

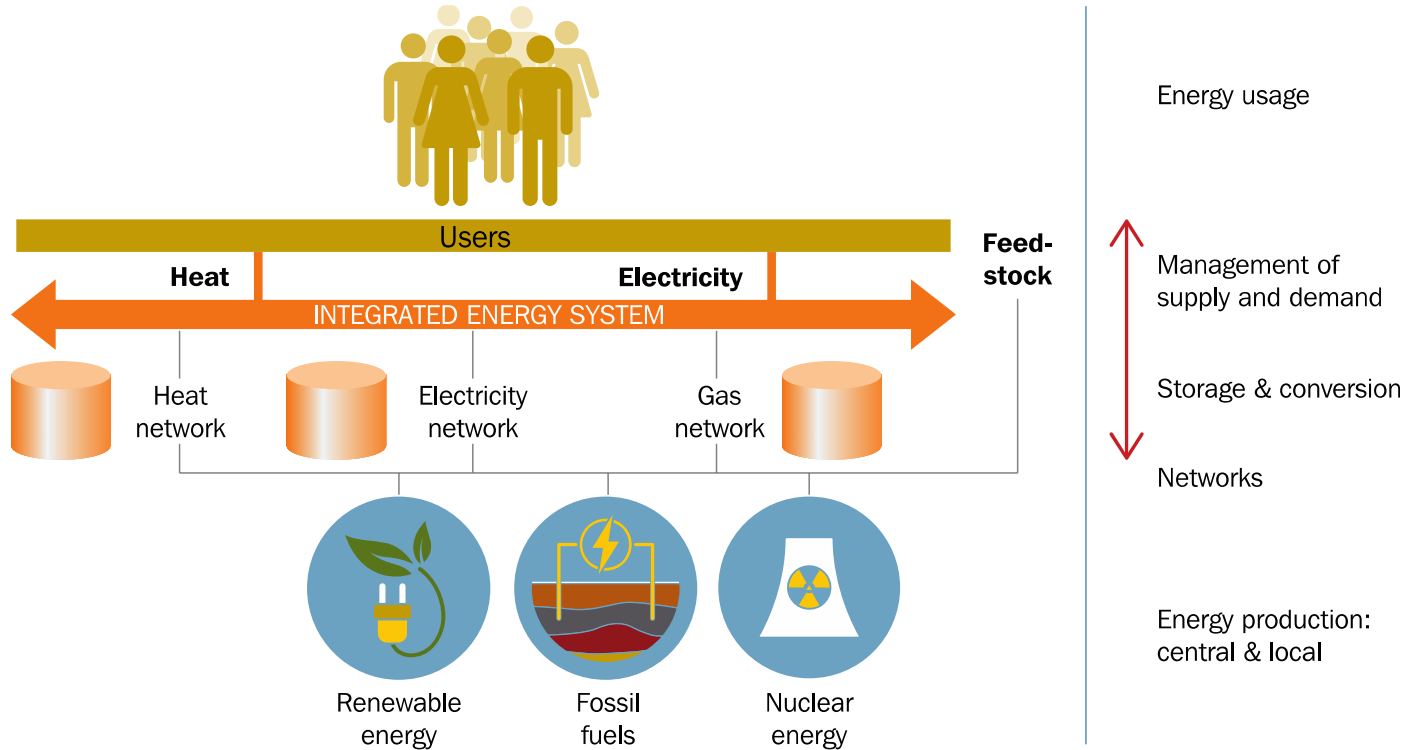


# › JOINING FORCES IN THE ENERGY TRANSITION

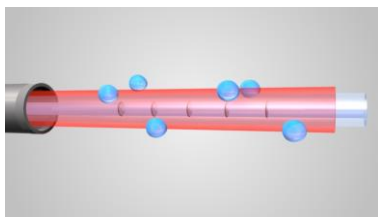
Richard Braal

**TNO** innovation  
for life

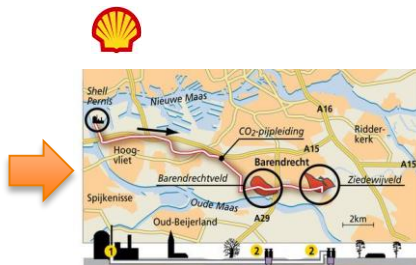
# HYBRID ENERGY SYSTEM



# FROM CCS → OIL & GAS → GREENHOUSES...



Distributed chemical sensing



Barendrecht CO2 storage

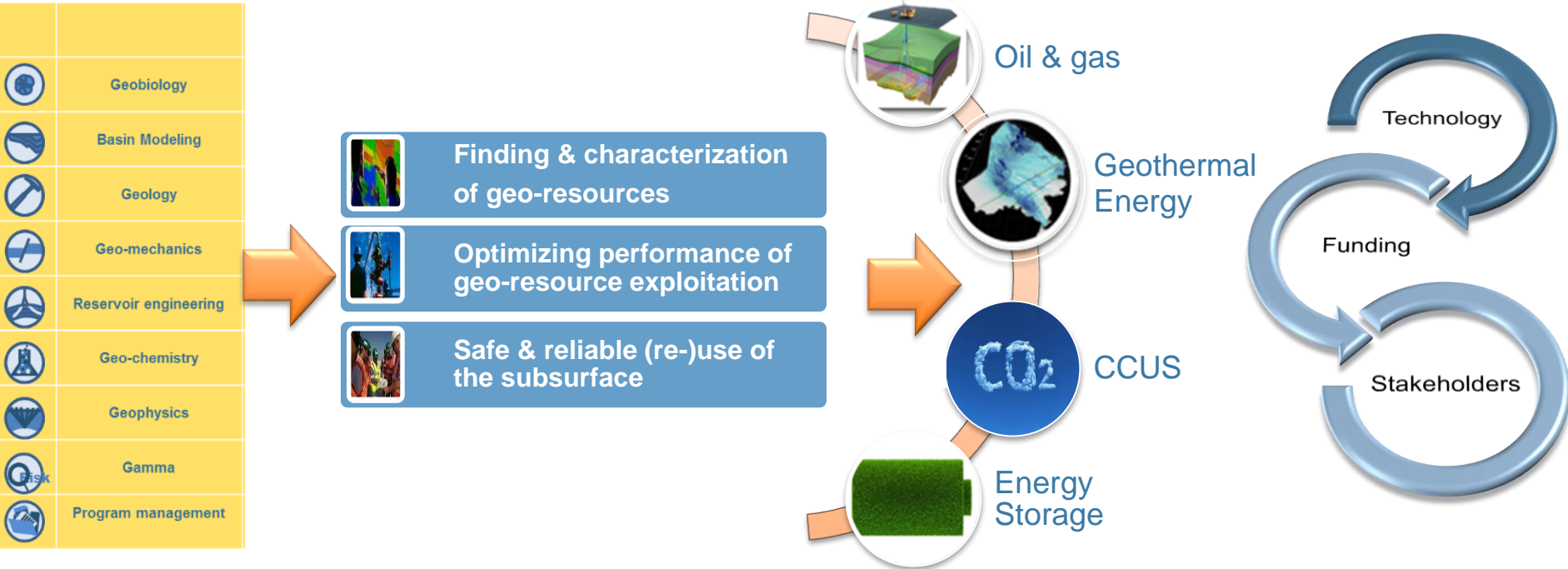


IOR/EOR: water or CO2  
breakthrough

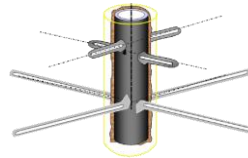
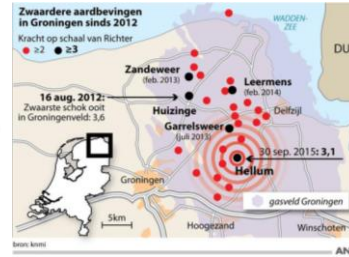


Monitoring CO2, H2O &  
temperature Greenhouses

# A strong geoscience base for enabling the energy transition



# CROSS FERTILIZATION IN GEO SCIENCE IN TRANSITION



Sealing ideas CO2 storage

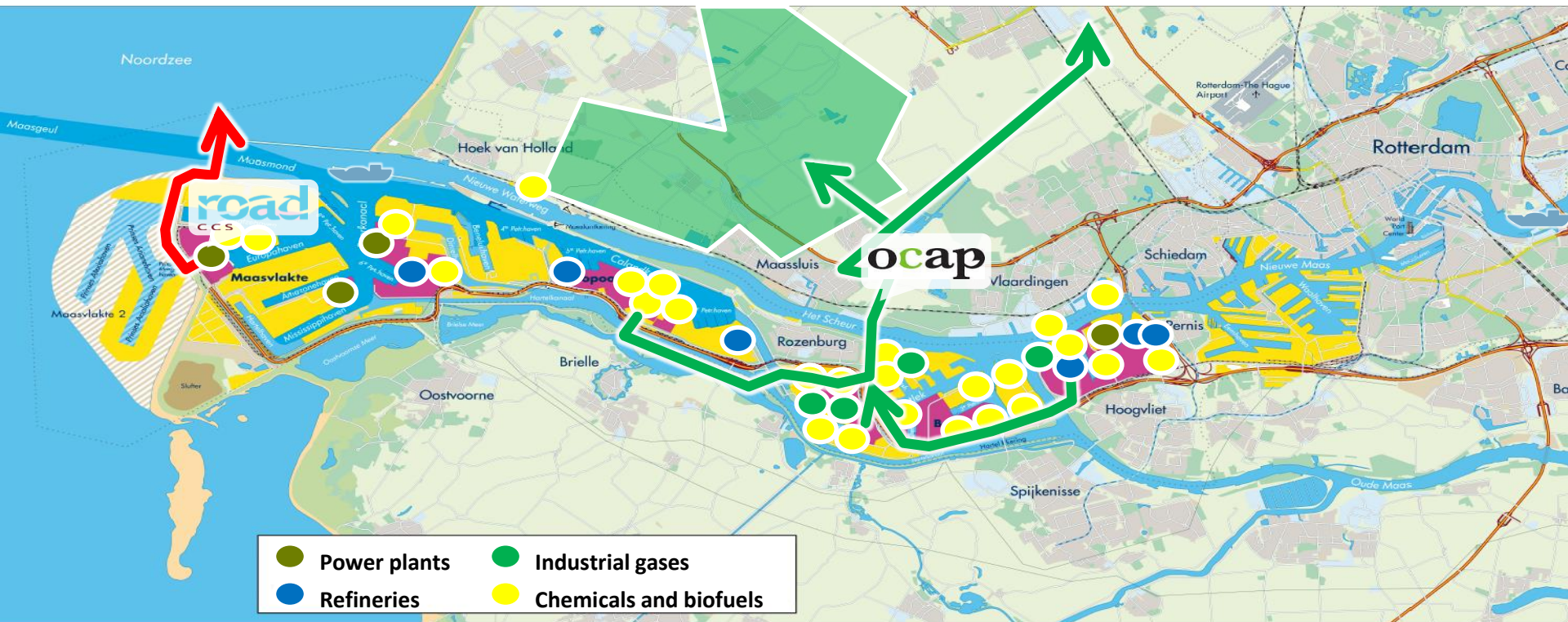


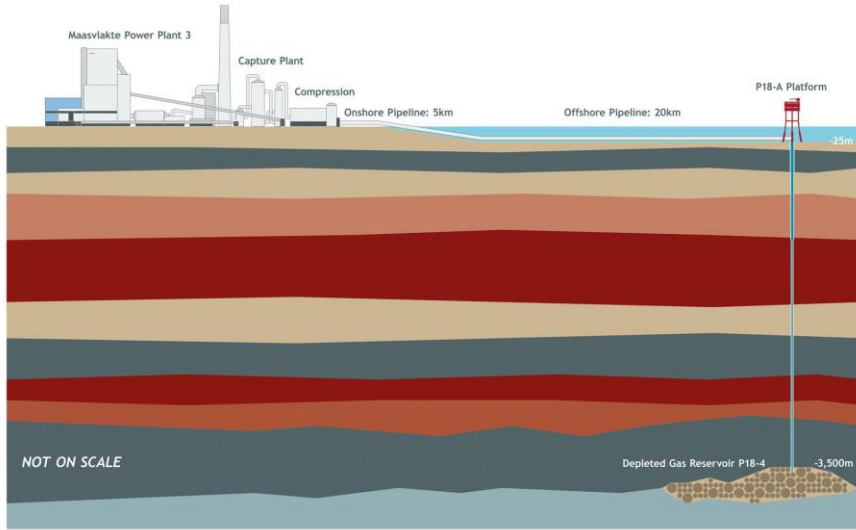
Downhole field lab: wellbore sealing by rock salt (natural sealing salt plug & clay & bentonite)



# MUTUALLY BENEFICIAL BUSINESS CASES

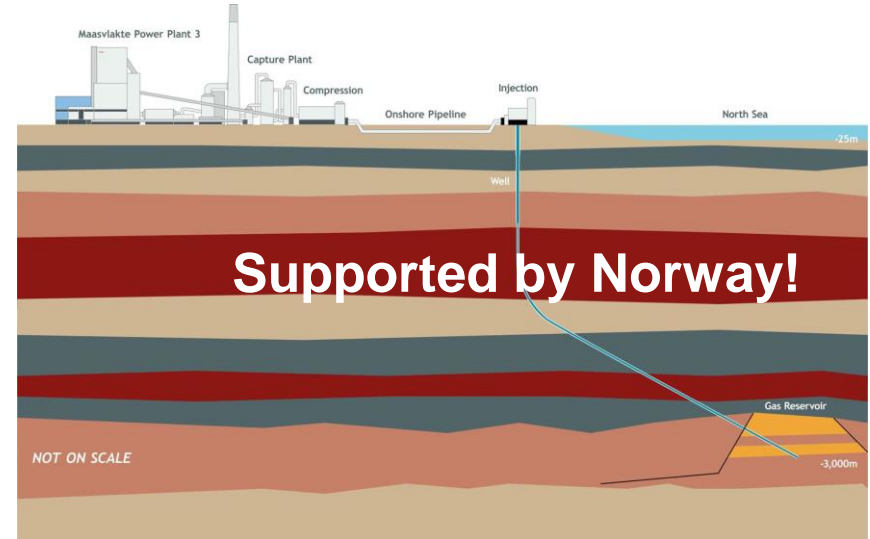
Next Step: ROAD Project, OCAP: Existing CO<sub>2</sub> Supply to Greenhouses, Many Large-scale CO<sub>2</sub> Emitters





**ROAD (OLD):  
STORAGE LOCATION TAQA P18**

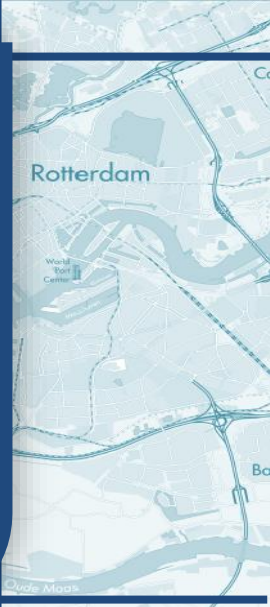
**CCS PROJECT NOT POSSIBLE**



**ROAD (NEW):  
STORAGE LOCATION ONE Q16**

**CCS PROJECT POSSIBLE!**

# ROAD Connection to Greenhouses



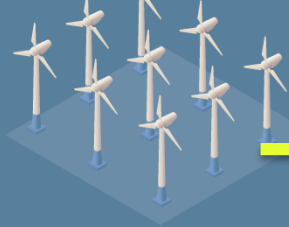
Westland Area

Q16 clears the road for CCUS

40 km

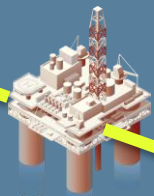
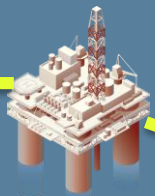




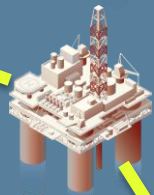


connect  
future  
wind parks

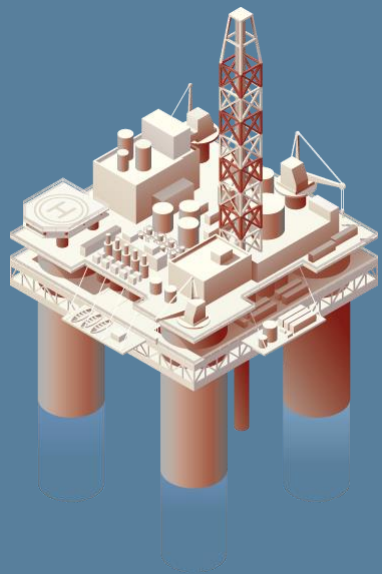
Future  
P2G/G2W



Zero  
emission  
platforms



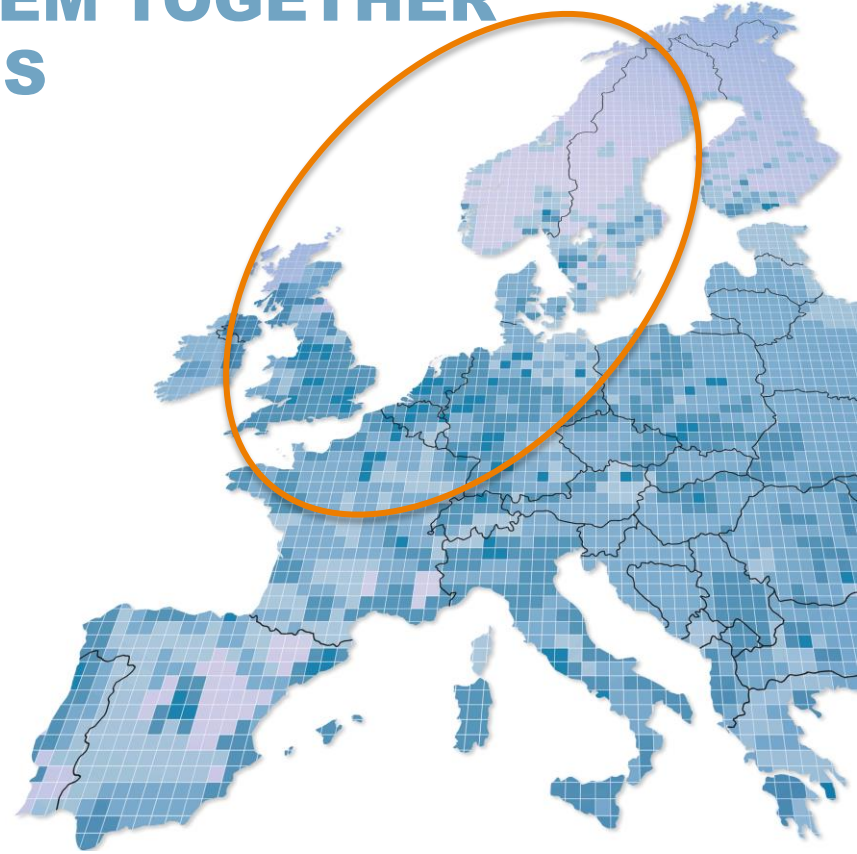
*The benefits of system integration*



# COMMON ISSUES, SOLVE THEM TOGETHER MAKE SMART COMBINATIONS

- › Maturing assets
- › Integrity of surface/subsurface energy systems
- › Well abandonment
- › Re-use of infrastructure
- › Offshore wind
- › Committed to Paris-agreement COP

**Large scale collaborations like  
NCCS are a must!**



A nighttime photograph of a city street. In the foreground, a modern, curved pedestrian bridge with a glass railing and a perforated metal mesh base spans across the street. The bridge is illuminated from below, creating a warm glow. In the background, a multi-story building with a curved facade and many lit windows is visible. The sky is dark, and there are long, horizontal light trails in shades of green and yellow, suggesting motion or light trails from a camera. The overall scene is a blend of urban architecture and modern design.

› **THANK YOU FOR YOUR  
ATTENTION**

Take a look:  
**TIME.TNO.NL**

**TNO** innovation  
for life