

# SENSE-Hub Stakeholder Forum

Solar Enhanced North Sea Energy Hubs; Combining solar, wind, and hydrogen – how does it make SENSE?

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## *Project Information*

*The Solar Enhanced North Sea Energy-Hub Stakeholder Forum was organized by TNO, Oceans of Energy, Deltares, and Utrecht University. The SENSE-Hub consortium furthermore includes NIOZ Royal Netherlands Institute for Sea Research, NewGround Law, Primo Marine, Advanced Electromagnetics and has received co-funding from the MOOI program by the Rijksdienst voor Ondernemend Nederland (RVO).*

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## Background and Overview

The SENSE-Hub Stakeholder Forum explored the integration of solar, wind, and hydrogen technologies in the North Sea to advance renewable energy solutions. This event highlighted key opportunities, challenges, and innovative strategies to optimize energy production and infrastructure utilization. It brought together 85 participants from diverse sectors and organizations, promoting collaboration and knowledge exchange.

## North Sea Energy Transition

Rene Peters from TNO delivered an introduction, sharing the latest insights into the North Sea energy system. He emphasized the ambitious climate targets set by the Netherlands and the EU, including achieving climate neutrality by 2050 and expanding offshore wind capacity to 300 GW. The North Sea plays a pivotal role in realizing this strategy. However, key challenges include infrastructure demands, spatial constraints, and the need for coordinated international energy networks. Rene Peters highlighted hydrogen production and offshore solar deployment as promising solutions to address some of these challenges.

## Offshore Solar Industry Insights

Johnny Meit (Oceans of Energy) emphasized the spatial requirements of offshore wind generation and highlighted offshore solar as a key complementary energy source. He noted that rising infrastructure costs will eventually increase energy prices, potentially making renewable energy less attractive and undermining emissions reduction efforts. However, integrating offshore solar within wind farms can significantly lower the required infrastructure costs, enhancing the economic viability of offshore renewable energy projects.

## Stakeholder Perspectives

- **TenneT:** Marien Rupert presented scalable solutions for offshore grid connections and shared a vision for international meshed networks. He emphasized the need for standardization to reduce costs and highlighted the importance of international cooperation to connect all wind and renewable energy areas. Marien Rupert also discussed TenneT's offshore solar vision, noting the potential to increase the capacity factor by complementing wind with solar power.
- **Gasunie:** Werna Udding highlighted green hydrogen production as a complementary solution to manage surplus energy and support hard-to-decarbonize sectors. She explained how hydrogen can help balance the system during periods of high demand and low electricity supply. Werna Udding also noted that hydrogen could reduce infrastructure costs, although the benefits do not always reach the developers. She emphasized the need for clear offshore ambitions and supportive instruments for optimal rollout.
- **Zeevonk:** Lieke Homminga discussed the Zeevonk project, which will combine a 2 GW offshore wind farm with a 50 MW offshore solar farm and a large electrolyser for hydrogen production. She emphasized the significant opportunity presented by the complementarity of wind and solar energy. Lieke Homminga also pointed out the importance of public and

political support as enablers for such initiatives but acknowledged that the business case for offshore solar still needs to be proven.

- **PosHYdon Project:** Rene van der Meer showcased the practical integration of hydrogen production on offshore platforms. He provided a detailed overview of the PosHYdon project, a one-year offshore pilot set to commence hydrogen production by the end of 2024, using a 1 MW seawater-based electrolysis system. This project marks a significant step forward in offshore hydrogen production.

### Legal and Regulatory Perspective

The integration of offshore solar and wind projects introduces unique legal challenges necessitating a robust and updated regulatory framework. Erwin Noordover from NewGround Law provided an overview of the current regulatory landscape, emphasizing the limitations of the existing Electricity Act. Key issues include the uncertainty surrounding large-scale offshore solar and hydrogen, complicating the permitting process as it remains unclear which permits are required. Additionally, the absence of enforceable obligations for grid access poses a significant obstacle. These challenges underscore the urgent need for updated policies to facilitate the successful rollout of future energy systems.

### Highlights from the Panel Discussion

Key challenges identified during the panel discussion included grid congestion, high offshore transmission costs, and the need for further scaling and commercialization of offshore solar and hydrogen technologies. Opportunities for integration, such as shared infrastructure between wind and solar farms, were highlighted as ways to enhance efficiency and reduce costs. Hydrogen integration was noted as a means to improve system utilization, making renewables economically viable even at low-capacity factors. The consensus was that technology would not be the primary obstacle to establishing SENSE-hubs in the North Sea. Instead, the main challenges lie in the costs and investments, emphasizing the importance of redistributing these among users and providers.

### Recommendations from the Panel and Audience

- **Policy and Targets:** Develop dedicated policies and targets to stimulate offshore solar deployment. This includes incorporating offshore solar targets in offshore wind tenders and subsidy arrangements like SDE++ or CfD.
- **Cross-sectoral Cooperation:** Promote cross-sector collaborations to achieve cost-efficient and scalable solutions. Additionally, encourage pilot projects to validate offshore solar-wind-hydrogen integration.
- **Cumulative Ecosystem Impacts:** Conduct deeper analysis of the cumulative impacts of SENSE-Hubs on the North Sea ecosystem.
- **Stakeholder Engagement:** Build a strong stakeholder community to effectively collaborate and advance the offshore energy system of the future.

