ProWind

The Research Council of Norway

ProWind

Advancing multi-scale physical modelling and bespoke monitoring for offshore wind foundations

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NGI OSLOMET NIVA Norsk institutt for vannforskning Akvaplan niva Norwegian Offshore Wind

Norwegian Geotechnical Institute (NGI)

- Leading **centre of research and consultancy** in engineering-related geosciences.
- **One of 33 research institutes** in Norway.
- Basic state funding from RCN enables NGI to build **long-term knowledge and expertise** relevant for the future.
- Large number of **experimental activities**.
- Involvements with at least **80 GW offshore wind** globally.









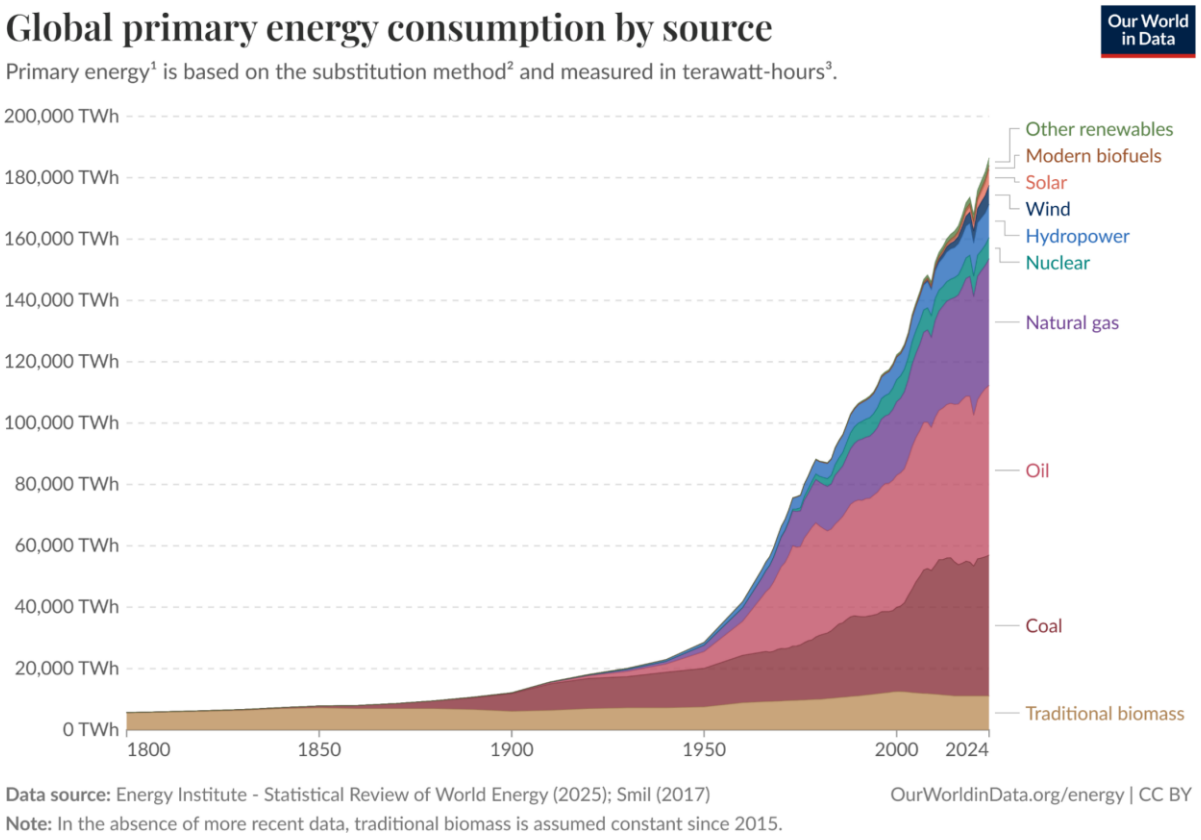




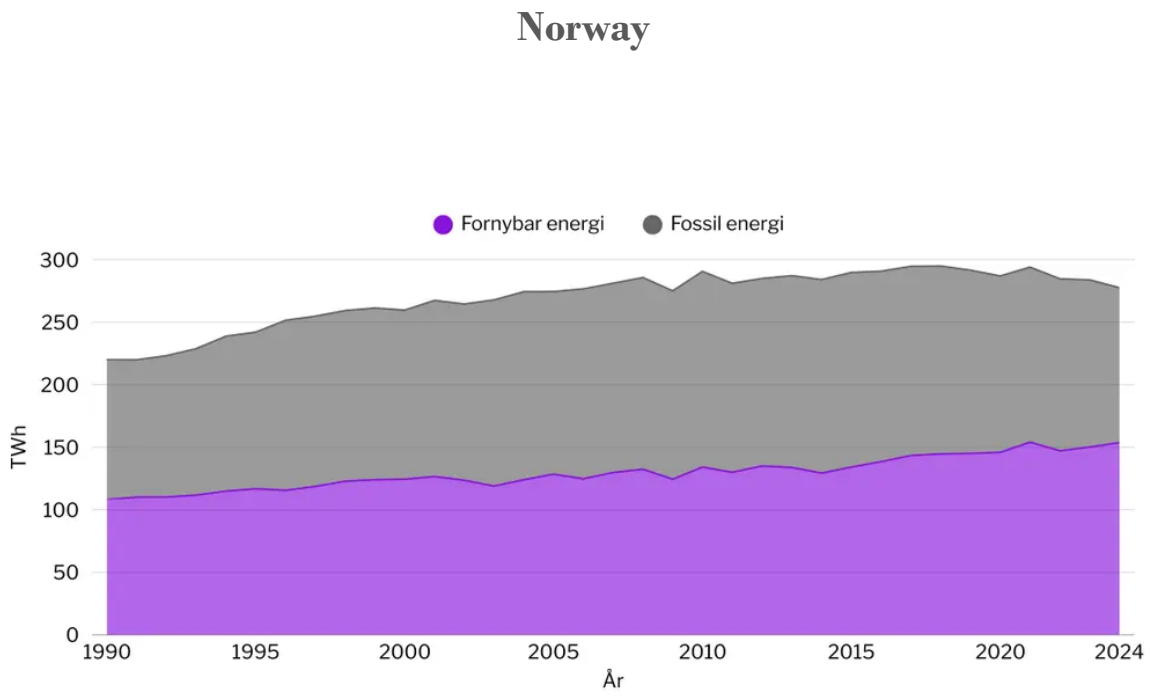


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Global and Norwegian energy consumption



ourworldindata.org



tilnull.no

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Offshore Wind

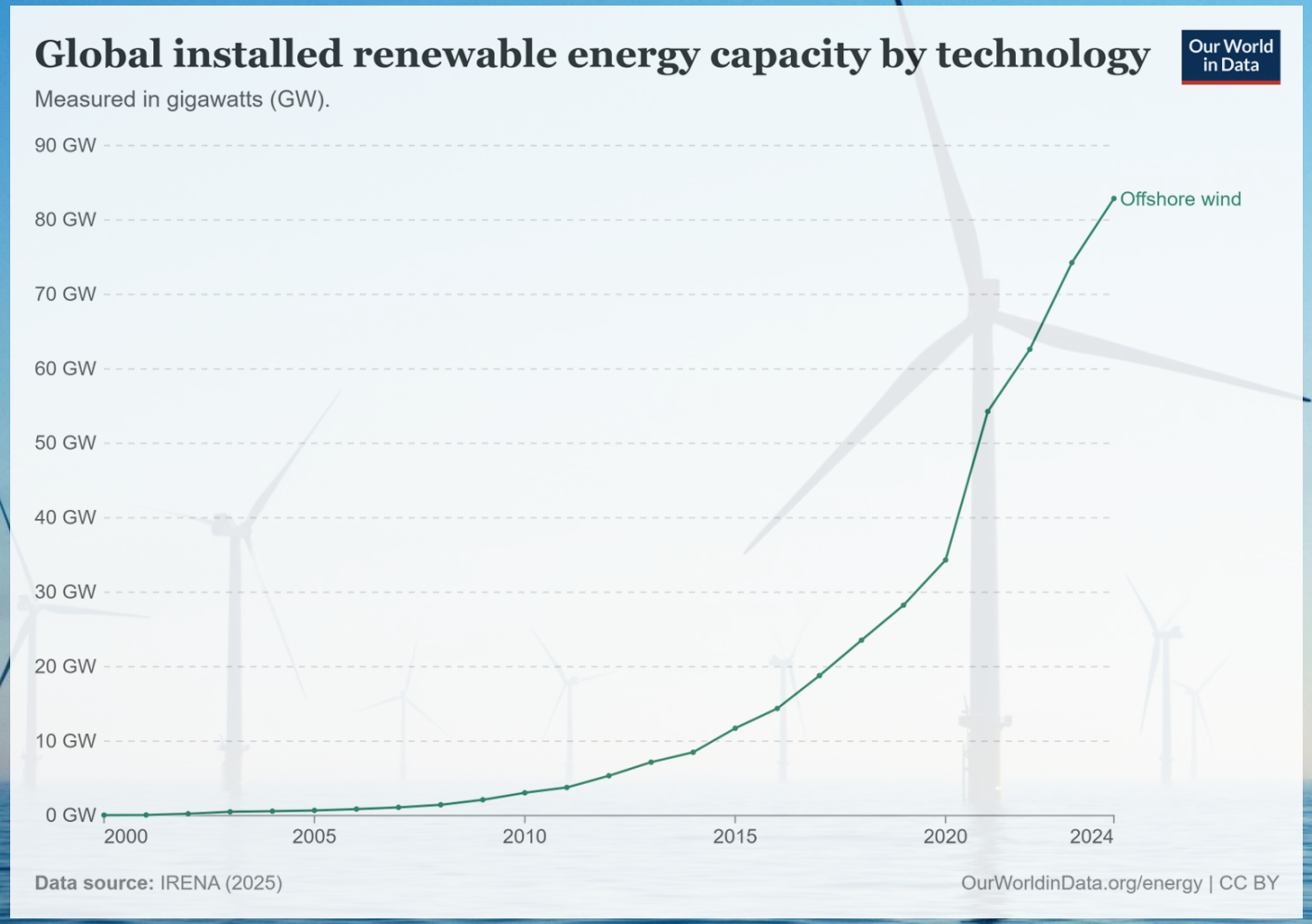
Offshore wind provides a partial solution, together with other renewable energy sources, CCS and application of energy efficiency measures



dudgeonoffshorewind.co.uk

ProWind

Offshore Wind



Research & research environments

- Improve understanding
- Support informed decisions
- Reduce costs
- Improve reliability
- Support new or adapted technologies and solutions
- Develop competence
- Support innovation
- Lower risk

TAILWIND

WindRise

ProWind

Why ProWind ?

- Offshore WTG **foundations account for 19 – 36 %** of CAPEX [1]. Technology must reduce cost.
- **Floating technologies** need further maturation. R & D is required for many associated technologies.
- Absence of an **integrated research infrastructure**, facilitating:
  - experimental *(geotechnical) modelling,*
  - structural *instrumentation,* and
  - environmental *monitoring*.
- **Biodiversity effects** are technology and site dependent. 90% of the scientific literature focusses on bottom-fixed structures [2]. Single factor effects only.
- **Insufficient data available** to the public for comprehensive research and optimization efforts.

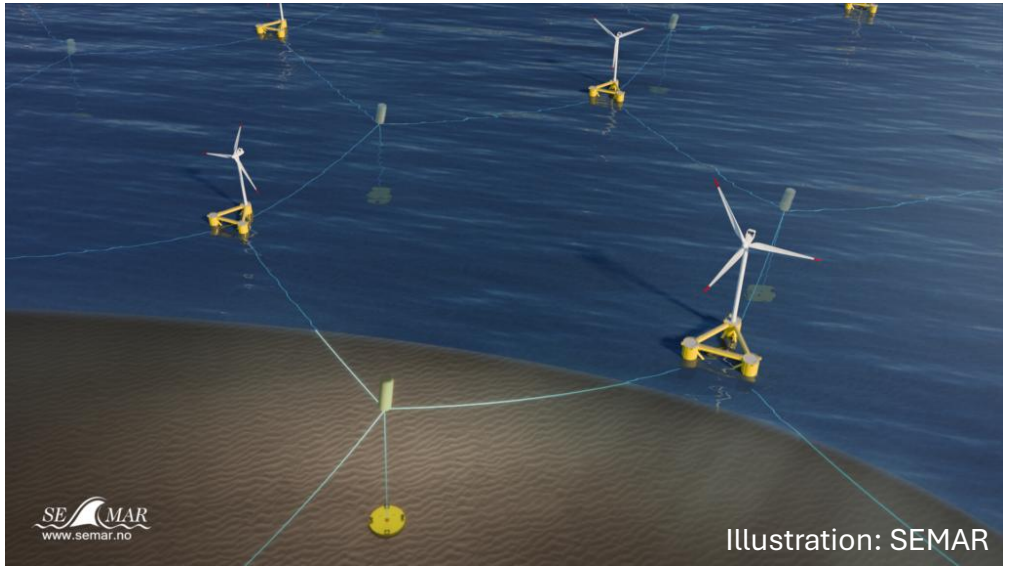


Illustration: SEMAR


Photo: NIVA



Photo: NGI

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[1] ETIPWind, 2021: Getting fit for 55 and set for 2050.; [2] Galparsoro et al., 2022, npj Ocean Sustainability

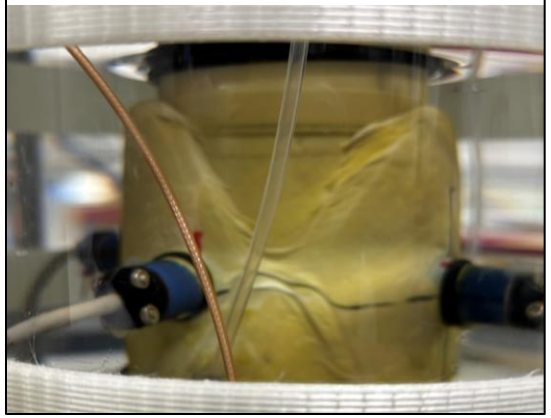
ProWind - Project Overview

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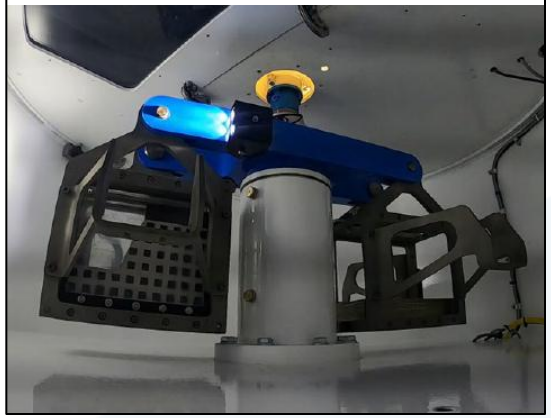
*Norway's national research infrastructure for **multi-scale physical experiments** on foundation systems and **monitoring** for offshore wind structures.*

INCREASING EXPERIMENT SCALE AND EFFORT

Element Testing
(laboratory)



Physical (Centrifuge) Modelling
(n-g)



Physical Model Testing
(1-g)

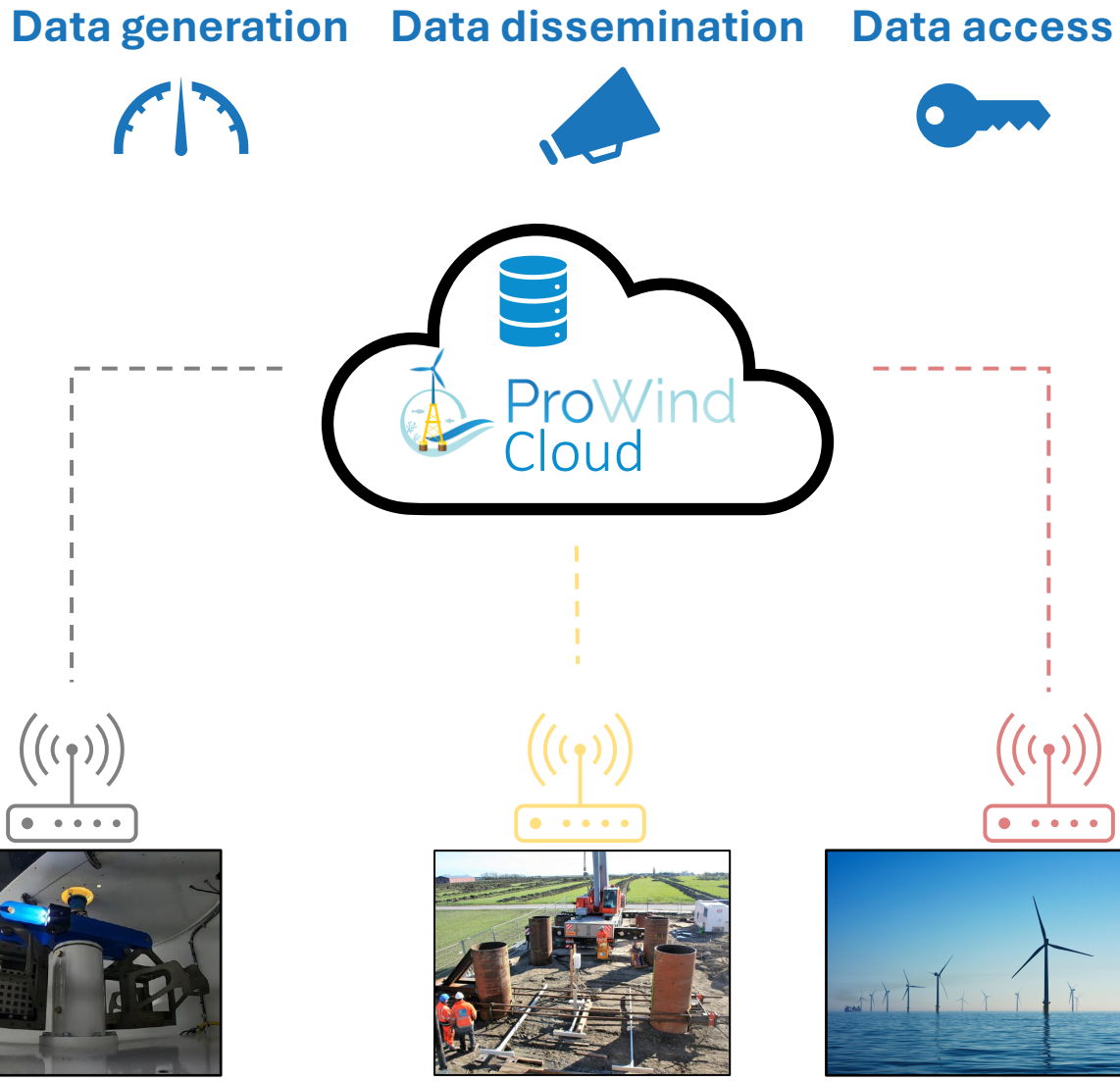


Full-Scale Monitoring
- Dynamic motions
- Environmental effects



ProWind - Project Overview

- **3 experimental nodes** under establishment
- Different access levels from **Q4 2027** (~10 yrs)
- **Cross-node** digital infrastructure
- **Database and software suite** that follows the FAIR principles.
- **Leverage existing** Norwegian research infrastructures



NGTS

METCENTRE
MARINE ENERGY TEST CENTRE, NORWAY

Summary

- Promote and enable experimental **research & monitoring**
- **Multiple** research scales
- **Foundation systems** and marine ecosystems
- Different access levels **from 2027**

ProWind
NEWSLETTER

ngi.no/en/projects/prowind/