

Offshore wind energy 2040 – Development of new approach and roadmap

Webinar 3 June 2021





Topics today

Refresh the memory

New Offshore Wind Approach 2040

Offshore Wind Energy
Roadmap 2040

Next steps

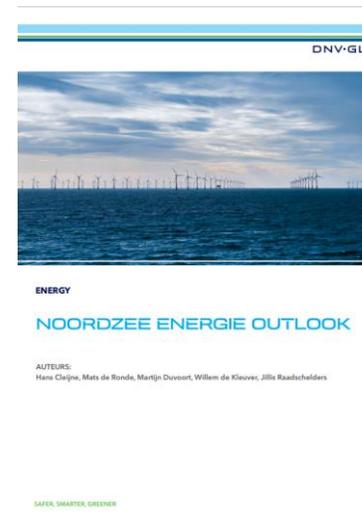


Refresh the memory



2020: setting the challenge

- > DNVGL - Noordzee Energie Outlook
- > Afry - Business case and supporting interventions for Dutch offshore wind
- > PWC/InvestNL - Financing offshore wind
- > Guidehouse – Combined tenders offshore wind & hydrogen





Highlights of that challenge

- › Offshore wind is to **grow towards 38-72 GW** in 2050. Roll-out speed of offshore wind needs to increase.
- › **Energy system integration is the main challenge.** Investments are needed in the entire value chain: production, conversion, transport and energy usage.
- › Merchant investments in offshore wind pose a challenge for the business case.
- › **New offshore wind and new demand** for green energy must go hand in hand.
- › Combining **offshore wind and hydrogen** has major potential, before 2030 with onshore electrolysis, post 2030 also offshore
- › Offshore wind projects will become more internationally connected. These hybrid projects pose new challenges.
- › Supply chain needs **clear vision on pipeline** towards 2040 in order to stay efficient.





Goal

- > The goal of this project is to facilitate the further and successful growth of offshore wind by 27 GW - additional to the current Offshore Wind Energy Roadmap - before 2040.





Why?

- › Current offshore wind approach: straight forward, efficient, cost reductions. Aimed at replacing current fossil fuel based electricity production.
- › New offshore wind will be used to meet new demand for renewable energy, replacing fossil fuels in other sectors.
- › Current approach was not designed with the challenges of system integration in mind: **update is needed.**

Why now?

- › Lead times
- › Supply chain
- › Climate Agreement: 2023 decision on systematic changes and instruments





How?

- › Together with stakeholders!
- › Current offshore wind approach is successful because government and market stakeholders worked together.
- › New approach adopts the same method: a lot of dialogue and open to solutions.





Work streams

A. Policy track: New offshore wind approach

- Focus on market organisation, regulation, and instruments
- Review role of government, TSOs and market
- Updating “instruments”: site decisions, allocation mechanism (tenders)
- Backstop instruments

B. Roadmap 2040

- Focus on conditions (spatial, time, and technical) for use of wind energy areas in North Sea
- Infrastructure development plan
- Preparation of offshore wind landfall (VAWOZ 2040)
- Offshore energy hub development

C. Planning for Road map realisation

- Focus on efficiently organising the realisation
- Focus on the role of public organisations (EZK, RVO, RWS, TenneT)



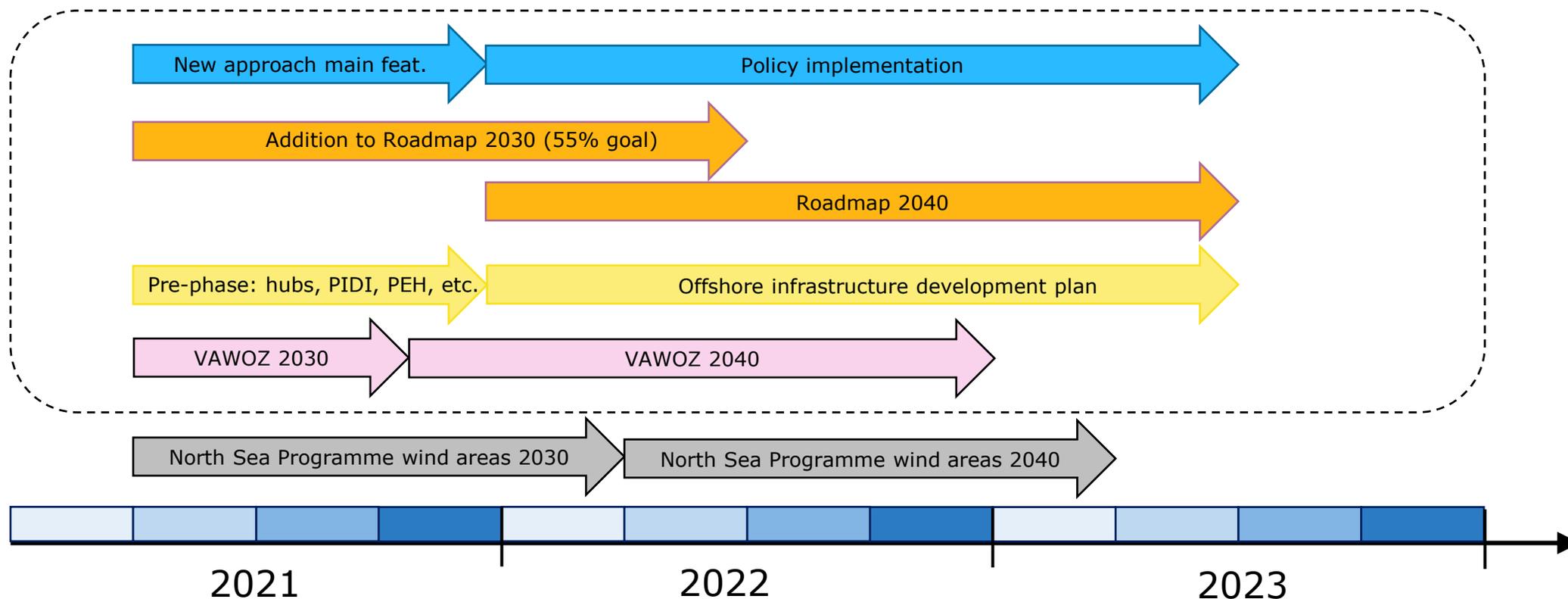
Results

- › **2020**: Setting the challenge: NEO, Guidehouse, Afry, InvestNL/PWC culminating in Letter to Parliament of Dec 4th setting out the challenge for further growth of offshore wind
- › **2021**: Main features of a New Approach and Roadmap 2040 + policy agenda
- › **2022**: Addition to Roadmap 2030
- › **2022-2023**: Further policy implementation and specification of the Roadmap 2040





Timeline





Offshore wind is building block in system approach



Offshore wind policy	Infrastructure offshore	Infrastructure onshore	Decarbonise energy demand
Offshore wind policy (new approach and roadmap)	TSO-development plan (Ontwikkel-kader)	PIDI - Hyway27	CES – National Hydrogen Programme – Electrification Road map - SDE++
North Sea Programme	VAWOZ	PEH	(PEH)





New Offshore Wind Approach 2040



A successful new approach...

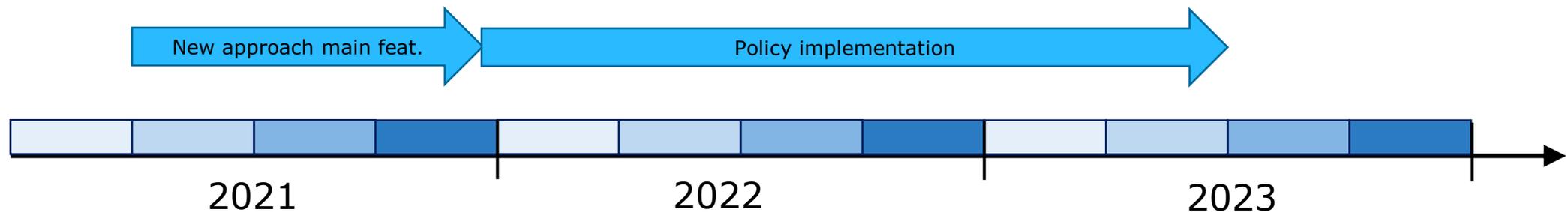
- > ...is **fit for the challenges** that offshore wind faces.
- > ...makes sure all parties (government, TSOs, market) are **doing what they are good at**.
- > ...makes **efficient energy system integration** of offshore wind possible.
- > ...is fit for **electrical and hydrogen** projects.
- > ...makes it possible to increase the roll-out speed to **1.5-3 GW/year** after 2030.
- > ...is **consistent with policies** in the rest of the energy system (PIDI, H2, PEH, VAWOZ, SDE++)
- > ...is consistent with international policy development and **catalyzes hybrid projects**
- > ...**retains success factors** of the current, successful, offshore wind approach





Result and timeline

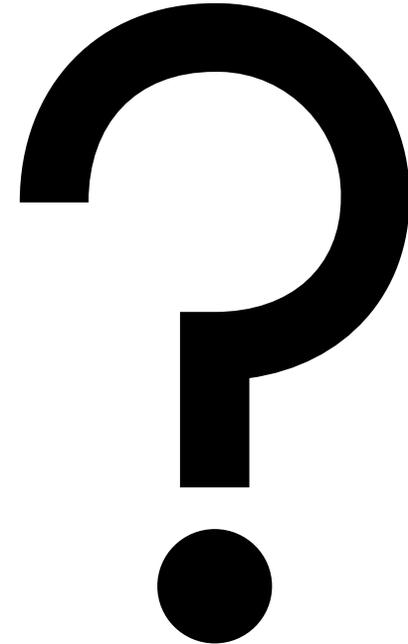
- Q4 2021: New approach main features + policy agenda
- 2022-2023: further implementation policies (and legislative process)
- Main features include: view on market organisation, site characteristics, instruments, integration with hydrogen
- Timeline is dependent on political developments





Main questions to address

- › Is change needed in the roles of government, market, and TSO?
- › Specifically: What is the role of TSOs in the future development of offshore infrastructure?
- › What are the right characteristics of future wind sites (“kavels”)? Size? Flexibility?
- › What allocation mechanism is needed?
- › How can offshore wind and hydrogen be integrated efficiently? E.g. combined tenders.
- › What “backstop” instruments are needed to keep pace with the roll-out plan?





A new puzzle

Current approach

Who makes decisions on offshore wind farms?

- › When? -> government
- › Where? -> government
- › How much? -> government
- › Technical configuration? -> permit holder

Who makes decisions about the grid?

- › Capacity and timing? -> government
- › Export route to landing point? -> government
- › Technical configuration? -> TSO

New approach

Evaluate roles of government, market, and TSOs

Also relates to who decides (and how) on characteristics of other elements of the energy system.

Different solutions to this puzzle for different project configurations?

- › Radial projects connected to onshore grid
- › Electrical hubs
- › Direct connection to end user
- › Offshore hydrogen production
- › Hybrid/international projects



Stakeholder engagement

- › Topics are discussed in a small **working group** of government, offshore wind industry, TSOs and land-based industry.
- › Consultant will be asked to prepare **discussion papers** and write a comprehensive **overall report with policy options**.
- › Bilateral meetings with parties that have **specific ideas or initiatives**.
- › Two **large stakeholder meetings** to engage with all stakeholders
- › Special RVO webpage for this project with all relevant documents.





Offshore Wind Energy Roadmap 2040



Contents

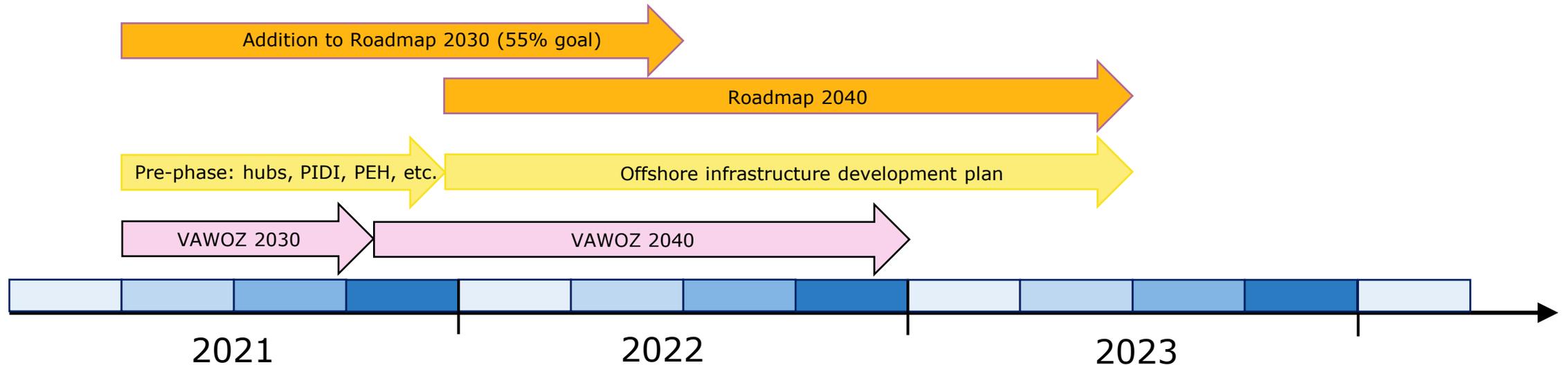
- › Goals, results, and timeline
- › Addition to Roadmap 2030
- › Roadmap 2040
- › Landfall options (VAWOZ)
- › Infrastructure development plan
- › Energy hubs



Goals and timeline

> Two goals

1. Roll-out of offshore wind energy in space and time -> Roadmap 2040
2. Technical outlines for integration into the North Sea energy system -> an offshore infrastructure development plan

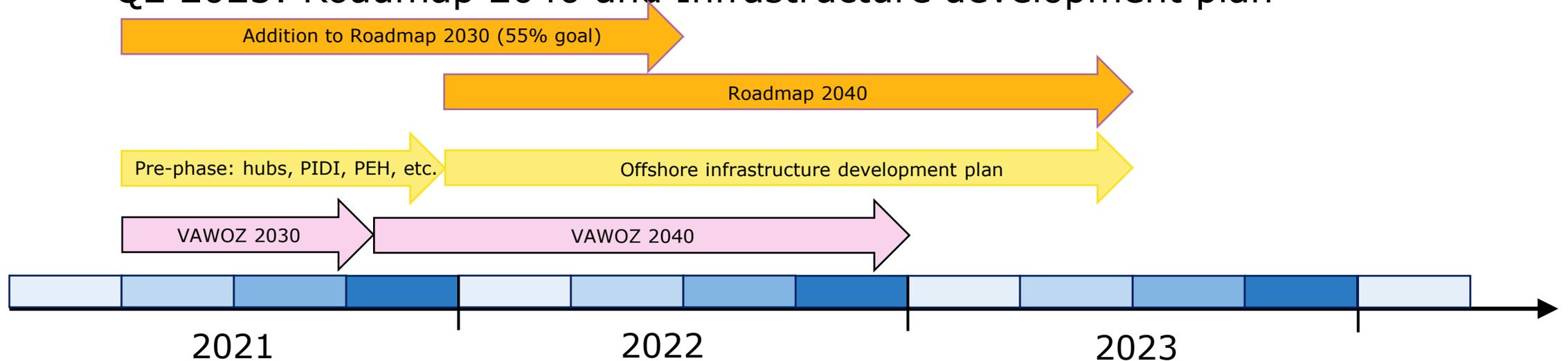




Results and timeline

> Results

- Q3 2021: Letter to parliament with main characteristics
- Q2 2022: Add-on Roadmap 2030, results pre-phase
- Q2 2023: Roadmap 2040 and Infrastructure development plan

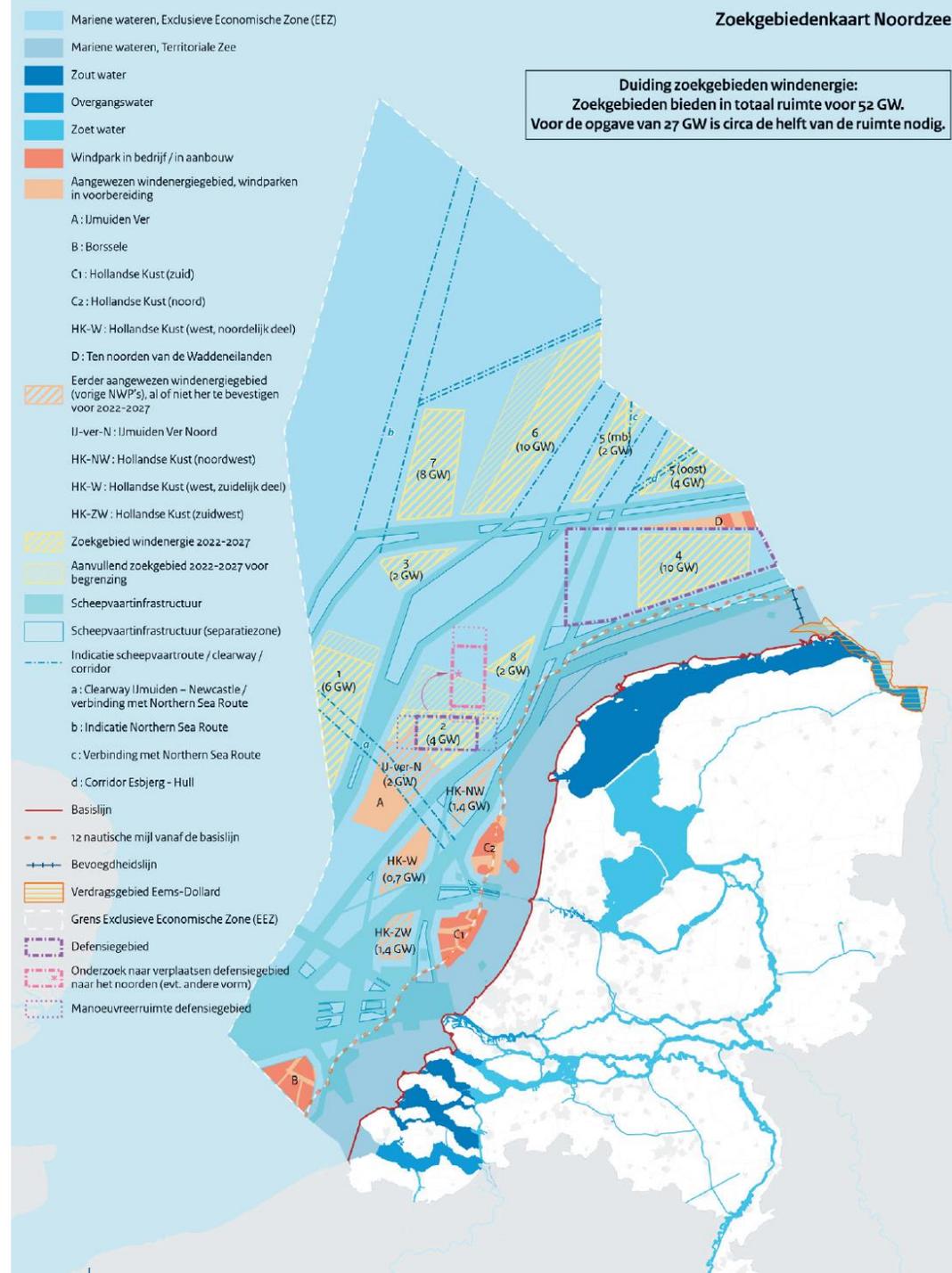




Add-on Roadmap 2030

> Add-on Roadmap 2030

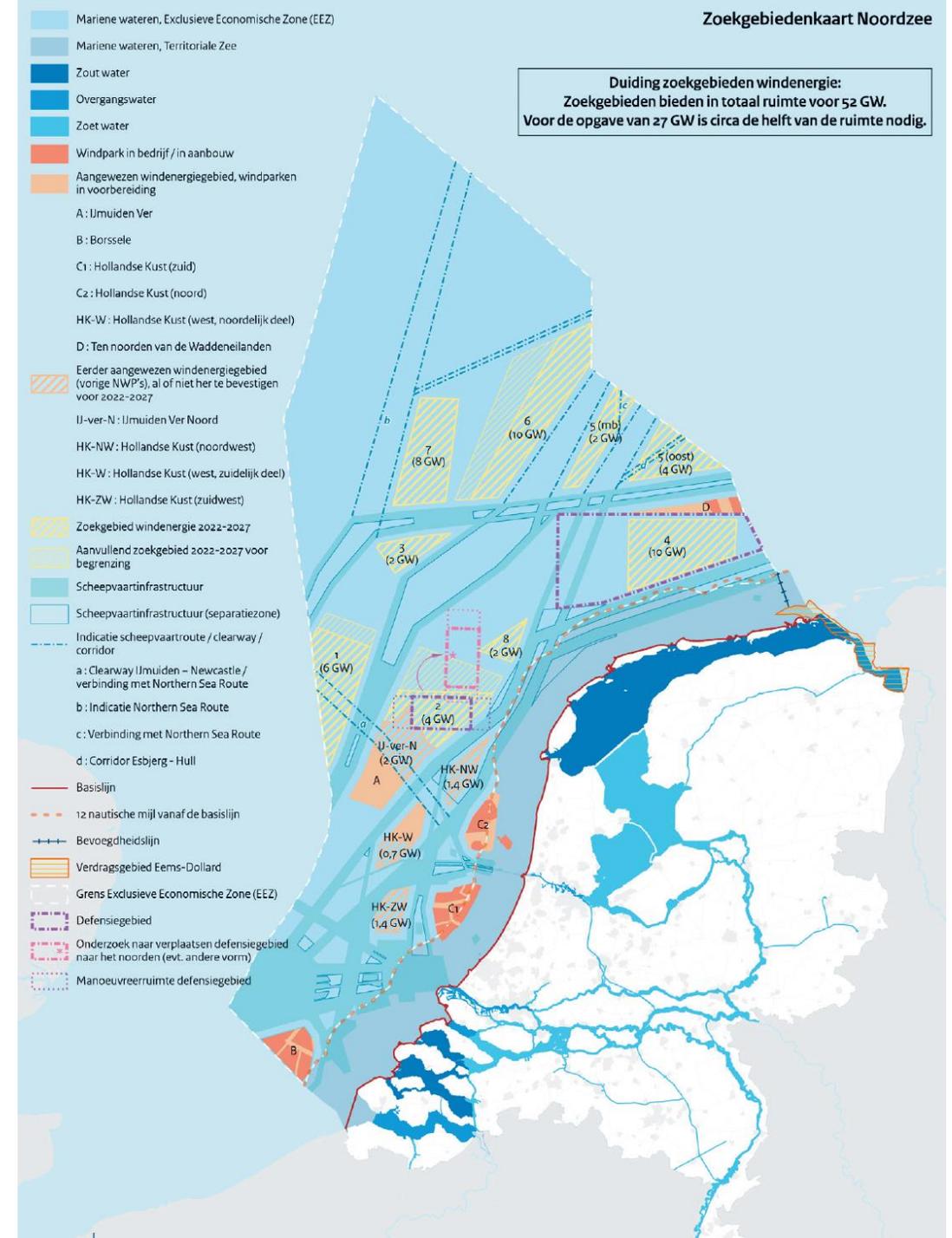
- To meet 49 TWh in 2030 (Climate Agreement): 3 TWh (0.7 GW) extra needed
- To meet demands of 55% CO₂-reduction goal: up to 45 TWh (10 GW) extra needed
- New Cabinet will set ambition and target
- Electrical connections (HVDC)
- Preparations IJmuiden Ver (noord) started





Roadmap 2040

- › Roadmap 2040:
 - Capacity: 27 GW – (add-on Roadmap 2030)
 - Which wind energy zones?
 - How to phase development of zones in time?
 - How to take demand side into account?
 - How to accommodate major (H₂) initiatives?





Landfall options (VAWOZ)

> **VAWOZ 2030**

- Additional landfall options for extra wind before 2030 are being explored
- Preparations for permitting (RCR) of landfall of additional wind farm (2 GW) in IJmuiden Ver started
- Witteveen en Bos is doing the impact assessment
- June and July stakeholder meetings, decision in October

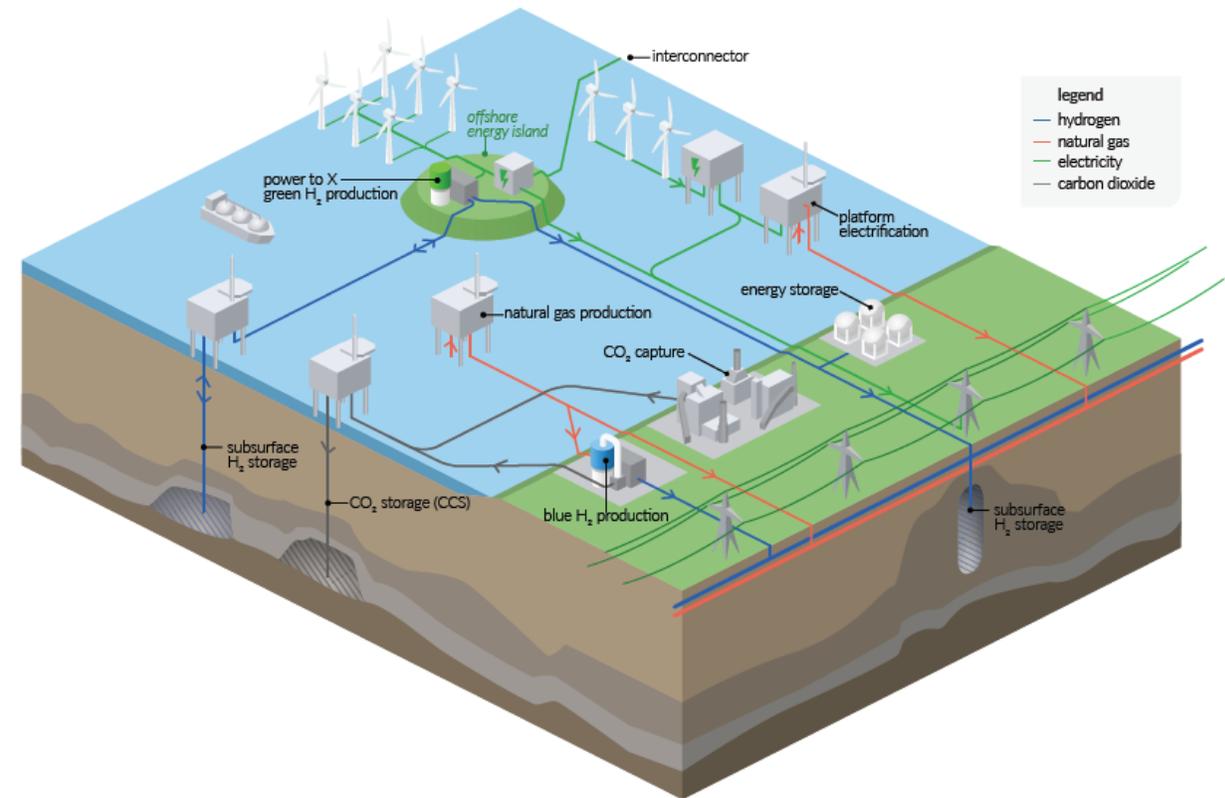
> **VAWOZ 2030-2040**

- Goal is to find additional landfall options for up to 27 GW of offshore wind (that is including the extra wind deployed before 2030)
- Preparations of this process have started, kick-off expected around the summer
- Offshore hydrogen production and hub development are being considered
- Energy system study by RVO looking at efficient integration by assessing the impact on onshore infrastructure



Infrastructure development plan

- > Offshore infrastructure development plan:
 - Which energy (cross-border) connections?
 - Which re-use of gas infrastructure?
 - Energy hubs/islands?
 - Which offshore energy consumers and producers to connect?
 - What will it cost?





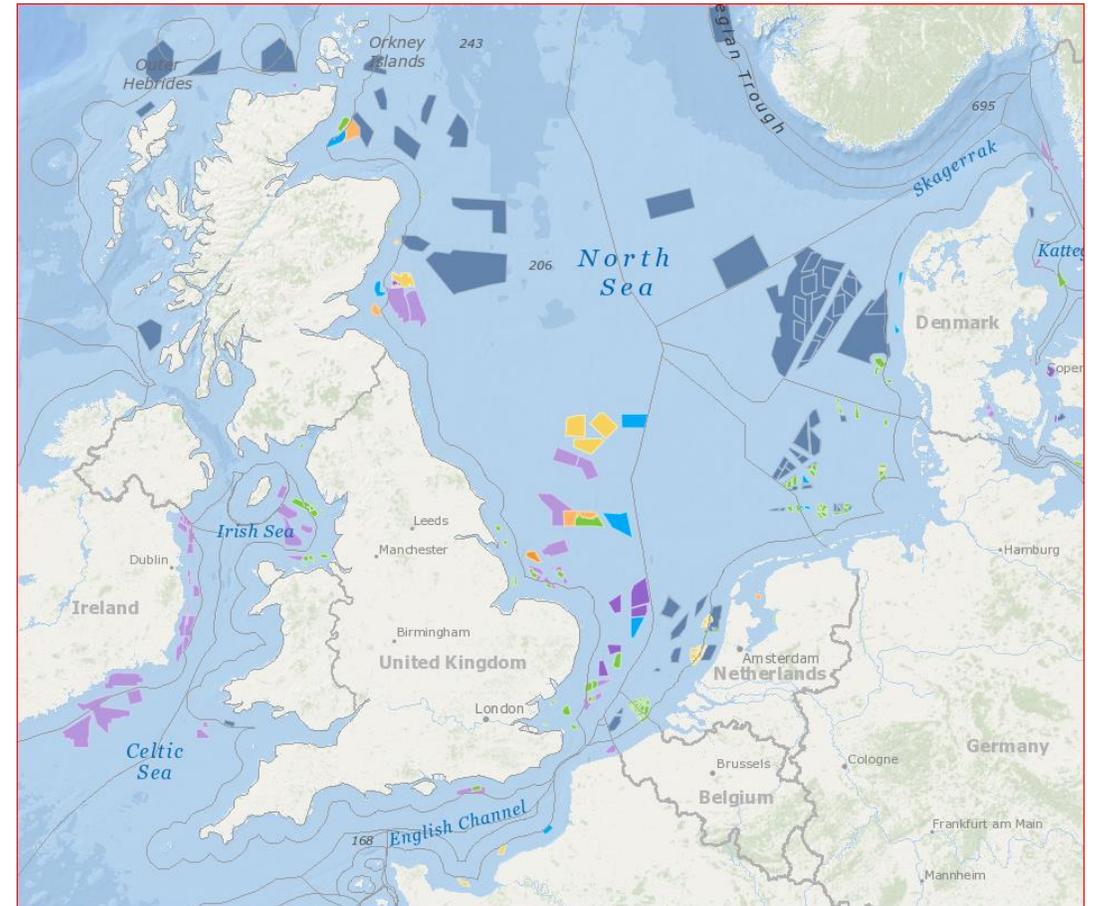
Offshore infrastructure development plan: what to take into account

- > EU Offshore renewable energy strategy
- > VAWOZ: (im)possibilities of landing cables/pipes
- > Energy system study by RVO: ratio between electrons and molecules
- > NSWPH studies: how to build energy hubs
- > International collaboration
- > Gas and CCS
- > Offshore solar
- > The cost (allocation) of offshore energy infrastructure



Why offshore energy hubs?

- Distance!
- Scale: larger offshore wind farms make hub solutions more viable
- Scarcity of space, connection, and transport capacity on land
- Transport of molecules is cheaper than electrons
- Opportunities for (hybrid) interconnections





Usefulness and necessity

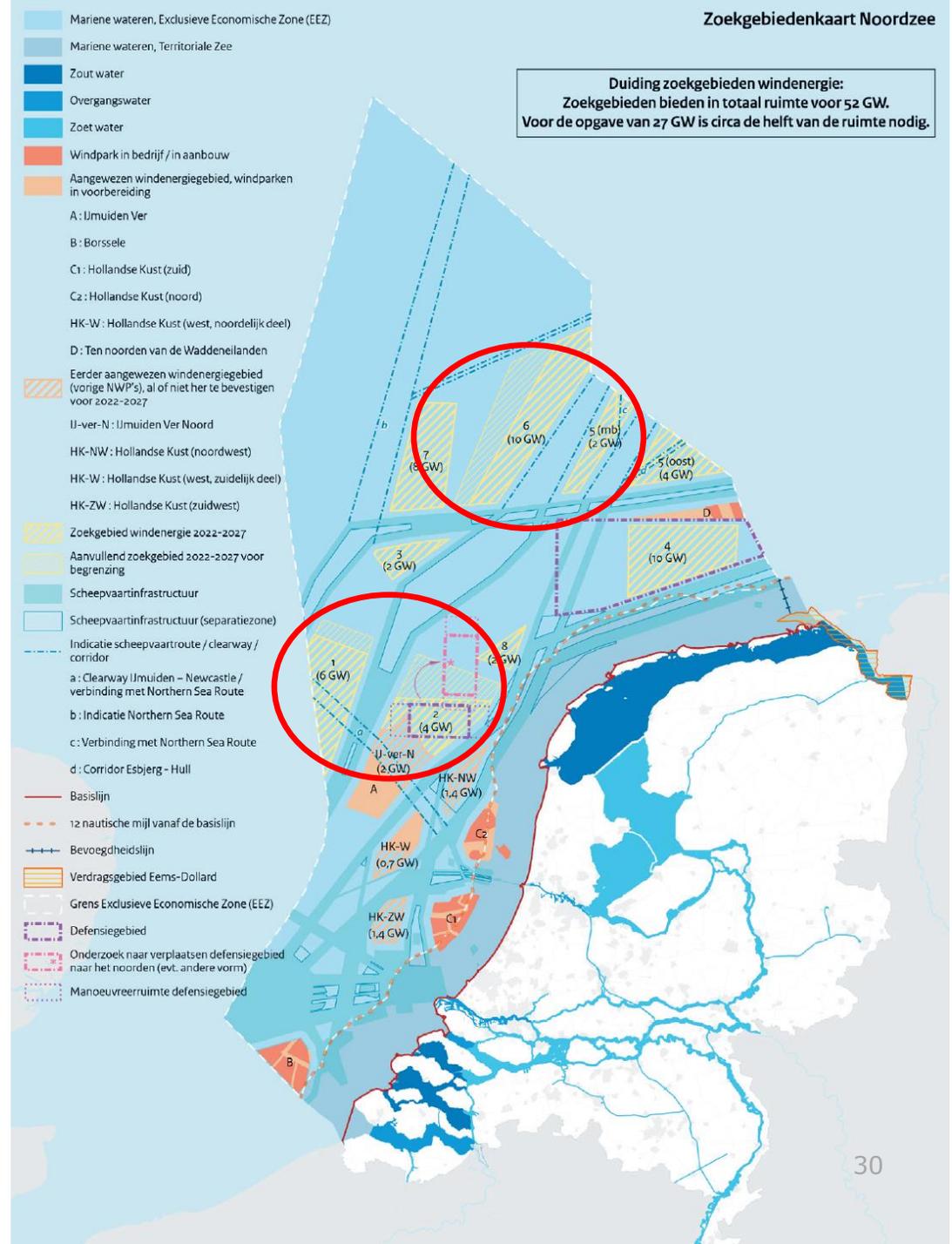
- Energy hubs: not a goal in itself
- Main functions:
 - Energy aggregation point: alternative for platforms
 - Energy distribution point: to main land, interconnection
 - Energy conversion: e.g. power-to-gas
 - Enabler of new logistical/O&M strategies
 - Hosting other services: e.g. coast guard base





How, where, and when?

- It will be a gradual development
 - From radial connections now ...
 - to hybrid connections (e.g. WindConnector) between 2025 and 2030 ...
 - to dedicated constructions or artificial islands from 2035 onwards





Q&A



Next steps



We hope to keep you engaged!

- › Topics are discussed in a small working group of government, offshore wind industry, TSOs and land-based industry.
- › Bilateral meetings with parties that have specific ideas or initiatives.
- › Large stakeholder meetings to engage with other stakeholders, next one expected fall of this year.
- › All questions asked in this webinar will be answered in QA-paper.
- › This webinar will be published on our websites: www.offshorewind.rvo.nl and www.rvo.nl/windenergie-op-zee

