

ENERGINET

ENERGINET PATHWAYS

100% clean energy – the importance of sector coupling, ESIG fall workshop, October 2024

Peter Markussen, Senior Director, System Operation,
Energinet



VISION

GREEN ENERGY FOR A

BETTER WORLD



ENERGINET

THE ENERGY BACKBONE

We operate and develop the electricity transmission grids, gas pipelines and gas storage in Denmark and are also appointed to build future hydrogen infrastructure

ENSURE BALANCE

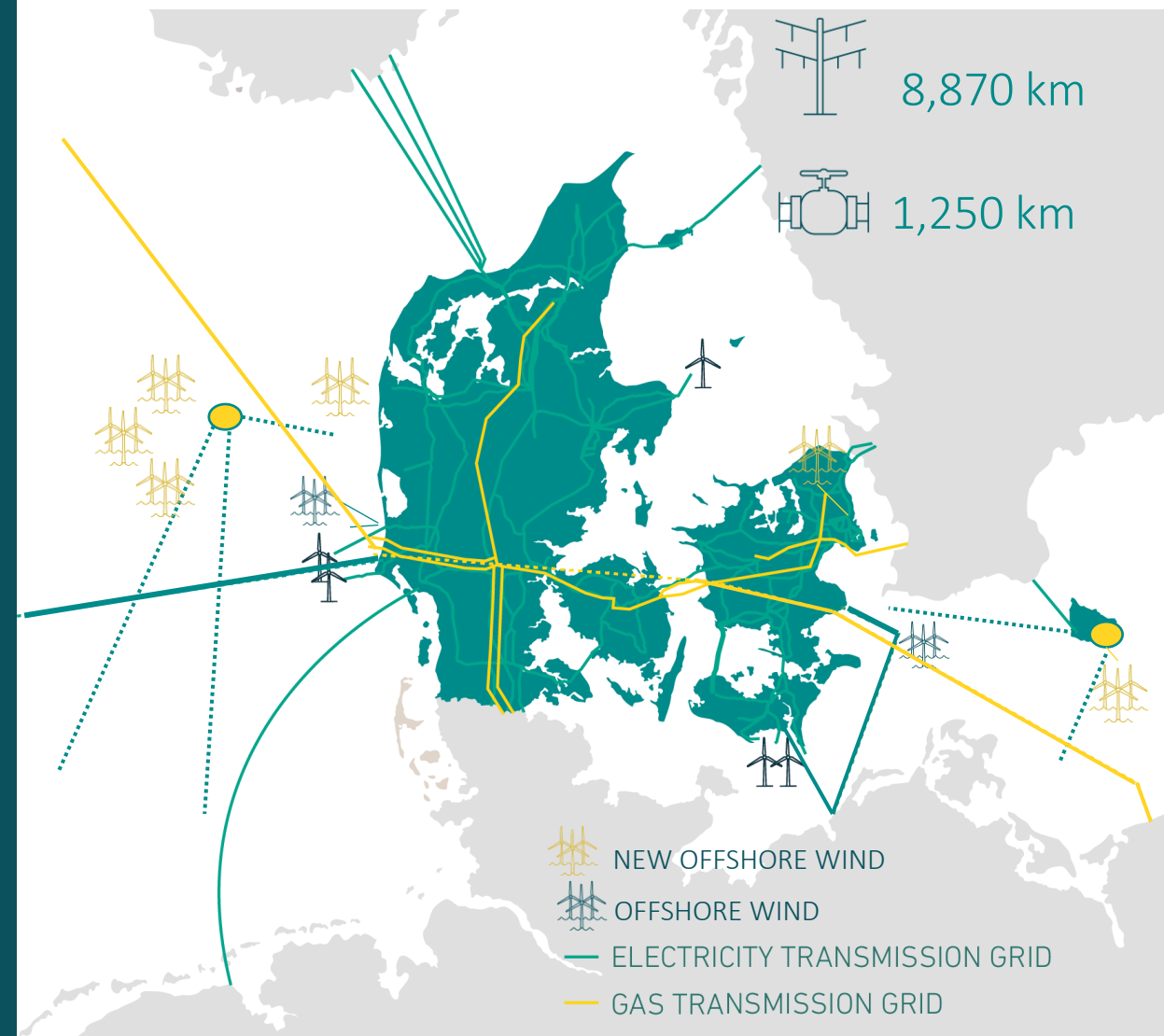
We have the day-to-day and long-term responsibility for the overall electricity and gas system in Denmark.

WORKING FOR THE SOCIETY

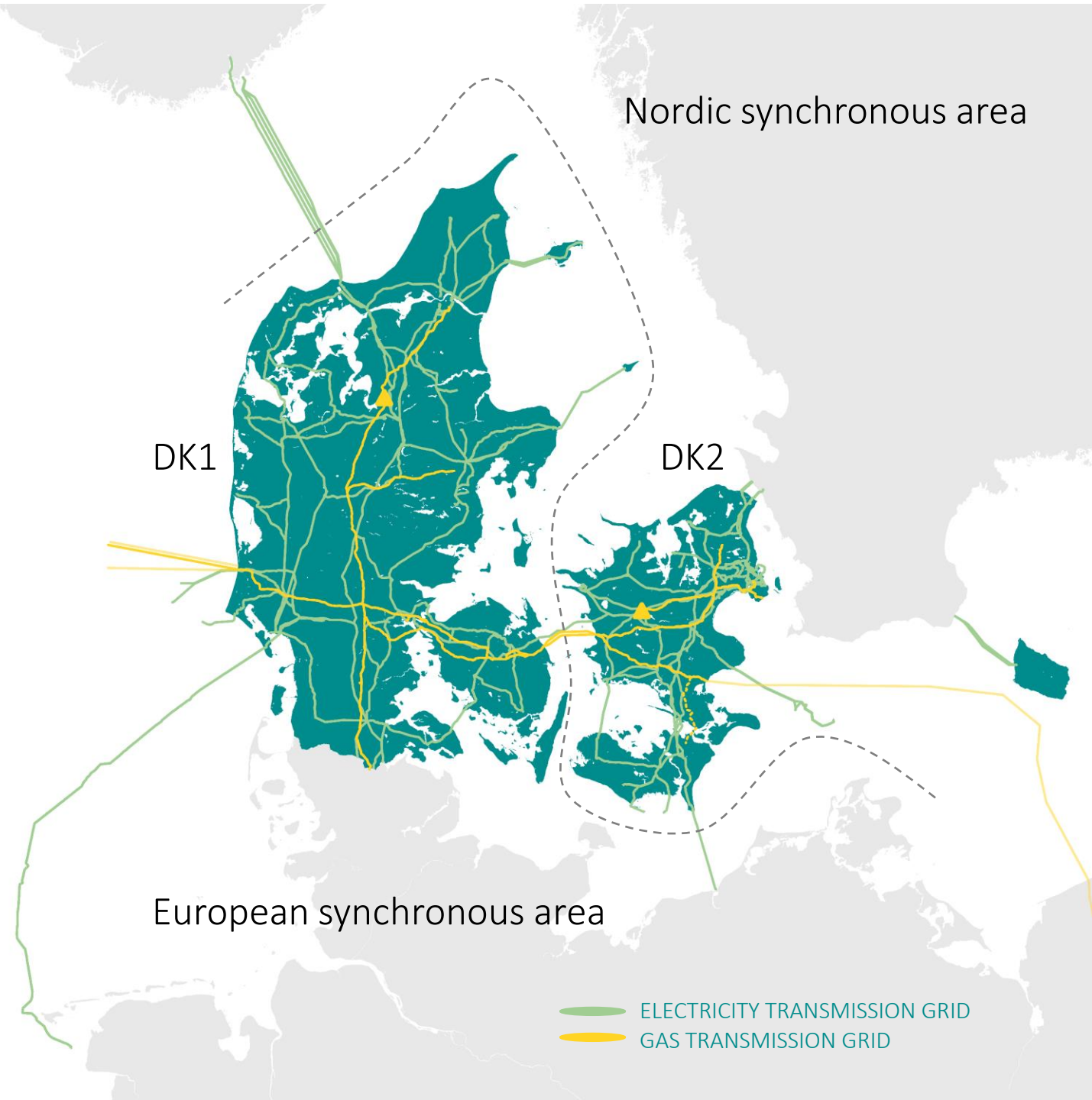
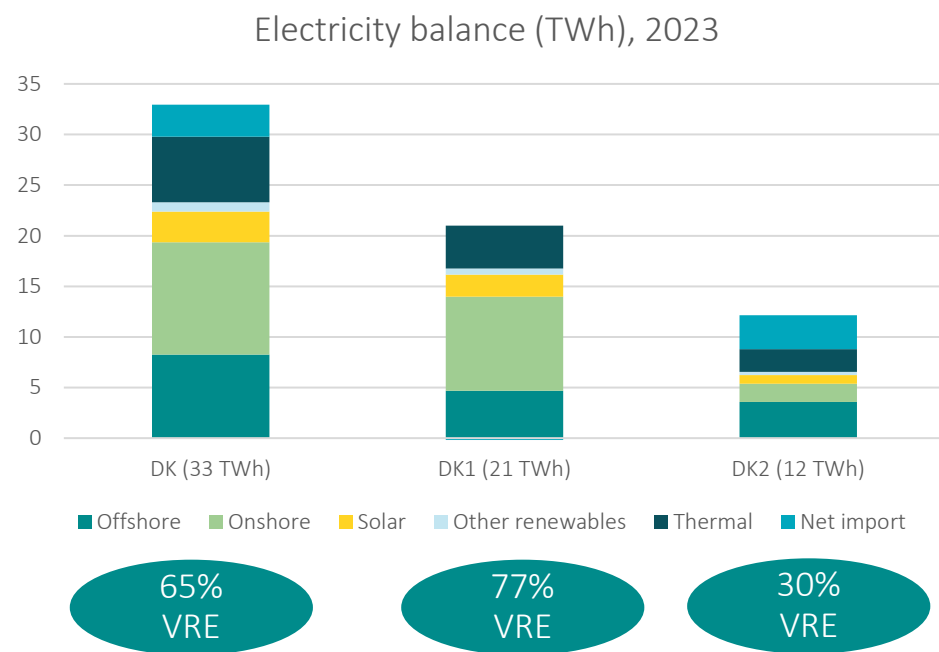
Owned by the Danish Ministry of Climate, Energy and Utilities we safeguard society's interests as we move to a 100% green energy system.

Appr. 2500 Employees

ENERGINET

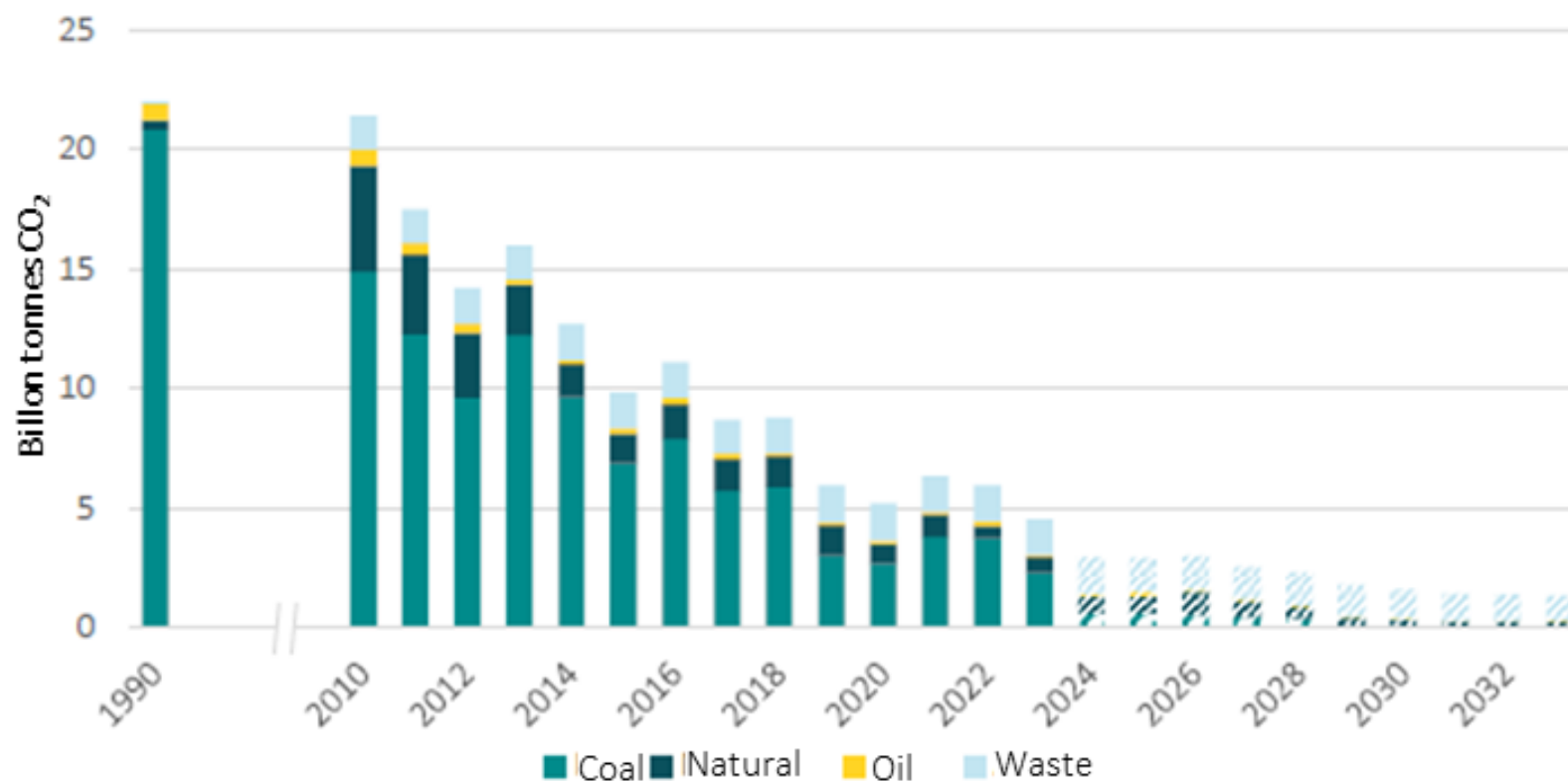


Energy island location, new OSW and connections only illustrative



15 YEARS OF GREEN TRANSITION

WITHIN THE DANISH POWER SECTOR CO₂ EMISSIONS FROM ELECTRICITY PRODUCTION HAVE BEEN REDUCED SIGNIFICANTLY

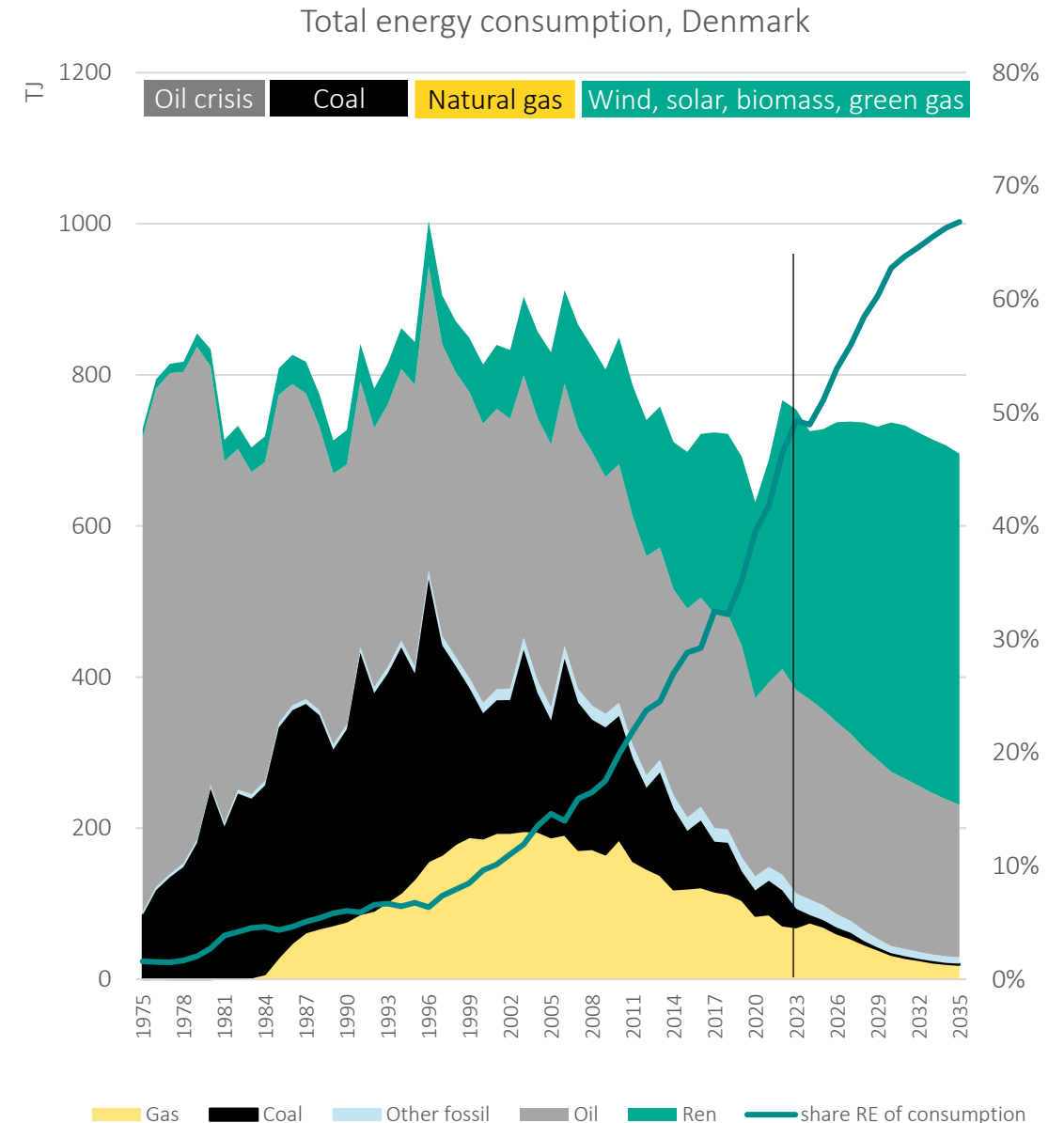


CO₂ emissions from thermal energy production (power and district heating)

THE DANISH ENERGY TRANSITION

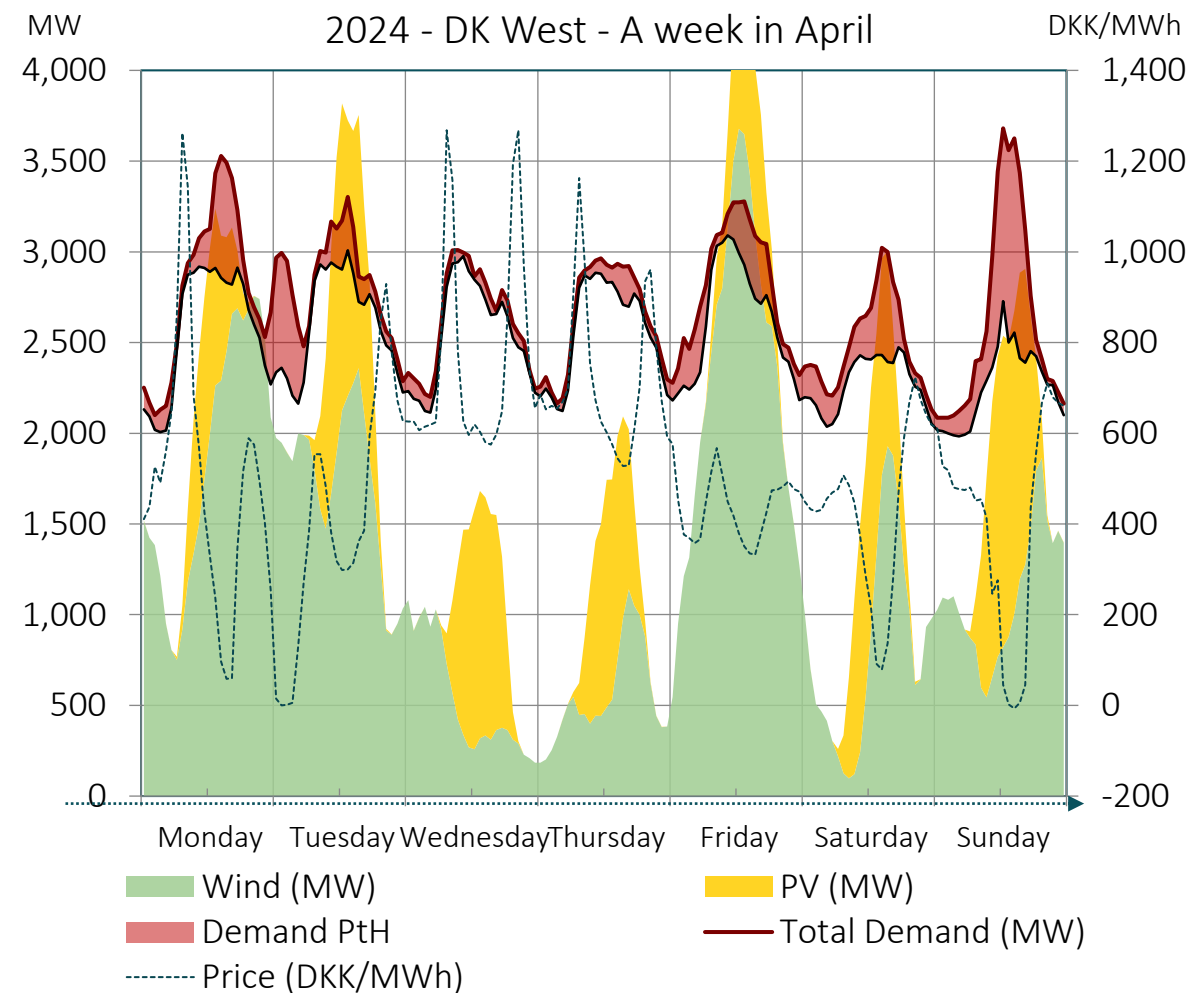
MAIN TOOLS FOR GREEN TRANSITION

- Stable and holistic energy planning
- Clear mandate for TSO and transmission buildout
- Flexible electricity production and interconnectors
- Market based regulation and European electricity markets
- Digitalization of operation and markets
- Future focus on flexible consumption and sector coupling (PtX and hard to abate sectors)

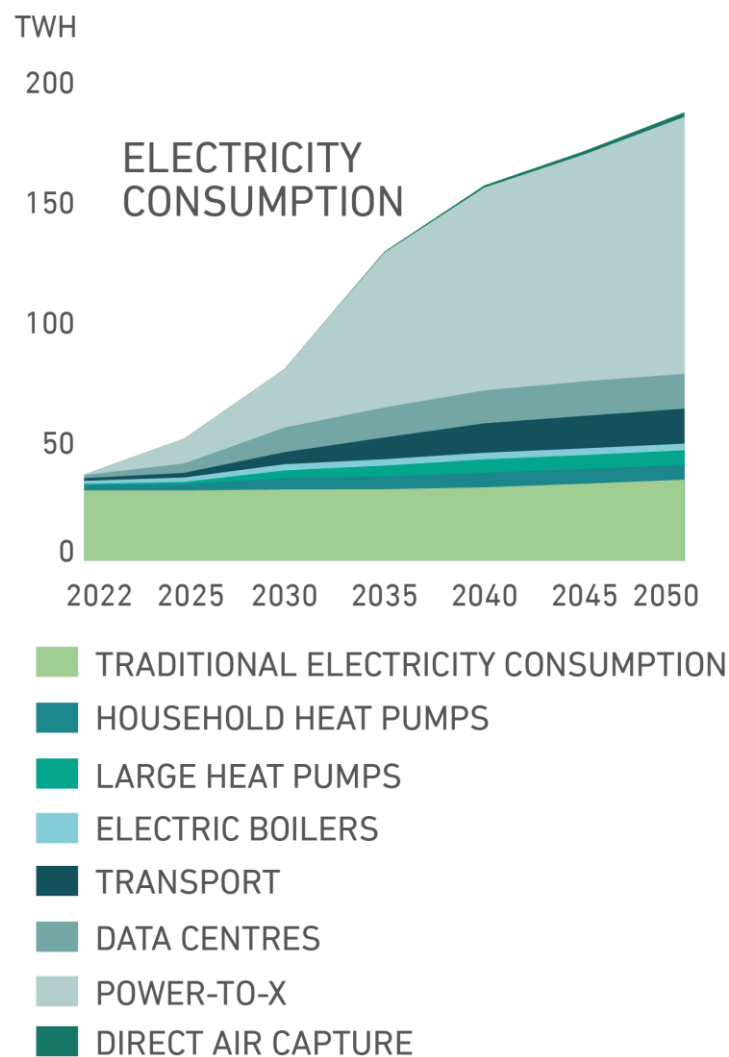


FLEXIBILITY

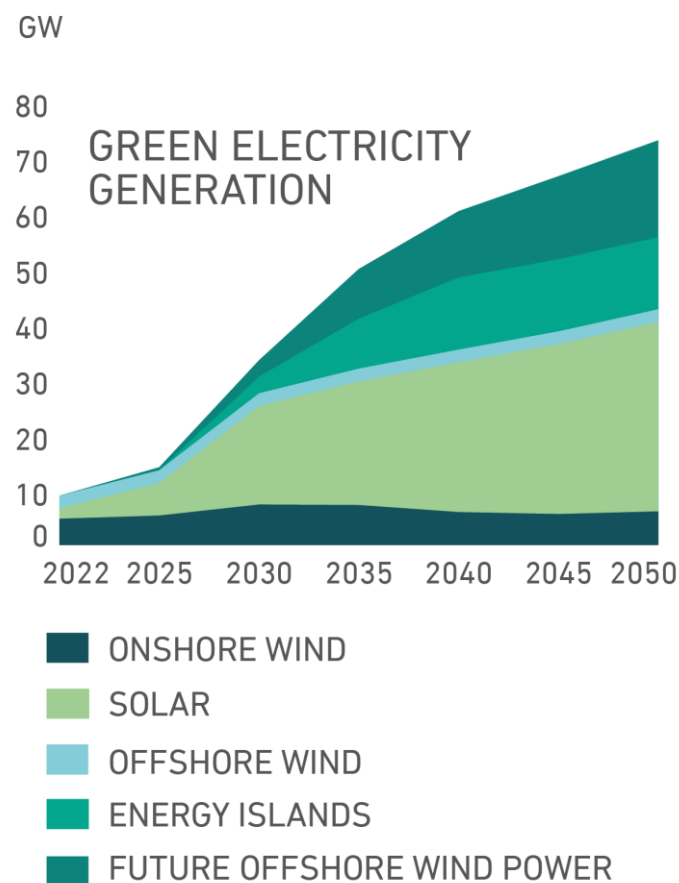
- Exchange with neighboring countries as part of European day ahead electricity market
- Increasing consumption flexibility mainly driven by Power to heat (PtH) in district heating and to less degree EV charging
- Voluntary market based curtailment of solar and wind, when electricity price is low/negative



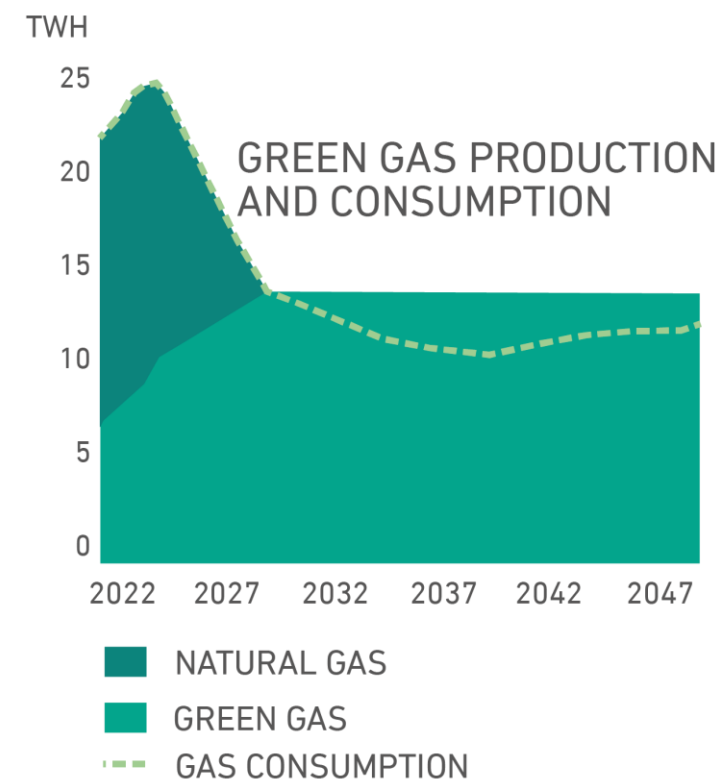
ELECTRIFICATION DRIVES THE CHANGE TO A CLIMATE NEUTRAL AND EFFICIENT ENERGY SYSTEM



WHAT HAS BEEN ACHIEVED IN THE LAST 20 YEARS ACCELERATES TOWARD 2040



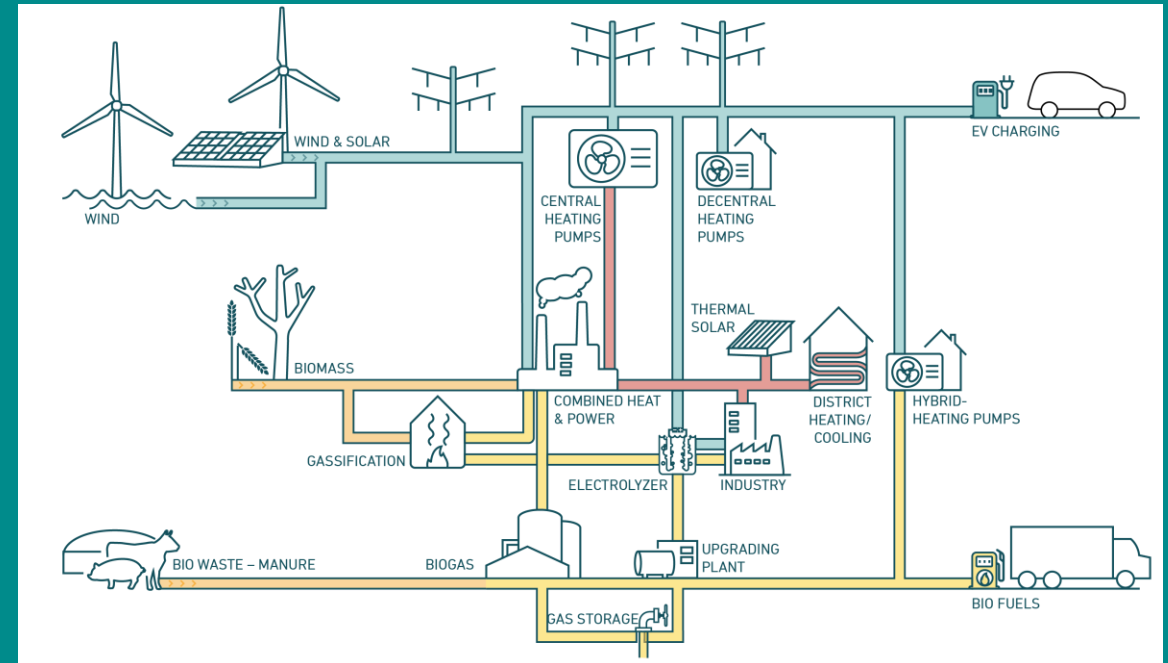
GREEN GAS (BIO METHANE) SUPPORTS THE SECURITY OF SUPPLY AND SMOOTH TRANSITION



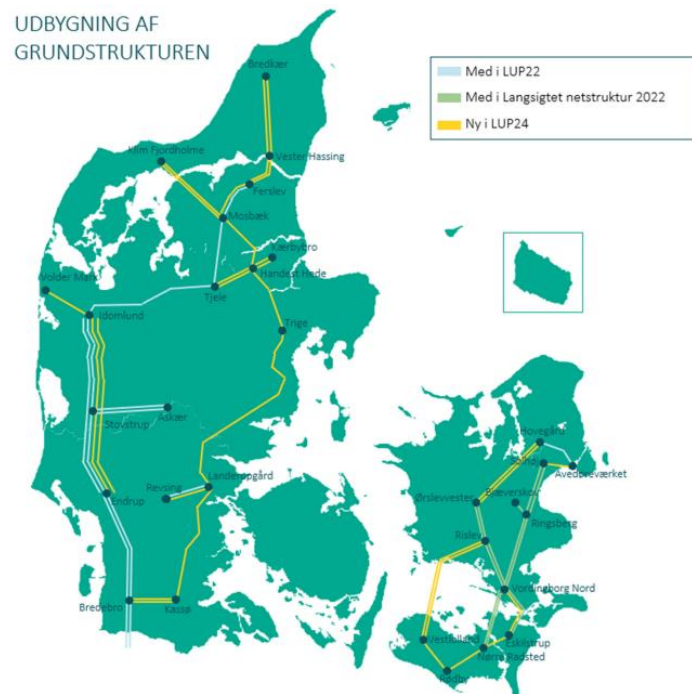
TOP 4 PREREQUISITES FOR THE ENERGY SYSTEM OF THE FUTURE

1. The power grid must be expanded to meet future needs
2. The power grid must be utilised in the best possible way
3. There is an increased need for ancillary services to maintain power system stability
4. Green gas grid must be competitive

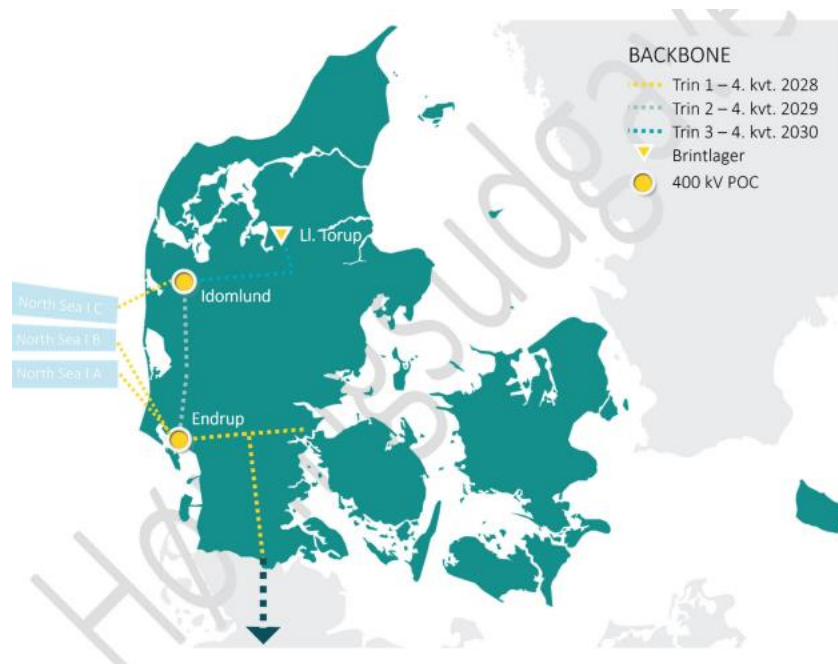
THE ENERGY SYSTEM OF THE FUTURE



LONG TERM DEVELOPMENT PLAN 2024 – PUBLIC HEARING VERSION

Electricity transmission

Figur 3 400 kV forbindelser i LUP22 og LUP24

Hydrogen transmission*Gas transmission*

INCREASED UTILIZATION OF GRID – LARGE SCALE OFFSHORE WIND AND OVERPLANTING

DANISH TENDER FOR +6 GW OSW
PUBLISHED 22 APRIL 2024

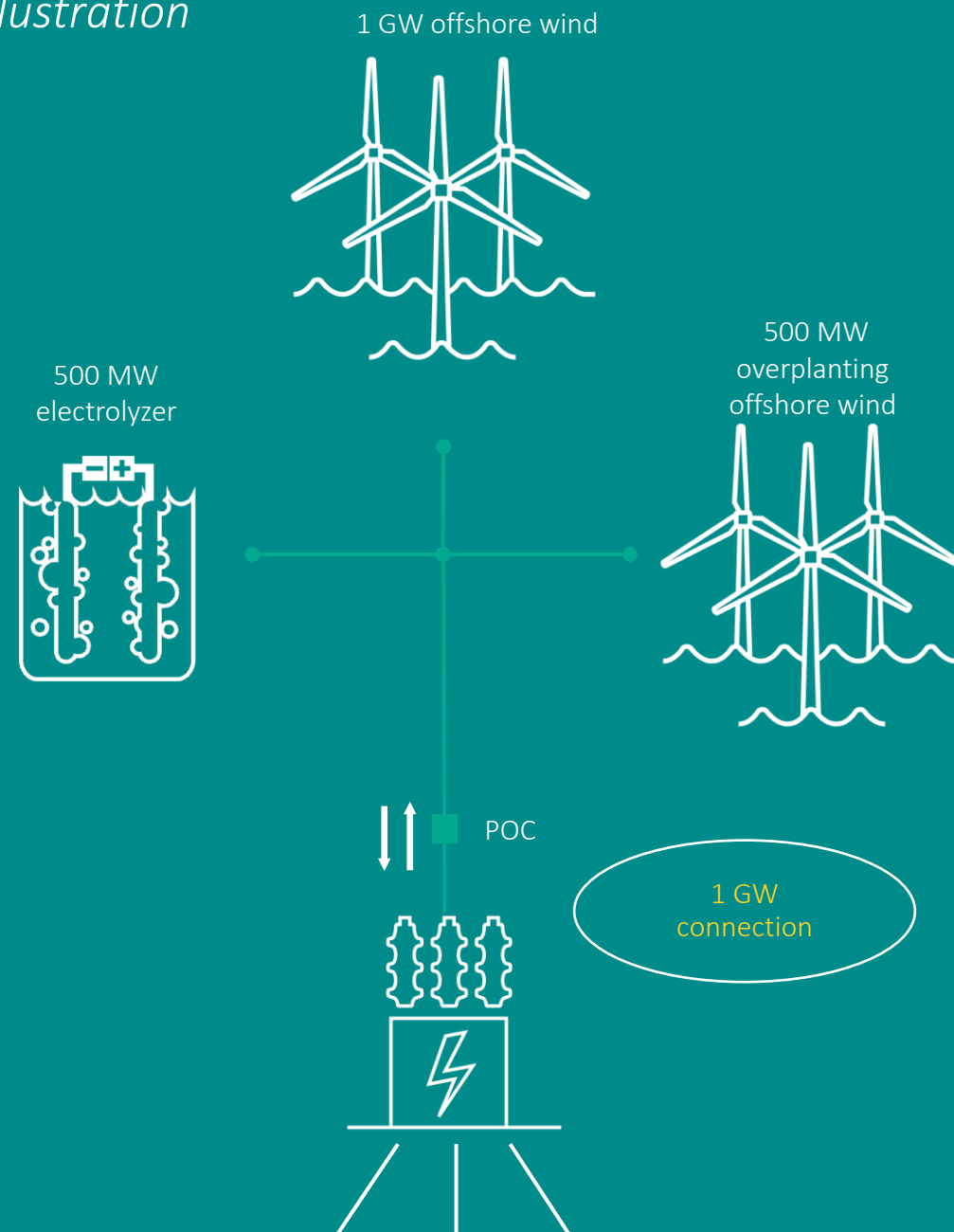


- The 6 GW offshore wind are tendered and grid connection ensured
- Option of overplanting– potentially 4 GW or more
- No state subsidies and with a yearly concession payment for use of seabed

WHAT DOES OVERPLANTING MEAN?

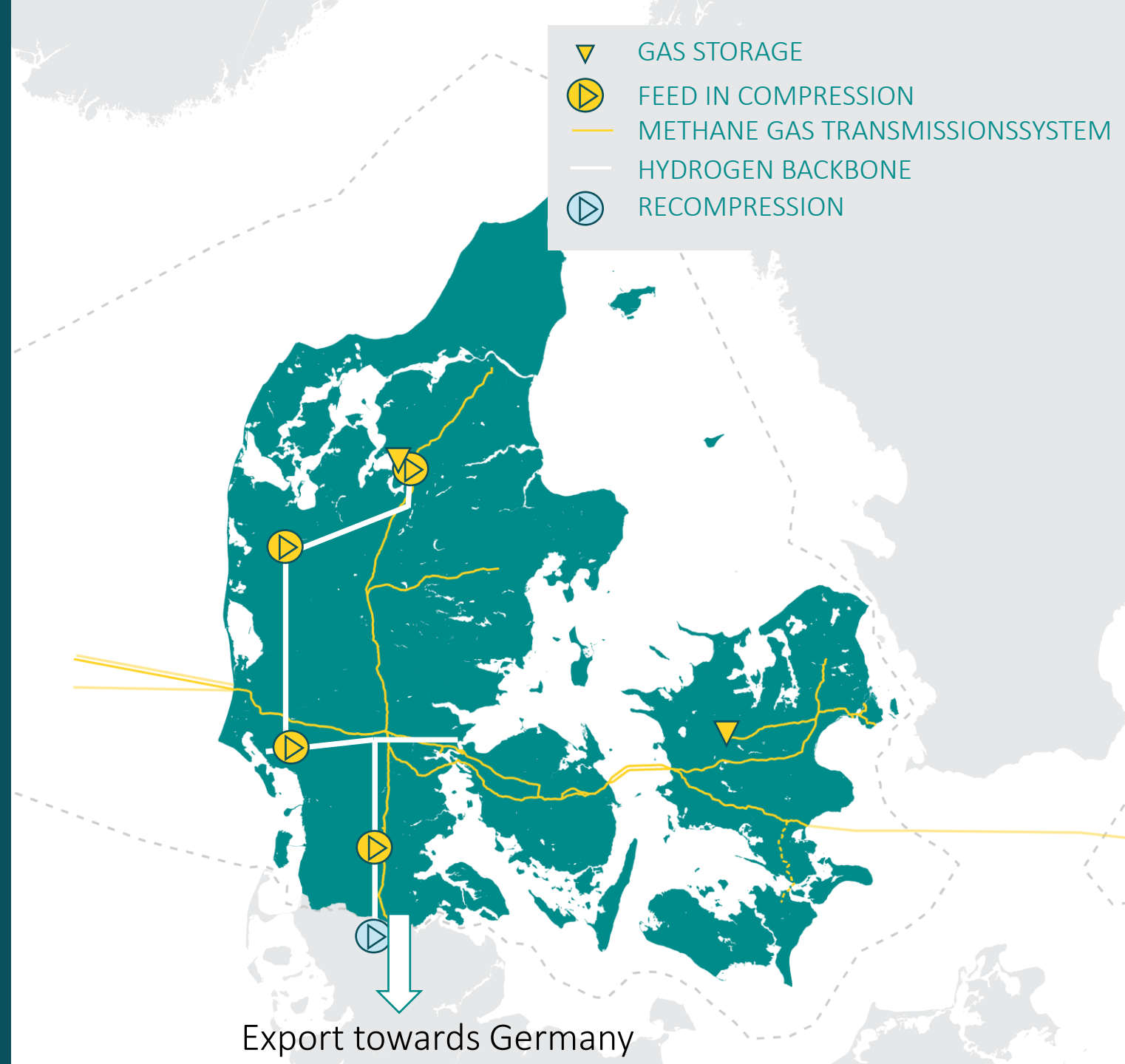
- 1 GW offshore wind tender – 1 GW grid connection is ensured
- Possible to increase offshore wind capacity (over planting) to increase utilization of grid connection
- Also possible to establish ptx, battery, solar capacity or other kind of generation or consumption before grid connection

Illustration



HYDROGEN BACKBONE

- Enables large scale hydrogen production for **export** and **production of fuels**
- **Reduces peak grid utilization**
- New tool for **balancing of electricity**
- Transmission plan based on announced and planned projects
- Expected commissioning 2032



THANKS FOR YOUR ATTENTION



VISION

GREEN ENERGY FOR A
BETTER WORLD

For more information please
contact: pmr@energinet.dk or visit
www.energinet.dk/EN

DISCLAIMER

Information provided is always based on best effort and “as is”.

Energinet takes no responsibility or liability for any errors or omissions in the content of this text/presentation

The information given should not be seen as an advice for investment and Energinet takes no responsibility for the use of the information provided in this presentation/text.

The views, thoughts, and opinions expressed belong solely to the author, and not necessarily to the author's employer, organization, committee or other group or individual

Reuse of this material is only allowed with clear reference to the source.

A BALANCING ACT

