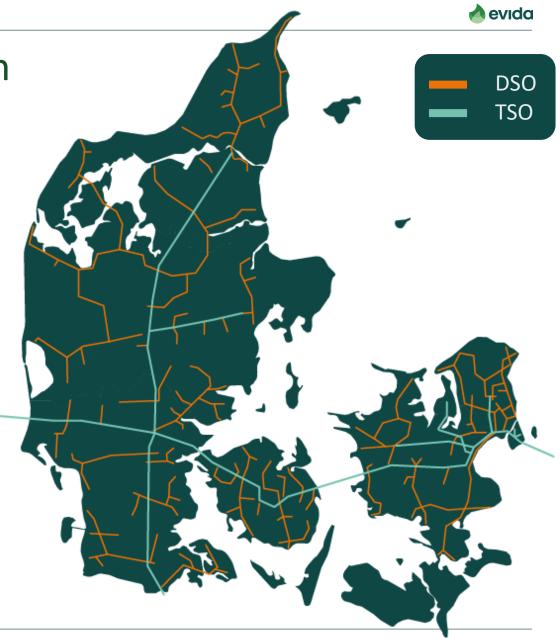
How pipeline infrastructure can support a future hydrogen economy, facilitate technological innovation and job creation in decentralized areas of Denmark

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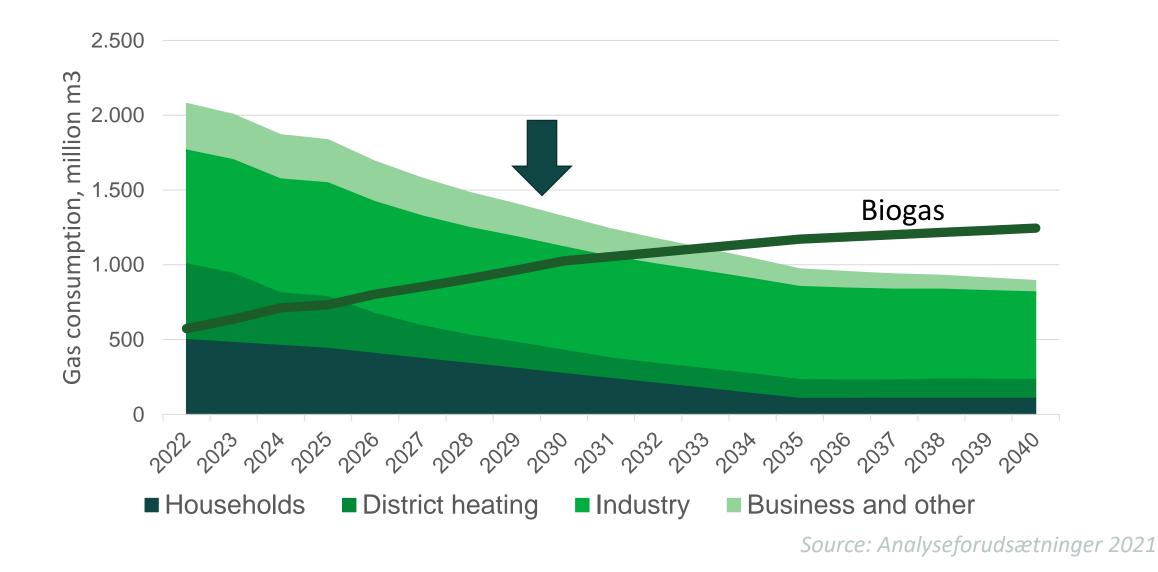


# **Evida** – the national gas distribution company

- 18,000 km of pipe infrastructure
- Transport of natural- and biogas
- 400.000 customers
- 53 biogas plants connected
- Approx. 25% of gas consumption in 2021 was biogas (for 2022 it estimated to be close to 40%)



### Projected future gas consumption and biogas production

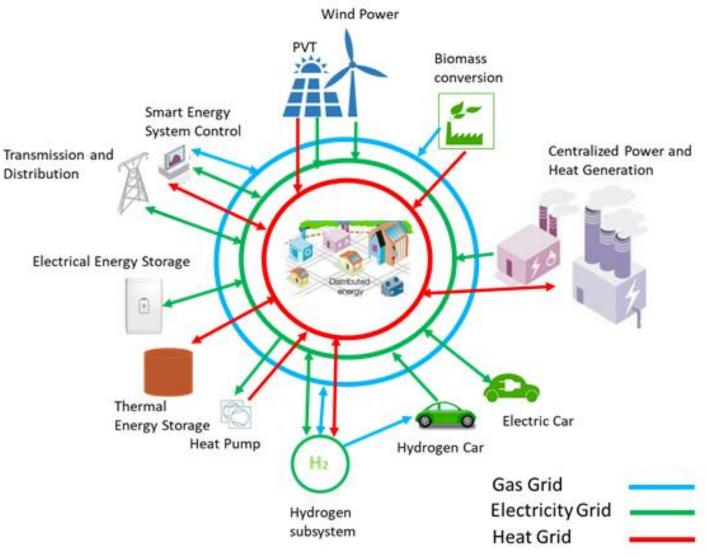


## THE FUTURE NEEDS GREEN INFRASTRUCTURE



#### INTEGRATED ENERGY SYSTEM

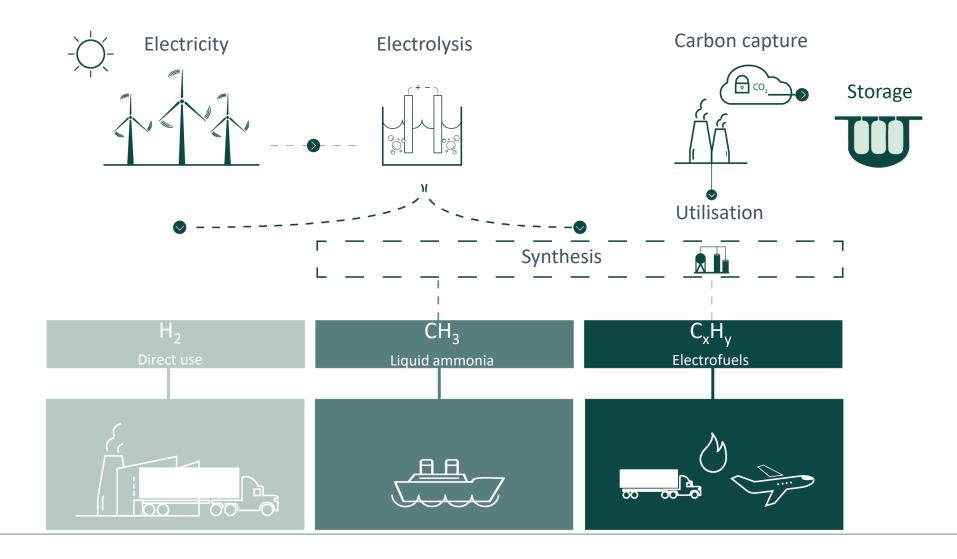
The integrated energy system is closely combined to production, compression of gas, consumption including derived value streams e.g. heat, flexibility and storage



Source: https://www.utwente.nl/en/et/tfe/research-groups/TE/research/research/Energy\_Systems\_Integration/



#### **OPPORTUNITIES FOR PTX AND CCUS IN THE FUTURE**

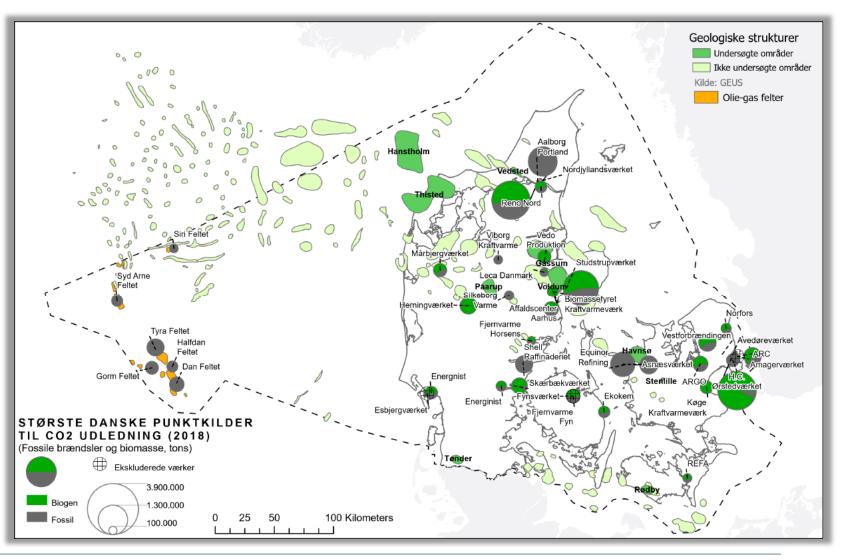


📥 evida

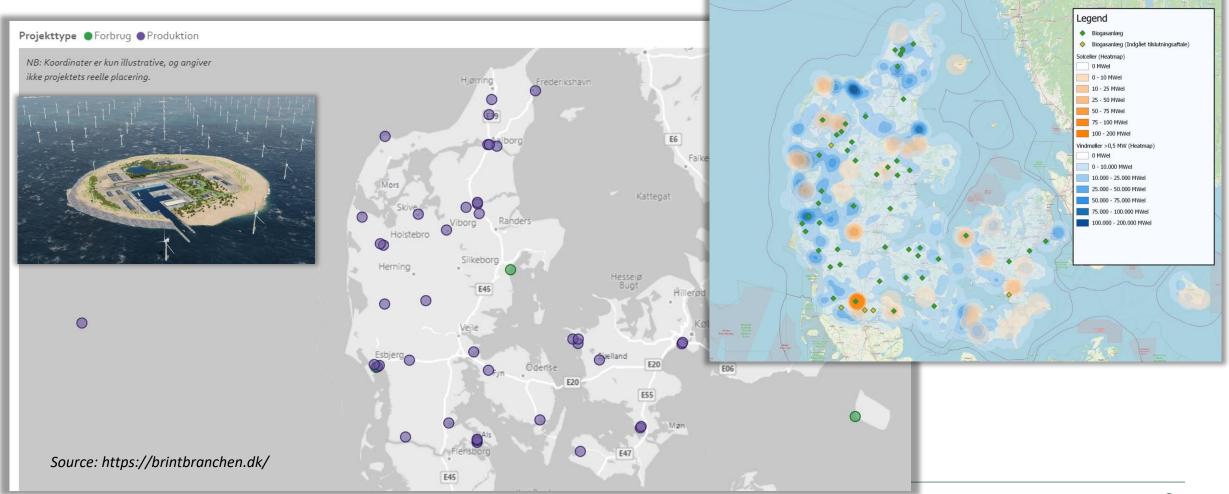
## Availability of CO2 for CCUS in Denmark

Biogenic sources

Fossil sources



# FUTURE RENEWABLE ENERGY SOURCES, PRODUCTION AND CONSUMPTION WILL DETERMINE THE DEVELOPMENT OF DANISH HYDROGEN INFRASTRUCTURE



📥 evida

# Learning from the existing natural gas network

- Designed as a tree structure in the 80s based on:
- central gas production in the North Sea at high pressure (ca. 120 - 130 barg)
  - gas transport driven by the high pressure from the North Sea;
  - **one-way flow** to consumption points in Denmark
  - planned rollout
- Conversion of the tree structure to decentralised biogas production means that there are significant and increasing costs

#### **Expectations for the development** of Danish hydrogen infrastructure

- Born with a **decentralized production** that supplies hydrogen at approx. 35 barg
- Consumption will also develop on a **decentralised** basis, e.g. in a number of energy clusters
- The development will be **organically** driven by producers and buyers, and the flow of hydrogen will be **both ways** in the system
- Phased expansion will support organic development and ensure the lowest possible operating costs for transporting hydrogen

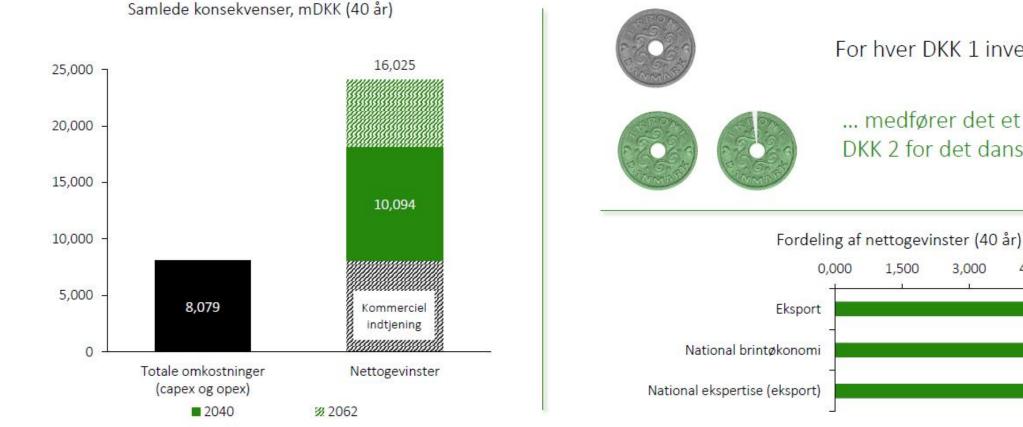


## HYDROGEN IS GOOD BUSINESS





#### A SOCIO-ECONOMICALLY SOUND DECISION



For hver DKK 1 investeret...

... medfører det et afkast på knap DKK 2 for det danske samfund.

4,500

6,000

5,128

4,703

7,500

6,508

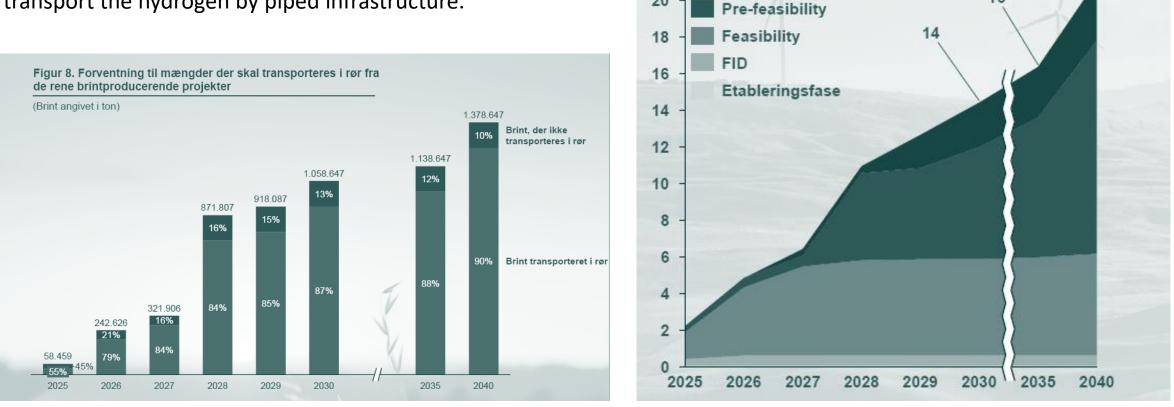


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16

#### MARKEDSDIALOG OM BRINT

The market is ready – the actors expect large amounts of hydrogen produced in Denmark. And they expect to transport the hydrogen by piped infrastructure.



(GW)

22

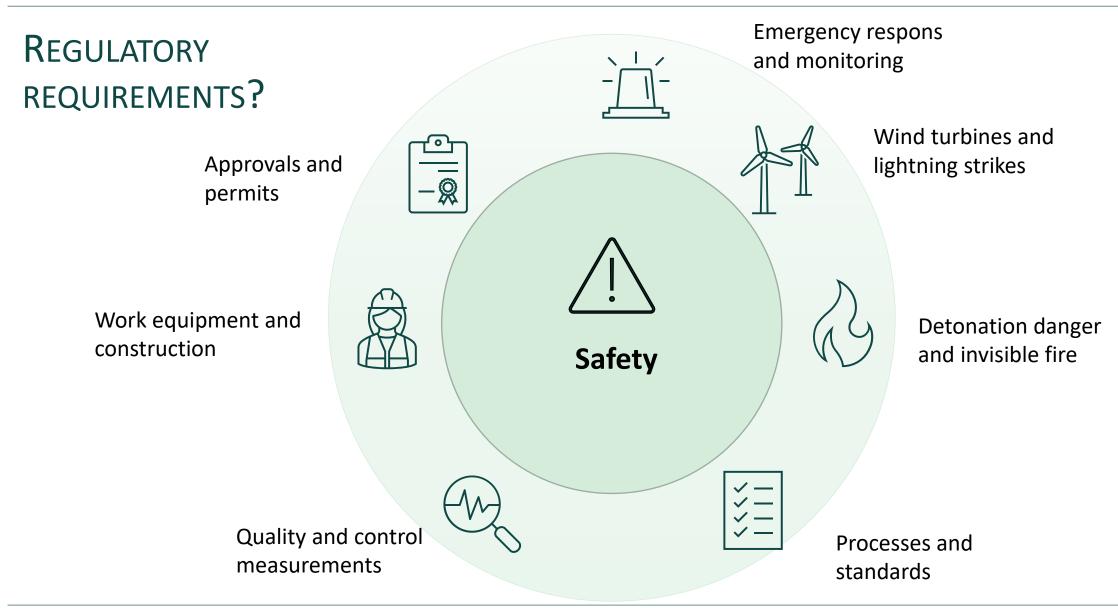
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Figur 4. Forventet udvikling i elektrolysekapacitet

Overvejelser om at initiere projekt

## KEY CHALLENGES

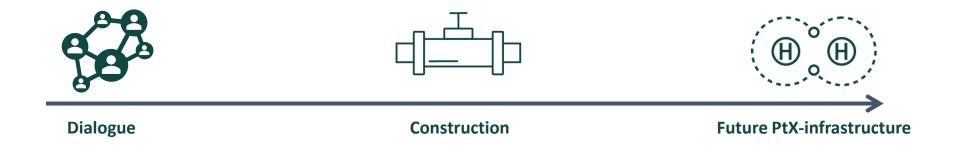






#### TIMING IS EVERYTHING

- Major infrastructure decisions billions in investments
- The unknows er enormous
- Scale and speed of implementation is needed
- Close cooperation between market players, Evida, Energinet and regulator to reach the goal.



### COLLABORATION IS KEY - LET'S GET IT STARTED!

#### Thank you!

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