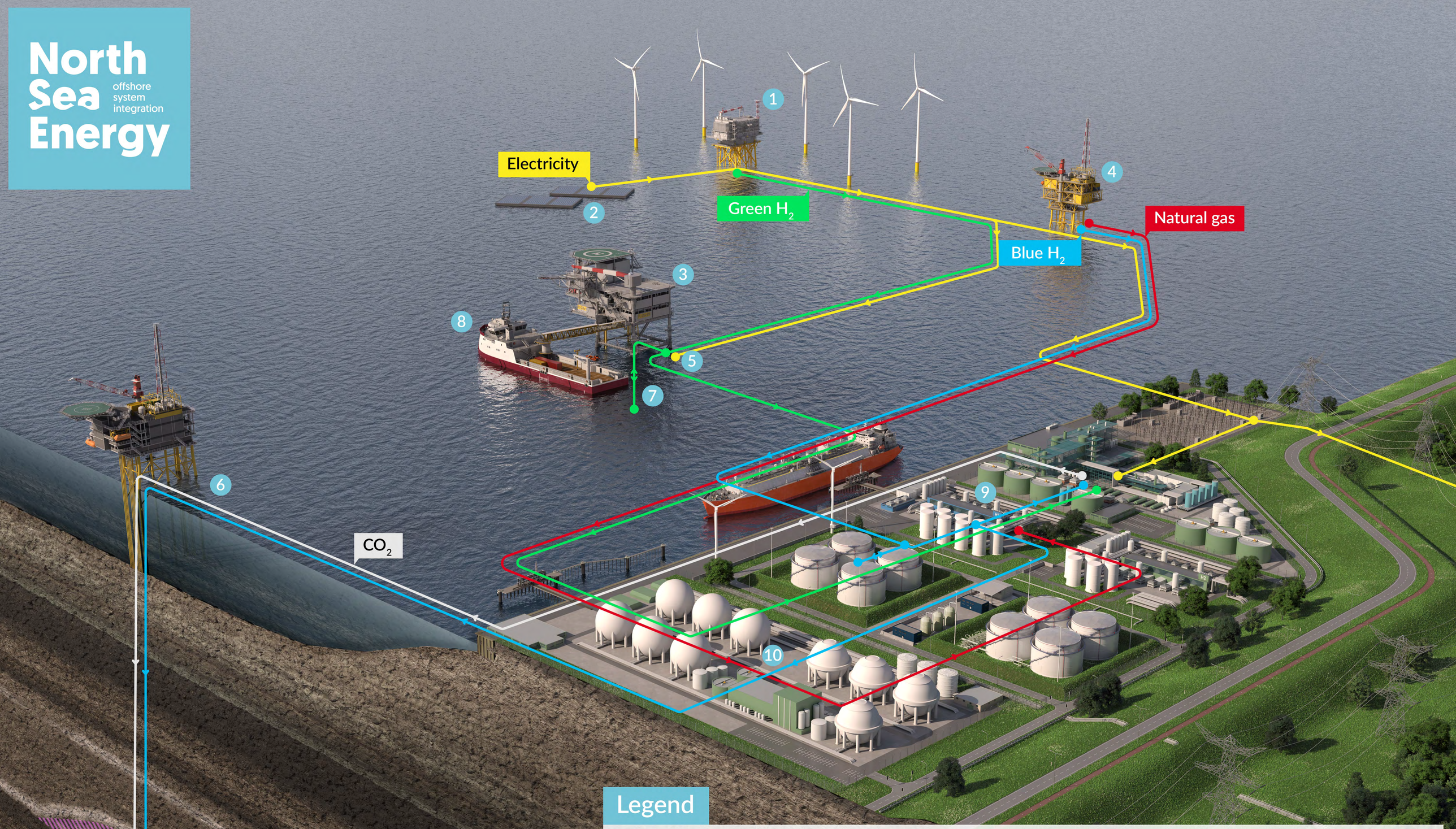
North Sea Energy

offshore system integration



Legend

1. **Offshore wind:** A mature technology and that will play a dominant role in the North Sea energy system by 2030; floating wind concepts are fast-maturing.
2. **Offshore solar:** The first floating offshore solar projects are operating in the North Sea and further scale-up is foreseen.
3. **Offshore H_2:** Producing green hydrogen through electrolysis of purified seawater with offshore green electricity will bring system flexibility.
4. **Offshore gas production / Offshore platform electrification:** Electrification of hydrocarbon production platforms reduces overall energy consumption, CO_2 and NO_x emissions.
5. **Offshore interconnection (H_2, electricity):** Interconnectors for electricity, hydrogen, CO_2 and natural gas connects markets and countries for enhanced flexibility and energy.
6. **Carbon capture and storage:** The North Sea has very large CO_2 storage potential in depleted hydrocarbon reservoirs and saline aquifers.
7. **Energy storage:** Various energy storage options could be placed on or unlocked via platforms or islands. The subsurface holds vast potential for H_2 storage.
8. **Offshore service sharing:** Sharing logistic services between offshore wind and the oil and gas sector to reduce emissions and costs.
9. **Blue hydrogen production onshore and CO_2 capture:** reforming natural gas, residual gases from industry or even biomethane to hydrogen for energy use and CO_2 ready for storage.
10. **Import and export:** Reception, storage and transshipment of liquids and gases.

Stakeholders

The North Sea Energy program actively involves stakeholders from various stakeholder groups:

- Governments
- Infrastructure owners
- Offshore wind operators
- Gas operators
- Logistics and service industries
- Demand-side industry
- Non-governmental organizations
- Ports
- Other North Sea users

Action Agenda

Based on the NSE results and input from partners and stakeholders, we drafted an Action Agenda system integration on 7 themes. Please check out the website for more information, or contact us if you want to contribute.

Goal setting: international, spatial and integral

An international vision needs to be developed with supply, transport, demand and storage targets for the integrated energy system at the North Sea with international cooperation between North Sea region nations.

Governance of the transition

Establish and align a legal and regulatory framework for the realisation, operation and decommissioning of new offshore energy initiatives.

Economic stimuli and market development offshore system integration

Establish international clarity on long-term investment climate including market framework and related support schemes

Technical improvements (North Sea offshore demonstration Flagship programme)

Set technology specific targets for offshore energy innovations for pilot and demonstration and (early commercial) full scale projects.

Establish European portfolio approach of Research, Development & Deployment (RD&D) initiatives for offshore system integration pilots and demonstration programmes for cross-country and cross-sectoral learning: appoint demonstration areas for pilot and scale-up.

Minimize negative impacts and seek positive impacts on the ecosystem

The Ecosystem Agenda requires embedding ecological principles – of nature-inclusive design and multi-use of the environment – into the design of new offshore systems and establishing a robust North Sea Research and Monitoring Programme.

Collaboration, engagement, dissemination and communication

Facilitate effective collaboration and early engagement with stakeholders by establishing a dissemination platform for the exchange of objective and independent knowledge.

The Communication Agenda involves bringing the offshore into people's homes and minds to build public awareness and support for the offshore system integration.

Human capital agenda

The Human Capital Agenda requires the assessment of the medium- and long-term workforce needs and challenges faced by the future offshore energy sectors to develop a Human Capital strategy and action plan.

North Sea Energy

North Sea system integration in Action

Connecting people and technology for an integrated offshore energy system

The North Sea Energy program envisions the North Sea as an area that contributes optimally to our future sustainable energy system. We study the benefits of an integrated approach to develop a reliable and low-cost energy system, while simultaneously taking nature into account. We connect people and technologies, and look across borders and disciplines to drive faster reduction of CO_2 emissions, energy transport and storage, multi use of space and effective use of infrastructure for conversion.

Our ambition is to make the North Sea *the* offshore pioneering region that remains innovative and important for global offshore energy solutions. Together with stakeholders and partners we have developed an NSE-Action Agenda that describes the necessary steps towards a sustainable future-proof North Sea.

If you have any questions or you want to contribute to the program and the Action Agenda, please contact us.

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