

North Sea Energy

offshore
system
integration

Miralda van Schot, 26-06-2019



In collaboration with:



university of
 groningen

New
Energy
Coalition



WAGENINGEN
UNIVERSITY & RESEARCH



Oil & Gas
Authority

gasunie



ESTRAC

Energy
Systems
Transition
Centre



Hanze Hogeschool
Groningen
University of Applied Sciences



Gasterra



Boskalis



SIEMENS



Royal
HaskoningDHV
Enhancing Society Together

LOYENS LOEFF



MARITIME & OFFSHORE MEDIA GROUP



DEME
Dredging, Environmental & Marine Engineering

ORANJE-NASSAU
ENERGIE



NAM



XKP

VISUAL ENGINEERS



TAQA



TOTAL



TKI WIND OP ZEE
Topsector Energy



TKI NIEUW GAS
Topsector Energie

www.north-sea-energy.eu

North
Sea
Energy
offshore
system
integration

Research program aimed at research & development of opportunities for system integration by integrating offshore wind and gas



Strategic Spatial Planning

Scenario development for spatial synergies now and in the future



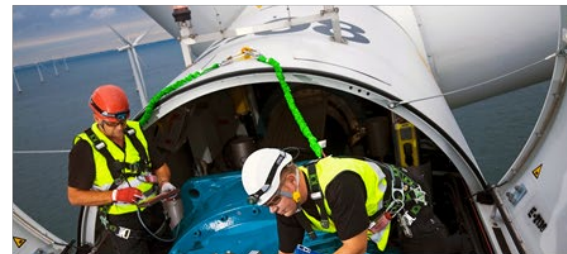
Society & Governance

Human Capital, Public Engagement and Regulations



Physical Networks

Techno-economic evaluation of various system integration options



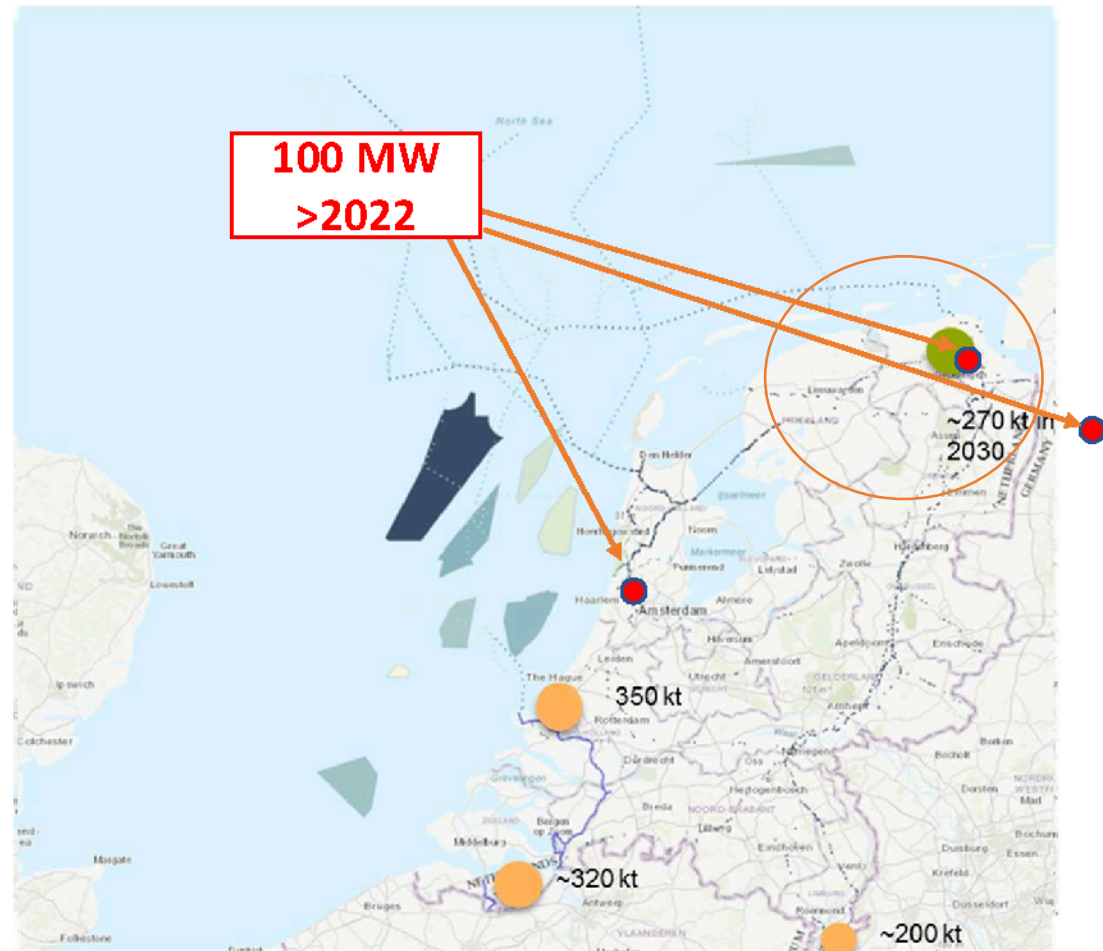
HSE

Health and Safety, Emissions and Environment

Trends: Hydrogen

- Current demand 0.8 million ton hydrogen
 - Ammonia
 - Refineries
- Future sector growth expected in:
 - Industry
 - Mobility
 - Electricity

Theoretical demand potential 14 Mt H₂

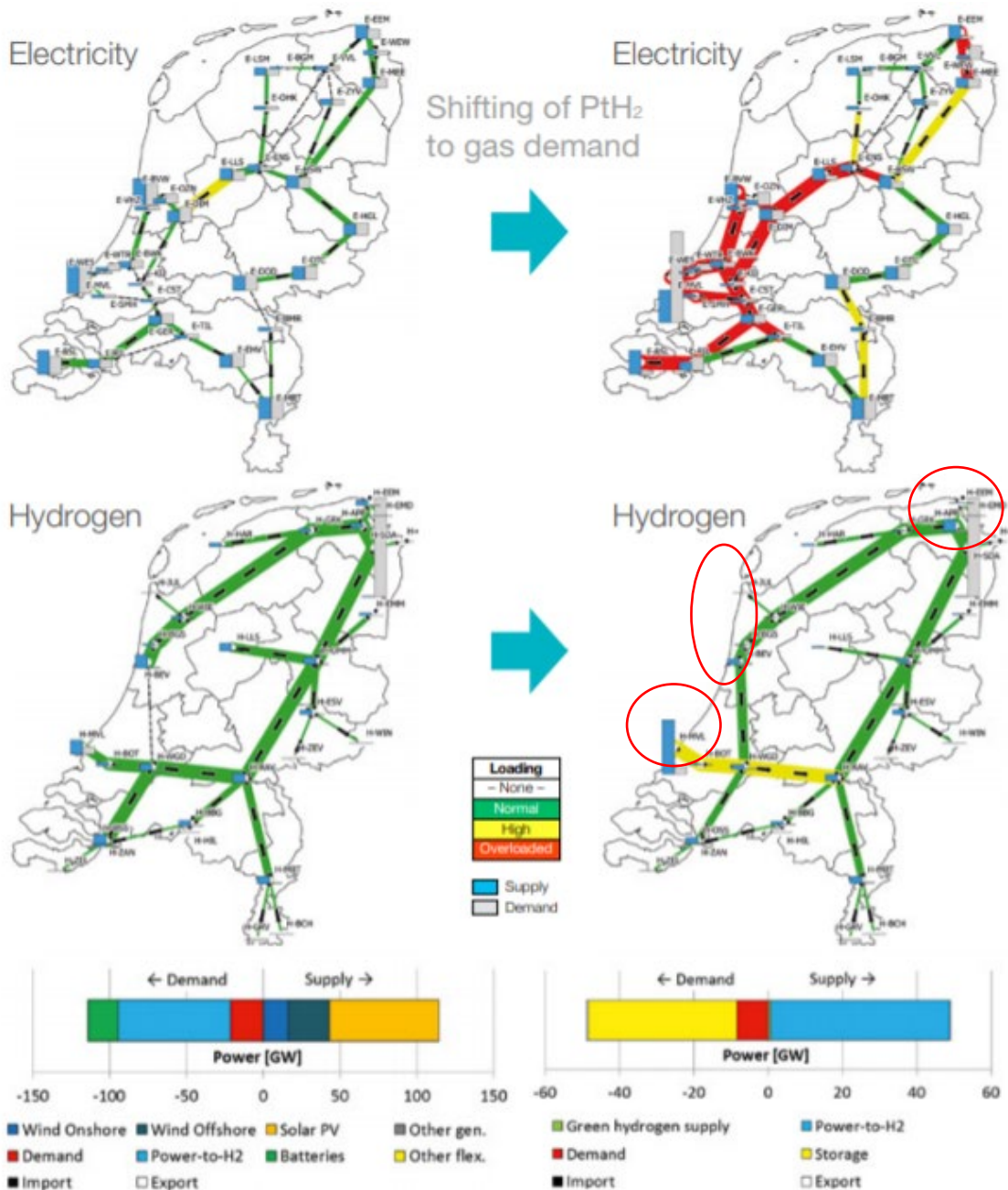


North Sea energy Atlas <http://www.north-sea-energy.eu>

Contouren van een Routekaart Waterstof 2018

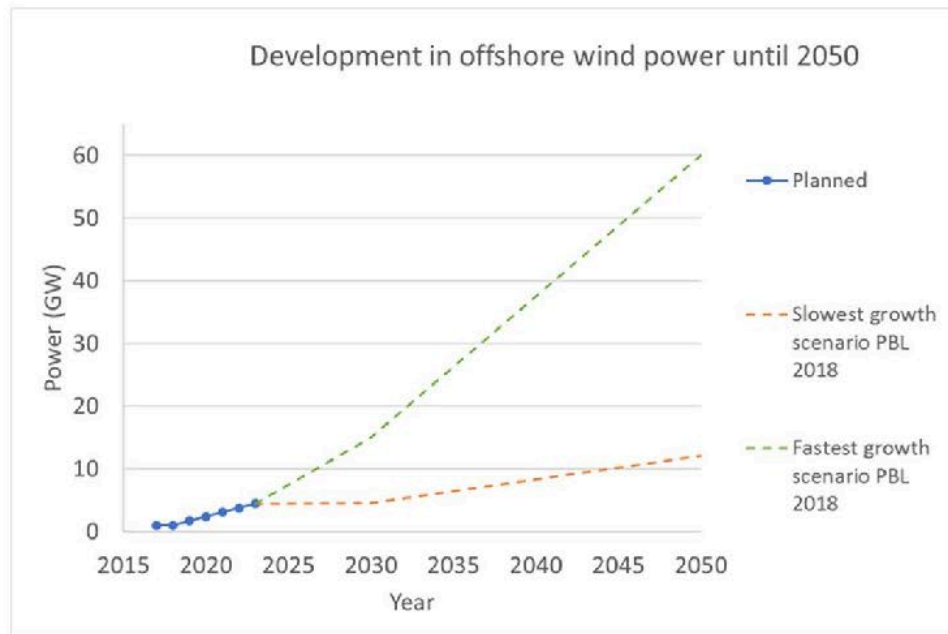
NIB De Groene Waterstofeconomie in NoordNederland 2017

- Infrastructure scenario by TenneT and Gasunie for 2050
- Displayed scenario has 53GW of offshore wind on DCS
- Integration of infrastructure reduced transmission barriers and increases security of supply.
- Molecules can be transported more cost-efficient.



Infrastructure Outlook, 2050 (TenneT en Gasunie)

Trends: strong growth for offshore wind



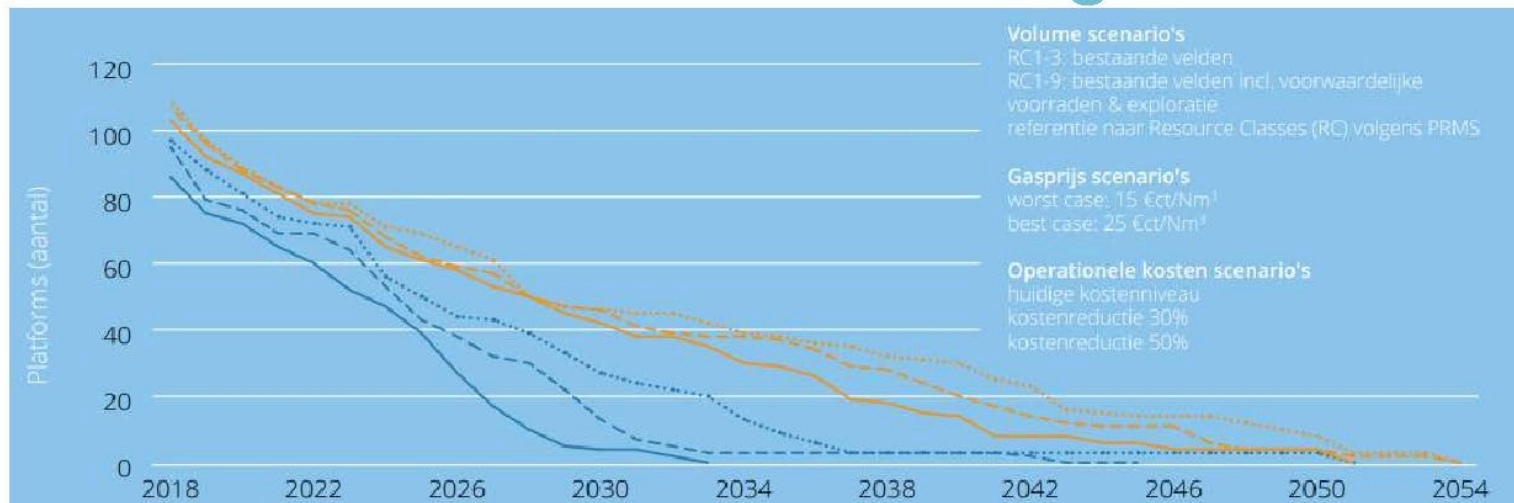
Offshore wind growth up to 2023 of ~4,5 GW (NL)
 2024- 2030 of ~11,5 GW (NL)
 2050 of 60 GW (NL)??



North Sea energy Atlas <http://www.north-sea-energy.eu/atlas.html>

- 2023: €8-11 billion investments, at least 4 billion for infrastructure
- Large offshore grid (vision 2050): 24 Billion Euro (NL only)

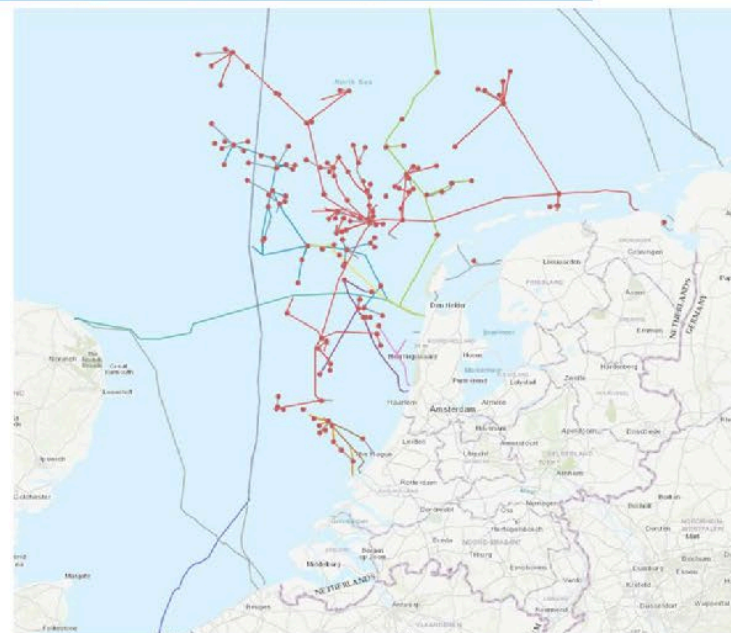
Trends: the decline of offshore gas



EBN Focus 2018 energie in beweging

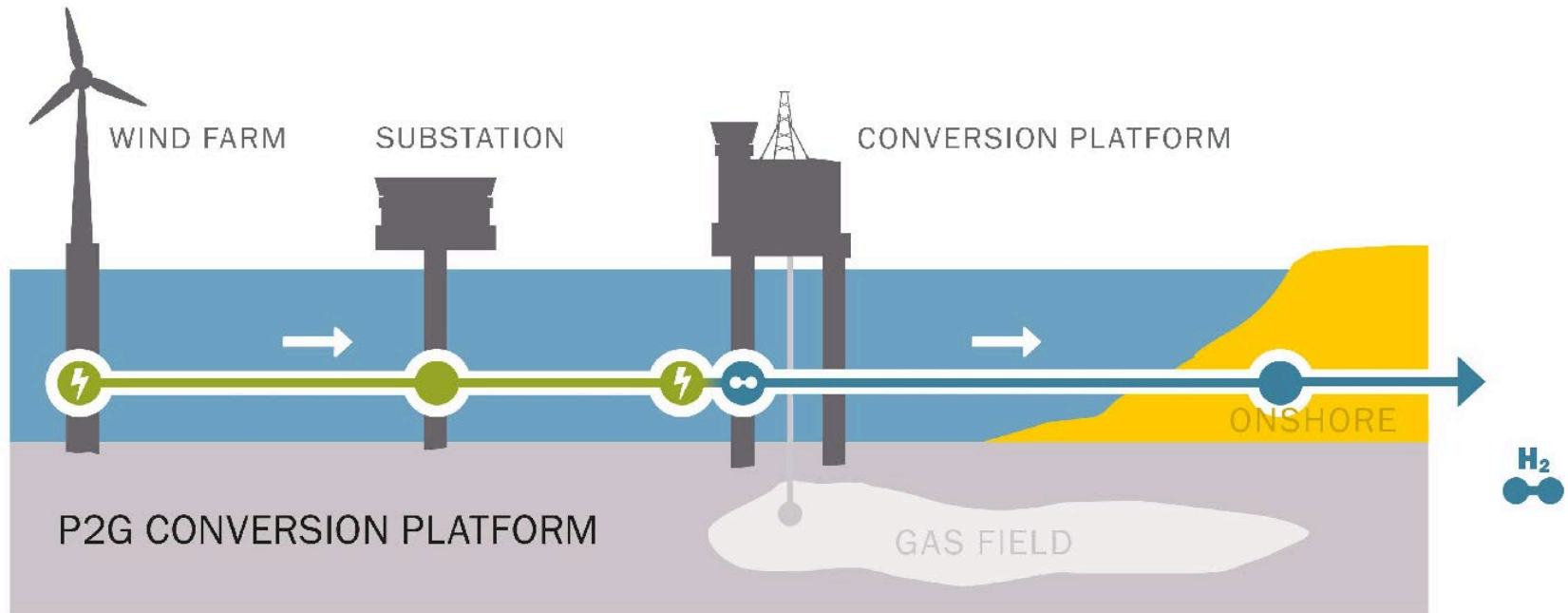
Decommissioning on the North Sea is large endeavour

The current sum earmarked as a provision for the decommissioning of all Dutch wells and infrastructure is some €7 billion, most (55%) of which is for the offshore sector



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Power to hydrogen



Full Conversion incl. Societal Revenue

Look from a platform perspective while keeping all current external ROIs the same.

i.e. windfarm will always get market value for their wind



- Saving on electric cable monetized
- Savings on e-grid enforcement monetized
- €1- €1.75 hydrogen price kg

Sensitivity for: **Size, price stochastics, externalities, old/new pipeline, efficiency electrolyser, learning curve, distance to shore, refurbishment costs**

Thank you for your attention

NSE programme:
www.north-sea-energy.eu

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