gasunie
crossing borders in energy

19 November 2020

Growing Hydrogen

Hydrogen & Synergy

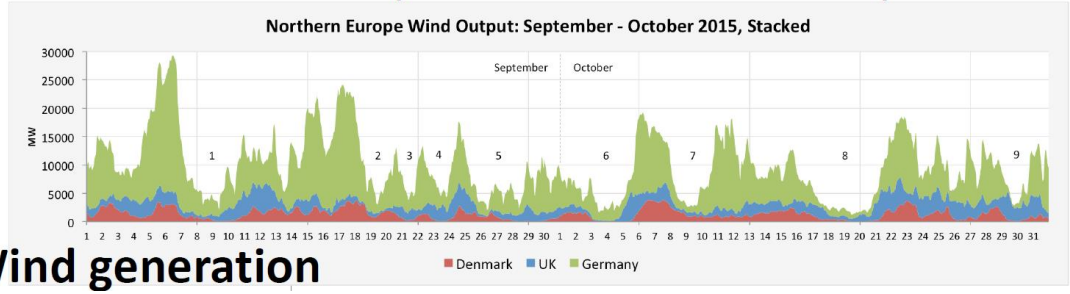
René Schutte

A smart role for green molecules provides for a reliable and affordable energy system

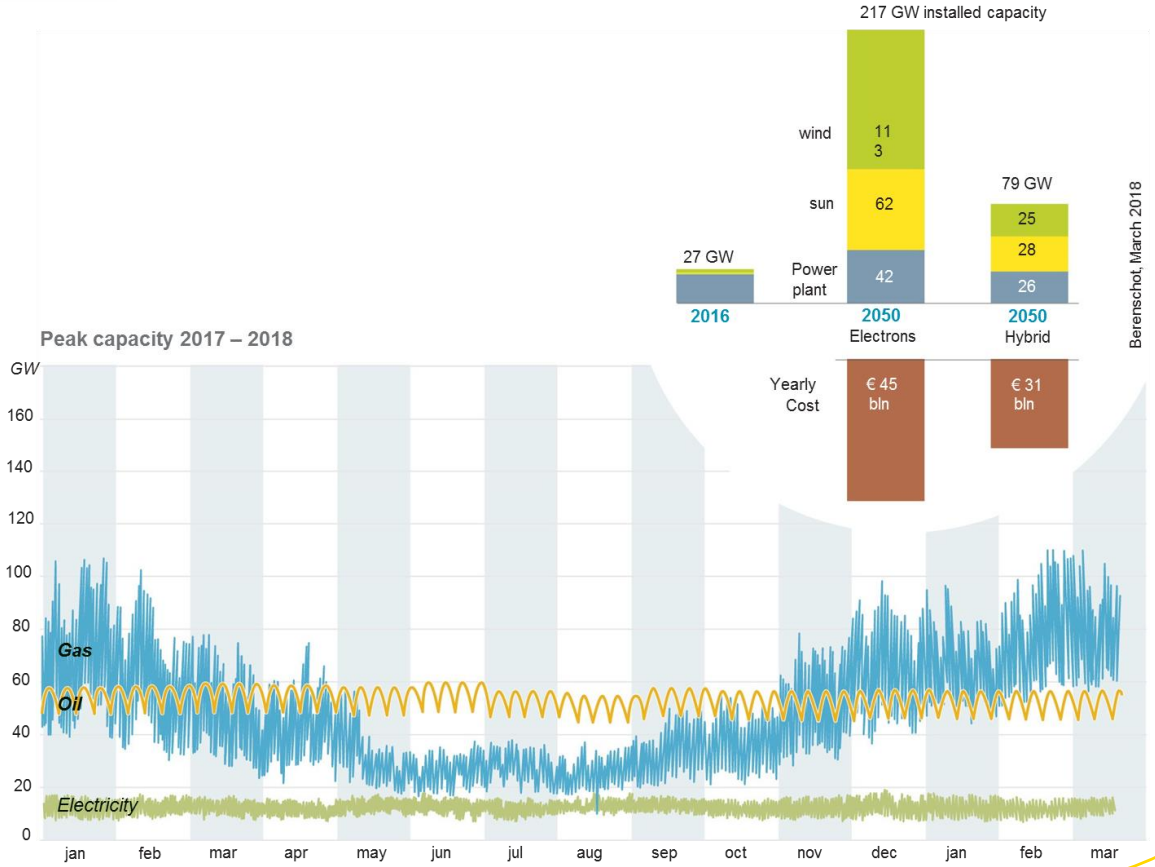
Logan Energy
hydrogen technologies

Renewable Energy

DAILY electrical production and load profiles

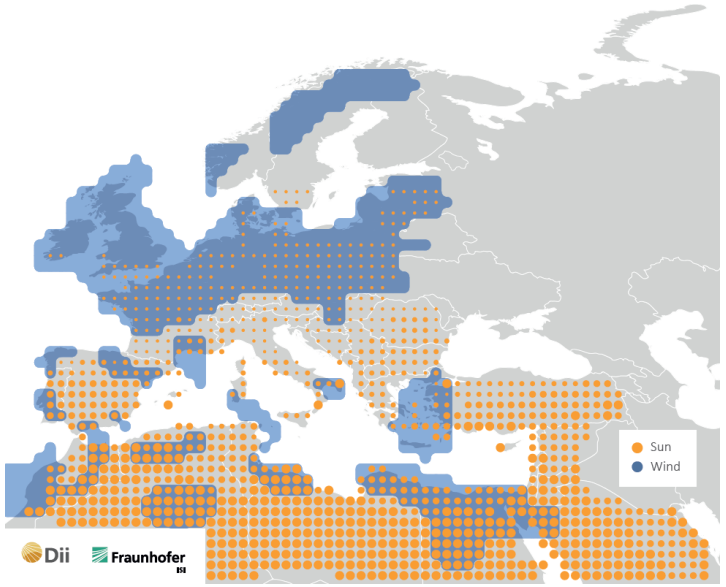


Wind generation



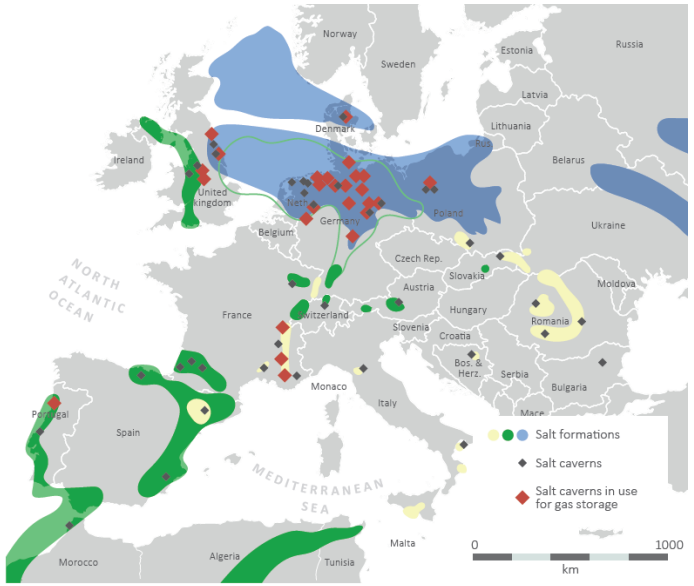
Unique opportunity to develop green hydrogen

Solar/wind resources

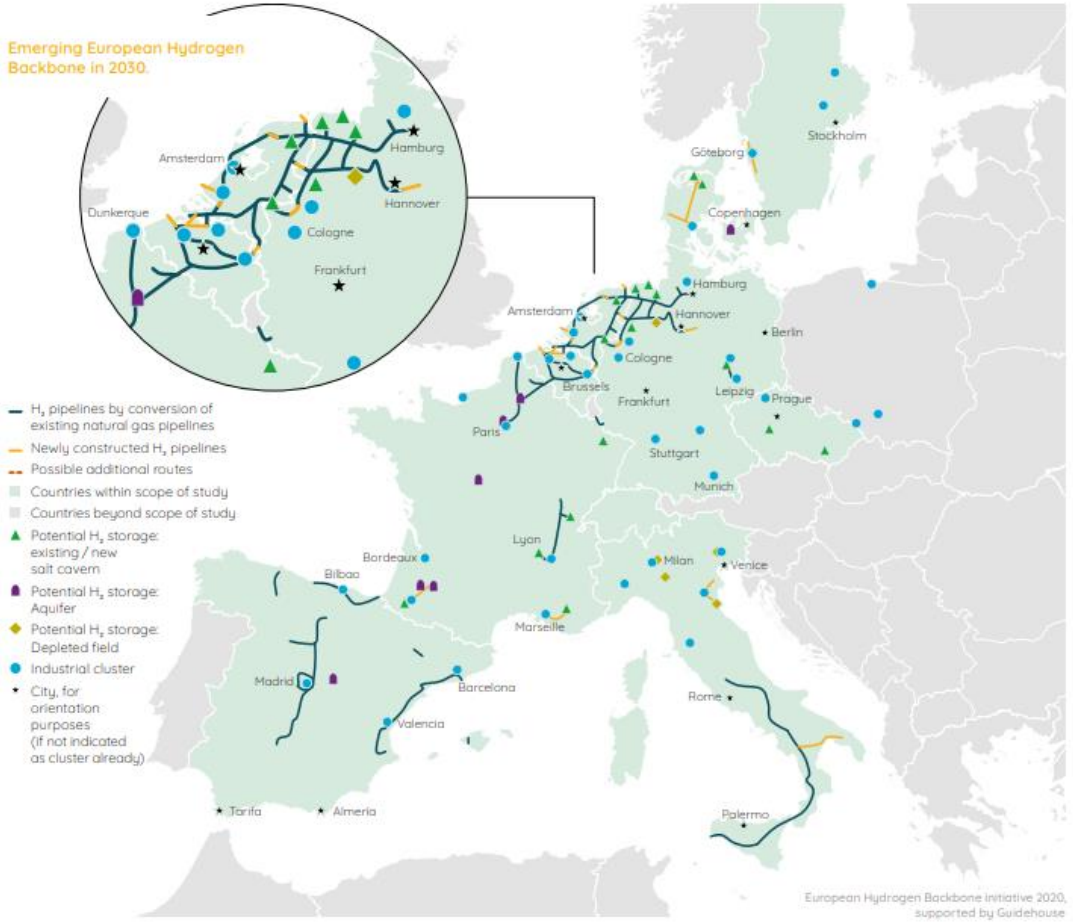


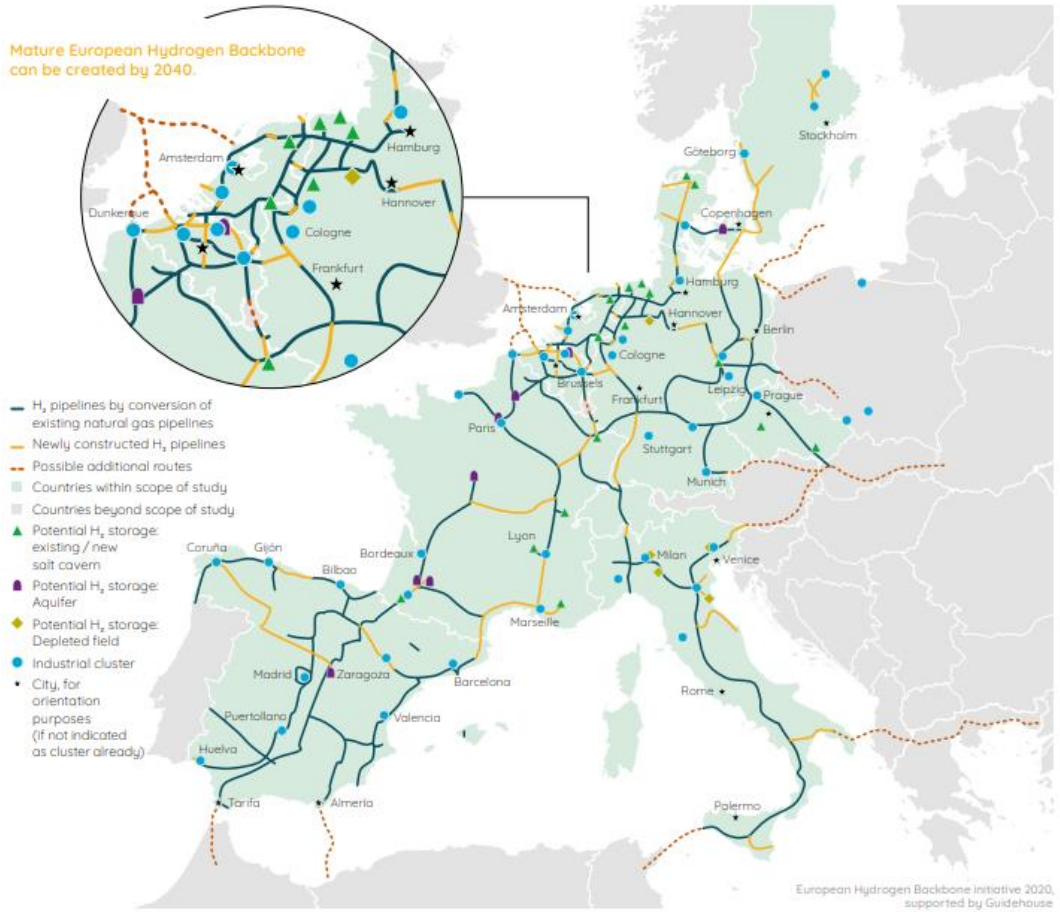
Hydrogen backbone

Salt Caverns



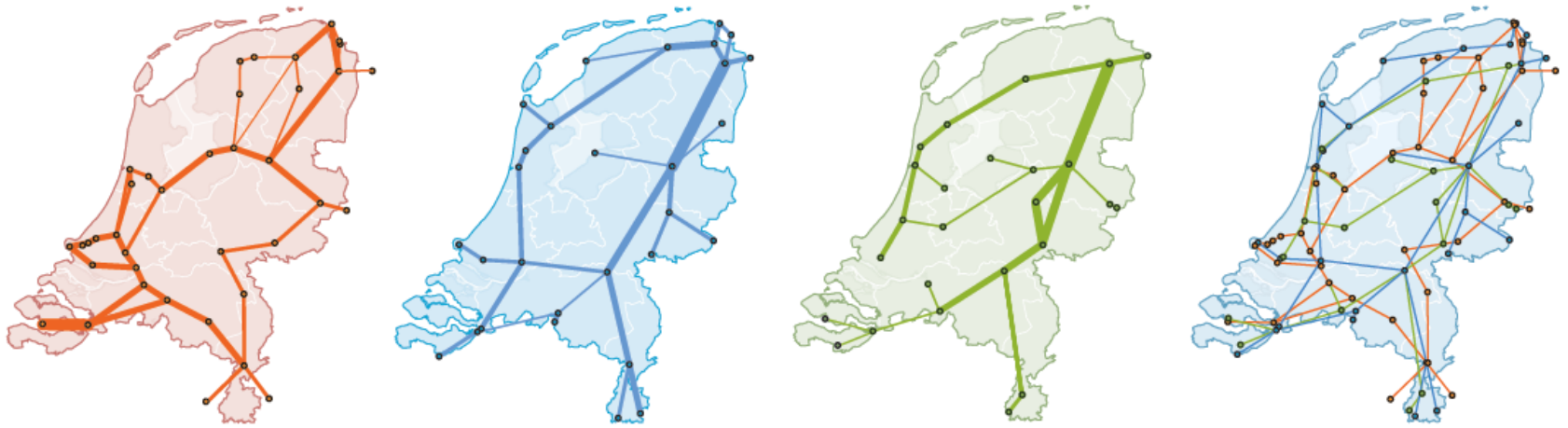
European Hydrogen Infrastructure





Existing grids as starting point

Electricity Grid + **Hydrogen Grid** + **Methane Grid** = **Combined Grid**



Capacity 20 GW

Capacity 350 GW

Connection Points
1. **Power Plants: methane of hydrogen -> electricity**
2. **Electrolysis: electricity -> hydrogen**

Tennet

Electricity grid (220 & 380kV)

Investment plans:

Reinforcement exisiting grid

New connections wind at sea

Gasunie

H-gas grid (80 bar)

Hydrogen grid 2030,

To connect industrial clusters and storage

Gasunie

G-gas grid (67 bar)

Feed in green gas via manifold line

- Adequate electrolyzer location
- Need for system integration
- Need for storage
- Need for Electricity infra expansion
- Build import

Developments in North Sea countries

Norway: consultation on offshore wind in the area Sørlige Nordsjø II which *"borders the Danish sector in the North Sea, and is relevant for direct export of electricity*"

UK:
- 30-40 GW offshore wind expected in 2030
- Round 4 leasing for offshore wind including areas close to the Dutch/German/Danish EEZ
- Ofgem: *'discussing the potential for projects that integrate international interconnectors with offshore transmission networks with governments, other regulators and industry'*

Denmark: agreement of new government:
- *Explore the possibility that Denmark will, by 2030, build the first energy island with a minimum of 10 GW connected.*
- Large area designated for additional offshore wind

EC
- Preparing 'Strategy on offshore wind' as part of Green Deal
- NSWPH on 4th PCI list

The Netherlands:
- Roadmap for 11 GW offshore wind in 2030
- Spatial planning in 2020 for additional offshore wind areas for 20-40 GW

Germany:
- Increased offshore wind target for 2030 from 15 to 20 GW
- Detailed spatial planning of future offshore wind farms in place
- TSOs propose to include NSWPH in NEP(2035) scenarios as a sensitivity

Green Octopus – potential group of projects for IPCEI application

Build a backbone and value chain to serve green hydrogen demand

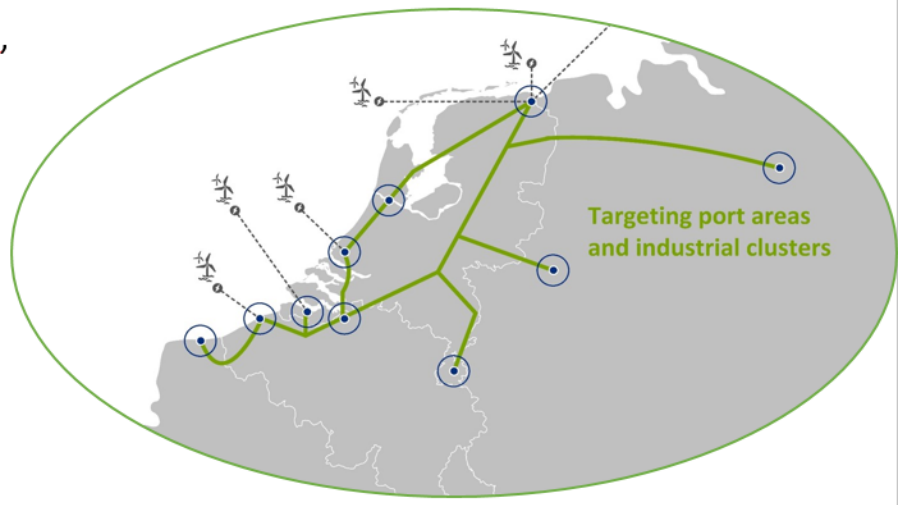
Hydrogen
for Climate Action

Large amounts of clean hydrogen will be **produced** locally or abroad,

will be **imported** via the ports,

will be **transported** by converted natural gas or new infrastructure

towards large scale **endusers** of hydrogen




thanks
for
your
attention
questions?
arigato
gracias
merci
spasiba
danke
grazie
cheers
mèsi
nkosi
wado
danki
vinaka
mahalo
talofa
shukran
saha
zikomo
sobodi
matondi
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dziekuje
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bayarlalaa
spas
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meharbani
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köszönöm
shukria
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nandri
matondo
taiku
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waybale
nuhun
tashakor
murakoze
aitäh
skee
paldies
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madlobt
merkzi
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waita
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