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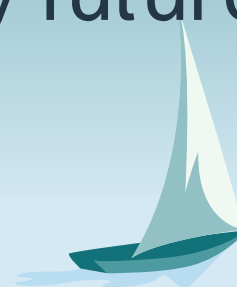
# A Norwegian perspective on the energy future of the North Sea

**Simen Moxnes**

Senior Advisor New energy

FE Research Forum

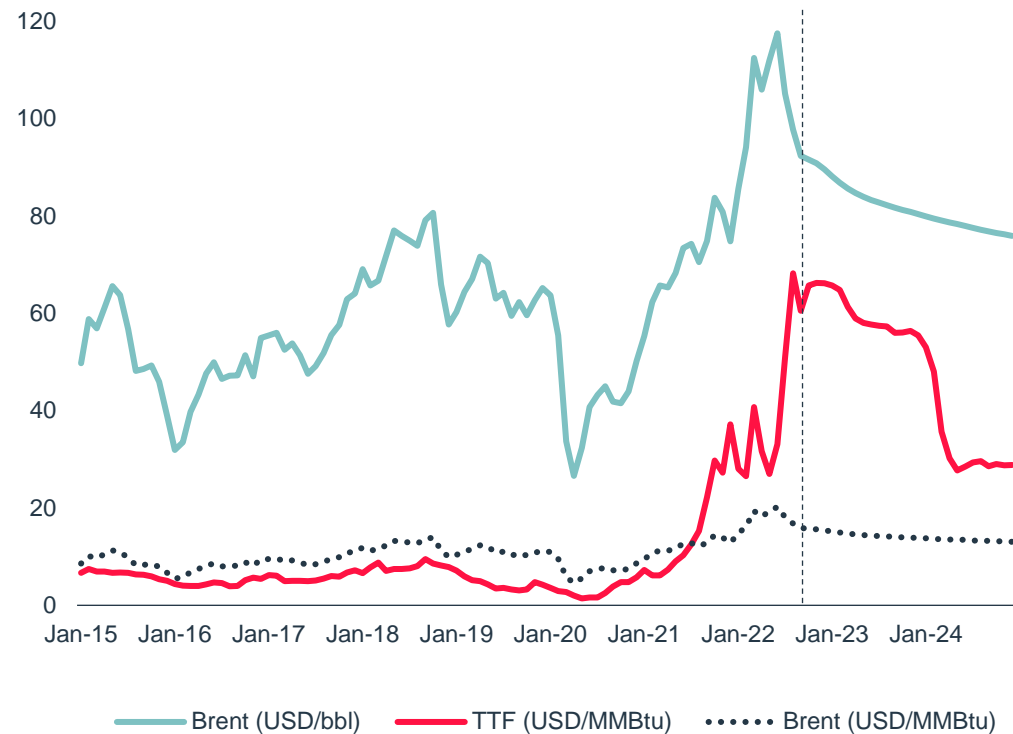
Trondheim 5th of June, 2024



# We are in a world of extremes

Conflicts and unrest, lack of trust, market imbalances, disastrous weather events

## Oil and gas price



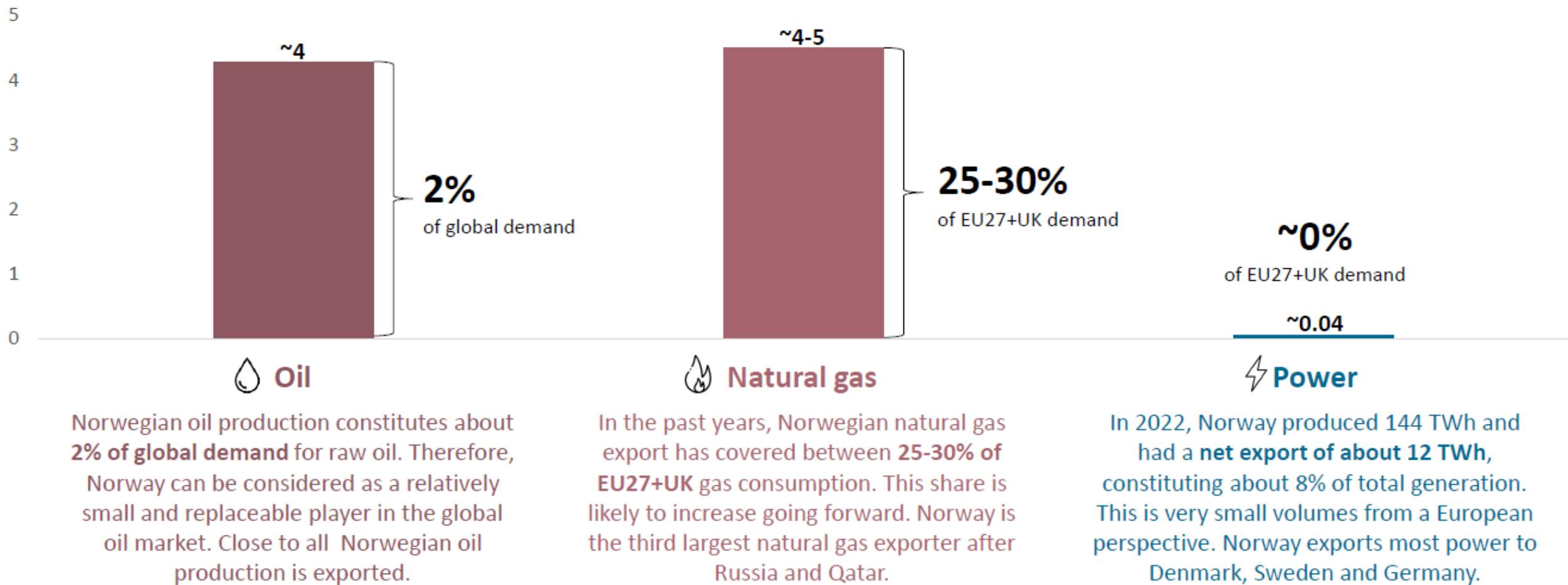
Source: Platts, Heren (history), ICE (projection)



# Norwegian gas export is crucial for Europe while export of oil and power is replaceable

## Norwegian 2022 energy export split by source\*

Exajoule

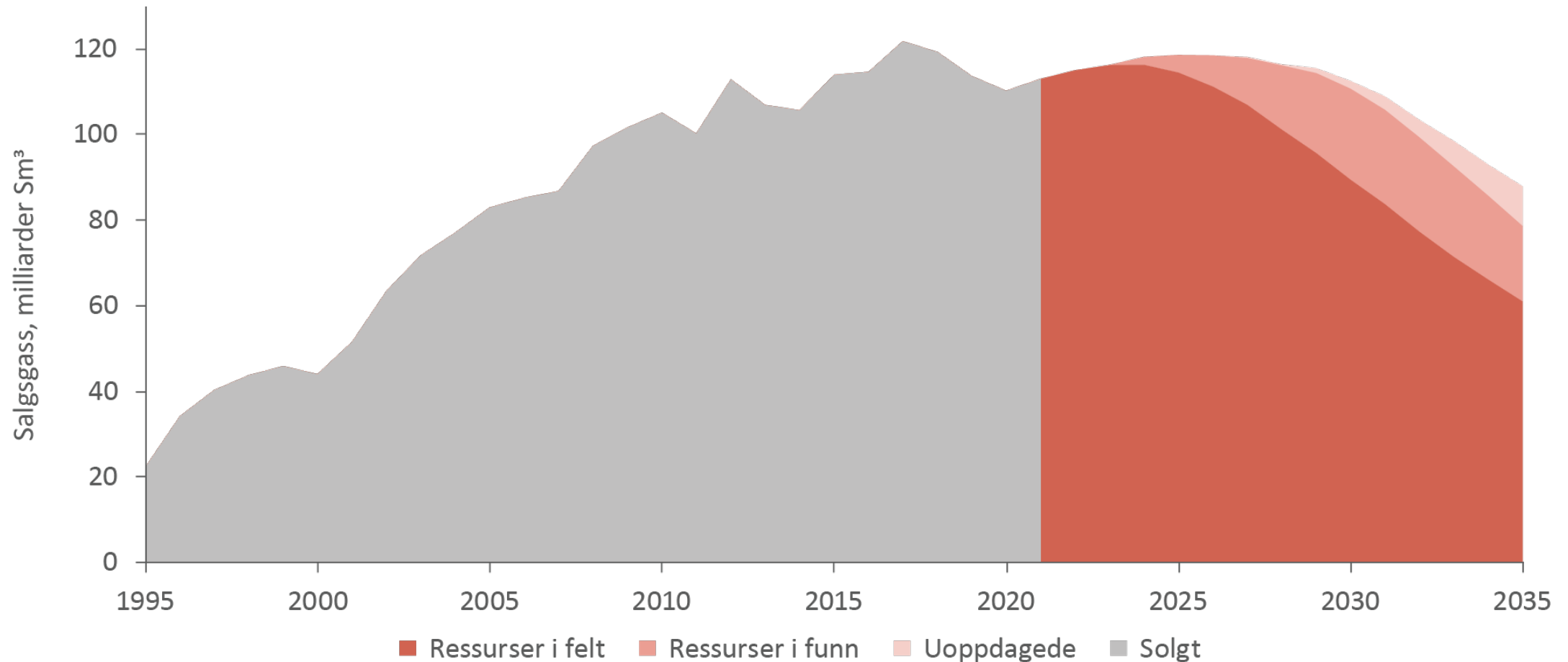


\* Power is converted from TWh to EJ using a conversion factor of TWh = 0.0036 EJ.  
Source: Rystad Energy research and analysis; Rystad Energy UCube; Norsk Petroleum; Statnett

Pre-read for OG21 Board and Members

Preliminary results, subject to change

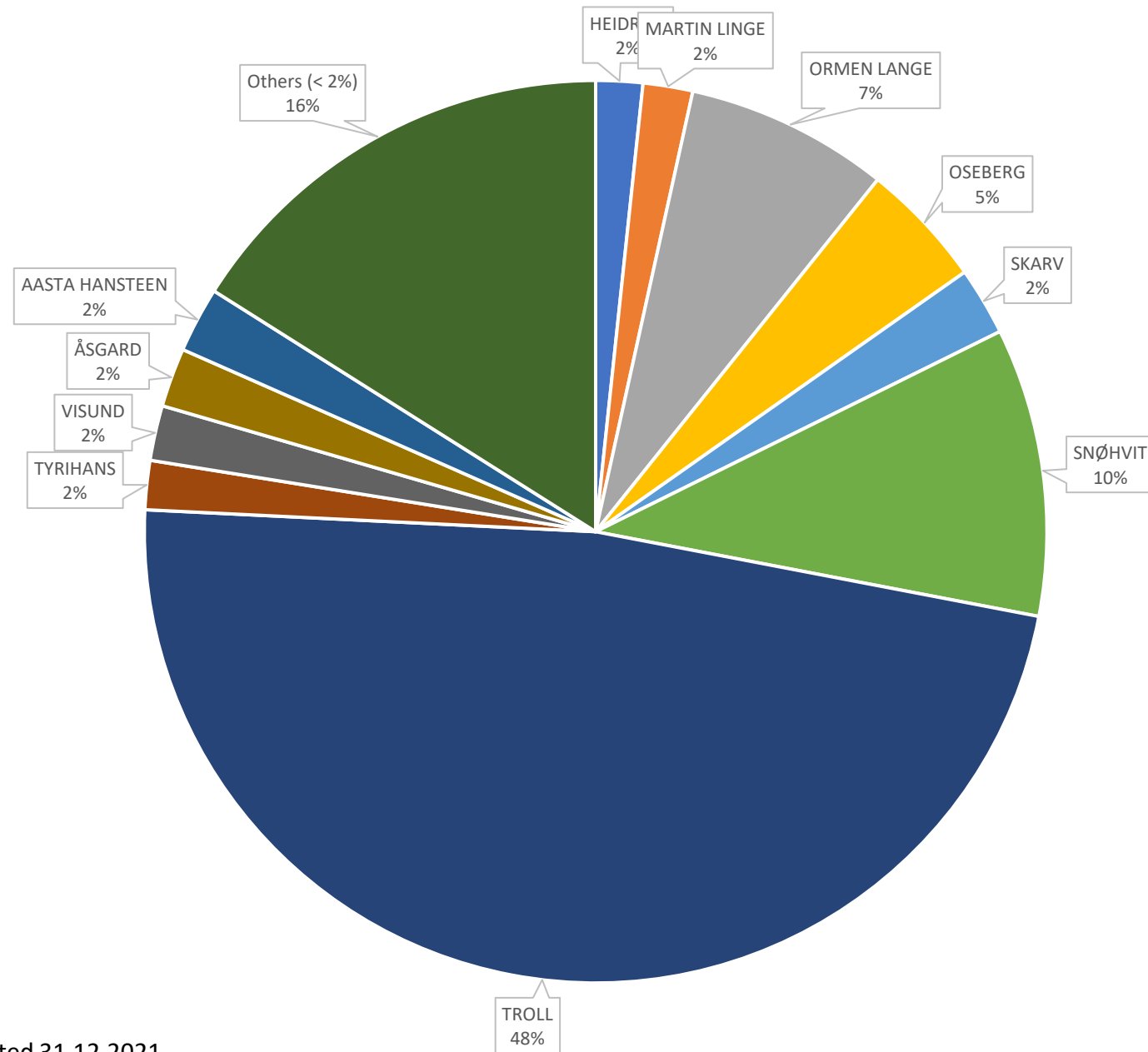
## Expected volume of sales gas from Norwegian fields, 1995-2035



Source: Norsk Petroleum

# Remaining gas NCS

[of total 1433 bill Sm3]



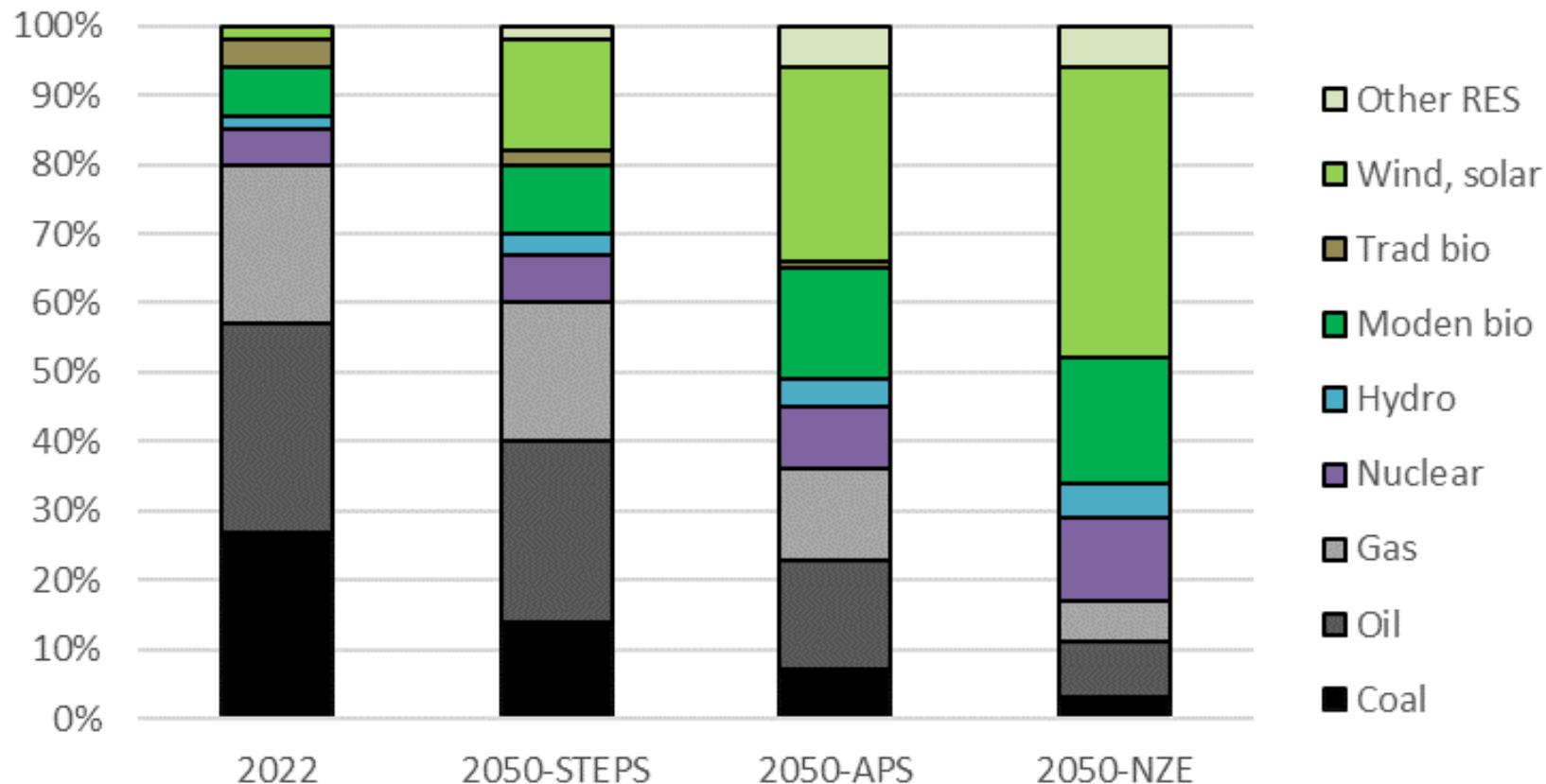
# IEA – World Energy Outlook 2023

STEPS: Stated Policies Scenario

APS: Announced Policies Scenario

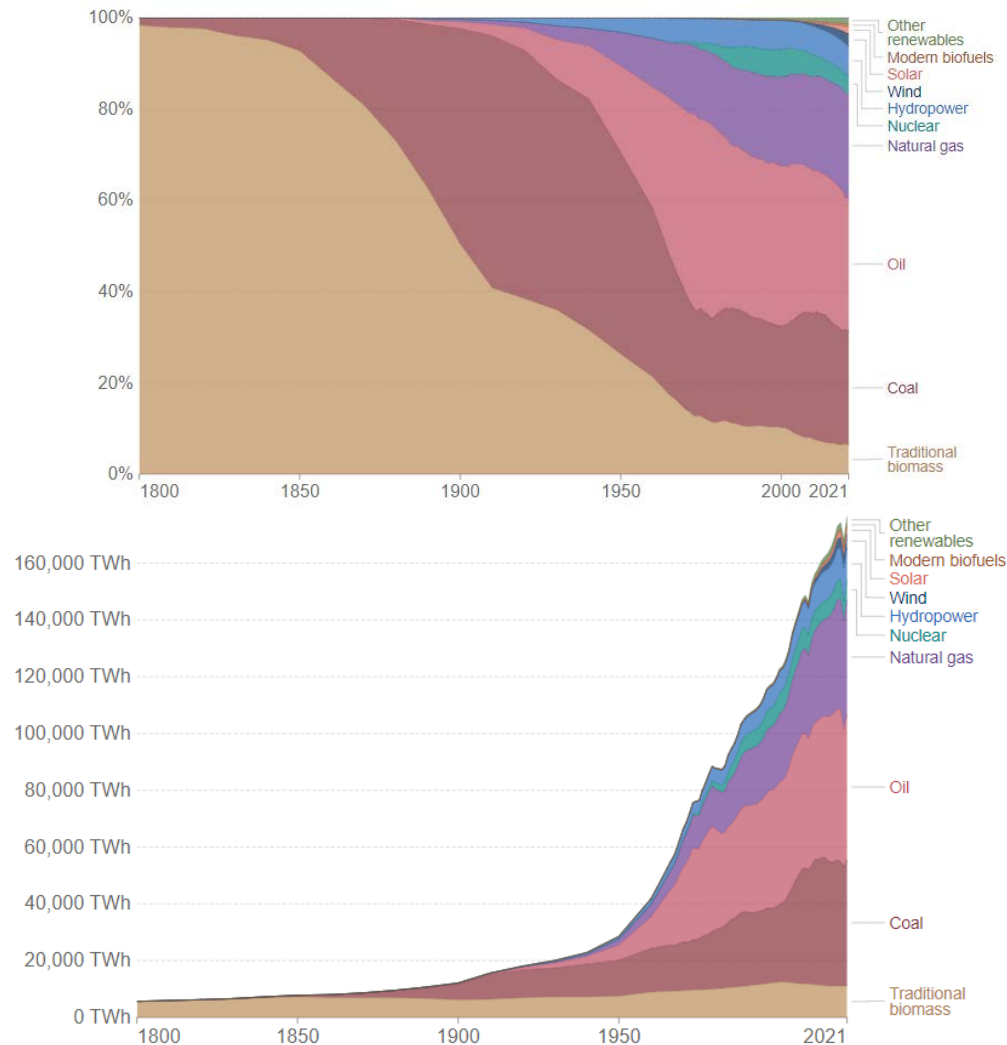
NZE: Net Zero Emissions Scenario

Split of global TPES by fuel in IEA's 2023 scenarios





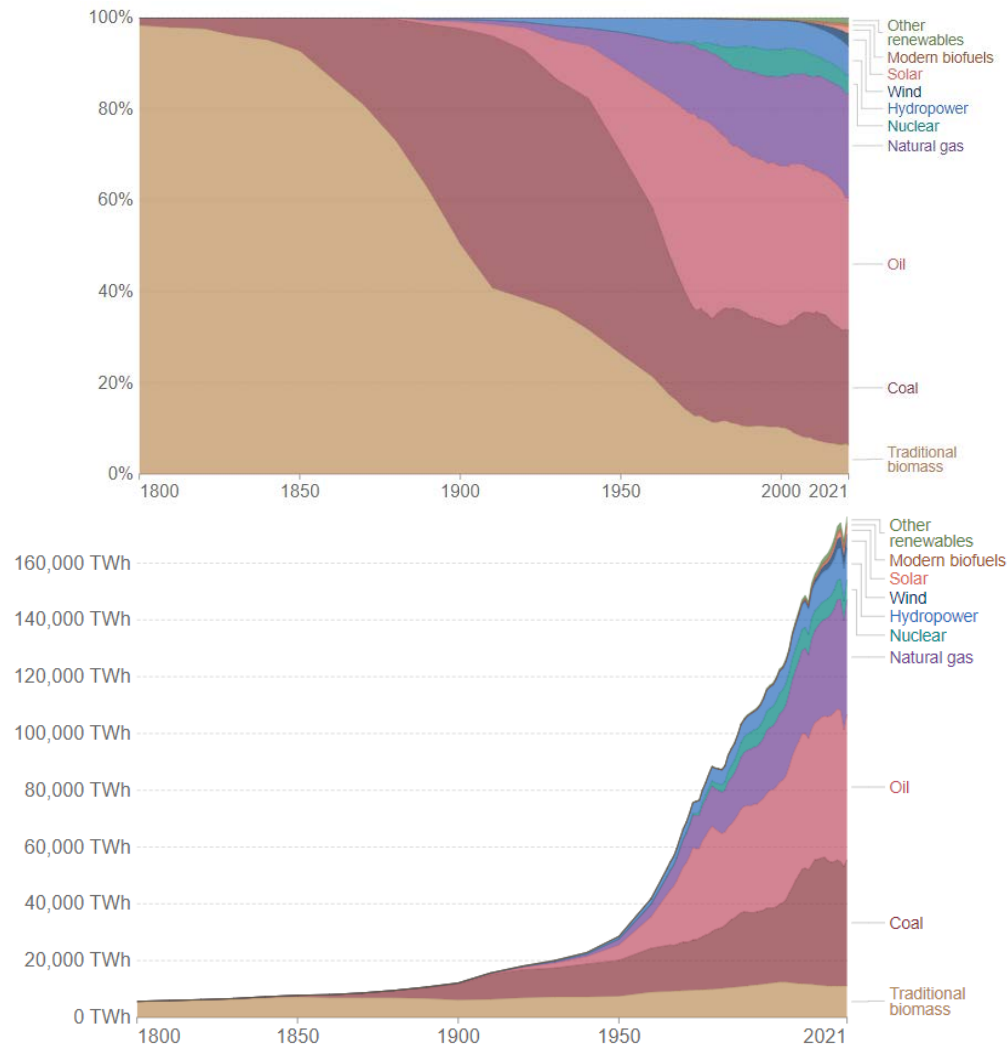
# Have we been through a fundamental energy transition in the past?



➤ Shifts in primary energy supply has taken decades in the past

➤ ...but GROWTH in energy demand more than outweigh shift between supply sources

# Energy history is about adding – not transforming



➤ Shifts in primary energy supply has taken decades in the past

➤ ...but GROWTH in energy demand more than outweigh shift between supply sources



# Did you know?

## Doggerbank v Johan Sverdrup

Utilised energy for transport

**36 %**

Energy content

**12 %**

## Doggerbank v Hydropower Norway

Yearly

**12 %**



### Doggerbank

Installed capacity	<b>3.6 GW</b>
Yearly energy production	<b>17 TWh/y</b>
Lifetime of 30 years	<b>510 TWh</b>

Capacity factor 0.54



**3x**

### Utilized for transport

Wind-to-wheel	<b>75 %</b> efficiency
Well-to-wheel	<b>25 %</b> efficiency

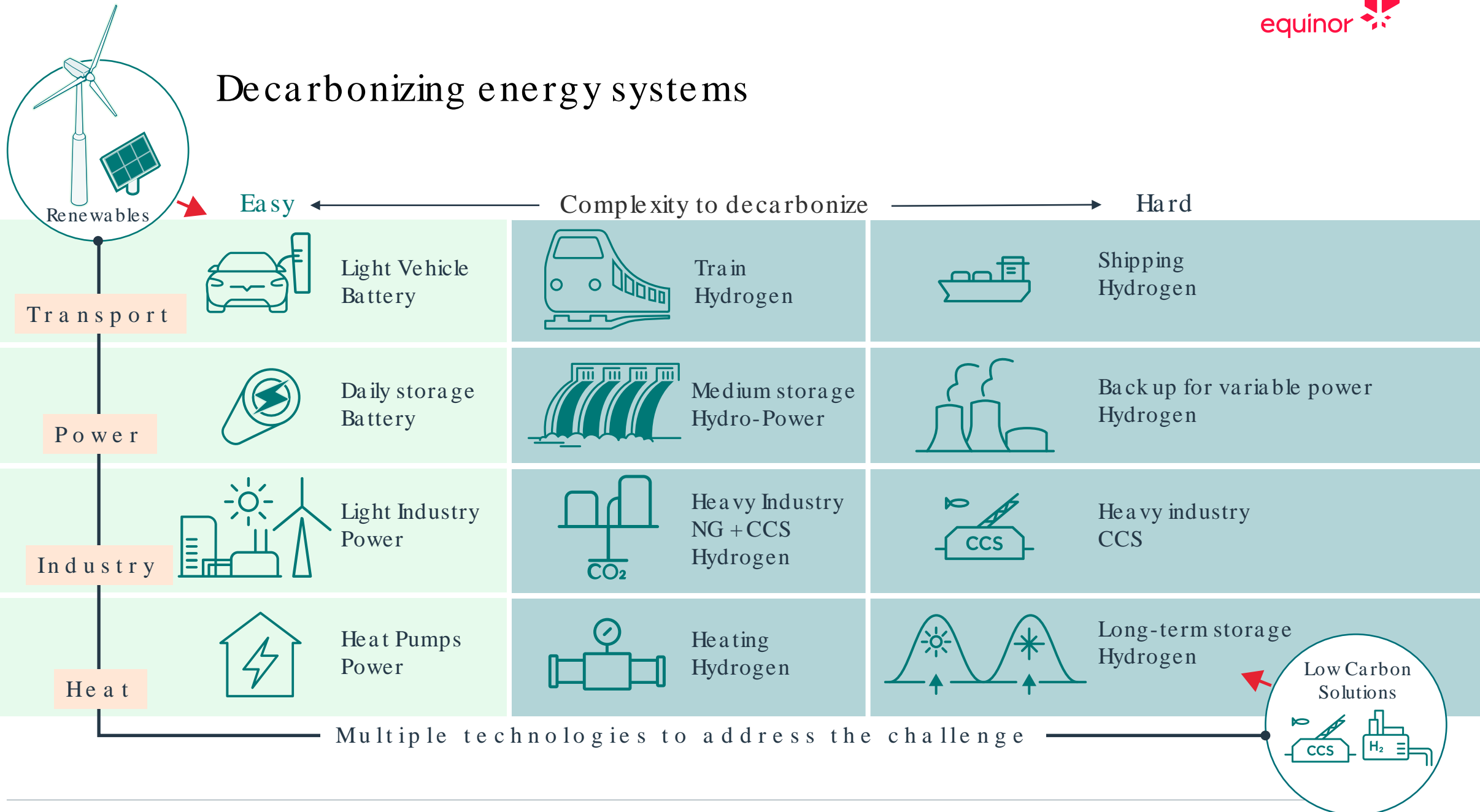


### Johan Sverdrup

Reserves	<b>2700 mboe</b>
Energy content in oil	<b>4285 TWh</b>

1 mboe = 1.587 TWh

# Decarbonizing energy systems





## OUR EQUITY STORY

# Clear strategy for transition and growth

### FIRM STRATEGY



#### STRATEGIC FOCUS AREAS



High value growth in renewables

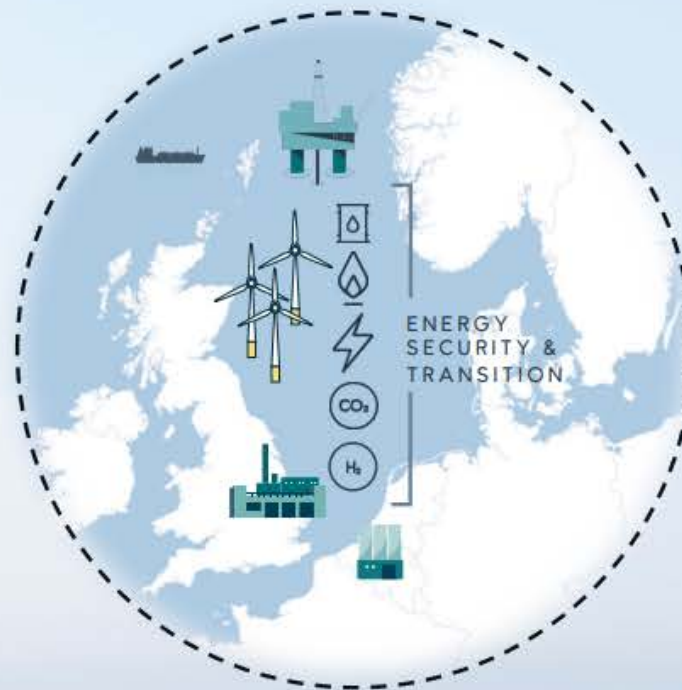


Optimised oil & gas portfolio



New market opportunities in low carbon solutions

### COMPETITIVE ADVANTAGE



### STRONG 2035 OUTLOOK

**Stronger** cash flow

**Broader** energy

**Lower** emissions



## OUR AMBITIONS

# Transition and growth to 2035

### Stronger cash flow

>26

BN USD

Cash flow from operations  
after tax

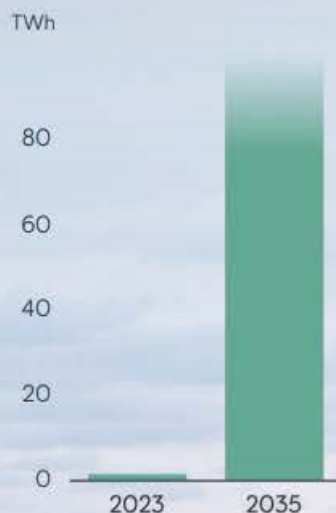


### Broader energy

>80

TWh

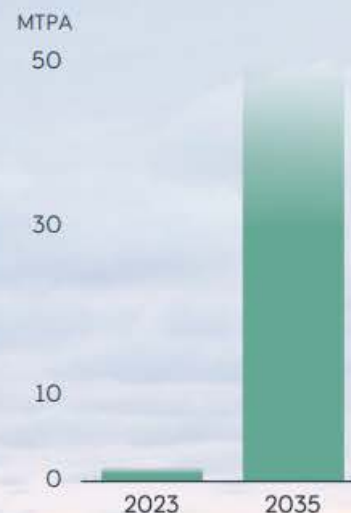
Renewables and  
decarbonised energy<sup>2</sup>



30-50

MILLION TONNES / ANNUM

CO<sub>2</sub> transport and  
storage capacity



### Lower emissions<sup>3</sup>

40

PERCENT

Reduction net  
carbon intensity



gCO<sub>2</sub>e/MJ ENERGY - Net carbon intensity  
scope 1,2, and 3 from use of our products

1. Based on reference case 75 USD/bbl, see appendix for key assumptions and definitions
2. Decarbonised energy defined as hydrogen, ammonia and gas to power with CCS, see appendix for more details
3. See equinor.com for more details around energy transition plan



# Transforming the NCS to deliver sustainable value for decades

- Norway Energy Hub an industry plan for Norway – Ambitions 2035

3.9

million boe/d  
oil and gas production



10

GW  
wind



40

million ton/year  
CCS storage capacity



2

GW  
hydrogen



Maintain value creation from oil and gas

Industrialise offshore wind

Commercialise transportation and storage of CO<sub>2</sub>

Scale up hydrogen production

Net zero  
by 2050

# Net zero driving demand for clean hydrogen

Global clean hydrogen production

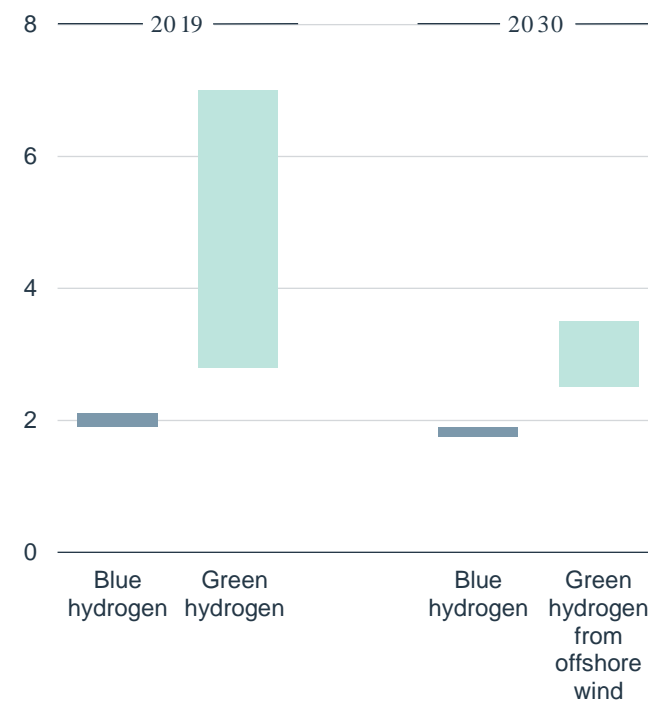
Million tonnes per year



Source: Wood Mackenzie

Hydrogen production costs in northwest Europe

EUR per kg



Source: IEA NWE hydrogen report April 2021





Securing our sustainable energy future...

 **Natural gas via**  
Europipe 1 & 2 and Norpipe

Secured supply  
by natural gas

Onshore pipeline

**+3 GW**  
Gas plants  
✓ H<sub>2</sub> ready

  
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**RWE**

Germany

2030

... and delivering on Europe's ambitious climate targets

CO<sub>2</sub> pipeline


Carbon Capture  
and Storage

Reforming  
plants

**Blue H<sub>2</sub>**  
*low-carbon*

Onshore  
Electrolysis

**Green H<sub>2</sub>**  
*renewable-based*

 **Hydrogen via**  
a new H<sub>2</sub> pipeline

Offshore Electrolysis  
e.g. AquaSector

**Green H<sub>2</sub>**  
*renewable-based*

**German H<sub>2</sub> network**  
incl. H<sub>2</sub>ercules

Gas plants  
✓ H<sub>2</sub> running

Industry

Industry

Germany

# Northern Lights

## World's first third-party CO<sub>2</sub> storage

1.5 MTPA

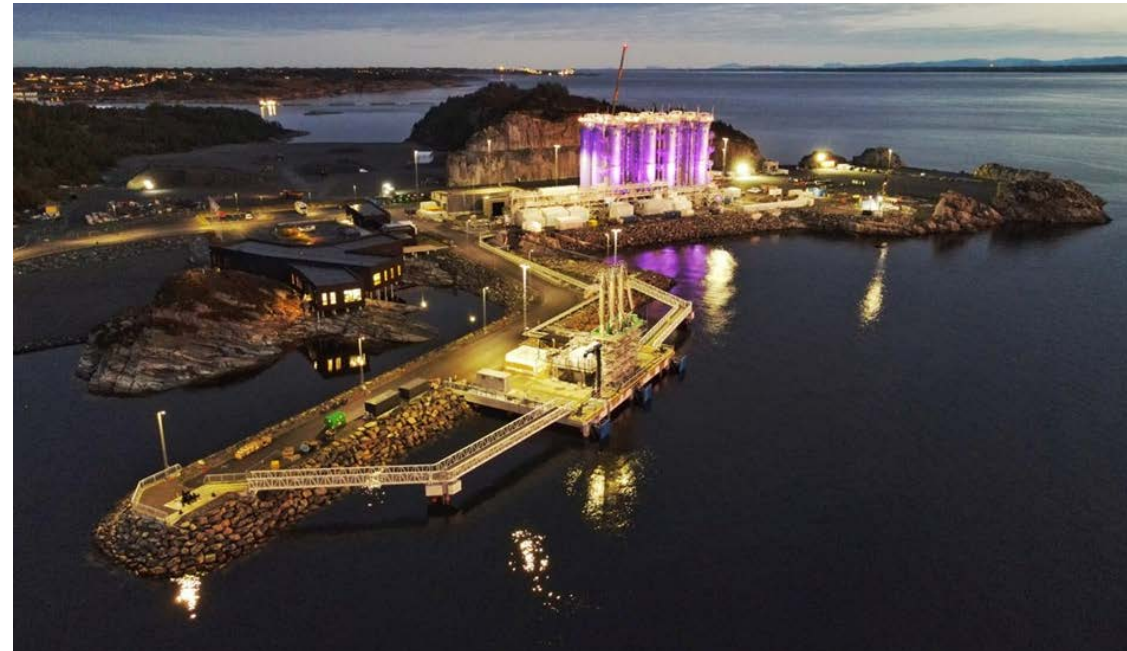
CO<sub>2</sub> volumes phase 1

100 % share

5 MTPA

CO<sub>2</sub> volumes including phase 2

100 % share



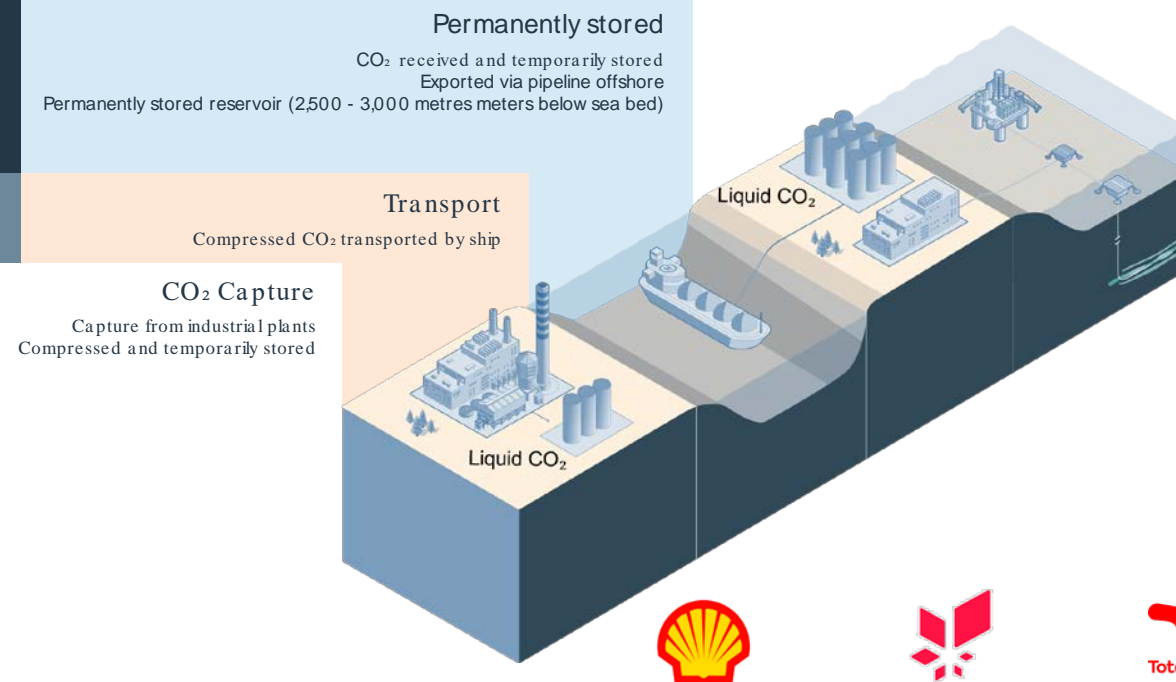
2024

Phase 1 – ready to receive CO<sub>2</sub>

~2028

Potential start-up, phase 2

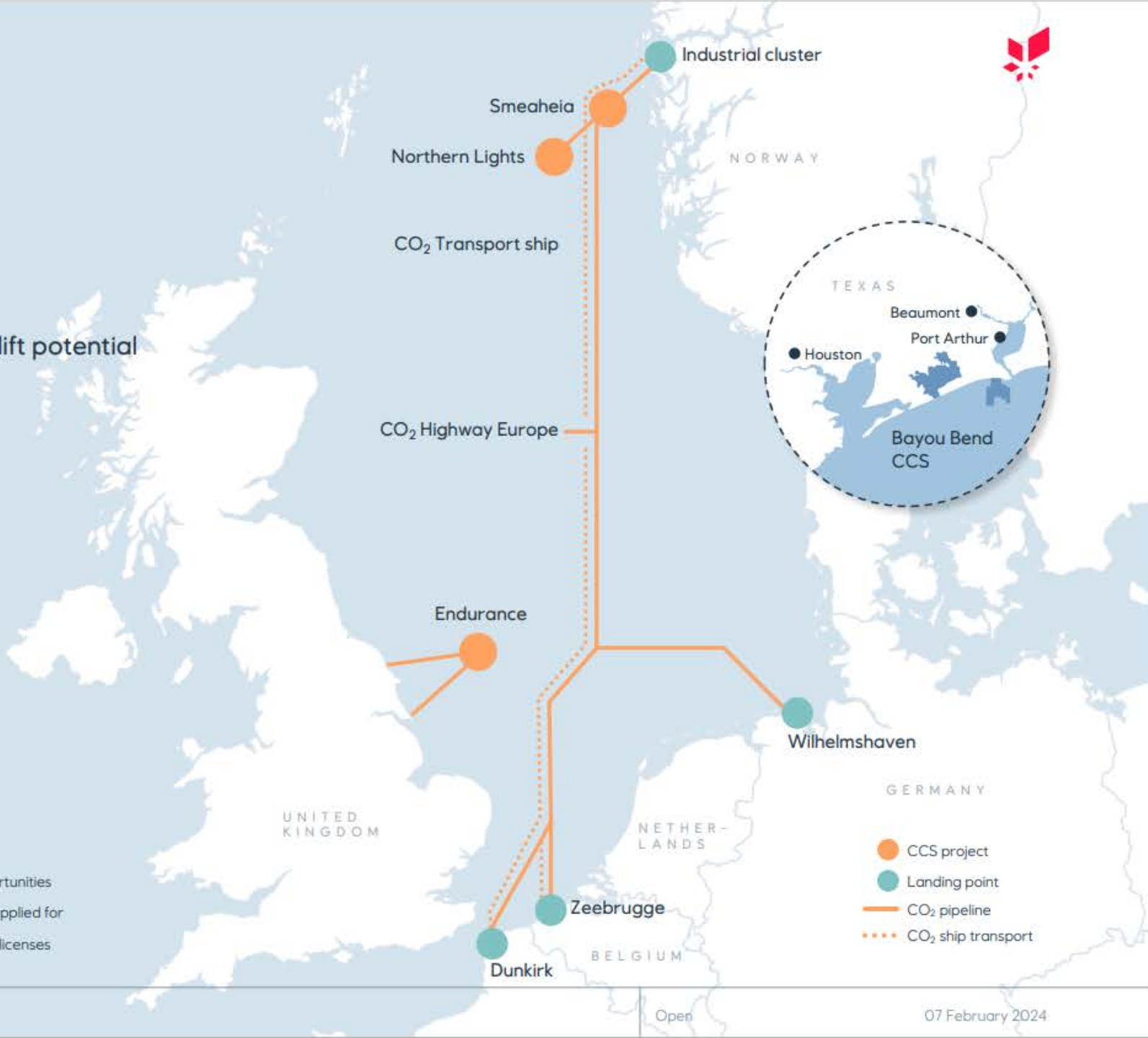
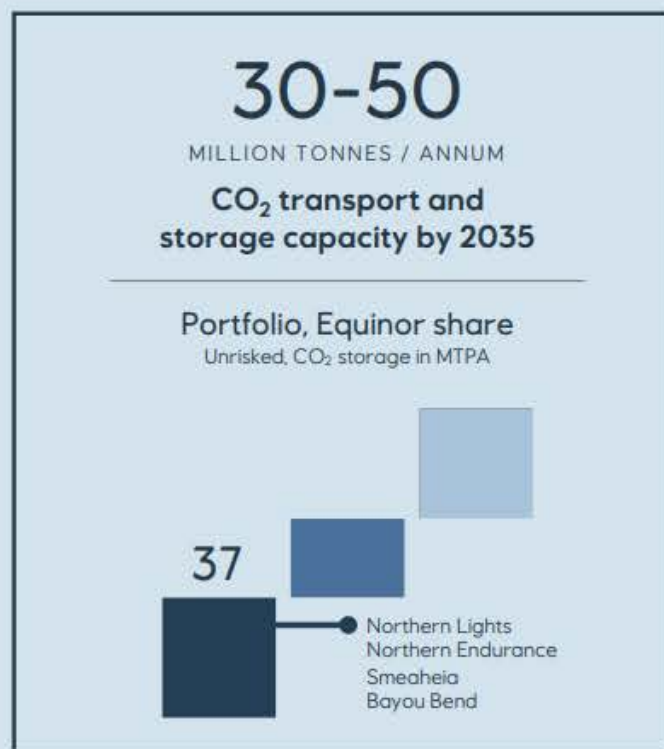
- Large scale CO<sub>2</sub> transportation and storage on NCS
- Funding from Norwegian government – part of Longship project
- Joint venture with Equinor, TotalEnergies and Shell
- Developing a new industry from scratch
- Proven technology - new value chains
- Commercial CO<sub>2</sub> transport and storage contracts with Yara/Ørsted
- EU funding available to support development of CCS industry





## Increasing CCS ambition

- Building the infrastructure of tomorrow
- Collaboration across the value chain
- 4-8% real base project returns, further value uplift potential



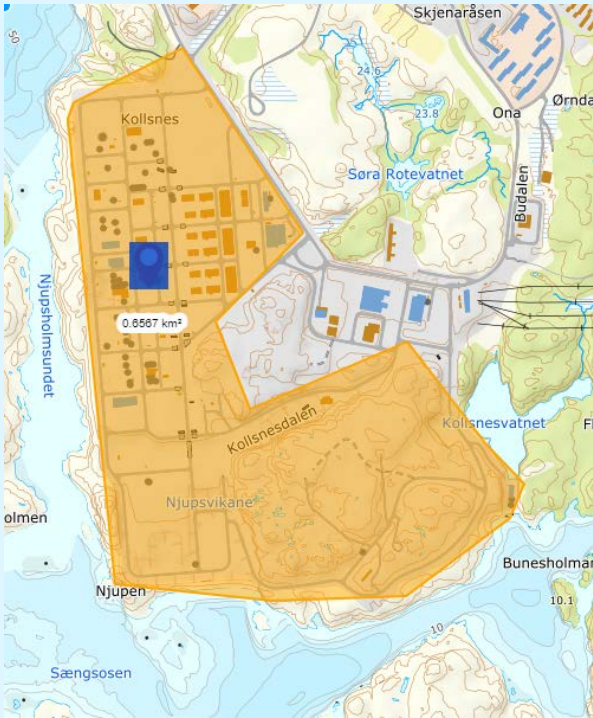
# Growth in renewables requires access to area

Kollsnes processes gas with a primary energy content of approximately 400 TWh/year

- ...at an area of 0,66 km<sup>2</sup>

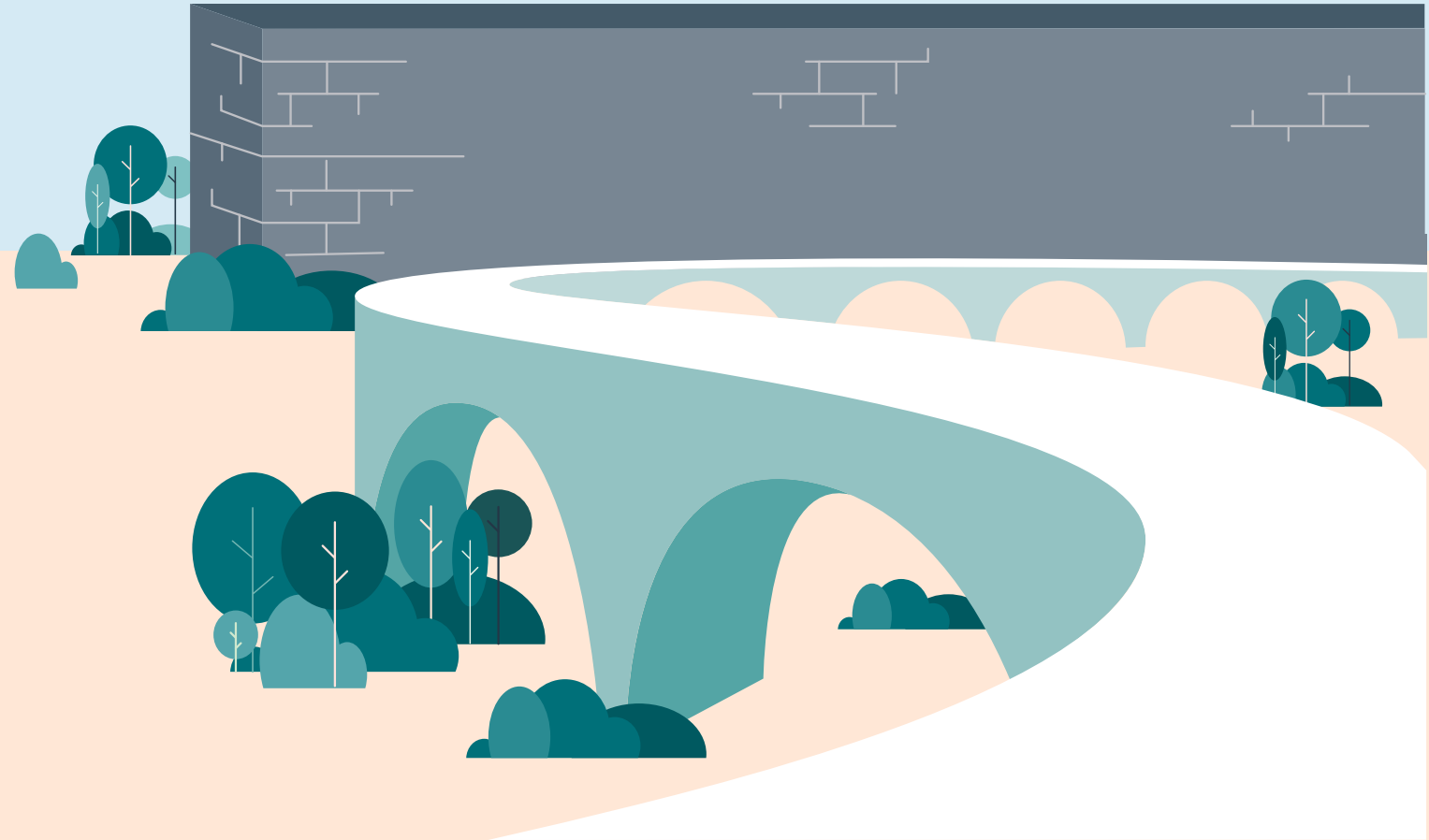
400 TWh/year corresponds to 90 GW installed capacity offshore wind

- ...needing an area of 24 000 km<sup>2</sup>



“We build  
too many walls  
and not enough  
bridges.”

*- Attributed to Sir Isaac Newton*





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