

# Klimarådet.

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THE DANISH ENVIRONMENTAL ECONOMIC CONFERENCE 2023



Panel session: Challenges of our future energy system

**Carbon Scarcity**

**Security of Supply**

**Speed & Scale**

- it must be *green!*

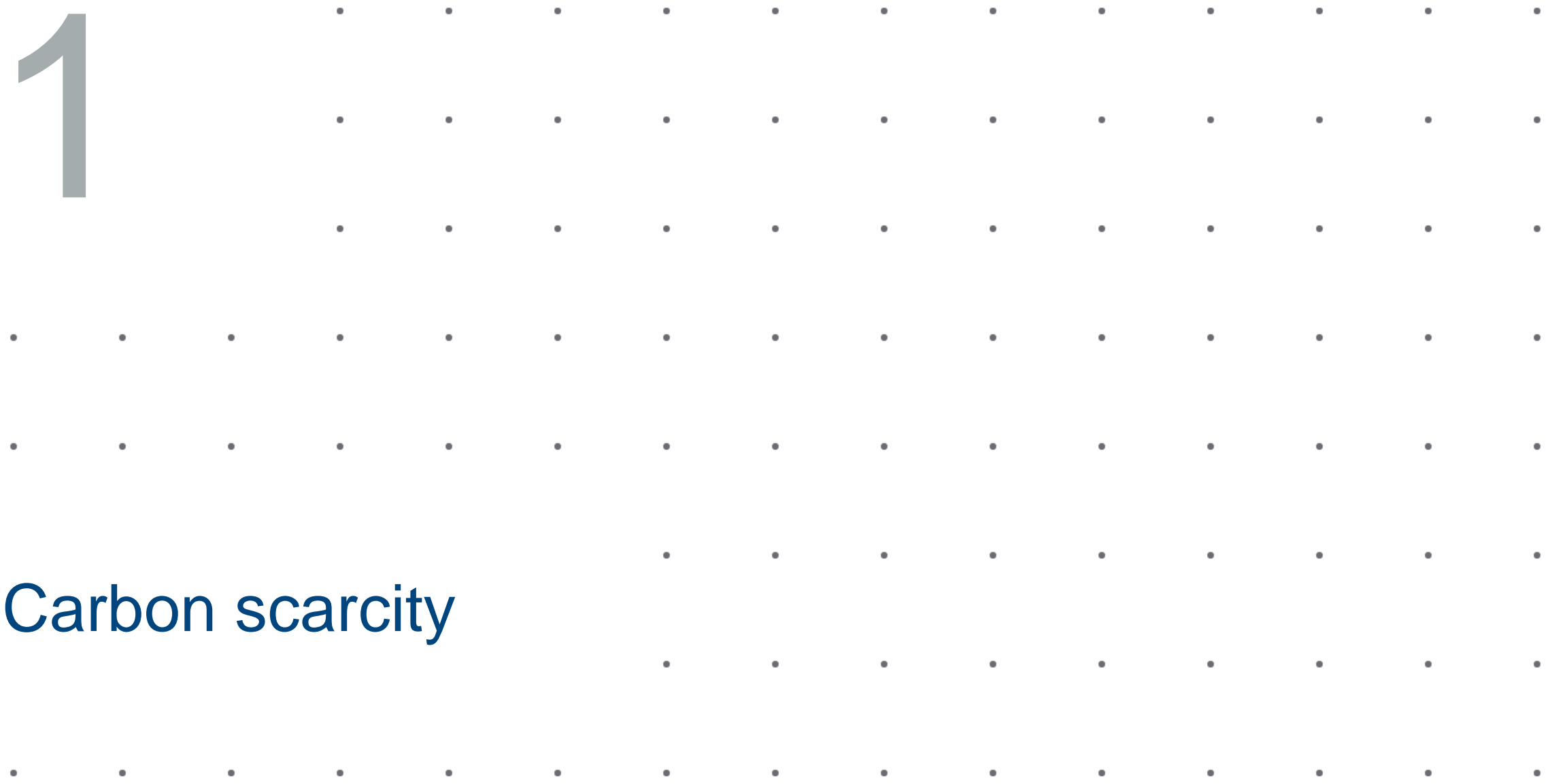
Niels Buus Kristensen

Vice chairman, Danish Council on Climate Change

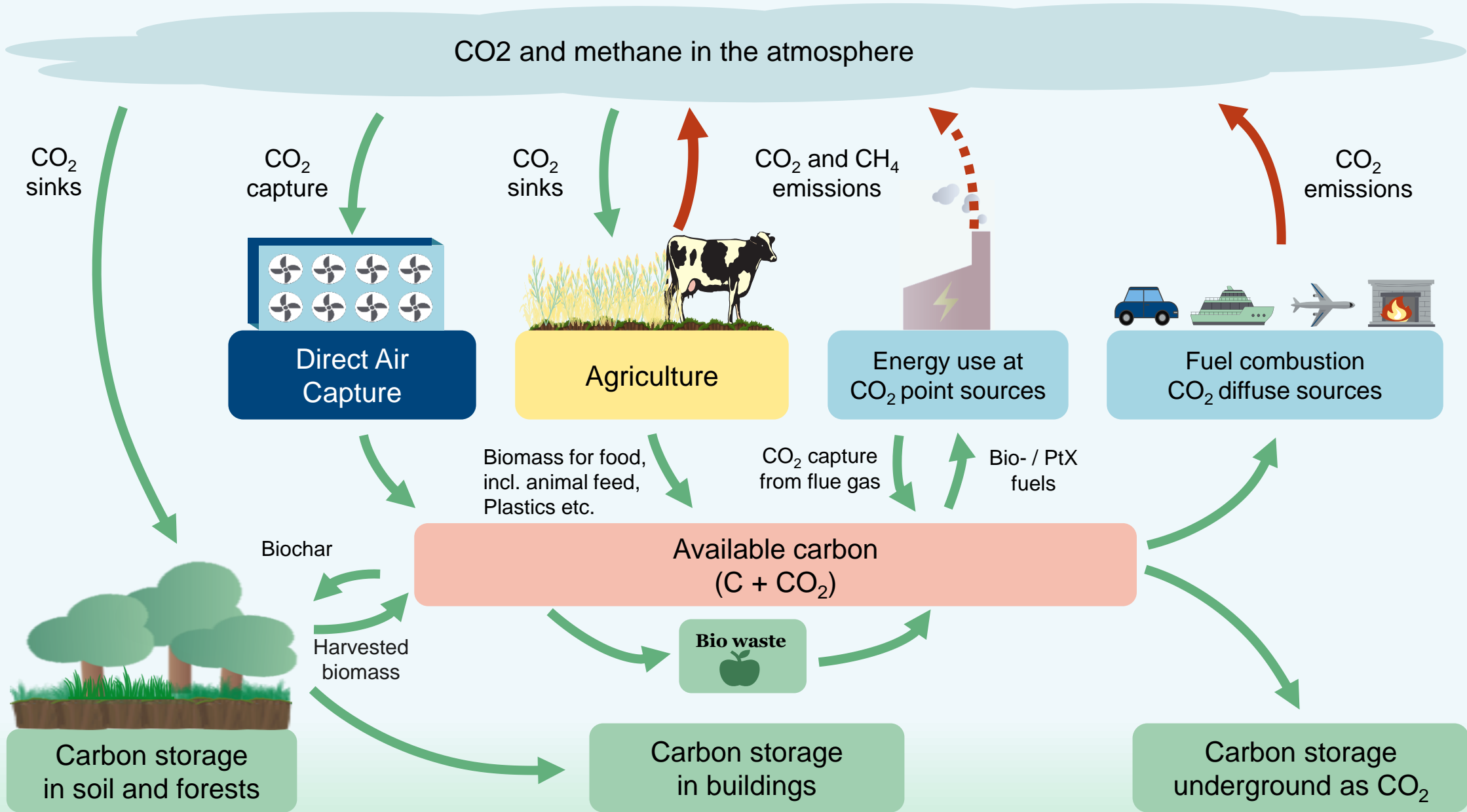
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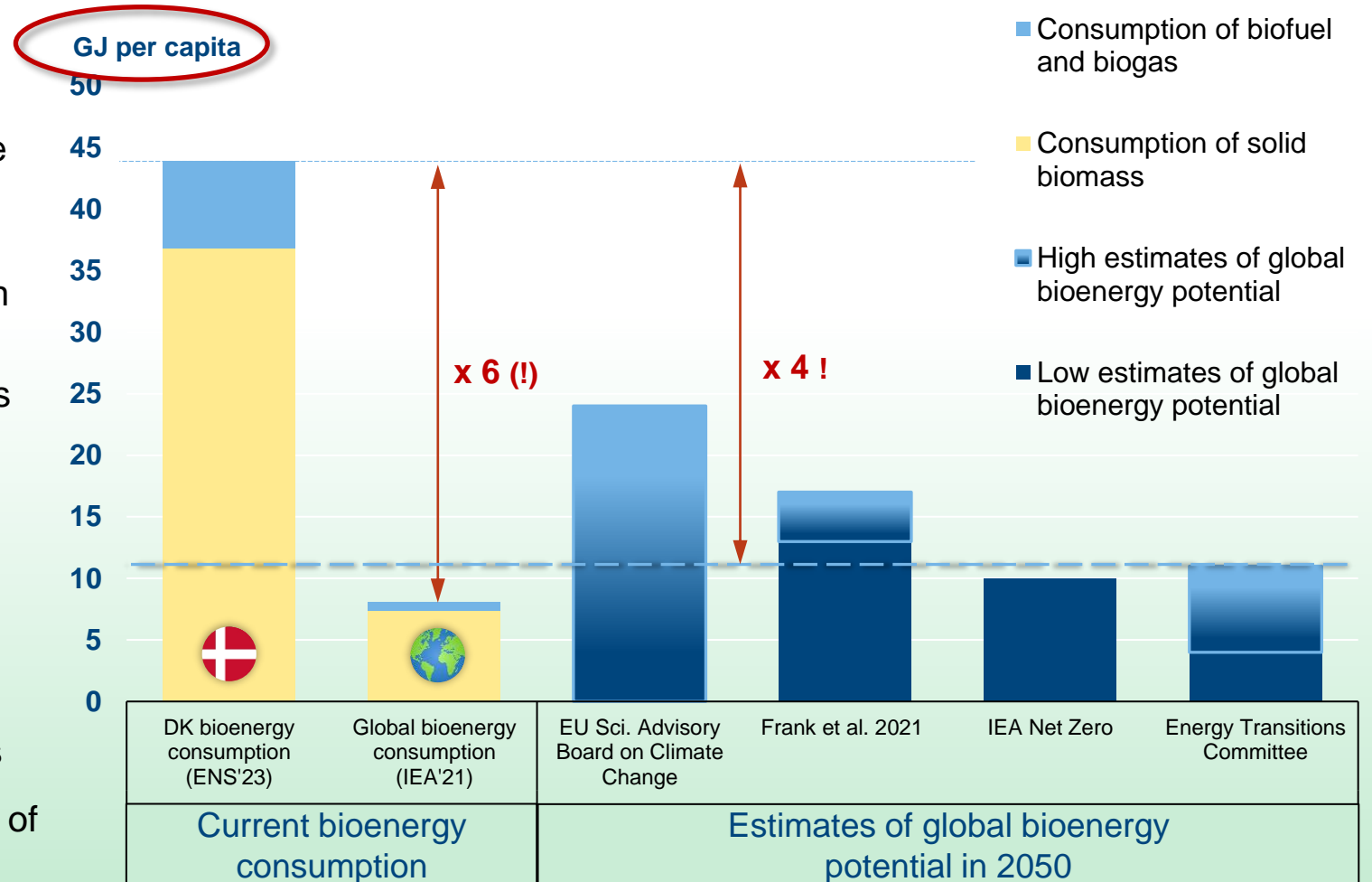


Carbon scarcity



# Biomass - a scarce resource

- ... and not, in general, carbon neutral
- Climate neutrality requires biogene CO<sub>2</sub> for green fuels for aviation and CCS in the future
- Bioenergy accounts for more than two thirds of Denmark's renewable energy consumption
- Denmark imports a large share of its biomass for energy production
- Long-term strategy: Reduce Denmark's consumption of biomass
- Secure incentives to
  - promote additional carbon uptake in forests
  - capture carbon emissions from incineration of biomass



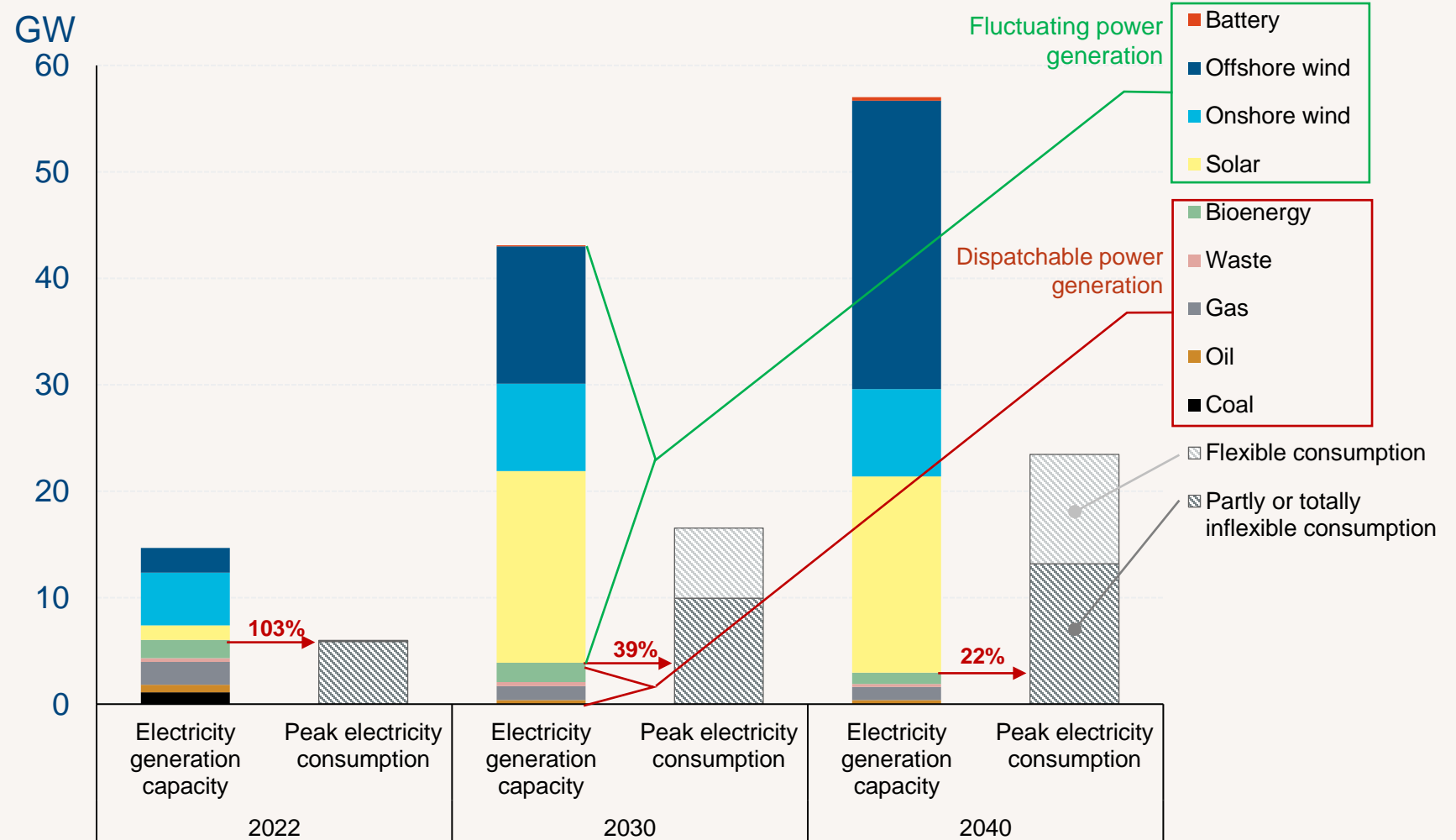
# 2

## Security of electricity supply

# Peak electricity demand will be challenged by declining power plant capacity

- An increasing share of inflexible demand will be covered by variable sources of power
- Oversized of max. capacity is the pivotal part of the solution
- However, in extreme weather situations we rely on imports
- Import potential is reduced by correlating weather patterns in Southern neighbouring countries

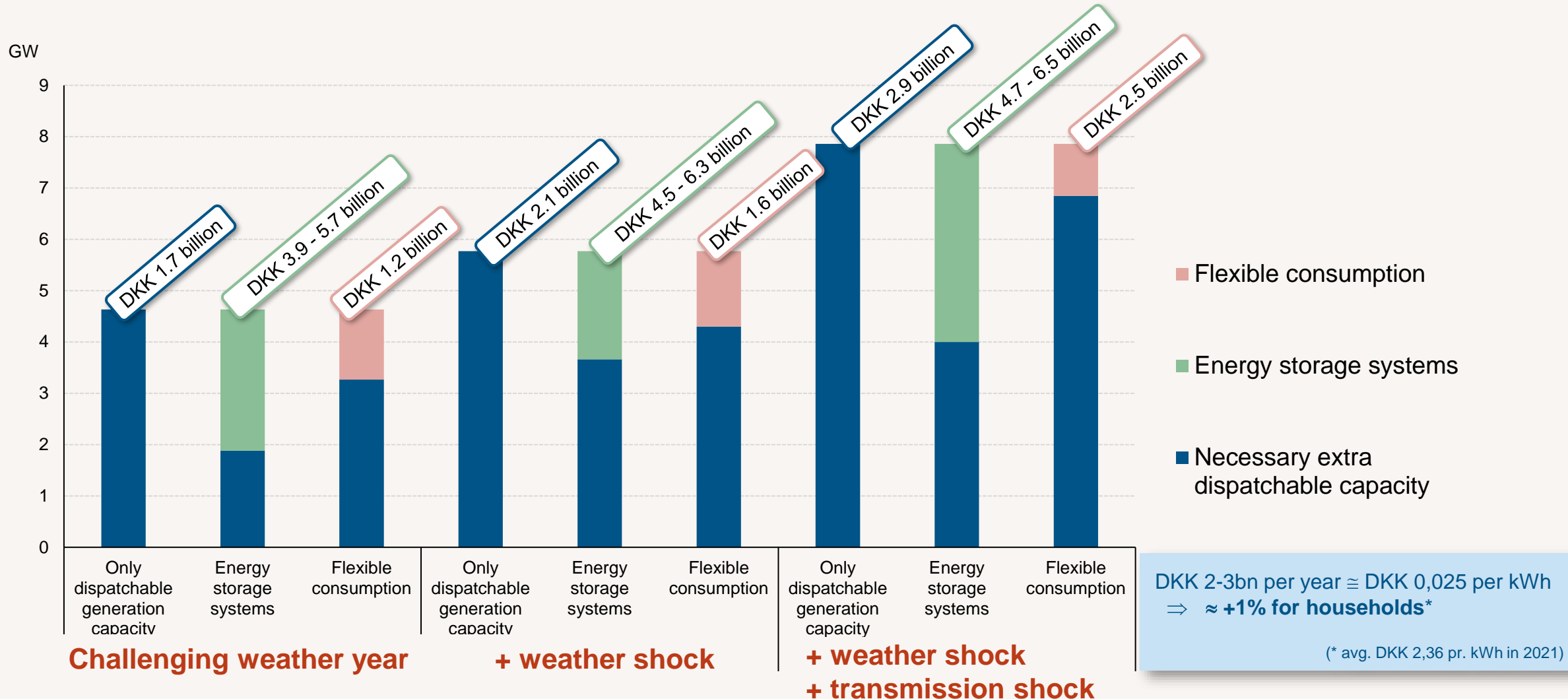
→ **We will need flexible back up solutions**



**Note:** The percentage reflects the share of inflexible consumption potentially being covered by dispatchable generation.

**Source:** The Danish Council on Climate Change (2023), 'Security of electricity supply with high shares of solar and wind power'.

# Stress test calculations are reassuring – but timely precautions are required



**Note:** Columns shows extra controllable capacity needed to maintain today's (low) level of power outages (GJ).  
 Costs tags above the bars represent rough cost estimates (2022-prices)

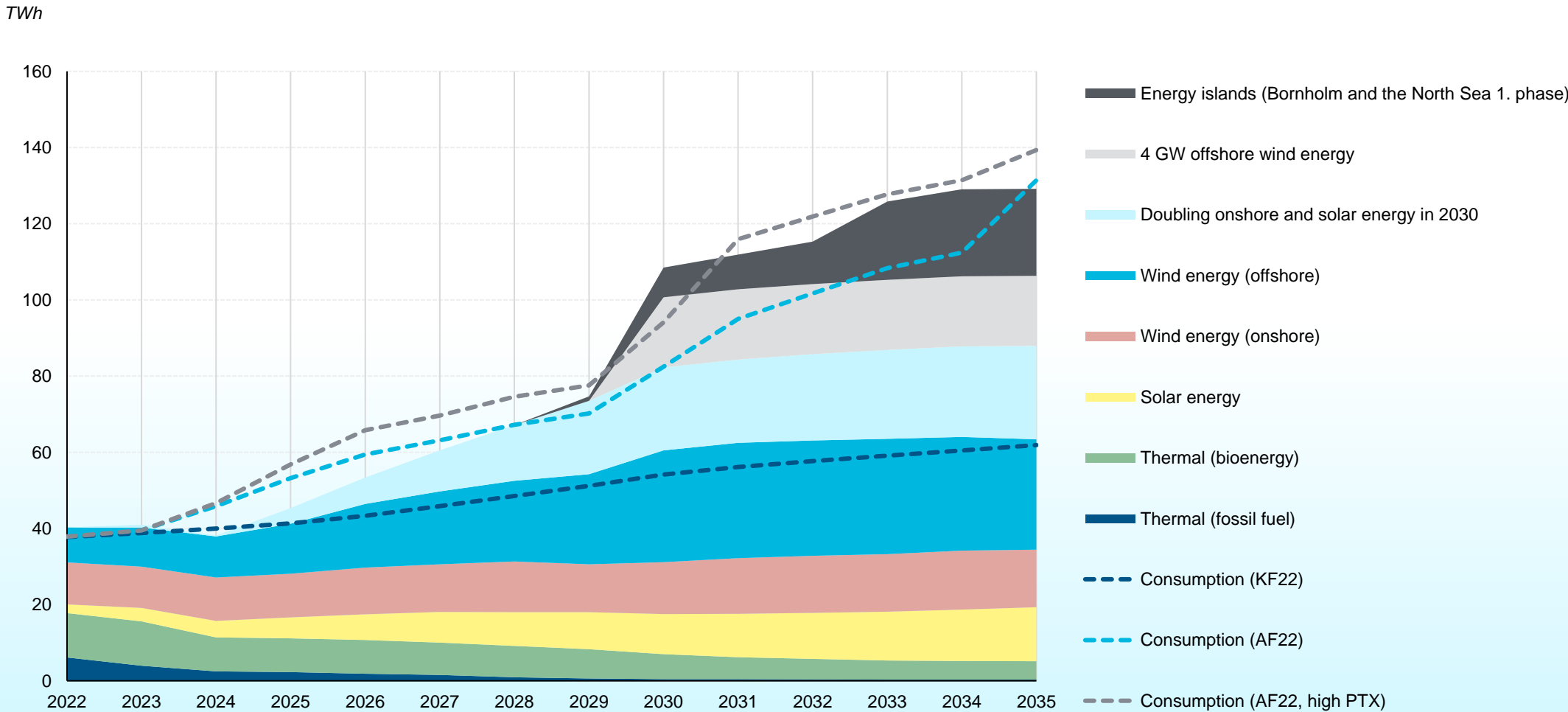
Source: The Danish Council on Climate Change (2023), 'Security of electricity supply with high shares of solar and wind power'.

# 3

Renewables expansion: Sufficient speed & scale?



# Renewables expansion is delayed and at risk

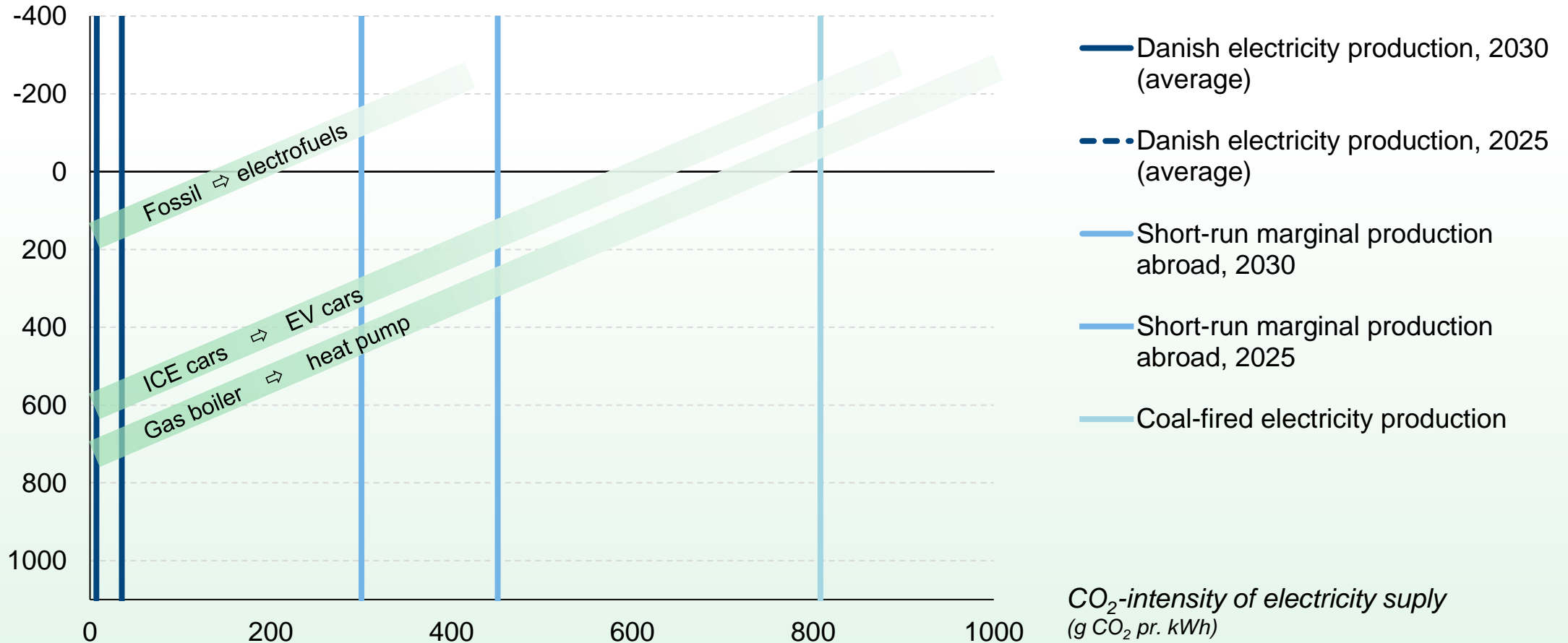


Source: Amended from The Danish Council on Climate Change (2023), *Statusrapport 2023*.

# ... hence, so is clean PtX

Electrofuels require green electricity to avoid increasing CO<sub>2</sub> emissions

Mitigation efficiency  
(g CO<sub>2</sub> pr. kWh)



CO<sub>2</sub>-intensity of electricity supply  
(g CO<sub>2</sub> pr. kWh)

# 'Executive Summary' – *how challenging?*



Carbon scarcity



Security of supply



Speed & scale of renewables expansion



*Thank you for your attention!*

*Perito Moreno in Los Glaciares National Park, Argentina  
– on of the world's very few non-retreating glaciers ...*

*Photo: © Niels Buus Kristensen*