wind farm. „A white bottle resembles a female, so a male swims towards it. But as soon as the male discovers it’s a bottle, he can’t get out.”” (Wisse, 2024) Active fishing (unthinkable at the moment): “Passive fishing yields relatively small catches that require a lot of effort,” says researcher Kees Taal of Wageningen Economic Research, who conducted the economic component of the study. „You sometimes have to go back and forth to the wind farm twice. One day to set nets or pots, the next to pick them up. That takes time and fuel, and you also need two good-weather days in a row. Fishermen should be able to combine it with other types of fishing. Then setting nets at a wind farm becomes part of the trip, and then you go catch crabs at a different location, for example.” (Moons, 2024) But that’s not possible now, because it’s not allowed to have different fishing gear on board because that makes enforcement difficult.” According to him, the 250-meter limit also needs to be critically examined. (Moons, 2024) “It [passive fishing] remains a niche. It produces top-quality fish, super fresh because it comes ashore the same day. But we will never catch the amount of sole that can be sustainably fished from the North Sea with pas-sive gear.” (Moons, 2024) “I’m fighting for my survival and that also means I have to try new things,” says Tijssen on the way back. „I grew up with the wisdom ‚Strength is power and mass is profit,’ but I see a better future in smaller-scale and more sustainable fishing.” If he gets the chance, he will probably continue fishing between the turbines of Hollandse Kust Zuid, although he also has another farm in mind. (Moons, 2024) Increased turbine spacing: Stakeholders and government officials suggest that ensuring distances of at least 800 to 1000 meters (or up to 1.5 km) between turbines can allow fishing activities and vessel maneuvering to continue after construction (van Hoey et al., 2021) “The fishing industry provided the following key principles and success criteria for managing fisheries and aquaculture stakeholders of a wind farm: [...] Other principles suggested included having minimal distance be-tween the individual turbines (for example 1.5 km) and creating shipping routes to maintain access to other fishing grounds. As already indicated, the UK is in the process of updating the FLOWW guidelines to include best practice on fisheries liaison, displacement community funds, and fisheries–cables interactions.” Strategic park structure: Reorganizing the layout to leave major, historical fishing grounds untouched or creating shipping corridors allows fishermen to reach distant grounds more efficiently (van Hoey et al., 2021) “Responses to the adaptation and mitigation strategies being used show that, by involving all stakeholders in the designation of new zones for offshore renewable energy, aquaculture and passive fisheries, Belgium au-thorities are clear that the intention is to have multi-use. Similarly, the UK government encourages coexistence and multi-use of marine space. The National Marine Plan sets out policy objectives to facilitate coexistence of sectors and activities. Policy officials indicated that they are currently still exploring the potential for safe coexistence between wind farms and commercial fishing through research projects. One project, for example, is trial-ling the safe and commercially viable deployment of static fishing gear within a floating offshore wind farm. In terms of mitigation, the government is asking developers to consider the types of fishing that takes place in the area and their minimum operating space requirements (for deploying and hauling gear) and vessel manoeuvrability. This is then factored into wind farm layout, configuration and turbine spacing at an early design process stage. For example, ensuring turbine spacing is at least 800 m to 1000 m allows fishing activity to continue after construction of the wind farm and encourages coexistence between the marine users and industries. We also recommend that a fisheries displacement assessment is carried out to estimate any displacement levels. This assessment should include but not be limited to considering the minimum operating space requirements for the range of fishing activities (deploying and hauling gear), vessel manoeuvrability and the ability to trawl over cables.” (van Hoey et al., 2021)

Category	Quotes
STAYING IN FISHING RELATED INDUSTRIES	
CABLE BURIAL AND PROTECTION	Designing the cable grid to avoid key areas or burying cables deep enough to permit trawling over them can reduce gear entanglement risks and the need for restrictive safety buffers: “The main concerns for the Belgian fishery sector are loss of fishing grounds (nothing can be done against it), rock dumping on cable lanes (which hamper fishing and is a high risk for the beam trawl fleet), spacing between OWF areas, and the presence of corridors between OWF areas (to allow fishing grounds to be reached easily).“ (van Hoey et al., 2021) „In terms of adaptation/mitigation strategies, respondents stated that activities that impact on the sea floor, such as regular anchoring and bottom trawling, are not acceptable. Although the cables are covered by sand, cable depth may vary (as sand moves around), so bottom disturbing activities can damage them.“ (van Hoey et al., 2021) Passive Fishing Co-location Designating specific zones within OWFs for static gear (such as crab and lobster potting) can keep the space productive for the fishing sector (van Hoey et al., 2021). “OWFs can be used as a tool for conserving fish stocks, for instance, by limiting access to OWFs for commercial and/or recreational fisheries using a permit system (Fayram et al. 2007). A study in an OWF on the English North Sea coast (Westermost Rough) also shows that OWFs can be used as an easily delineated area for rotational closures of lobster fisheries, which can help prevent overfishing (Roach et al. 2018). Hooper & Austen (2014) show that the potential of OWFs to increase lobster populations depends on the design of the OWFs; that potential being related to not having scour protection on certain parts of the turbines or installing additional rock armouring. Within the literature reviewed, co-location of OWF and fisheries was only mentioned in relation to static gear such as pots. There is no mention of static gears in OWF aimed at finfish, such as gillnets, maybe because it is not optimal to use within OWFs.“ (van Hoey et al., 2021)
AQUACULTURE INTEGRATION	Designing turbine foundations to support mussel, seaweed, or oyster cultivation transforms energy sites into „Blue Growth“ hubs: “Stakeholders provided different views (often polarized by sector and areas) on the issues under study (p 36-50). These were largely dependent on the background of the stakeholder and their direct interactions with OWFs and collaborative opportunities with other stakeholders. Best practices in stakeholder governance were identified as early engagement in discussions and planning of OWFs, alongside support for active enforcement of multi-use in future marine spatial planning. Recommendation: Early engagement in discussions and planning, on a continuous basis and by taking into account the fishery and aquaculture needs from the start of the OWF design is essential to create beneficial conditions for future multi-use and co-location of fishery and offshore aquaculture activities with OWFs.“ (van Hoey et al., 2021) “The majority of articles on the effect of OWFs on aquaculture focus on the potential of offshore aquaculture in OWFs. To date, there are no areas in the North and Baltic Seas in which current aquaculture practices seem threatened by OWF construction. On the contrary, OWF expansion is seen as an opportunity for Blue Growth activities like aquaculture and other forms of marine energy production such as tidal energy or solar energy. To develop offshore aquaculture in OWFs, co-management of multi-use initiatives by wind developers and the aquaculture sector can be developed and stimulated by governments.“ (van Hoey et al., 2021)
LESS WIND FARMS	“The Dutch Fishermen's Association is skeptical after the initial findings and would prefer a limitation on the number of wind farms, because co-use is „a possibility and a profitable alternative for a very small part of the fishing fleet,“ the association writes on its website.“ (Moons, 2024) “Wind turbine capacity is increasing steadily, meaning fewer will be needed in the future.“ (Witteман, 2023) “Dutch fishermen are pleased that the caretaker government is lowering its ambitions for North Sea wind energy.“ (van Hove, 2025) “This is finally the first sign of common sense,“ said Johan Nooitgedagt, chairman of the Dutch Fishermen's Association. „We have been saying for years that it is insane to fill the North Sea with wind turbines without taking into account fishermen, nature and a healthy food supply. The original plan of 50 gigawatts was a frontal attack on our fishing industry. This adjustment to 30 gigawatts is a step in the right direction, but far from enough.“ (van Hove, 2025)
CHANGES IN POLICY/REGULATIONS	Current restrictions on different types of fishing gear on one boat: “The results are still pending, but for Tijssen, it's clear that many regulations still stand in the way of profitable fishing between the turbines. The wind farms are quite a distance away. For example, it takes about two to three hours from Neeltje Jans to reach the Borssele wind farm . To use time efficiently, it would be useful to both raise cages and set standing gear in the same day. „But in the Netherlands, it's prohibited to have two different types of fishing gear on board simultaneously.“” (Wisse, 2024) 250m restriction zone around wind turbines (even 500m safety zone): “What also doesn't help is the strict regulations within wind energy zones. For example, fishermen who have been granted permission to enter the area must maintain a minimum distance of 250 meters from the turbines. Lobsters and crabs are particularly abundant around the foundations, having found shelter among the rubble.“ (Wisse, 2024)

Category	Quotes
PROHIBITION OF NIGHT FISHING/ACTIVITIES IN WIND PARKS	“Furthermore, it is still prohibited to be present in the wind farm at night , even though some fish species are active then, and nets must be raised very early in the morning.” (Wisse, 2024)
HIGH ADMINISTRATIVE HURDLES TO FISH IN WIND PARKS	“In addition, fishermen face a lot of administration and bureaucracy. „Initially, we had to make as many as eight phone calls to various agencies. Fortunately, that quickly decreased to two,” says Neitzel. Net locations must also be accurately communicated in advance, while in practice, fishermen are often forced to improvise, for example, due to weather conditions.” (Wisse, 2024)
PROHIBITION OF DOING OTHER WORK (THAN FISHING) IN WIND PARKS AS A FISHER	Prohibition of doing other work (than fishing) in wind parks as a fisher: “Tijssen does see a future for what he calls a „maritime entrepreneur.“ „In foreign wind farms, fishermen are also hired for other assignments. For example, you might do odd jobs for the wind farm owner or bird counts for nature organizations. You can combine that with your fishing activities. Unfortunately, that’s not yet possible due to legislation and regulations.” (Wisse, 2024) “Speaking of wind turbines, why shouldn’t fishermen lend a hand with their maintenance? The cutters sail in the vicinity anyway. If they are redesigned, they can also check the cables, give them a lick of paint, or perform technical maintenance, says Flynth director Hoefnagel. „Fishermen will still go out to sea on Mondays, but not just to fish.” Of course, this requires cooperation with the operators of the parks. According to Hoefnagel, this has been difficult to get off the ground so far. In Urk, young fishermen are already being trained in a much broader range of skills than in the past.” (van Dillen, 2024) “Fishermen, such as those in Urk, work in the North Sea. This is the largest nature reserve in the Netherlands. The researchers believe it is a logical step to make fishermen (partly) nature conservationists as well. By installing ingenious measuring systems on the cutters, you can learn more about water quality, for example.” (van Dillen, 2024)
NEW JOBS AT SEA	Since the identity of many fishers is actually closely bind to the sea, new jobs should also be located at sea or around the fishing sector (e.g. import; auctions): “I’m 51 years old and I’m a bit of a stay-at-home dad now. I’m applying, but for jobs on the water, like towing or something like that. I’ve been at sea all my life. You shouldn’t put me behind a computer in an office.”” (De-Telegraaf, 2022)
CABLE BURIAL AND PROTECTION	“In December, I worked for my cousins in their smokehouse, but I don’t aspire to that. I’m used to the view. You’re not just a shoreman, I’m realizing now.”” (Akinci, 2023) “There are still sons ready to take over from their fathers. Just look at how many young men graduate from fishing school. And at the auction, we’re looking for new revenue models. For example, we’ve invested in increasing the volume of frozen fish from Alaska.” (Akinci, 2023) “I’m not beating around the bush: the fishing industry will disappear from Urk. Some will still be sailing in the future, but the fleet will practically disappear.” Jurie van den Berg was a fisherman himself and now works at a concrete plant. [...] „“The fish processing industry is doing well. It relies on imports. Salmon, for example. That will continue and even grow. „But the soul of the village, the fleet, that will disappear.” Van den Berg says he finds it a shame, but also sees that things change over time: „That’s just the way it is. But that doesn’t mean the end for the village. The maritime sector is large. Young people still want to go into shipping. There’s plenty to do: coastal shipping, inland shipping, offshore. I’m not worried about that. I left the fishing industry two years ago. I think it’s a dying breed.” (Boelens, 2022) “None of the young people here on board actually want to go into fishing anymore. They hear too many stories, of course, about how hard it is to earn a living. They do want to sail. So they look for work in inland shipping or freight shipping at sea.” (Boelens, 2022)
MORE COOPERATION	“More cooperation. It sounds logical, but according to Flynth, it is not happening enough yet. If you own one ship, you certainly have little capital left to invest, especially now. So the researchers see the value of cooperatives, something that is already happening in Scotland, among other places. These cooperatives make major innovations affordable, says Flynth, who regularly carries out assignments for the fishing industry. According to director Hoefnagel, the current situation is limited to new nets or different fuel consumption. „This allows you to completely change course.”” (van Dillen, 2024)

The authors went on a Fieldtrip around the IJsselmeer to better understand the locations and their connection to the sea, while experiencing the layout an livability of the fishing communities first hand.

PLACE	BEFORE & AFTER
URK	Rationale: A secluded but strong religious fishers community. It would be nice if their voices are being incorporated in the energy transition dis-course After field-trip: More related topics emerged in the conversation with a local citizen, the transition of fisher industry/fishing town entagles with so-cial, cultural, ecological aspects.
HARLINGEN	Rationale: As the port of where Urk fisher community stays if they fish in North Sea, after the Afsluitdijk was built. After field-trip: Fish Production happens in the area, Urk fishers are re-mote from the community (our thought)
WINDPARK FRYSLAN	Rationale: The world biggest inland wind farm, good to look into how wind turbines are arranged, the actual spatial extent of a wind farm. After field-trip: Understanding the spatial extent of wind energy pro-duction, circulation and storage, the whole wind energy process (from wind turbines to high-voltage power)
ECW GEOHOL-DING MIDDEN-MEER	Rationale: Alternative way of energy production with greenhouses nearby (which could indicate potential exploitation of migrant farm work-ers) After field-trip: Understanding the spatial extent of geothermal pro-duction and the proximity of energy-intensive industry (greenhouse), also
SOLAR CAM-PUS PUMER-END	other „unknown“ huge infrastructures in the surroundings. Rationale: Solar panels that could be reached closely After field-trip: Understanding the spatial extent of solar energy pro-duction

DATA OBTAINED

Talk with local resident

Pictures of: energy infra-structure, traces of fishing community, traces of re-ligion

Pictures of traces of Urks fishing community (work)

Pictures of energy infra-structure

Sound samples of energy infrastructure

Pictures of energy infra-structure

Pictures of energy infra-structure



Figure C.1: Fieldwork trip around the IJsselmeer route, with some images
Source: PDOK

Interview memory protocol Urk, the Netherlands.

Interviewers: Sudents from the TU Delft, authors of this report.

Interviewee: Local resident from Urk.

Original language of the conversation was Dutch.

(We are walking though a small neighborhood, looking around like tourists.)

(This resident from Urk approached us)

Resident: Hey, are you playing tourists or something?!

Student: Hello, we are students from TU Delft, and we are looking into the wind turbines and their connection to fishing.

Resident: Oh! We can really feel some negative changes from the wind turbines for our fishing. There are so many, and they take up all the space already.

Resident: We’ve been fishing here for so long. You know, we (Urk) used to be an island, and we’ve been fishing here for centuries. We know every canyon and creek in this area, in the lake (Ijsselmeer). It used to be the sea, but because of the Afsluitdijk now this water has also changed from salt to brackish. But now they come here with these very big platforms where the wind turbines are placed, puncturing the earth, which is really bad for nature.

Resident: These wind turbines really affect every underwater flow and stream. We don’t even recognize these waters anymore. The fish stay away because of the turbulence; it’s really bad. They are really hard to find now.

Resident: Also, the birds! Every time I see them fly so close to one of these wind turbines, I hold my heart. It’s so dangerous for them as well.

Resident: When the Ijsselmeer was still the sea, it was all better. Now we fish on the North Sea where there is no space left, but we also still fish on the Ijsselmeer. It has changed completely, and it’s also going to be full soon. It’s not good for us and our income you know.

Student: For our project we try to see if there are options to better the situation a bit and...

Resident: Oh yes, you are already too late. The entire Ijsselmeer is full, and also the North Sea! There is no place to fish anymore, and the boat routes have changed so much.

Resident: You are the future, you students, but it is already too late. Of course it is important that we keep the conversation about this, yes, to make sure it will not get even worse than it is now.

Resident: You should really talk to my husband; he is in the European Union, you know. He is not here right now, but he will be back tomorrow evening. It’s a shame you miss him just now.

Resident: You should go to this school to have your talk! There you can really get some information.

Resident: I just really find it a shame, you know. I know there are other ways to create this energy.

Resident: Oh, you know, there are enough nature-created things that we could burn or something. This is not the only way.



Writers note / disclaimer:

This resident from Urk started the conversation, without being asked. She approached us. Since the conversation was naturally, we did not ask for permission to record the conversation. We made notes directly after the interview ended about what was said. At home, we wrote down the conversation from memory – what is written here, can therefore be not used as direct quotes. It is a memory protocol of how things were said.

Resident: Also we used to be a very bonded community, also because we were an island. But now society forced us to open up and also welcome immigrants. The only time we are a real community is between 9:00 and 11:30 on Sunday mornings, and around 15:00 again. Then we come together to sing and meditate, and peace returns again. Doesn’t matter what you believe; everything is welcome.

First observations and notes made by the group after the interview:

- 1) the moment we got out of our cars , a local caught sight of us
It was evident that we were outsiders
it is a small well knit community where everyone knows each other
- 2) A local approached us with intrigue rather than cynicism and was very vocal about her community and the issues that they have faced as consequences of the wind turbine project. She was the wife of a fisher man who represented the community in the European union
- 3) Is it possible that this is a very matriarchal society given that men are gone into the sea for days and women are left in charge of the town
- 4) Fishermen are always left out of the very discissions that affect the sea and their very livelihood. However they hold a lot of native wisdom about they sea that they have passed down for century. This data though not measured by devices is equally valuable and can help aid new energy projects
- 5)The local mentioned migrant communities that are a slow growing part of what was once a very closed off town.
- 6) The local mentioned underwater flows that have changed because of the windturbines and their trubulence. How does this work?



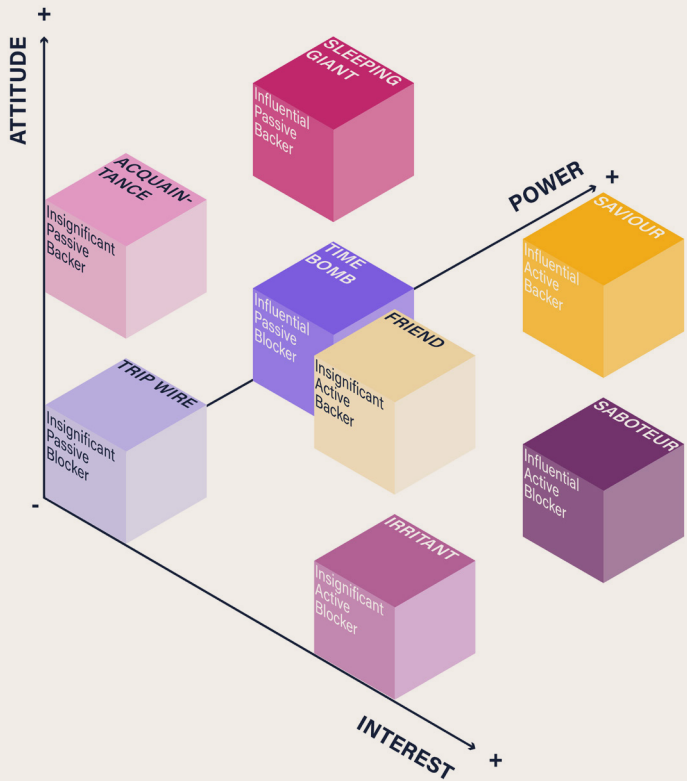
Figure D.1: Neighborhood of Urk where the interview took place, and thus the place where the resident felt we where tourists.

PROFILING STAKEHOLDERS

Stakeholders involved in the energy transition at the IJs-selmeer and North Sea scales are mapped according to their interests, perception of the issue, attitude towards the proposed vision, power and resources. They are subsequently classified into eight categories using the Power-Interest-Attitude Matrix, which provides a clarer picture of the the stakeholder in the project and faciltiates stakeholder engagement (Murray-Webster & Simon, 2006).

Governmental actors across administrative levels, including the Dutch government, national governments bordering the North Sea, and marine security securities are incorporated into the analysis to evaluate their perception of the proposed vision. Their regulartory and political power make them influencial over the feasibility of the proposal.

Figure E.1:
Power-Interest-Attitude Matrix showing the eight categories of stakeholders
Source: (Murray-Webster & Simon, 2006)



STAKEHOLDERS

GOVERNMENT

NATIONAL GOVERNMENT



PRONVINCIAL GOVERNMENT



MUNICIPALITY GOVERNMENT



EUROPEAN UNION



EUROPEAN UNION MEMBER STATE



NORWAY GOVERNMENT (PART OF EEA, NOT PART OF EU)



U.K. GOVERNMENT (NOT PART OF EEA/EU)



KUSTWACHT



MILITARY



INTERESTS

Needs and Wants

Ensure the country meet the emission/energy goals at EU level

Support National Government to limit carbon emissions and achieve energy transition goals in provincial scale

Plan and implement energy infrastructure plan; Distribute resources to sectors and people

Provide broader rules and regulations for the renewable energy systems

Collaborate with other member states in energy transition to reduce costs

Collaborate in energy transition without having many responsibilities imposed by EU

Promote energy transition and emission goals according to Nationally Determined Contributions in the UN

Support the surveillance and monitoring of the energy systems and the fishing grounds

Secure national security

PROBLEM PERCEPTION

Ambitious in reaching energy goals. Ensuring the energy goals could be achieved by provinces and municipalities.

Energy infrastructure requires space; Where to get the land and how much land to get are the concerns

Concern about communities' view on local plans and policy and how energy transition can be implemented

Concern about whether each member state could reach its emission and transition goals

The sea as an untapped site for developing blue economy; An ideal site for renewable energy infrastructure development

Concern about the decline in the reliance of fossil fuels from other countries

Seek partnership for energy transition after Brexit

Concern about how energy transition would change the job nature, role and workload

Energy infrastructure on sea could be disrupted and destroyed

ATTITUDE

Positive/
Negative

Positive/Negative

Positive/Negative

Positive/Negative

Positive/
Negative

Negative

Positive/Negative

Positive

Positive/Negative

POWER

How can they help/block our vision?

Big neutral power: Drafting national energy vision and goals, recognising the legitimacy of the North Sea common

Blocking power: Strict on the provincial energy goal. Would be difficult to negotiate when they have no stake in changing provincial goal

Limited neutral power: Have to follow provincial government's decision, but also adaptive to local needs.

Big Netural Power: Have the upper hand in decision-making and in executing energy systems, either in favor of or against plans to incorporate the fishers.

Big neutral power: Drafting national energy vision and goals, recognising the legitimacy of the North Sea common

Big blocking power: As Norway is not in EU, there is no responsibility in aligning themselves with other EU member states around The North Sea when their interests are harmed

Blocking power: When The UK is out of EEA or EU, which makes negotiations of the commons difficult when the relations are mainly driven by market incentives

Supportive Power: Could help oversee and manage the commons, and guard the newly introduced interventions, such as artificial reefs and transit hubs.

Supportive Power: Could help oversee that rules and regulations are being abided to at a national level

RESOURCES

Assets they can mobilise

Accessibility and network within public institutions. Data availability, legitimate lobbying and negotiating power in national and EU scale

Accessibility and network within public institutions. Data availability, legitimate lobbying and negotiating power in provincial scale

Accessibility and network within public institutions. Data availability, legitimate lobbying and negotiating power in local scale

Ability to influence diverse stakeholders/ communities

Accessibility and network within public institutions. Data availability, legitimate lobbying and negotiating power in national and EU scale

Political boundary that does not allow the proposed development/fishing boats to go into their sovereignty

Political boundary that does not allow the proposed development/fishing boats to go into their sovereignty

Ability to monitor and guard

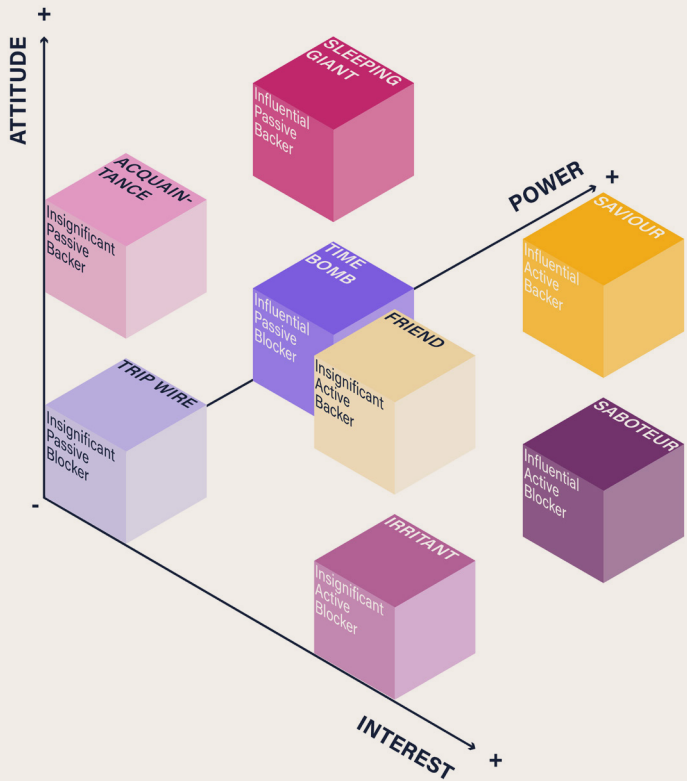
Ability to monitor and guard

PROFILING STAKEHOLDERS

Nature, encompassing fauna, flora and water systems, is recognised as a fundamental driver of the energy transition and is therefore included in the analysis.

Fishing communities, together with their subcommunities and ancillary industries, are central to the proposal. Their perspectives play a signficiant role in shaping the strategy.

Figure E.2:
Power-Interest-Attitude Matrix showing the eight categories of stakeholders
Source: (Murray-Webster & Simon, 2006)



STAKEHOLDERS

NATURE

NATURE

COMMUNITIES

TRADITIONAL FISHER

TIRED FISHER

SILENT FISHER

ADAPTIVE FISHER

FISHERWOMEN

FUTURE GENERATION

FISH PROCESSING INDUSTRIES

BOAT INDUSTRIES

SHIPPING INDUSTRY

INTERESTS

Needs and Wants

Leave non-human beings intact;
NO disruption on natural cycles and ecosystems.

Preserve traditional fishing industries (the status quo) and minimise impacts of energy transitions on themselves.

Preserving family fishing traditions while securing a stable livelihood even if it requires changing professions.

Stable income and safer maritime work while maintaining maritime identity.

Maintaining a viable fishing economy by exploring other maritime services and trade.

Stable household income, community wellbeing, and sustaining local fishing-related businesses.

Diverse and meaningful career opportunities linked to modern maritime sectors.

Stable fish supply, strong trade networks, and continued economic growth.

Demand for vessel construction, maintenance, and maritime innovation.

Aid in the import and export of goods across the region

PROBLEM PERCEPTION

Energy transition brings positive impacts in the long-term but creates immediate negative impacts.

NIMBY; Unnecessary; Procedural injustices, when they are not involved in the decision-making process.

EU regulations (pulse fishing ban), offshore wind expansion, and lack of public consultation make the fishing industry unsustainable.

Fishing is becoming less viable and vessels are not suited for new offshore work without investment.

Concern about the disruption on traditional fishing industry but seeing the growth of other maritime industries as opportunities.

Concern about job security and community stability.

Concern about future job opportunities in renewable energy sectors and maritime services.

Concern about the impacts of energy transition on fish supply chains.

Concern about how the expansion of offshore wind farms create new vessel demand.

Current Windfarms and Natura Zones obstruct routes, leading to extra cost in circumventing them

ATTITUDE

Positive/Negative

Negative

Fence-sitter

Fence-sitter

Positive

Positive

Positive

Positive

Positive

Positive

POWER

How can they help/block our vision?

Fundamental production power: Nature provides resources for energy production, enabling the transition to happen

Blocking power: Coalition with other opposition parties; Protest

Depends: Protest because of reduced fishing grounds and opportunities / Support the transition for stable income

Depends: Protest because of reduced fishing grounds and opportunities / Support the transition for stable income

Supportive power: Support innovation, education, and diversified career paths.

Supportive power: Support community acceptance and workforce participation; may resist if livelihoods are threatened.

Supportive power: Accelerate transition by entering new maritime and renewable industries.

Supportive power: Can support transition by expanding processing plants and product lines

Supportive power: Accelerate transition by designing offshore wind support vessels

Supportive power: Could aid with the export of locally produced goods and share knowledge on viable transit ruotes

RESOURCES

Assets they can mobilise

Energy flows, nutrient cycles, that shape climatic elements and land, affecting where and what for energy production.

Ability to mobilise people across fishing communities, sharing unverified information; Knowledgeable with local knowledge on sea

Generational fishing knowledge, practical sea skills, vessels/ equipment, and strong community networks within the fishing sector.

Can support by repurposing vessels and working in offshore wind support; may block if transition costs are too high.

Industry networks, logistics systems, trading infrastructure, maritime expertise.

Social networks, processing skills, local knowledge, family business management.

Education, digital skills, adaptability, new technical expertise.

Industry networks, logistics systems, trading infrastructure, maritime expertise.

Shipyards, engineering expertise, repair facilities, vessel design capacity.

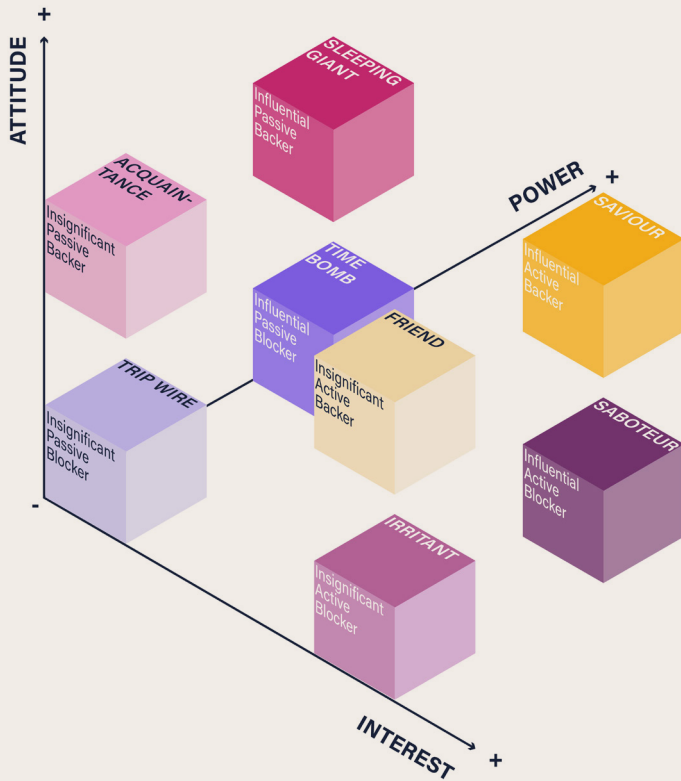
Ability to mobilise

PROFILING STAKEHOLDERS

Civil society, plays a supportive role in just transitions and contributes to the legitimacy of the proposal and broader public support.

Energy sectors, as primary drivers of the energy transition, are critical in determining whether the proposed vision can be integrated into their energy infrastructure. Their participation and support will help anchor the proposal.

Figure E.3:
Power-Interest-Attitude Matrix showing the eight categories of stakeholders
Source: (Murray-Webster & Simon, 2006)



STAKEHOLDERS

CIVIL SOCIETY

ENVIRONMENTAL GROUPS



RESEARCH INSTITUTIONS AND UNIVERSITIES



ACTIVIST GROUP



ENERGY

FOSSIL FUEL CORPORATIONS



RENEWABLE ENERGY CORPORATIONS



INTERESTS

Needs and Wants

Reduce human impacts on the environment; Give policy suggestion; Raise environmental awareness

Show climate urgency with data supported; Support energy transitions with evidence, innovations and knowledge

Varies; Ensure their demands are recognised and addressed

Ongoing reliance on fossil fuel resources (oil, natural gas)

Promoting green energy; Expanding market share for more profits ; Supporting energy transitions

PROBLEM PERCEPTION

Concern about whether the energy transition could be achieved without creating immediate negative environmental impacts (e.g. ecological disaster, pollution)

Concern about just transitions and different means for renewable energy production

Challenge technocratic approach towards energy transition; Raise neglected issues in the public discourse (e.g. animal rights)

Harm long-term financial viability when renewable energy has greater market share

More investment; More spaces for energy infrastructure; Opposition from fishing communities; Competitions within the market

ATTITUDE

Positive/Negative

Positive

Positive/Negative

Negative

Positive/Negative

POWER

How can they help/block our vision?

Blocking power: When certain policies are not aligned with their view; Production power, when their stances are complementary to the policies

Supportive power: Back up energy policies implemented across different scales. Provide suggestions for policymakers

Supportive power: Raise public awareness of the issues raised in our vision and other issues that hidden in the discussion

Blocking Power: Strong lobbying power in hindering energy transition

Leading Power: Gaining lobbying power in fostering energy transition

RESOURCES

Assets they can mobilise

Lobbying power (in political parties); ability to mobilise; knowledge in natural conservation

Knowledge-exchange with different stakeholders for informed decisions.

Ability to mobilise community members and draw public attention; Network with media and press

Existing energy resources make them have greater lobbying power

Financial Resources and lobbying power, whether they accept the regulations.

Turbines and Tensions

This position paper adopts the perspective of utility-scale offshore wind developers (UOWFDs'), key actors in the transformation of the North Sea into a renewable energy landscape (See figure 1). Major companies active in this sector include Orsted, Vattenfall, RWE, Shell and Equinor, which hold long term development rights for offshore wind farms in the North Sea (Van Diest & Amersfoort, 2023), as shown in figure 2. To provide a focused and coherent perspective, this paper uses Vattenfall as a representative example actor for this group*, while the analysis is grounded in broader research on UOWFDs' and the offshore wind sector.

We as offshore wind developers are driven by the need to deliver substantial volumes of, and cost-efficient renewable energy, while prioritizing spatial efficiency, technical feasibility and system integration (Vattenfall, n.d. ; Schupp et al., 2020). The studio's community vision, which promotes multi-use and greater consideration of fishing communities, aligns with our sustainability goals but introduces spatial and operational challenges. In particular, the redistribution of marine space and the integration of multiple uses within wind farms (Michler-Cieluch & Krause, 2008 ; BWO – German Offshore Wind Energy Association, 2025) may conflict with the requirements for efficiency, safety and system integration that support large-scale wind energy production. This raises concerns regarding whether the proposed vision can deliver the energy transition at the scale that is required.

Multi-use wind farms

From our perspective, wind farm design is highly sensitive to spatial conditions, including turbine spacing, wake effects and access for installation and maintenance (Michler-Cieluch & Krause, 2008 ; BWO – German Offshore Wind Energy Association, 2025 ; Röckmann et al., 2017 ; Wever et al., 2014). The studio's vision proposal to introduce multi-use principles within wind farms, such as integrating fishing activities, challenges this spatial logic. Vattenfall has a low interest in multi-use, unless clear value can be demonstrated in both economic and spatial patterns, with minimal risk for all involved parties (Schupp et al., 2020 ; Michler-Cieluch & Krause, 2008). Interviews conducted by Michler-Cieluch & Krause (2008) highlight persistent concerns regarding multi-use implementation, resulting in caution and restraint from multiple other developers as well.

We as Vattenfall primarily emphasize the technical and coordinational challenges associated with multi-use (Schupp et al., 2020 ; Michler-Cieluch & Krause, 2008 ; Wever et al., 2014). Additional users may damage fixed turbine structures, as envisioned in figure 3, and offshore wind farm planning is already complex: introducing new uses increases costs for design checks and safety measures. Questions around insurance and liability, such as who is responsible if damage occurs, remain unsolved, and the lack of trust between us and the different users groups, for example ensuring fishers adhere to agreed practices, further complicate matters (Michler-Cieluch & Krause, 2008 ; Wever et al., 2014). As a result, what the community vision frames as a more inclusive and multifunctional use of space may, from our perspective, undermine efficiency, safety and reliability required for large-scale offshore wind energy production.

Besides that the development of offshore wind energy involves substantial costs, constructing multi-use wind farms is particularly expensive to implement (Kaldellis & Kapsali, 2012 ; Röckmann et al., 2017). This also results in high repair and operational costs, if damage is done by additional wind farms users. At the same time research into shared operational and management frameworks suggest potential opportunities to reduce expenses and improve efficiency (Röckmann et al., 2017). From our perspective, these economic considerations further complicate the implementation of multi-use principles, reinforcing the need for careful risk assessment and more research before introducing new activities within our wind farms (BWO – German Offshore Wind Energy Association, 2025).

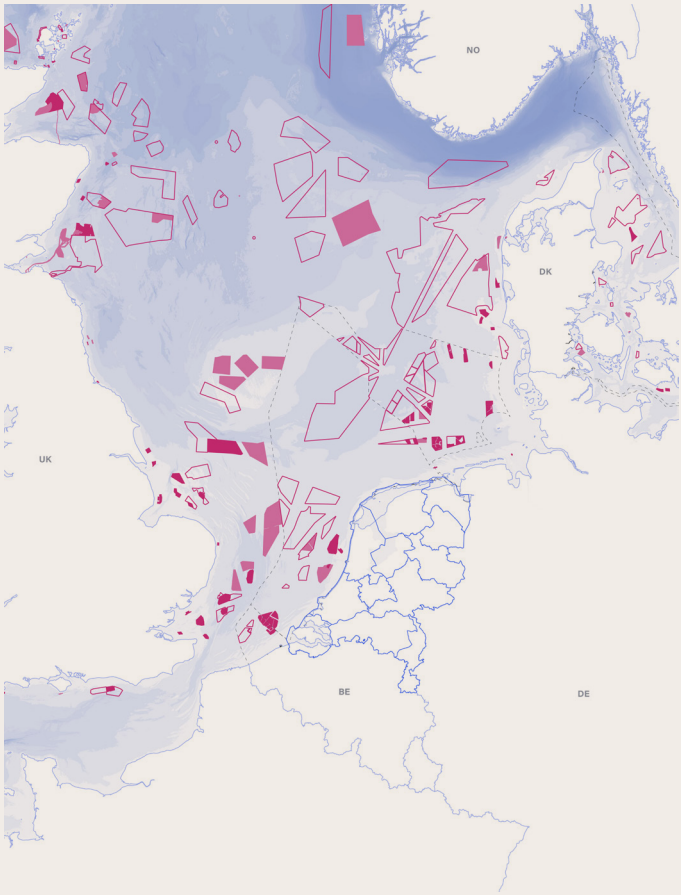


Figure 1: The current and future wind farms layout of the North Sea
Source: Het Informatiehuis Marien; EMODnet European Commission

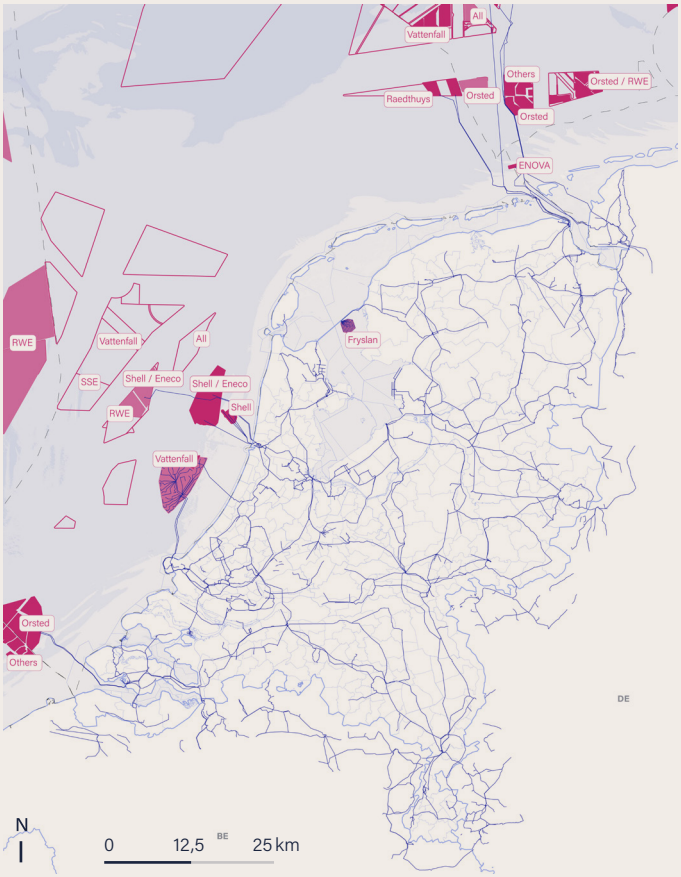


Figure 2: The (ownership of) offshore windfarms and high voltage system of the Netherlands
Source: Het Informatiehuis Marien; EMODnet European Commission, Source materials AR2U086 2026, TGS4c

Additional costs

Beyond the challenges related to multi-use, we also question the overall cost-benefit balance of other elements in the proposed vision. The vision plan to relocate new wind farms further offshore aligns with higher wind speeds, but also significantly increase construction and operational costs (Bilgili et al., 2010). Greater distance from shore results in longer travel time for installation and maintenance, as well as higher expenses for export cables connecting turbines to the onshore grid (Bilgili et al., 2010). In addition, offshore locations are often characterized by deeper water and harsher weather conditions, further increasing investments cost (Bilgili et al., 2010).

Floating hydrogen wind farms

The studio vision proposes floating hydrogen windfarms as a potential solution to reduce the reliance on long-distance cable infrastructure. However from our point of view, both floating wind technology and offshore hydrogen production remain relatively underexplored. While research, like Barter et al. (2020) from the U.S., shows the potential for offshore floating wind turbines, these technologies are still under development and require significant advancement and cross-sector coordination before becoming cost-effective. Although institutions, like the Rijksdienst voor Ondernemend Nederland (RVO, n.d.), support innovation through subsidies, the combined application of floating hydrogen windfarms introduces additional uncertainty. As a result, these solutions may conflict with our priority to deploy proven and reliable technologies in order to meet the energy



Figure 3: Fishing vessels damaging wind farm cables with their anchors and nets
Source: Freepik, techxplore.com

targets (Vattenfall, n.d.).

Overall, from Vattenfall's' perspective, the North Sea is primarily understood as a strategic place for delivering large-scale renewable energy. While the proposed community vision aligns with our broader sustainability and justice goals, its emphasis on multi-use, spatial redistribution and technical experimentation introduces challenges in term of efficiency, costs and reliability. We primarily prioritize economic viability and risk management, while remaining open to innovation and change, provided that these are well-researched and offer clear benefits to our operations (Michler-Cieluch & Krause, 2008 ; Schupp et al., 2020). This highlights that the implementation of such a vision would require careful balancing of competing priorities, as well as the stimulation of further innovation across sectors. With all eyes on the North Sea, conflicts can become opportunities for

**Disclaimer; While this paper adopts the perspective of key UOWFDs', like Vattenfall, it does not fully capture the diversity in the sector. Established developers are typically better positioned to access international markets due to their resources and experiences, allowing them to scale up existing technologies more easily (Van Der Loos et al., 2020). In contrast, younger and smaller developers depend more on innovation systems and policy support to develop new solutions (Van Der Loos et al., 2020). As a result, attitudes towards risk, technological innovation and multi-use practices may differ significantly across actors, with larger developers generally favoring proven and market-ready approaches.*

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Language and style corrections were supported by OpenAI’s ChatGPT (GPT-5) AI tool.

MULTI-USE, MULTI-FUEL: CHARTING THE NORTH SEA’S ENERGY FUTURE WITH SHELL

ALIGNING ENERGY SECURITY, COMMUNITY INTERESTS, AND ENVIRONMENTAL STEWARDSHIP

1. Stakeholder Role and Interests

At Shell plc, we operate as an integrated energy company with a central role in the North Sea’s past, present, and future energy systems. Our activities span oil and gas extraction, liquefied natural gas (LNG), offshore infrastructure, and an expanding portfolio in solar, offshore wind, hydrogen, and carbon capture and storage (CCS).

Our primary interests in the envisioned development of the North Sea are:

- Integrated Gas: We explore and extract natural gas and liquids, turning some into liquefied natural gas (LNG) or converting it into gas-to-liquids (GTL) fuels.
- Upstream: We focus on finding and producing crude oil, natural gas, and natural gas liquids.
- Marketing: We run our retail network, sell lubricants, and provide low-carbon energy solutions like biofuels.
- Chemicals and Products: Our refineries transform crude oil into fuels and chemicals.
- Renewables and Energy Solutions: We invest in renewable power, solar, hydrogen, carbon capture, and carbon credits.
- Trading and Supply: We use our global network to optimize delivery of power, biofuels, oil, and gas.

We recognize the growing importance of environmental stewardship and societal inclusion. However, we maintain that the transition must be gradual, system-oriented, and economically grounded.

2. Position on the Community Vision

We support the overarching ambition of a sustainable and diversified North Sea and acknowledge the importance of strengthening Dutch fishing communities. However, we take a conditional and critical stance toward key elements of the vision, particularly:

- The designation of protected fishing hotspots
- The prioritization of community-led spatial governance over system efficiency
- Potential constraints on offshore energy infrastructure expansion

Our position is that:

A just and sustainable North Sea transition must prioritize integrated, multi-use spatial planning where energy infrastructure remains central, while selectively accommodating fishing activities where feasible.

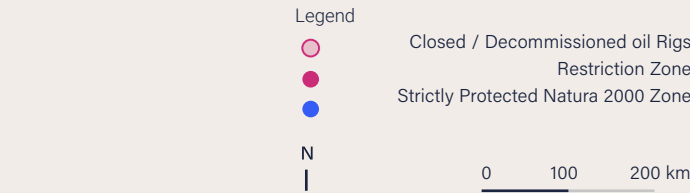


Figure 1: Operational , Shell Operated & Closed / Decommissioned oil Rigs
Source: This map was sourced from Maritime Forum ,EMODnet, European

3. Balancing Energy Transition & Community Interests

Energy Security as a Non-Negotiable Foundation

The North Sea is not only a cultural and ecological space but also a strategic energy landscape. Offshore wind farms, gas infrastructure, and future hydrogen systems are essential to achieving national and European climate goals.

Scientific and policy literature consistently highlights that:

- Offshore wind will form the backbone of Europe’s renewable energy system. The International Energy Agency projects that offshore wind capacity in Europe must increase more than tenfold by 2050 to meet net-zero targets (IEA, 2021).
 - Natural gas remains a transition fuel necessary for grid stability, particularly in balancing intermittent renewable energy sources (IEA, 2022).
 - Large-scale CCS is required to meet net-zero targets. The Intergovernmental Panel on Climate Change identifies carbon capture and storage as essential in scenarios limiting warming to 1.5°C (IPCC, 2022).
- Restricting spatial access for energy infrastructure through extensive protected fishing zones risks:
- Reducing renewable energy capacity
 - Increasing total system costs for producing, delivering, and maintaining energy
 - Delaying decarbonization timelines

This directly conflicts with climate targets and energy affordability objectives.

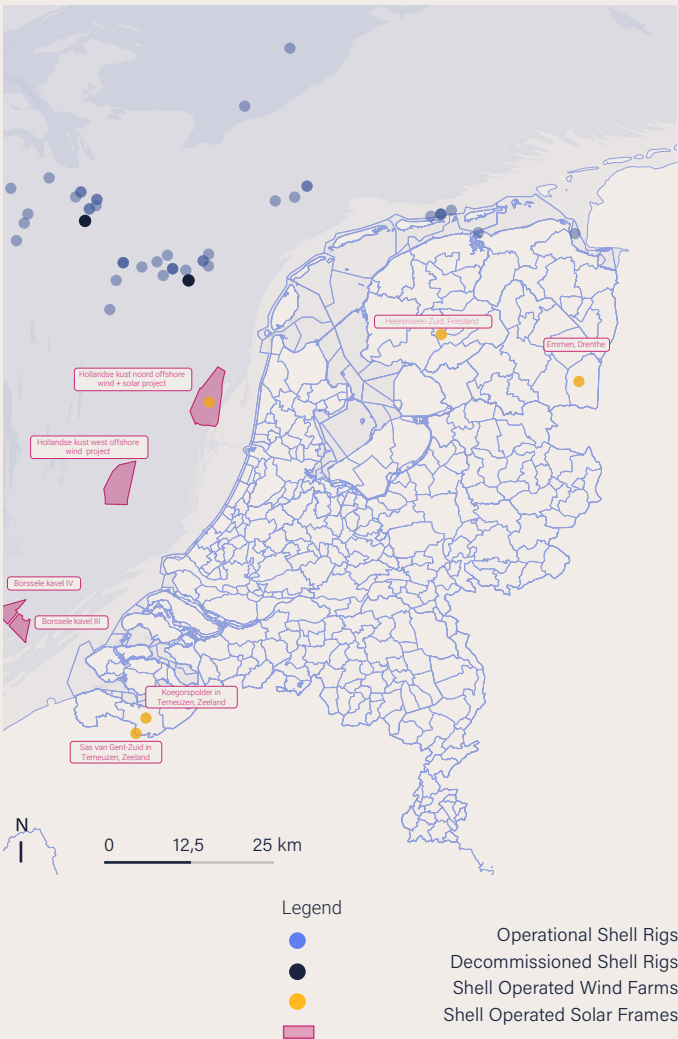
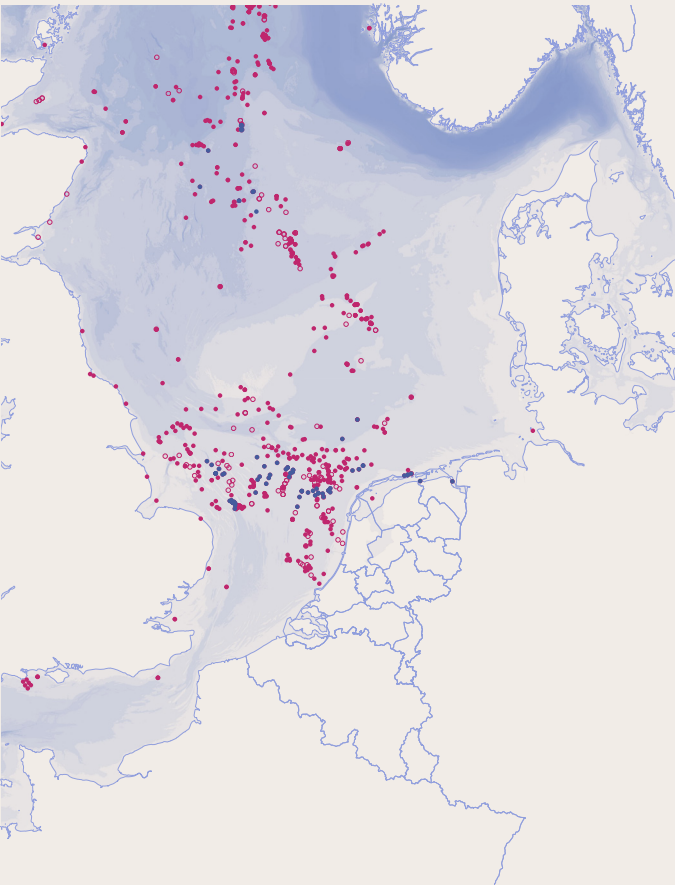


Figure 2: Shell’s active involvement in diversifying its investments towards renewable sources of energy.

Source: This map was sourced from , EMODnet, & data collected from Shell

Economic Viability and Transition Financing

The vision proposes new systems such as cooperative networks and learning corridors. While valuable, these depend heavily on stable financial resources. Oil and gas revenues continue to play a critical role in:

- Financing offshore wind expansion
- Supporting hydrogen development (e.g., large-scale electrolyzers)
- Enabling CCS infrastructure

Given the scale of required investment estimated by the International Energy Agency to reach trillions of Euros globally by 2050 continued revenues from existing energy systems remain a key enabler of the transition (IEA, 2021).

A rapid restriction of fossil fuel activities in favor of localized community control would:

- Undermine investment capacity
- Increase reliance on public funding
- Slow down large-scale energy innovation

We therefore maintain that continued, selective fossil fuel production is necessary to fund the transition envisioned.

Governance and System Coordination

We support greater inclusion of fishing communities in decision-making processes.

However, the proposed governance model risks becoming:

- Fragmented
- Inefficient in large-scale spatial coordination
- Misaligned with technical and economic constraints of offshore systems

This risk aligns with the concept of the Tragedy of the Commons, where decentralized control over shared resources can lead to inefficiencies and suboptimal outcomes (Hardin, 1968).

Offshore energy systems require:

- Long-term planning horizons
- High capital investments
- Centralized coordination across national and international scales

4. Evidence Base

Our position is supported by:

- International Energy Agency: emphasizes the ongoing need for oil, gas, and offshore wind expansion during the transition, and highlights the scale of investment required for net-zero pathways (IEA, 2021; 2022).
- Intergovernmental Panel on Climate Change: underscores the necessity of CCS and system-wide transformation to meet climate targets (IPCC, 2022).
- Industry data: demonstrates the technical feasibility of multi-use offshore platforms and co-location strategies.
- Shell plc reports (2025): confirm continued investment in LNG and offshore energy, expansion of hydrogen and CCS projects, and integration of offshore wind into future energy systems (Shell, 2025).

These sources collectively show that energy system transformation must be systemic, not sector-specific.

5. Spatial Implications of Our Position

Our position implies a reconfigured North Sea spatial structure:

Core Spatial Elements

- **Energy zones (dominant use):**
 - Offshore wind farms
 - Hydrogen production hubs
 - CCS infrastructure corridors
- **Multi-use zones (integrated use):**
 - Wind farms combined with aquaculture
 - Controlled fishing access within energy areas
- **Selective fishing priority areas:**
 - High-value or culturally significant fishing grounds
 - Located outside key energy corridors

6. Conclusion and Policy Recommendations

As Shell plc, our position is grounded in our role as an integrated energy company operating across the full energy value chain from upstream production and LNG to renewables, hydrogen, and carbon capture and storage. This integrated portfolio uniquely positions us to enable a system-wide energy transition in the North Sea.

We share the ambition for a just and sustainable North Sea. However, we argue that:

- The transition must be energy-system-led, reflecting the interconnected nature of gas, electricity, hydrogen, and carbon management systems in which we actively operate
- Multi-use integration, rather than strict protection, offers the most viable path forward, aligning with our activities in offshore wind, trading, and emerging marine co-use models
- Continued fossil fuel activity, combined with rapid low-carbon investment, is essential to sustain the financial and technological capabilities required across our business segments
- Fishing communities can thrive through integration into new maritime economies, creating opportunities that align with our investments in offshore infrastructure and energy systems

We therefore recommend:

- Prioritizing offshore energy zones within North Sea spatial planning frameworks, consistent with our role in developing large-scale offshore wind, hydrogen, and CCS infrastructure
- Implementing flexible multi-use policies instead of rigid protected fishing zones, enabling synergies between energy production and marine economic activities
- Maintaining regulated and declining fossil fuel production to finance the energy transition, in line with our integrated gas and upstream operations
- Strengthening participatory processes while preserving centralized coordination for large-scale infrastructure, ensuring alignment with the technical and economic realities of offshore energy systems in which we are a key actor

In this light, the North Sea should not be seen as a space of competing claims, but as a strategically coordinated, multi-functional energy and maritime system. From our perspective as Shell plc, this approach ensures that economic, environmental, and social goals are aligned through efficiency, innovation, and system integration.

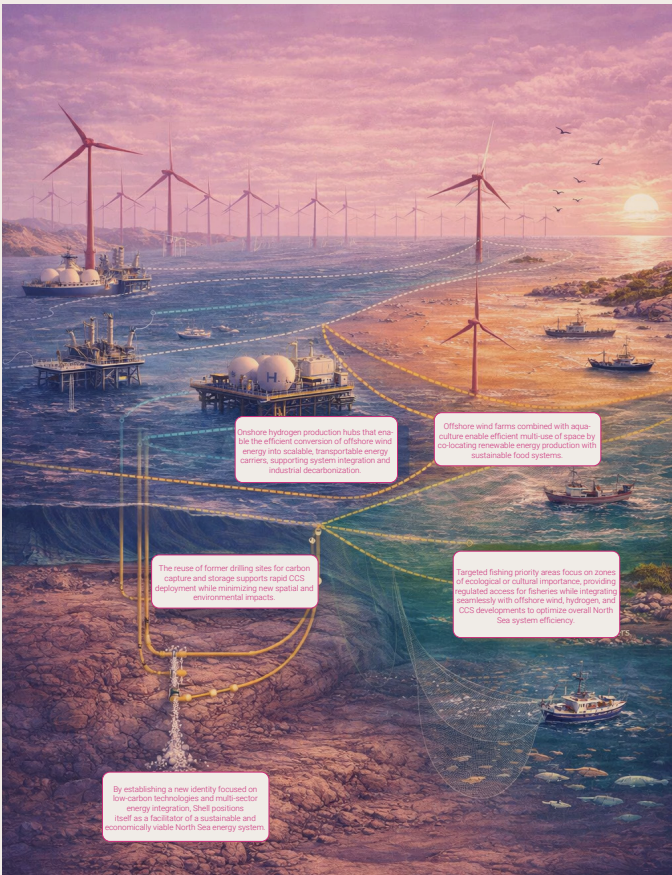


Figure 3: From Oil Major to Integrated Energy Partner: Shell's North Sea Vision
Source: This image was generated using ChatGPT by applying a collage-style illustration based on this report. The overall content of the image was derived from the report's Conclusion and Policy Recommendations sections.

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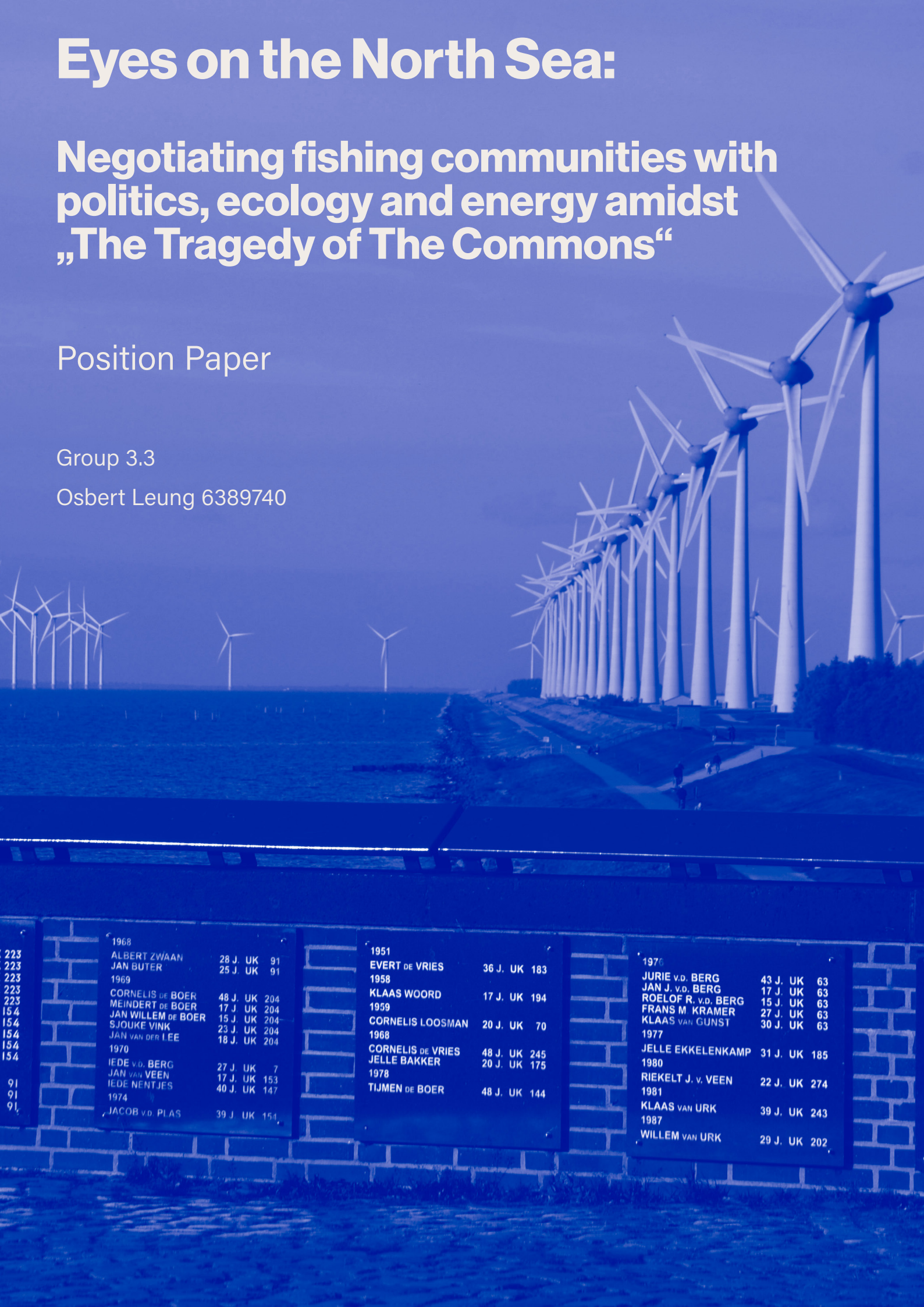
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Eyes on the North Sea:

Negotiating fishing communities with politics, ecology and energy amidst „The Tragedy of The Commons“

Position Paper

Group 3.3
Osbert Leung 6389740



POSITION IN THE DELIBERATIVE ARENA

The deliberative arena comprises four stakeholders with high power and/or interests. Environmental groups, as one of them, are positioned with high power and high interest, reflected by their ongoing advocacy and lobbying efforts with fossil fuel and renewable energy corporations. Their involvement in the just energy transitions in the North Sea is crucial to guide corporations to make informed decisions and preventing greenwashing.

OVERVIEW

We, Seas At Risk, and other environmental groups, have long been vocal in intervening in the discourse of the blue economy and growth. In our joint manifesto, we state that “the relentless pursuit of blue growth is pushing European seas to the brink” (Seas At Risk et al., 2024, p. 4). The growth trend has made 90% of the European marina area overexploited by diverse human activities. The EU-wide energy transition driven by the European Green Deal posed further burdens on the sea with offshore wind energy infrastructures, for instance. Therefore, we advocate for “a truly sustainable blue economy” (p. 3) that centres “human needs within ecological limits” (p. 4) with the Blue Doughnut concept derived from Raworth’s Doughnut Economics (Seas At Risk, 2023).

Our stance is not merely an imagination in the growth-centred political landscape, especially when there are increasing interactions between wind energy corporations and environmental groups in jointly exploring measures to enhance biodiversity with climate mitigation (see Belgian Offshore Platform et al., 2021; Offshore Coalition for Energy and Nature (OCEaN), 2024).

VIEWPOINT

We welcome the proposed community vision, which aligns with our vision towards a blue economy that respects the ecological ceiling (Seas At Risk, 2023) with further ecological restorative and regenerative initiatives (Seas At Risk et al., 2024). The North Sea Common proposed in the plan serves as a prototype of what Seas At Risk (2024) suggests, incorporating strong cross-border marine governance, with nature-inclusive design structures and co-location strategies with energy infrastructure (such as wind farm). The emphasis on people’s well-being and ecological integrity is what we advocate for the future of the marine spaces.

We did not explicitly employ the concept of ‘blue degrowth’, but we do share a similar vision for the blue economy, as Hadjimichael (2018) and Ertör and Hadjimichael (2020) advocate for the use of marine resources (including energy and material) in a socially and ecologically just manner. Specifically, the proposition of collective ownership and stewardship of the marine spatial resources demonstrates how degrowth could redefine the ‘blue economy’ (Hadjimichael, 2018).

Respecting Ecological Limits – The North Sea Common

By 2050, almost 70% of the total offshore renewable generation capacity would come from the North Sea along with other sites including the Baltic Sea, the Mediterranean Sea and the Atlantic Ocean (Seas At Risk, 2024). The North Sea then became a contested area with diversified interests. Turning it into a negotiable, regenerative common would indeed make the blue economy just.

The current community vision incorporates circular use of energy infrastructures, including obsolete oil rigs and wind farms, which gradually reduces resource demand and facilitates a closed-loop supply chain. Deep-sea mining (DSM) has been an emerging human activity in other deep oceans to extract raw materials for batteries and elec-

reversible impacts on biodiversity contributed by DSM, including the release of greenhouse gases stored and disturbance of the marine food chain. Therefore, a holistic consideration of the wind energy value chain, from raw materials to wind turbine operation, is important. The incorporation of circularity in the project is worth further exploration. This would further support our advocacy to ban DSM in European water with a more concrete direction (Seas At Risk et al., 2024).

The proposed development mainly focuses on the operation and decommissioning phases of the offshore wind turbines, further consideration should also be put on the planning and designing and construction phases to mitigate the negative impacts on the ecosystem. For instance, WWF-Norway (2014) highlighted the need to keep migration corridors for birds in planning and consider reproductive periods and migration patterns of fish and marine mammals in construction and decommissioning. The North Sea Common should also consider animals, including birds, fish and marine mammals, as stakeholders to ensure they are not neglected in the just transition.

Safeguarding Fishing Communities’ Well-Being

It is strategic to include mixed-use windfarms on the North Sea, which aligns with our vision of implementing co-location strategies for affected communities’ well-being (Seas At Risk, 2024). Although their feasibility and practicality are still under research, co-location would bring diverse benefits to people and the environment. Besides, the North Sea Common provides a platform for engaging low-impact fishers co-managing fish resources with researchers and local NGOs, which further supports the transition towards sustainable fisheries (Seas At Risk et al., 2024). The involvement of fishing communities in the offshore renewables development would ensure their abilities and interests are considered, safeguarding their livelihood in the energy transition.

FURTHER SUGGESTION

Further strategies to be incorporated in the North Sea Common could be mandatory non-price criteria on offshore renewable energy project auctions (Birdlife International, 2025; Seas At Risk et al., 2024). The non-price criteria cover aspects like biodiversity and benefits to communities (OCEaN, 2023), which motivate energy developers to further consider the environmental and social benefits of the project (Birdlife International, 2025). The initiative has been widely supported by several offshore wind developers, considering the potential benefits yielded, including the rise in public reputation and community acceptance of new projects. Given that the fishing communities play a central role in the community vision, this could serve as an institutional instrument to align the interests of the renewable energy industry with other stakeholders in the North Sea Common.

CONCLUSION

We, Seas At Risk, fully support the community vision that guides energy transitions in a socially and ecologically just manner. The North Sea Common serves as an innovative initiative to experiment with cross-border and inclusive governance of the currently contested marine space. We welcome further collaborations to strive for a sustainable blue economy and just transitions.

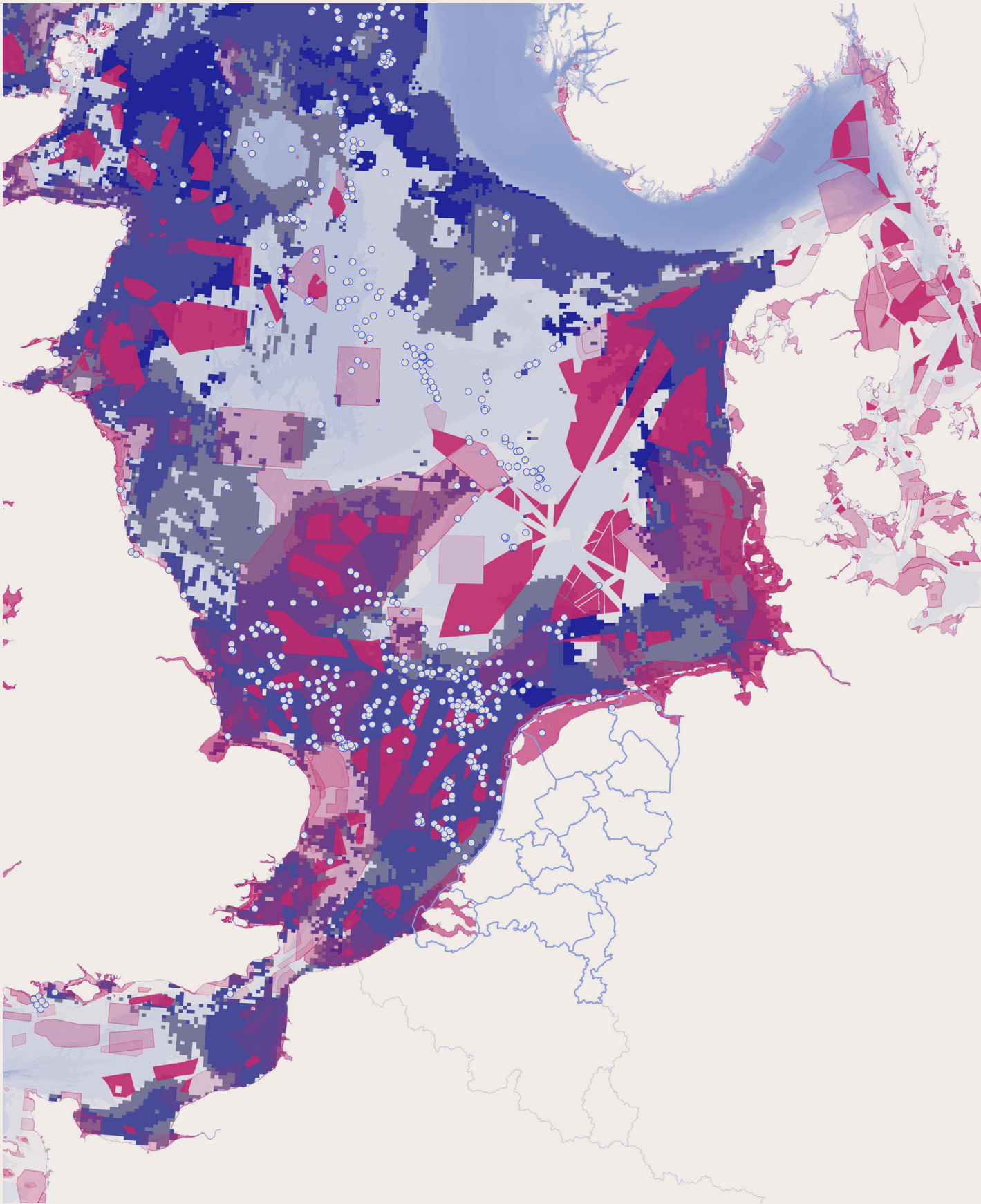


Figure 1: Overview of Ecology, Marine Protection Zone, Energy infrastructure in the North Sea
Source: Protected Planet, EMODnet

Several oil rigs and windfarms are located in Marine Protection Area. The conflicting functions on the sea pose threats on the ecosystem, especially at the fish habitats. Further planning of the energy infrastructure should avoid ecological sensitive area.

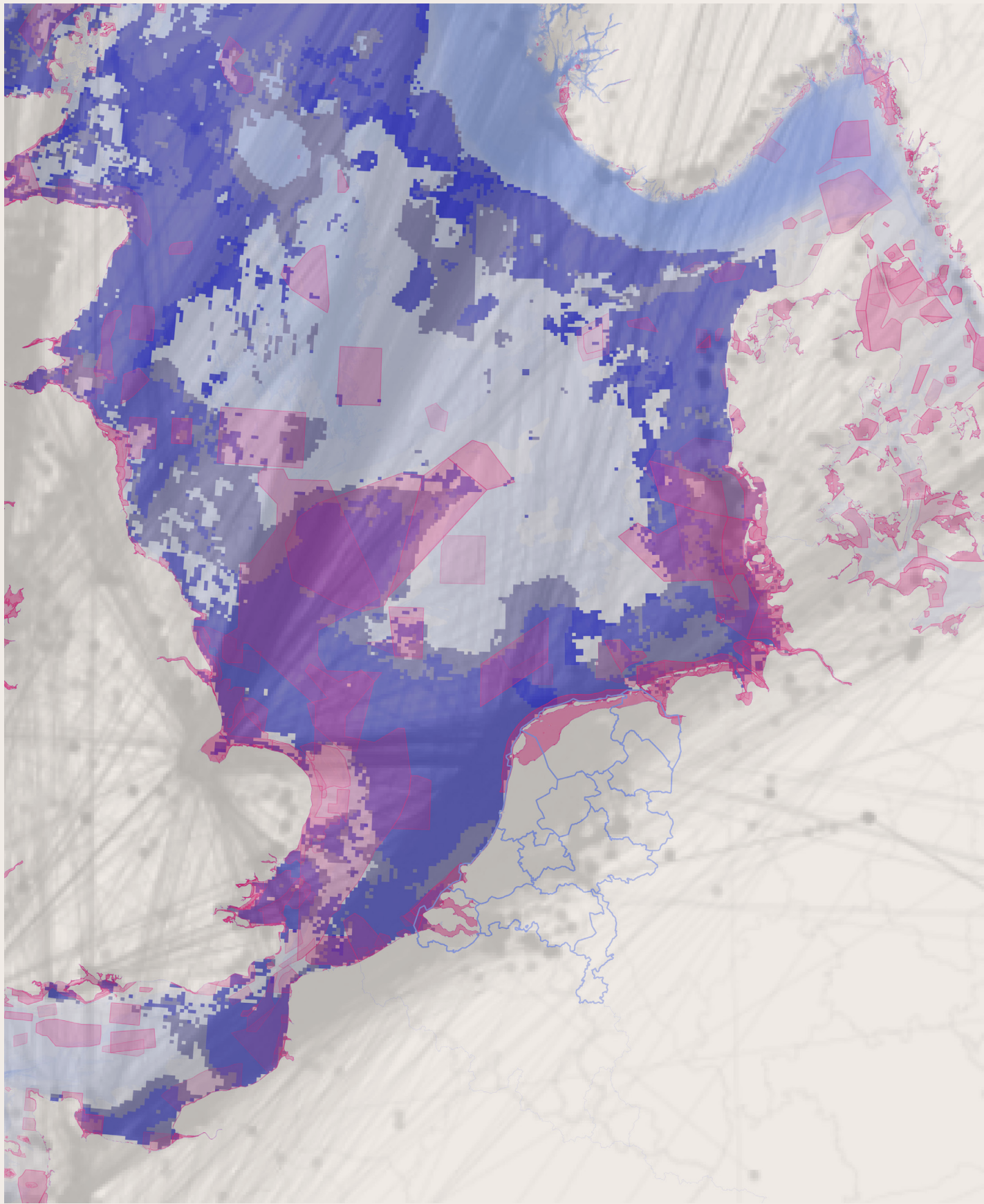


Figure 2: Ecology and Marine Protection Area in the North Sea
Source: Protected Planet, Migration Atlas, EMODnet

Fish Spawning Ground

High Probability	Marine Protection Area
Medium Probability	Bird Flight Path
Low Probability	(Eurasian Oystercatcher)

N
0 75 150 km

The flying path of Eurasian Oystercatcher (*Haematopus ostralegus*), a currently vulnerable species, is overlayed above the marine protection area. Density of bird flight paths could be another criteria for consideration when placing energy infrastructure.

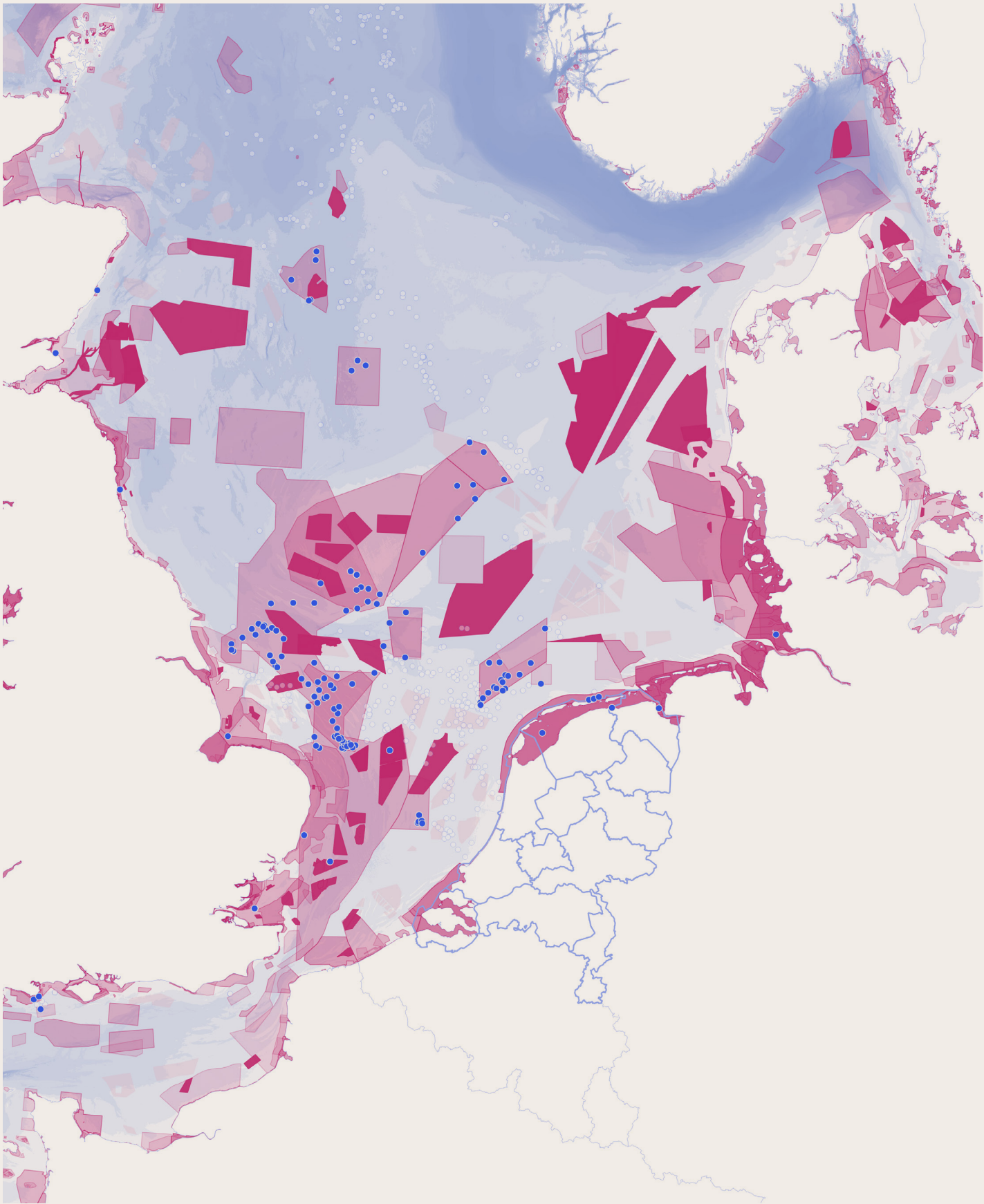


Figure 3: Energy Infrastructure with Ecological Restoration Potential in the North Sea
Source: Protected Planet, EMODnet

Oil Rigs and Gas Fields in Marine Protection Area (for future restoration)
Wind Farm in Marine Protection Area (for future restoration)
Other Oil Rig and Gas Field
Other Wind Farm
Marine Protection Area

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0 75 150 km

Future ecological restoration and regeneration in the North Sea could utilise decommissioned energy infrastructure, especially those located in Marine Protection Area.

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Context:

THE NORTH SEA MARITIME SECURITY ALLIANCE AS
STAKEHOLDER OF THE FUTURE

Multiple actors at international (Monaghan et al. 2023) as well as more regional (Six North Sea Countries 2024; Knighton 2024) and national level (Bekkers et al. 2021) propose the introduction of new alliances at North Sea level to tackle the problem of unclear responsibilities and missing authorities in the security of critical maritime infrastructure.

In the context of the fishing communities' vision for the North Sea in 2100, maritime security is therefore unlikely to be addressed by a single national actor such as the Dutch Coast Guard or Navy. Instead, it is more plausible that a coordinated alliance of North Sea states will play a central role in safeguarding offshore infrastructure. The position paper will therefore argue from a perspective of the (imagined) “North Sea Maritime Security Alliance” (NSMSA) – an alliance between the Netherlands, Belgium, France, UK, Germany, Denmark, and Norway to protect critical maritime infrastructure at the North Sea. The alliance builds on existing forms of security cooperation at North Sea level (Six North Sea Countries 2024; Knighton 2024; JEF n.d.).

THE NSMSA’S IMPORTANCE IN THE DELIBERATIVE ARENA

Considering the NSMSA perspective in the deliberative arena of the fishing communities’ vision is crucial. As critical infrastructure increasingly shifts offshore due to the energy transition, interest from security actors is growing. While the NSMSA may not hold the greatest decision-making power in spatial planning, it has significant blocking power: high perceived risks can delay or alter project implementation. Including maritime security considerations early ensures that projects remain feasible and are not dismissed solely on security grounds. The NSMSA therefore functions as an important context-setter and could even evolve into an active player in project decisions, particularly if the geopolitical situation in Europe intensifies.



NSMSA 2026
POSITION PAPER

in response to the 2100 vision of the North Sea Commons by dutch fishing communities



A Security Framework for the North Sea Commons

SUMMARY

We, the NSMSA, call on the deliberative arena to implement a security framework in the envisioned North Sea Commons to reduce the risk of hybrid attacks on critical maritime energy infrastructure:

- 1) **Optimize Detection:** Through new maritime domain awareness hubs and security clearance zones around wind farms.
- 2) **Optimize Response:** Through a network of bases for rapid response units at former oil rigs and special wind farms for the training of our rapid response units.
- 3) **Optimize Prevention:** Through further research on the safety of hydrogen, better protection of transformed oil rigs, and a decentralized network of energy nodes.

INTRODUCTION

The sabotage of the Nord Stream gas pipelines and the suspected severing of the Estlink 2 electricity cables in recent years illustrate an emerging threat in Europe: grey zone warfare against critical maritime energy infrastructure (Hobhouse 2025). Instead of direct and overt attacks, low-force actions that cannot be traced back to specific state actors have become more frequent (Bekkers et al. 2021). The North Sea is an attractive target due to its high value for the economy and energy security of its surrounding countries and its remote and transnational location (Bekkers et al. 2021; Bueger & Edmunds 2024).

POSITION

In this context, we, the NSMSA, support the vision of a more transnationally managed North Sea (Bekkers et al. 2021; Monaghan et al. 2023; Six North Sea Countries 2024). However, such a vision requires a security framework (optimized detection, response, and prevention) to protect the region's growing maritime infrastructure network (Bueger & Liebetrau 2023; Monaghan et al. 2023).

I. Vision Elements that Support The Security Framework

1) THE NORTH SEA COMMONS: ENHANCING DETECTION

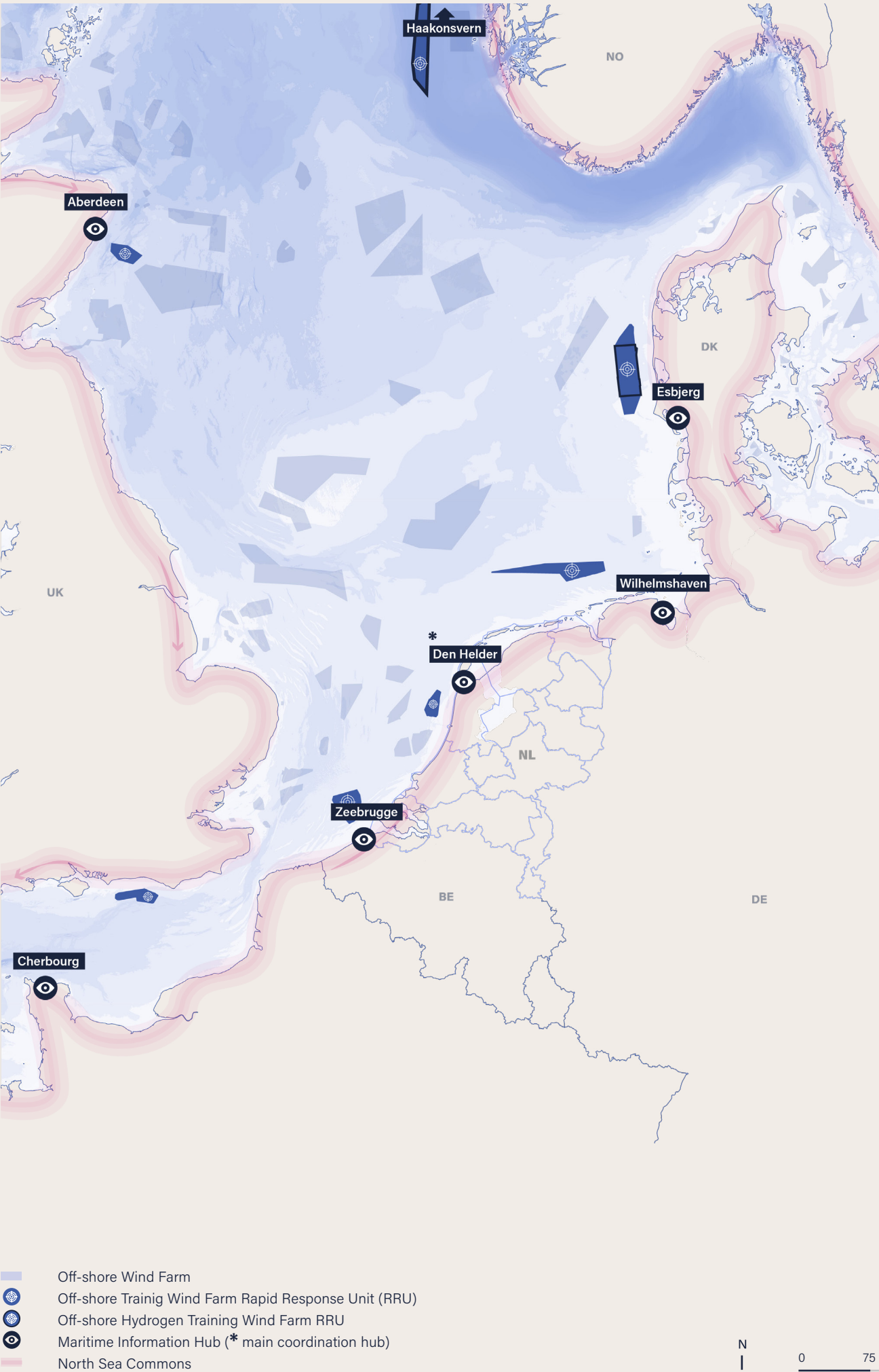
The North Sea Commons will facilitate coordination between the most important actors of the North Sea. This will enhance our ability to detect attacks on critical maritime infrastructure in two ways (Bekkers et al. 2021; Monaghan et al. 2023; Bueger & Liebetrau 2023):

- a) **Data Collection:** We need tracking data from fishing and transportation vessels, coastal radars, and satellites from all North Sea nations to gain full maritime domain awareness (MDA) and detect attacks (Bekkers et al. 2021; Bueger & Liebetrau 2023). The connectedness of nations and sectors in the North Sea Commons will make data bundling easier (ibid.). For this, however, we call for maritime information hubs at places where commercial and fishing harbors, naval bases, and energy infrastructure meet (Bekkers et al. 2021) *see figure 1*.
- b) **Cooperation with Private Owners of Wind Farms:** We will especially profit from the better connection to the private businesses that own the critical maritime infrastructure (Bueger & Liebetrau 2023). At the moment, many operators rely on service staff without security clearance, which makes grey zone operations easier (Bekkers et al. 2021). The commoning framework will improve the management of security responsibilities between us and the infrastructure operators (Bueger & Liebetrau 2023; Bueger & Edmunds 2024).

2) TRAINING WIND FARMS: ENHANCING RESPONSE

The planned training wind farms for re-skilling and education will enhance our ability to respond to attacks. Our forces are not yet trained to protect critical maritime infrastructure (e.g., off-shore wind farms and undersea cables) (Monaghan et al. 2023; Bueger & Edmunds 2024). Shared training wind farms close to naval bases can prepare our rapid response units for the unique challenges of protecting such infrastructure (ibid.) *see figure 1*.

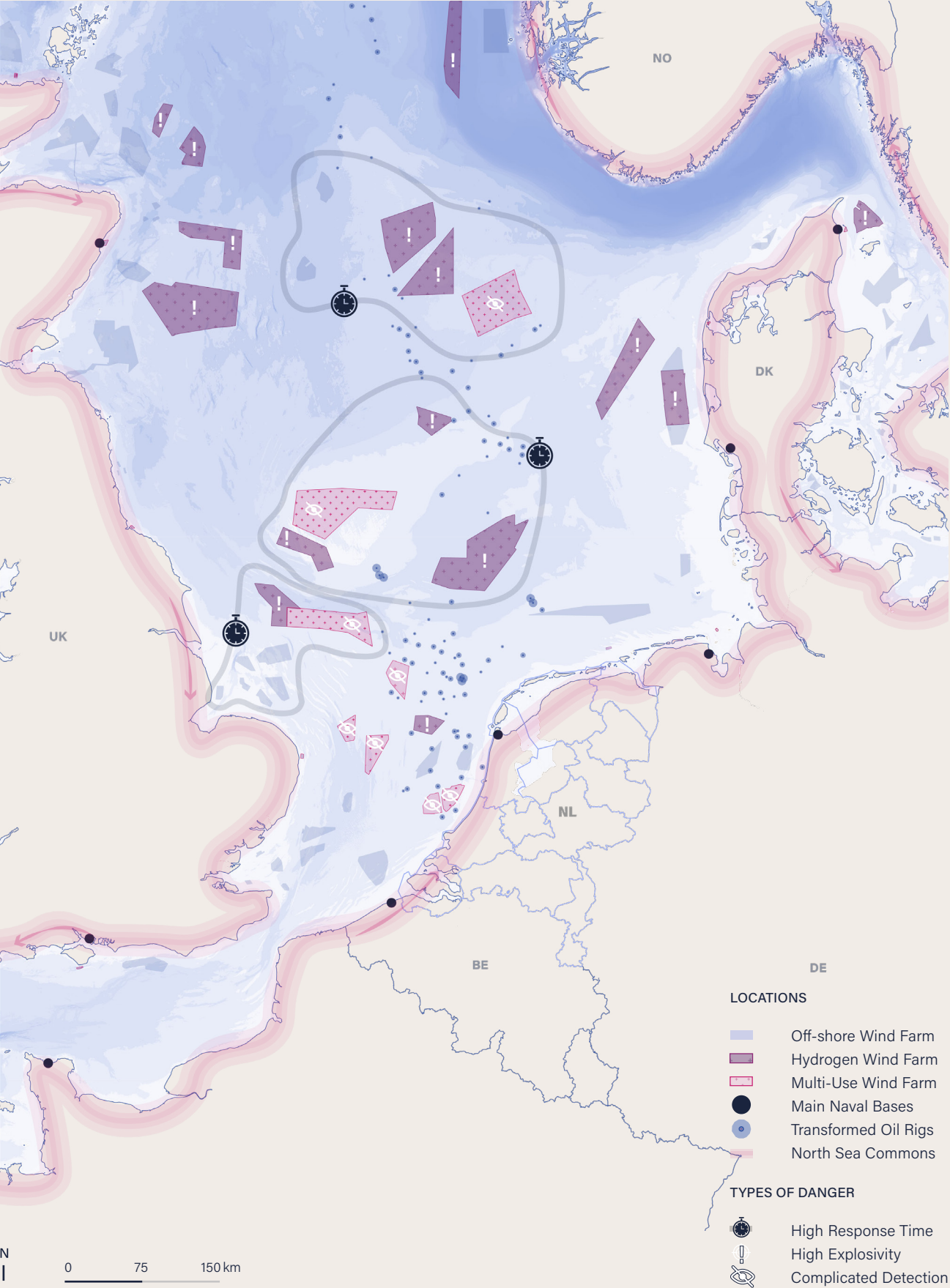
Figure 1: Location of Maritime Information Hubs and Training Wind Farms
Source: EMODnet European Commission, Noun Project



II. Vision Elements Requiring Adjustment within the Security Framework

However, some vision elements create challenges for us in the detection, response, and prevention of attacks (Hobhouse 2025; Monaghan et al. 2023; Bueger & Edmunds 2024; Bekkers et al. 2021) ^{see figure 2}.

Figure 2: Locations of Security Risks in the Fishing Communities 2100 Vision
Source: EMODnet European Commission; Noun Project



1) DETECTION CHALLENGES IN MULTI-USE WIND FARMS:

Multi-use fishing wind farms are a high-risk endeavor. Chinese fishing vessels have been used by the state for grey zone warfare (Bueger & Edmunds 2024). Such detection-prevention techniques could become a relevant risk in the North Sea as well (ibid.). It will be hard for us to detect whether a fishing vessel only anchors to fish or is a proxy that manipulates energy infrastructure (Bueger & Edmunds 2024; Bekkers et al. 2021) ^{see figure 2}. Therefore, fishing between wind farms or the maintenance of wind farms should only be allowed for specifically registered fishing vessels with security clearance ^{see figure 3}.

2) RESPONSE CHALLENGES IN REMOTE WIND FARMS:

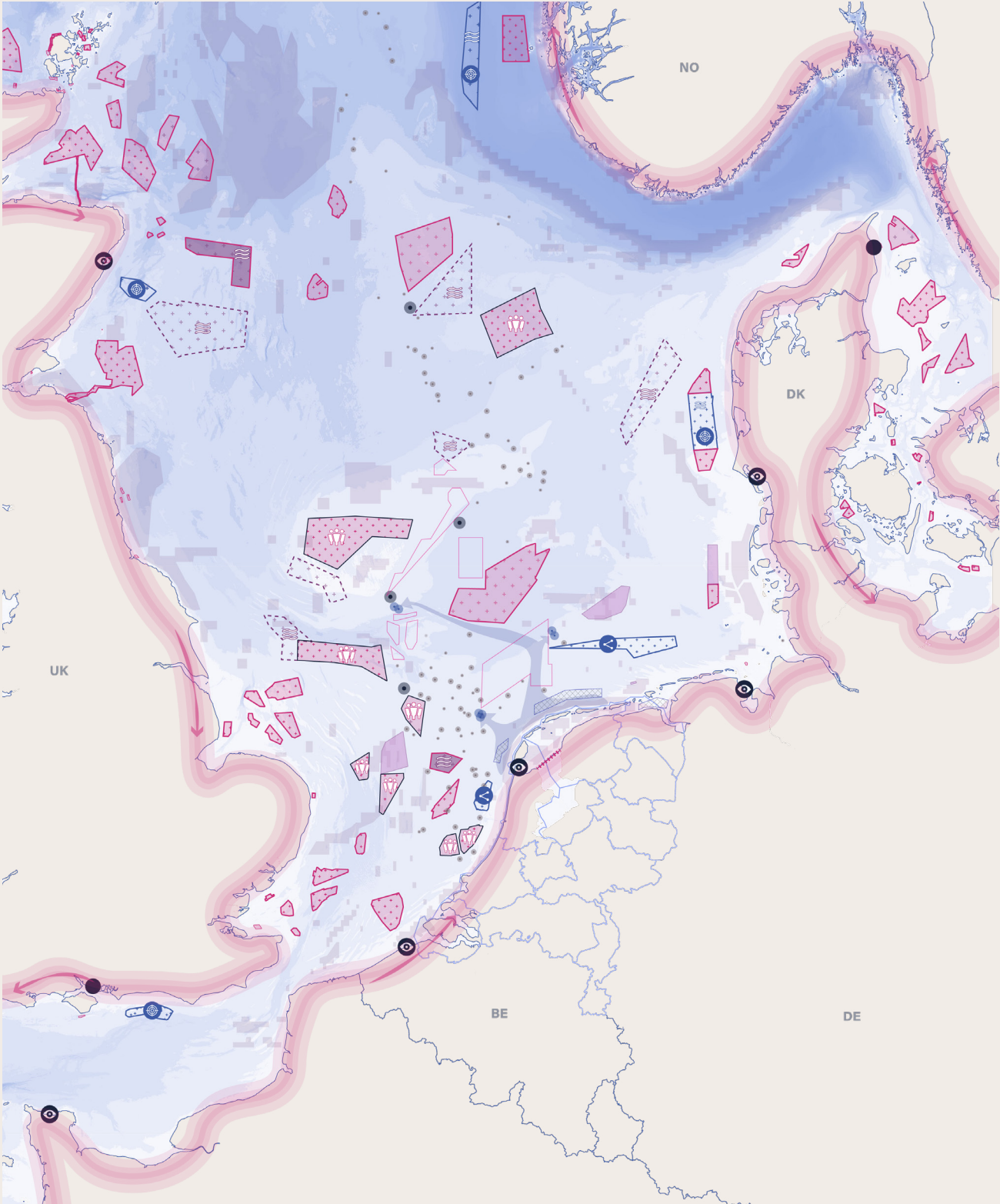
Furthermore, some of the proposed wind farms are far out at sea. Their remoteness makes surveillance more difficult and increases response times in case of sabotage (Bueger & Edmunds 2024) ^{see figure 2}. Therefore, strategically located oil rigs – close to multiple wind farms – should be turned into bases for our military response units (Monaghan et al. 2023) ^{see figure 3}. Some existing zones need to be reorganized to accommodate such response bases.

3) PREVENTION CHALLENGES IN CENTRALIZED, HYDROGEN WIND FARMS AND TRANSFORMED OIL RIGS:

Some vision elements also worsen the prevention of attacks on maritime critical infrastructure. Big, centralized wind farms with shared energy nodes are a risk to our nations energy security (Hobhouse 2025). If only one node is sabotaged, the energy supply for many is endangered (ibid.). Therefore, more small-scale wind farms with many energy nodes can help prevention (ibid.). Furthermore, high explosivity makes the newly planned hydrogen wind farms and transporting ships an attractive target for terrorist attacks (Bekkers et al. 2021) ^{see figure 2}. Until further research is conducted, we advise treating hydrogen facilities in offshore environments with caution ^{see figure 3}. Finally, oil platforms are attractive targets for other states to infiltrate, since they can be used to coordinate physical as well as cyber attacks (ibid.) ^{see figure 2}. Therefore, most platforms should be turned into artificial reefs that need no extra security from our side (Bekkers et al. 2021; Bueger & Liebetrau 2023) ^{see figure 3}.

Many of these concerns are hypothetical in nature and not a major concern at the moment (Bueger & Edmunds 2024). Since the energy transition moves increasing amounts of critical infrastructure offshore, and grey warfare will likely only increase, security risks must be considered from the earliest stages of spatial planning (Bekkers et al. 2021; Hobhouse 2025). The proposed North Sea Commons therefore requires an integrated security framework to ensure that cooperation does support our strategy of optimized detection, response, and prevention ^{see figure 3}.

Figure 3: Adapted Vision 2100 with integrated Security Framework
Sources: EMODnet European Commission; Noun Project



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How much energy do the Dutch Fishing Communities use?

FIRST POSSIBLE CALCULATION METHOD:

In the Dutch fleet report of 2021 (European Commission, 2021), there are 720 fishing ships in the fleet, from which 524 are active. These ships were a total of 49.365 day at sea and used a total of 181 miljoen liter of diesel.

Diesel consists out of 9,8 kWh energy per liter, so $181.000.000 \times 9,8 = 773.800.000$ kWh. So the Dutch fleet used approximatly 1,77 TWh in energy in the form of diesel. Normally has the motor of a boat 40-50% effecientcy, but for this overview we do not take this into account.

In 2025 produced the windfarms in the Netherlands a total of 32.235 GWh (16.850 on-shore and 15.384 offshore). This makes for 32,23 TWh.

This shows that the fishing industries (purely the fishing activity) only uses a very small portion of the produced windenergy, 5,5% to be precise (32,235/1,77).

With future plans for more offshore windfarms will this percentage only decrease.

SECOND CALCULATION METHOD

CBS energy usage (Centraal Bureau voor de Statistiek, 2025) shows for the agriculture, forestry and fishing industries a netto toal energy consumption of 140,1 PJ. This translates to $140,1 \times 0,278$ (1 PJ=0,278 TWh) = 38,9 TWh for the total sector. This includes fuel, elektricity, warmth and other uses of energy.

If we want to see what fishing usages on it's own, we can look at the total sector share.

The fishing sector accumulated around €0,9 bilion (staat van landbouw, visserij, voedsel en natuur 2025). According to the CBS the three sectors togheter accumulated €17 miljard. The total share of the fishing industries is then $900/17.000 = 5,3\%$.

For the energy share this would result in $39,9 \times 2,1\% = 2,11$ TWh

This shows that the total use of energy in the fishing industries mostly consists out of fuel usage (1,77 TWh, from the 2,11 TWh total)

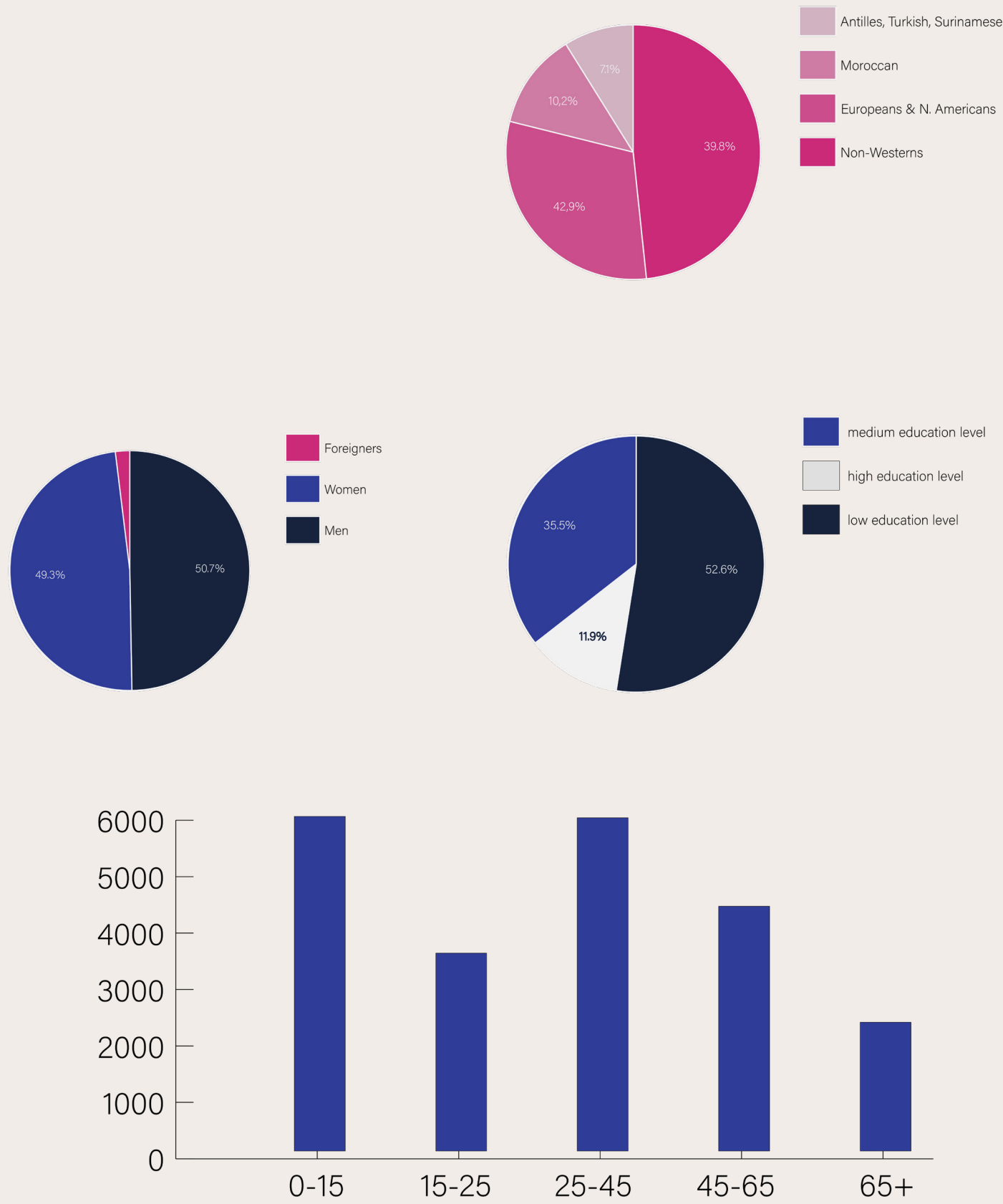
Compared to the total produced wind energy this is $(32,325/2,11) = 6,8\%$

This means that the amount of energy the fishing communities use is just a very little amount of the energy that is produced by the energy production sites that impact their profession, showing that the profit and burden ratio are not in line. This is one of the reasons the fishing communities where chosen as the main focus group for this report.

How is the community of Urk structured?

The community of Urk is characterised by its demographic profile, including age distribution, origin of residents, gender balance, and levels of education. Understanding these aspects provides insights into the social structure and capacities of the community.

Figure F1: Urk's demographic profile numbers
Source: (Alle Cijfers, 2024)





1954

JAN v.d BERG 37 J. UK 60

1960

WILLEM HOEKSTRA 29 J. UK 33

POWKE HOEKSTRA 25 J. UK 33

1966

HENDRIK RAS 33 J. UK 56

JACOB RAS 31 J. UK 58

WILLEM POPPEN 43 J. UK 58

KLAAS POPPEN 21 J. UK 58

JAN DE GROOT 23 J. UK 58

JACOB POST 52 J. UK 53

FRANK ROELEWIJN 33 J. UK 106

1967

JACOB ZWAAN 23 J. UK 223

TEUNIS ROMKES 45 J. UK 223

ARIE LIEVAART 22 J. UK 223

ALBERT ROMKES 19 J. UK 223

KLAAS KAPITEIN 17 J. UK 223

PIETER VAN SLOOTEN 30 J. UK 154

LOUWE VAN SLOOTEN 23 J. UK 154

JAN ARJEN JENEMA 24 J. UK 154

JELLE KAPTEIN 23 J. UK 154

MAARTEN v.d. ZWAN 25 J. UK 154

1968

ALBERT SNOEK 41 J. UK 91

REINIER LOOSMAN 58 J. UK 91

HARMEN DE BOER 32 J. UK 91

1968

ALBERT

JAN BU

1969

CORNE

MEINDE

JAN WIL

SJOUKE

JAN VAN

1970

IEDE v.d.

JAN VAN

IEDE NE

1974

JACOB v