North Sea Energy
offshore system integration

WEBINAR

Stakeholder perspectives on North Sea system integration

20 January 2022

Program

North Sea Energy offshore system integration

11:00 Welcome and opening remarks
René Peters, business director NSE program

11:15 Key learnings from the study
George Wurpel and Anne-Mette Jørgensen, MSG Sustainable Strategies

11:45 Discussion with panel of interviewees and participants led by René Peters
Wouter van der Hilst, Coast Guard Netherlands
Anne-Marie Frissen, NOGEPA
Hans Timmers, NWEA
Heleen Vollers, Stichting De Noordzee
Thomas Donders, TenneT

12:30 Closing

North Sea Energy Program

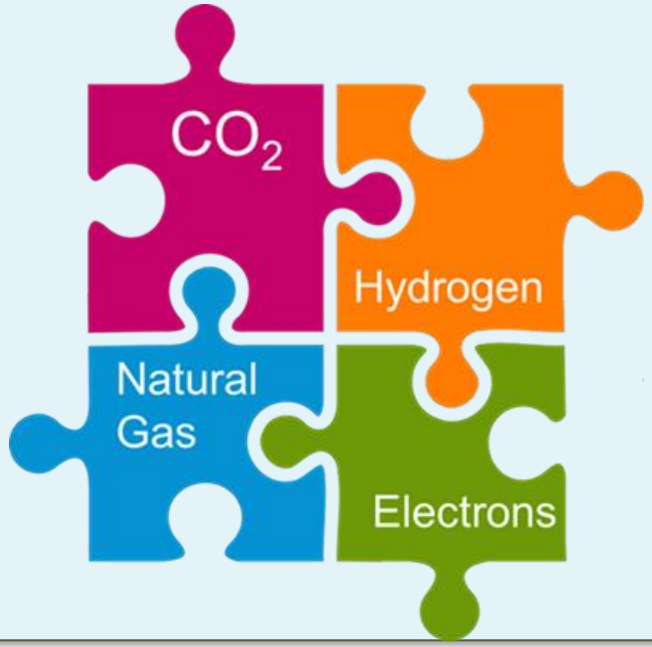
North Sea Energy offshore system integration

- Smart offshore connections will save society costs, time, space and CO_2 emissions.
- Potential as a pioneer region for the European Green Deal.
- Includes pilots and projects to test and demonstrate innovative concepts in practice.

Public-private research consortium;
30+ international parties from the energy value chain;
launched in 2017.

Investigates the North Sea's potential for a new reliable and affordable energy system towards 2050.

At the heart is an integral approach of the energy system and its benefits.



Partners 2016-2022

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BILFINGER

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New Energy Coalition

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NEPTUNE ENERGY

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TNO innovation for life

Offshore & Energy

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TKI NIEUW GAS Topsector Energie

Royal HaskoningDHV Enhancing Society Together

Port of Rotterdam

TenneT Taking power further

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gasunie

Van Oord Marine ingenuity

university of groningen

PORT OF DEN HELDER

Net Zero Technology Centre Technology Driving Transition

MSG

Oil & Gas Authority

TotalEnergies

Port of Amsterdam

XKP VISUAL ENGINEERS

SMART PORT

TAQA

SIEMENS energy

NOGAT NORTHERN OFFSHORE GAS TRANSPORT

Huisman

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NOGEPA NEDERLANDSE OLIE EN GAS EXPLORATIE EN PRODUCTIE ASSOCIATIE

NGT NOORDGASTRANSPORT

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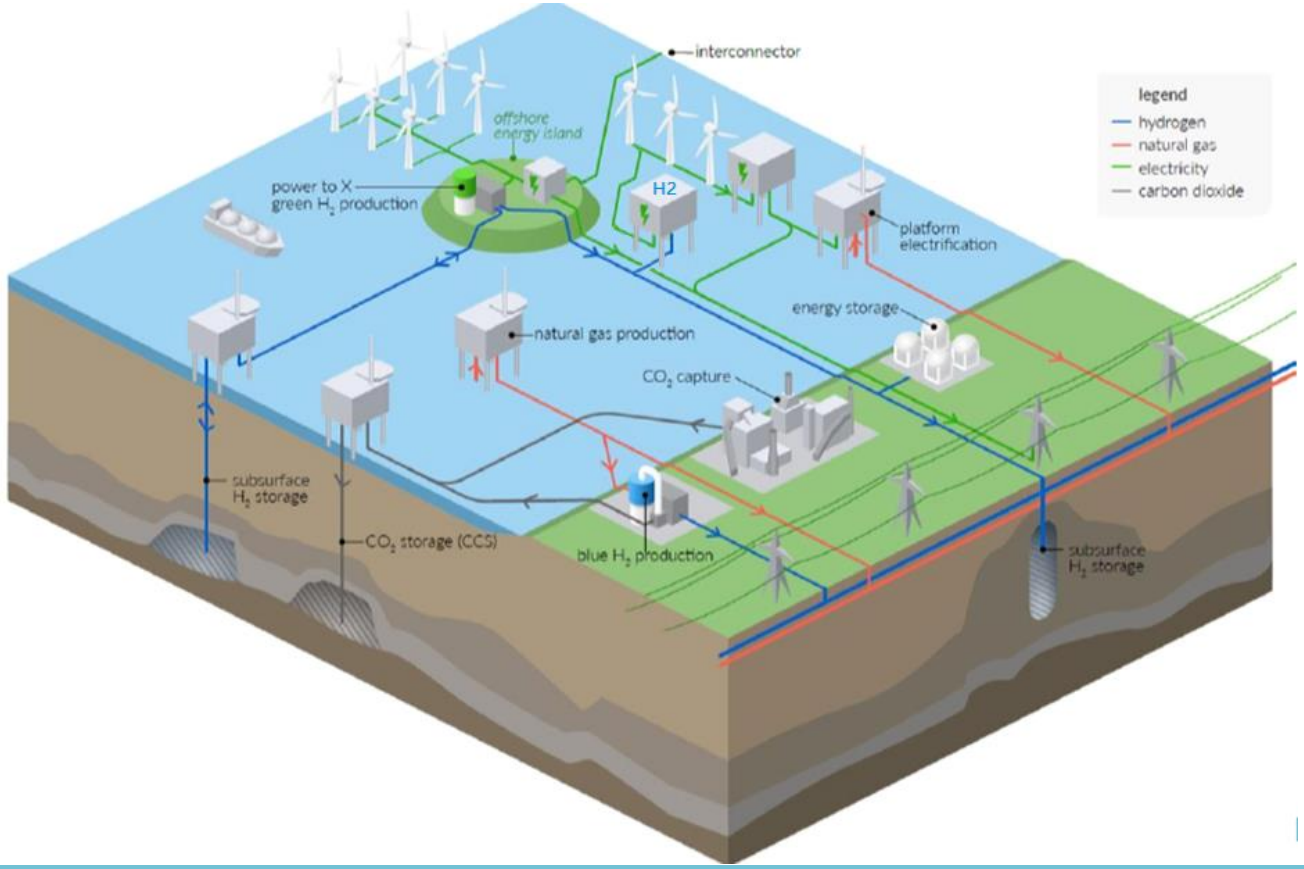
Integrated energy system on the North Sea



- CO_2 storage
- H2 production
- Electrification
- Energy storage
- Energy islands

Research Themes

North Sea Energy offshore system integration

2. Society, Governance and Communications

1. North Sea Energy hubs and transport infrastructure

4. Ecology & Environment

3. Safety, integrity & Reliability

5. Offshore logistics

6. North Sea Energy system mapping and modelling

7. Roadmap towards an integrated North Sea Energy system in 2050

The energy transition is a social transition!

North Sea Energy offshore system integration

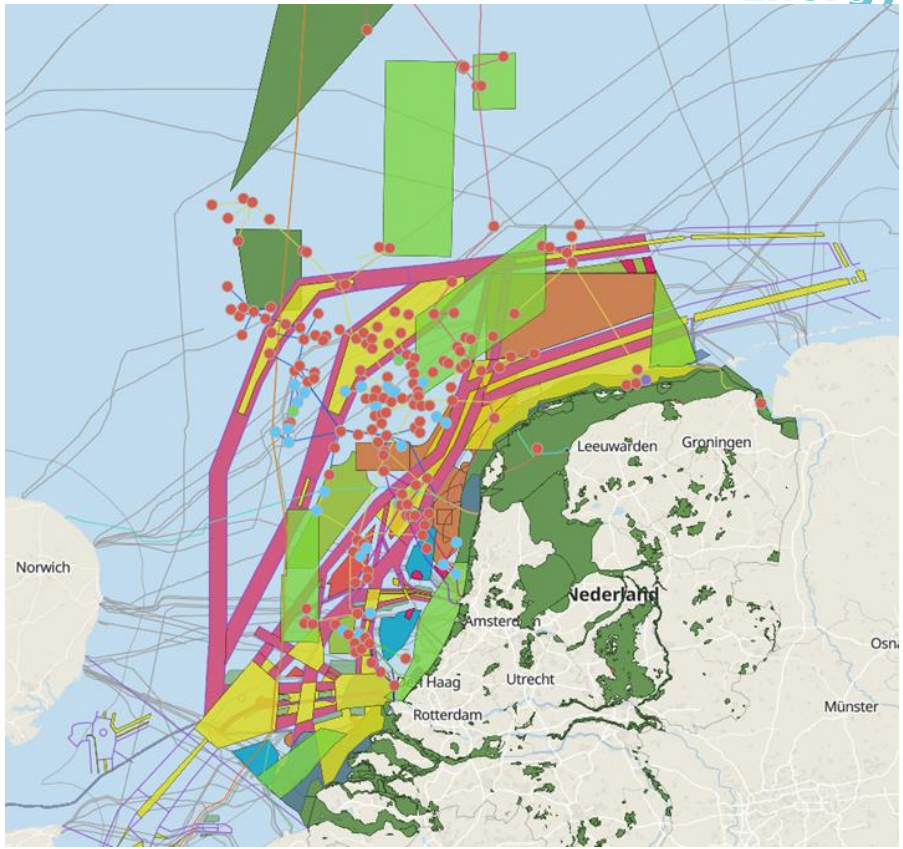
- The North Sea is crucial in the energy transition: production, conversion, transport, buffering, storage potential

But….

- Energy is not the only function

And there is considerable pressure on

- Time (fast)
- Space (small footprint)
- Economics (low cost, business case)



Social embedding of North Sea energy system integration

A Stakeholder Analysis

North Sea Energy
offshore system integration

Anne-Mette Jørgensen and George Wurpel

MSG Sustainable Strategies

North Sea Energy offshore system integration

System integration means connecting the various factors and actors involved in the energy transition so that they function as a single energy system.

The energy system of the future - from generation to use - has dependencies between different sectors and between technological, economic, legal and socio-political aspects. This complexity calls for an integrated approach in which all the different aspects are geared to one another. We call this approach system integration.

System integration: what is the opportunity?

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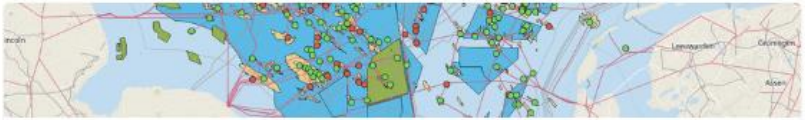
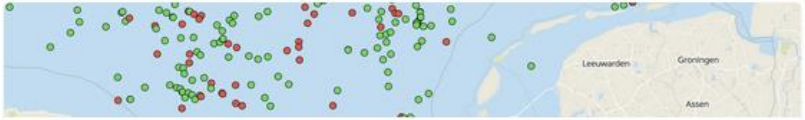
1. Not just economically,
2. Not just technical,
3. But part of a societal transformation.

This requires a dialogue with stakeholders



Energy

Fishery



Oil and gas platforms

Electrification

Objectives

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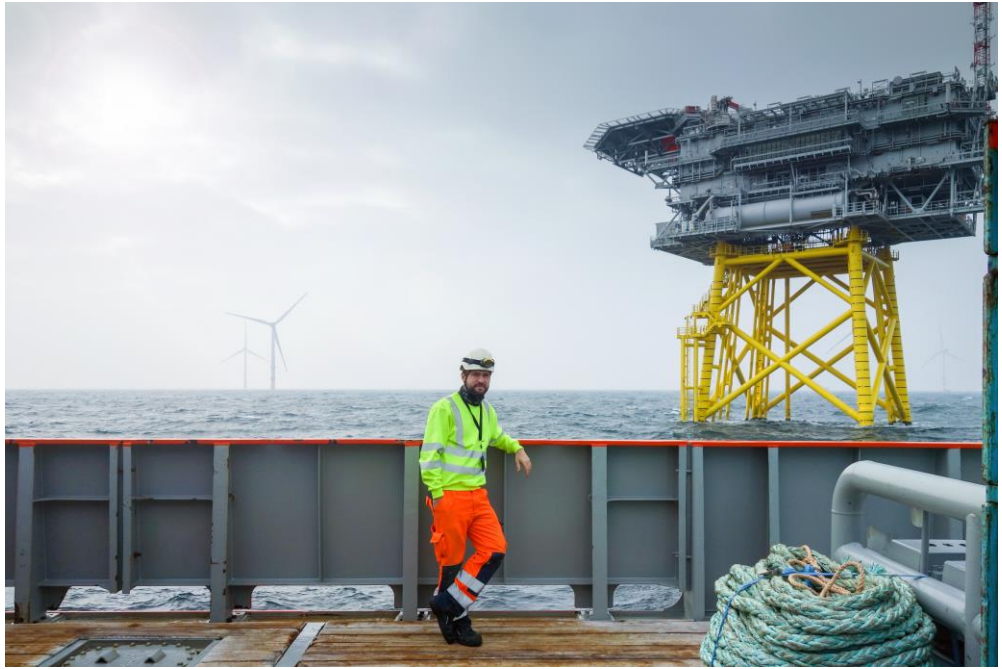
- Improve understanding of (other) stakeholders' views
- Identify various stakeholders' concerns and needs
- Identify potential societal benefits of system integration
- Strategy for stakeholder engagement around Hubs and System integration Roadmap.



Our research in a nutshell

North Sea Energy offshore system integration

SCOPE

NL

Reuse

CCS

Hydrogen

APPROACH

16 interviews

176 sources

4 work sessions

3 review rounds

6 Perspectives

Stakeholder fact sheets

North Sea Energy
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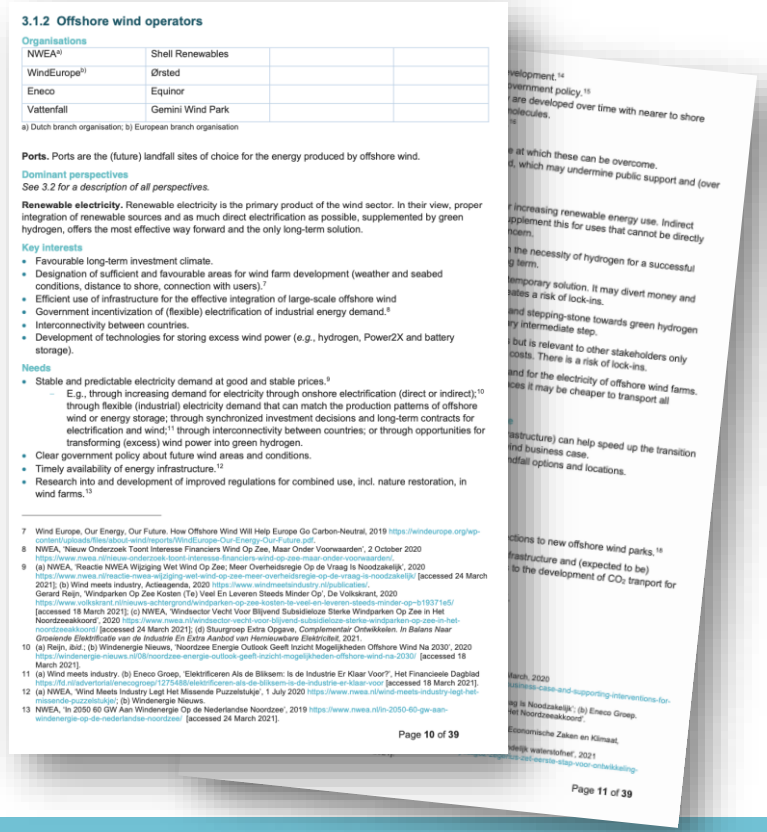
- Organizations/Sectors
- Dominant perspectives
- Key interests
- Needs
- Concerns
- Views on technologies
- Knowledge and information needs



3.1.2 Offshore wind operators

Organisations

NWEA[a)]	Shell Renewables		
WindEurope[b)]	Ørsted		
Eneco	Equinor		
Vattenfall	Gemini Wind Park		

a) Dutch branch organisation; b) European branch organisation

Ports. Ports are the (future) landfall sites of choice for the energy produced by offshore wind.

Dominant perspectives

See 3.2 for a description of all perspectives.

Renewable electricity. Renewable electricity is the primary product of the wind sector. In their view, proper integration of renewable sources and as much direct electrification as possible, supplemented by green hydrogen, offers the most effective way forward and the only long-term solution.

Key interests

- Favourable long-term investment climate.
- Designation of sufficient and favourable areas for wind farm development (weather and seabed conditions, distance to shore, connection with users).[7]
- Efficient use of infrastructure for the effective integration of large-scale offshore wind
- Government incentivization of (flexible) electrification of industrial energy demand.[8]
- Interconnectivity between countries.
- Development of technologies for storing excess wind power (*e.g.*, hydrogen, Power2X and battery storage).

Needs

- Stable and predictable electricity demand at good and stable prices.[9]
  - E.g., through increasing demand for electricity through onshore electrification (direct or indirect);[10] through flexible (industrial) electricity demand that can match the production patterns of offshore wind or energy storage; through synchronized investment decisions and long-term contracts for electrification and wind;[11] through interconnectivity between countries; or through opportunities for transforming (excess) wind power into green hydrogen.
- Clear government policy about future wind areas and conditions.
- Timely availability of energy infrastructure.[12]
- Research into and development of improved regulations for combined use, incl. nature restoration, in wind farms.[13]

7 Wind Europe, Our Energy, Our Future. How Offshore Wind Will Help Europe Go Carbon-Neutral, 2019 https://windeurope.org/wp-content/uploads/files/about-wind/reports/WindEurope-Our-Energy-Our-Future.pdf.
8 NWEA, 'Nieuw Onderzoek Toont Interesse Financiers Wind Op Zee, Maar Onder Voorwaarden', 2 October 2020 https://www.nwea.nl/nieuw-onderzoek-toont-interesse-financiers-wind-op-zee-maar-onder-voorwaarden/.
9 (a) NWEA, 'Reactie NWEA Wijziging Wet Wind Op Zee; Meer Overheidsregie Op de Vraag Is Noodzakelijk', 2020 https://www.nwea.nl/reactie-nwea-wijziging-wet-wind-op-zee-meer-overheidsregie-op-de-vraag-is-noodzakelijk/ [accessed 24 March 2021]; (b) Wind meets industry, Actieagenda, 2020 https://www.windmeetsindustry.nl/publicaties/. Gerard Reijn, 'Windparken Op Zee Kosten (Te) Veel En Leveren Steeds Minder Op', De Volkskrant, 2020 https://www.volkskrant.nl/nieuws-achtergrond/windparken-op-zee-kosten-te-veel-en-leveren-steeds-minder-op~b19371e5/ [accessed 18 March 2021]; (c) NWEA, 'Windsector Vecht Voor Blijvend Subsidieloze Sterke Windparken Op Zee in Het Noordzeeakkoord', 2020 https://www.nwea.nl/windsector-vecht-voor-blijvend-subsidieloze-sterke-windparken-op-zee-in-het-noordzeeakkoord/ [accessed 24 March 2021]; (d) Sturgroep Extra Opgave, *Complementair Ontwikkelen. In Balans Naar Groeiende Elektrificatie van de Industrie En Extra Aanbod van Hernieuwbare Elektriciteit*, 2021.
10 (a) Reijn, *ibid.*; (b) Windenergie Nieuws, 'Noordzee Energie Outlook Geeft Inzicht Mogelijkheden Offshore Wind Na 2030', 2020 https://windenergie-nieuws.nl/08/noordzee-energie-outlook-geeft-inzicht-mogelijkheden-offshore-wind-na-2030/ [accessed 18 March 2021].
11 (a) Wind meets industry. (b) Eneco Groep, 'Elektrificeren Als de Bliksem: Is de Industrie Er Klaar Voor?', Het Financieele Dagblad https://fd.nl/advertorial/enecogroep/1275488/elektrificeren-als-de-bliksem-is-de-industrie-er-klaar-voor [accessed 18 March 2021].
12 (a) NWEA, 'Wind Meets Industry Legt Het Missende Puzzelstukje', 1 July 2020 https://www.nwea.nl/wind-meets-industry-legt-het-missende-puzzelstukje/; (b) Windenergie Nieuws.
13 NWEA, 'In 2050 60 GW Aan Windenergie Op de Nederlandse Noordzee', 2019 https://www.nwea.nl/in-2050-60-gw-aan-windenergie-op-de-nederlandse-noordzee/ [accessed 24 March 2021].

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offshore system integration

PERSPECTIVES ON NORTH SEA ENERGY SYSTEM INTEGRATION

PERSPECTIVE	CO_2-NEUTRAL RAW MATERIALS AND FUELS	RENEWABLE ELECTRICITY	INFRASTRUCTURE	SPATIAL PLANNING	NATURE	INDUSTRIAL TRANSITION
STARTING POINT	Carbon-neutral fuels and raw materials are needed to reach climate goals. Start now to realize a cost-effective, net CO_2-neutral energy system by 2050.	Electrify the energy system as quickly and as far as possible. Avoid that fossil-based solutions slow down the development of renewable energy.	Infrastructure is an important bottleneck in achieving the climate goals due to the long realization times.	Because of competing spatial claims, efficient use is necessary. Existing users must be left with sufficient space.	Improvement of nature and the environment is necessary. Cumulative impacts must not exceed carrying capacity of ecosystem.	The industry needs long-term investment security. The industry will have to develop circular, climate-neutral processes and at the same time remain competitive.
REALISATION	Develop CCS as a transition technology. Integrate assets of oil & gas with new energy functions.	Large-scale roll-out of offshore wind is leading. Put efforts in electrifying the demand-side, before switching to hydrogen. Promote a sustainable business-case for the offshore wind sector.	Infrastructure requires long-term planning to keep the costs as low as possible.	Promote collaboration and coordination between stakeholders.	Strengthening nature outside protected areas, e.g. in wind parks. Designate protected (nature) areas. Minimize impact of human activities.	No preferred technique for decarbonisation yet: electrification, hydrogen, CCS, biomass, are all possible. Make use of a world market for raw materials and energy carriers.
ROLE SYSTEM INTEGRATION	Develop transport and storage of CO_2 and hydrogen. Explore options to reuse existing infrastructure.	Develop conversion options that increase stability of renewables and reduce energy loss.	Optimize energy transport with new, existing, and redesigned infrastructure.	Develop options that reduce spatial needs of energy and allow for multifunctional use.	System integration can be part of nature-inclusive construction and habitat restoration.	Develop solutions for flexible energy supply, like energy storage.

The full report is available on the website of the North Sea Energy Programme: https://north-sea-energy.eu
Research and concept: MSG Sustainable Strategies • Design: Mead in Holland

Het project is uitgevoerd met subsidie van het Ministerie van Economische Zaken, Nationale regelingen EZ-subsidies, Topsector Energie uitgevoerd door Rijksdienst voor Ondernemend Nederland.

CO_2-neutral raw materials and fuels

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STARTING POINT

Carbon-neutral fuels and raw materials are needed to reach climate goals.

Start now to realize a cost-effective, net CO_2-neutral energy system by 2050.

REALISATION

Develop CCS as a transition technology.

Integrate assets of oil & gas with new energy functions.

ROLE SYSTEM INTEGRATION

Develop transport and storage of CO_2 and hydrogen.

Explore options to reuse existing infrastructure.

Renewable electricity

STARTING POINT

Electrify the energy system as quickly and as far as possible.

Avoid that fossil-based solutions slow down the development of renewable energy.

ROLE SYSTEM INTEGRATION

Develop conversion options that increase stability of renewables and reduce energy loss.

REALISATION

Large-scale roll-out of offshore wind is leading.

Put efforts in electrifying the demand-side, before switching to hydrogen.

Promote a sustainable business-case for the offshore wind sector.

Infrastructure

North Sea Energy offshore system integration

STARTING POINT

Infrastructure is an important bottleneck in achieving the climate goals due to the long realization times.

REALISATION

Infrastructure requires long-term planning to keep the costs as low as possible.

ROLE SYSTEM INTEGRATION

Optimize energy transport with new, existing, and redesigned infrastructure.

Spatial planning

North Sea Energy offshore system integration

STARTING POINT

Because of competing spatial claims, efficient use is necessary.

Existing users must be left with sufficient space.

REALISATION

Promote collaboration and coordination between stakeholders.

ROLE SYSTEM INTEGRATION

Develop options that reduce spatial needs of energy and allow for multifunctional use.

Nature

North Sea Energy offshore system integration

REALISATION

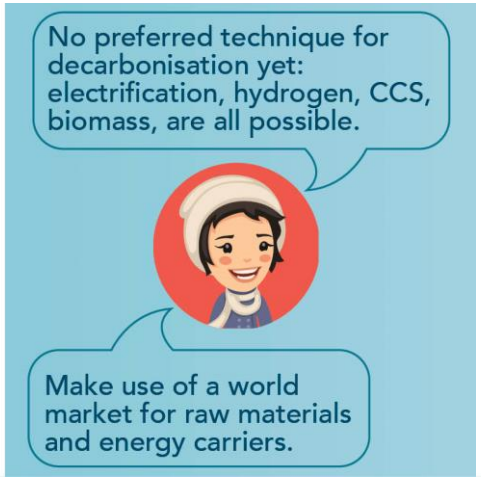
STARTING POINT

ROLE SYSTEM INTEGRATION

Industrial transition

STARTING POINT

REALISATION



ROLE SYSTEM INTEGRATION

Stakeholder views on North Sea System Integration: Common ground

North Sea Energy offshore system integration

- Target for 2050: carbon-neutral energy system with large amount of renewables.
- North Sea offshore wind will play a key role in the energy transition.
- Increased coordination between sectors is key.
- Clear & solid policies are essential: direction/incentives and spatial procedures.
- Knowledge base: Need for an (independent) common knowledge base.
- Spatial pressure on North Sea is high; solutions to efficient use of space are needed.

Views differ with regard to

North Sea Energy offshore system integration

General

- Self-sufficiency *vs*. trade opportunities
- Speed of transition from fossil to renewables
- Priority of energy transition in relation to other goals (nature, food, other uses)
- Role of government vs. market players (industry) in facilitating decarbonisation

Reuse

- Benefits: size of cost savings, right locations, environmental benefits?

Common ground on necessity, but conditional on paths

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Hydrogen

- Timing (technological development) and necessity (alternatives)
- Blue hydrogen as a stepping stone or as a lock-in ?
- Offshore versus onshore production: costs, safety, spatial claims

CCS

- not seen as part of system integration
- temporary technology or key technology also for negative emissions after 2050?

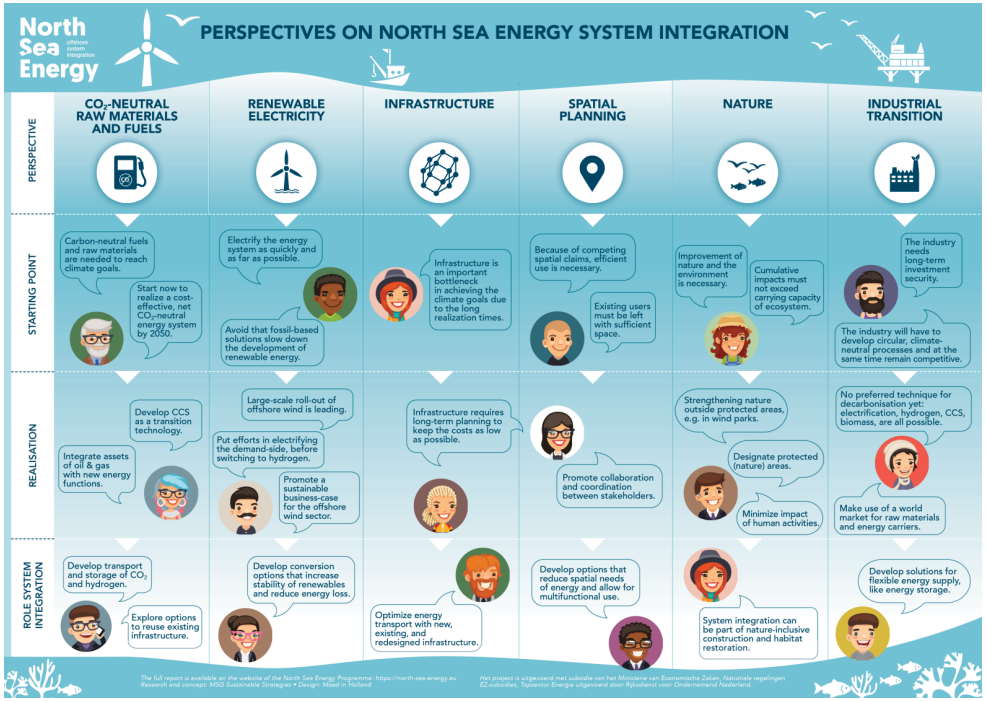
North Sea system integration is a wicked problem

North Sea Energy offshore system integration

- Different perspectives of what's the problem
- Time line
- Distance
- No set number of solutions
- Governance

Full report and perspective map available

https://north-sea-energy.eu/nl/resultaten-2021/



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THANK YOU!

Find more information and the analysis report on:

www.north-sea-energy.eu