



Scenarios for achieving Denmark's Climate Targets

Input for the
Danish Government's
Climate Program 2022

Karsten Hedegaard
Chief Advisor
Centre for Systems Analysis
MSc Eng, PhD
khg@ens.dk



AIM OF THE SCENARIOS

- To illustrate that it is technically possible to achieve the long-term goal of climate neutrality by 2050 (at the latest) and the 70 pct. target in 2030 as a stepping stone
- To illustrate that there are different ways to achieve the targets based on the outcome space that the scenarios expand
- To create a basis for discussions around the further green transition

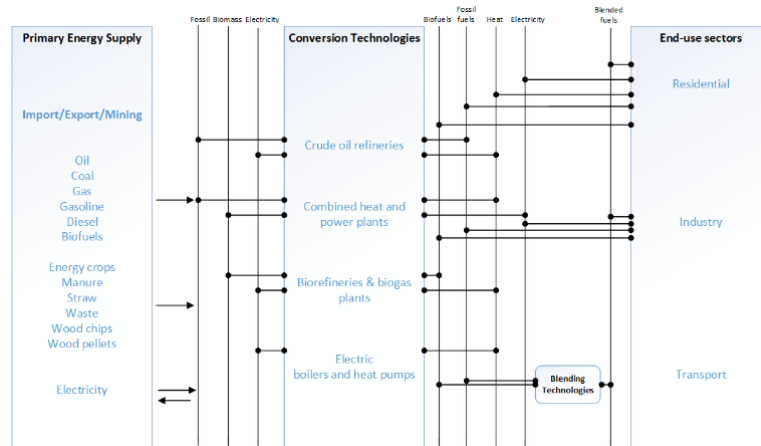




METHODOLOGY

- IntERACT-model (TIMES based) covering all sectors
- Model suggests cost-effective solutions
- Some sectors are based fully/partly on expert input rather than optimisation
- GHG emissions follow UN calculation principles
- International aviation & shipping included
- Biomass constraints considered

- Scenario design process
 - Informal stakeholder involvement
 - Inspiration from other scenario studies
 - Varying factors that are considered of great importance while also uncertain



Principal illustration of the TIMES-model (not all sectors shown)



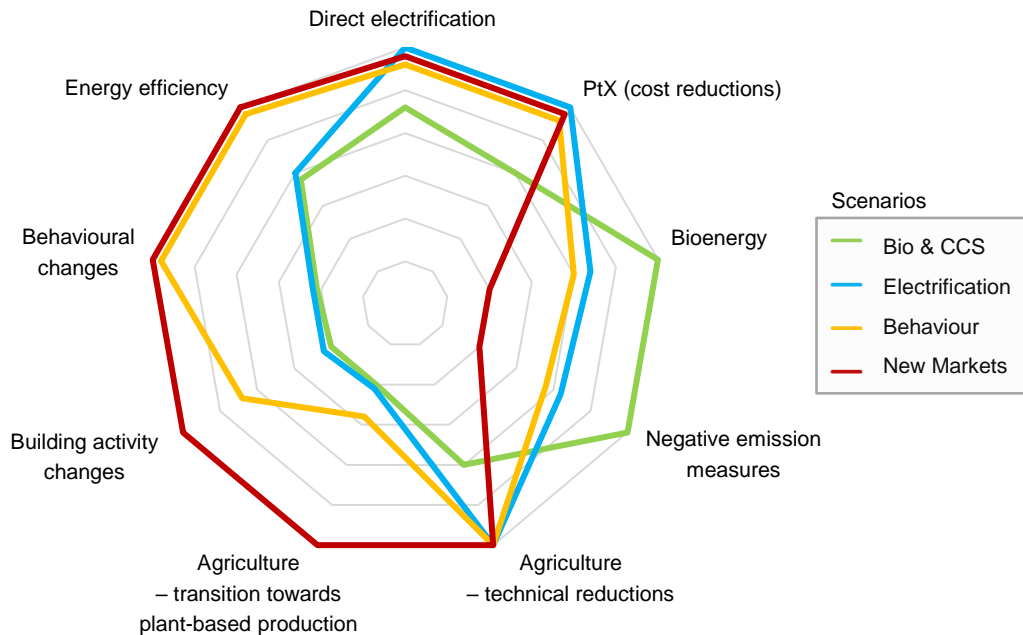
IntERACT is based on the internationally used TIMES model platform, which is developed in IEA and is used in more than 60 countries



4 SCENARIOS

Characterisation, in short

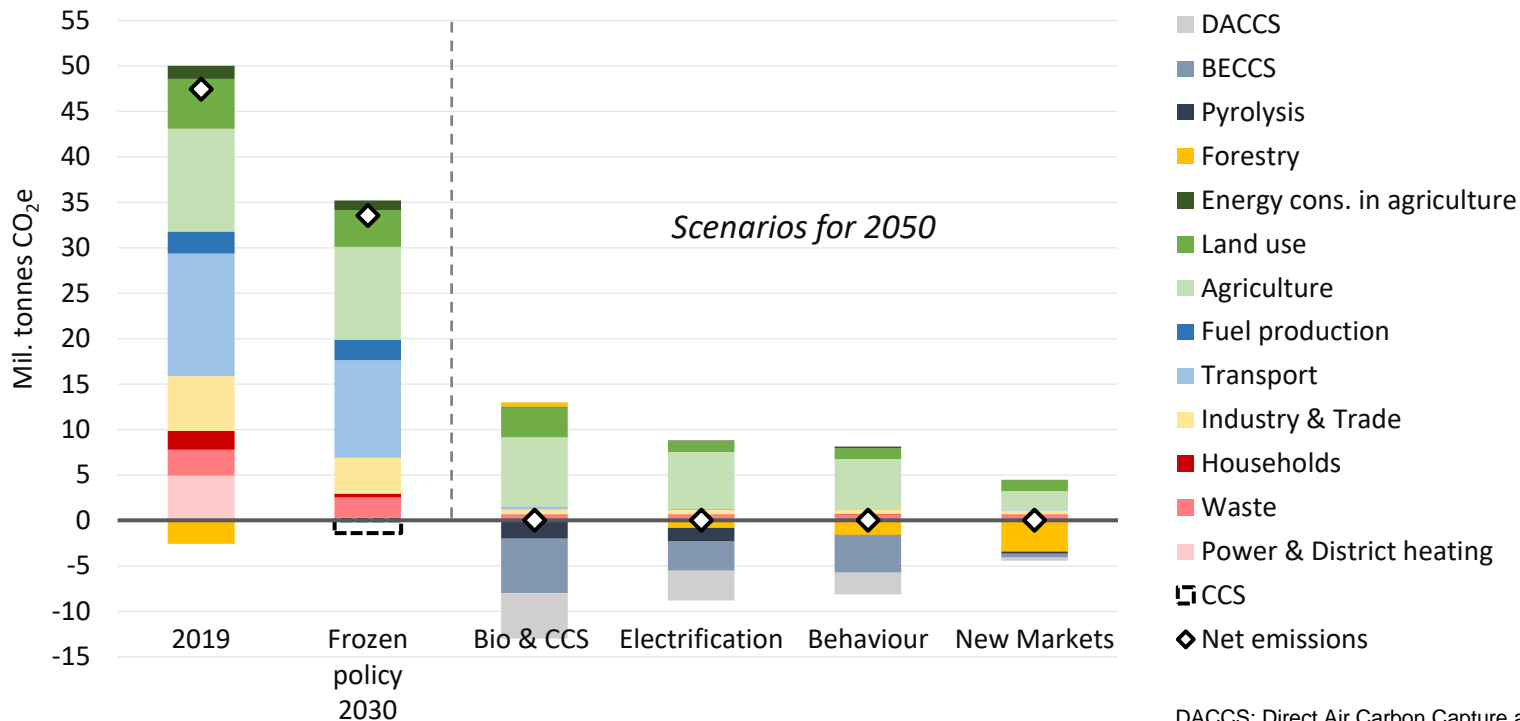
| | |
|------------------------|--|
| Bio & CCS | Bioenergy and carbon storage plays a relatively large role |
| Electrification | High degree of electrification - directly and indirectly via PtX |
| Behaviour | Significant climate-conscious behavioural changes among citizens and businesses as well as a high degree of energy efficiency |
| New Markets | High degree of transition in agriculture towards supplying the international markets for plant-based foods → significant decline in livestock |



Focus on 2050 in this presentation...



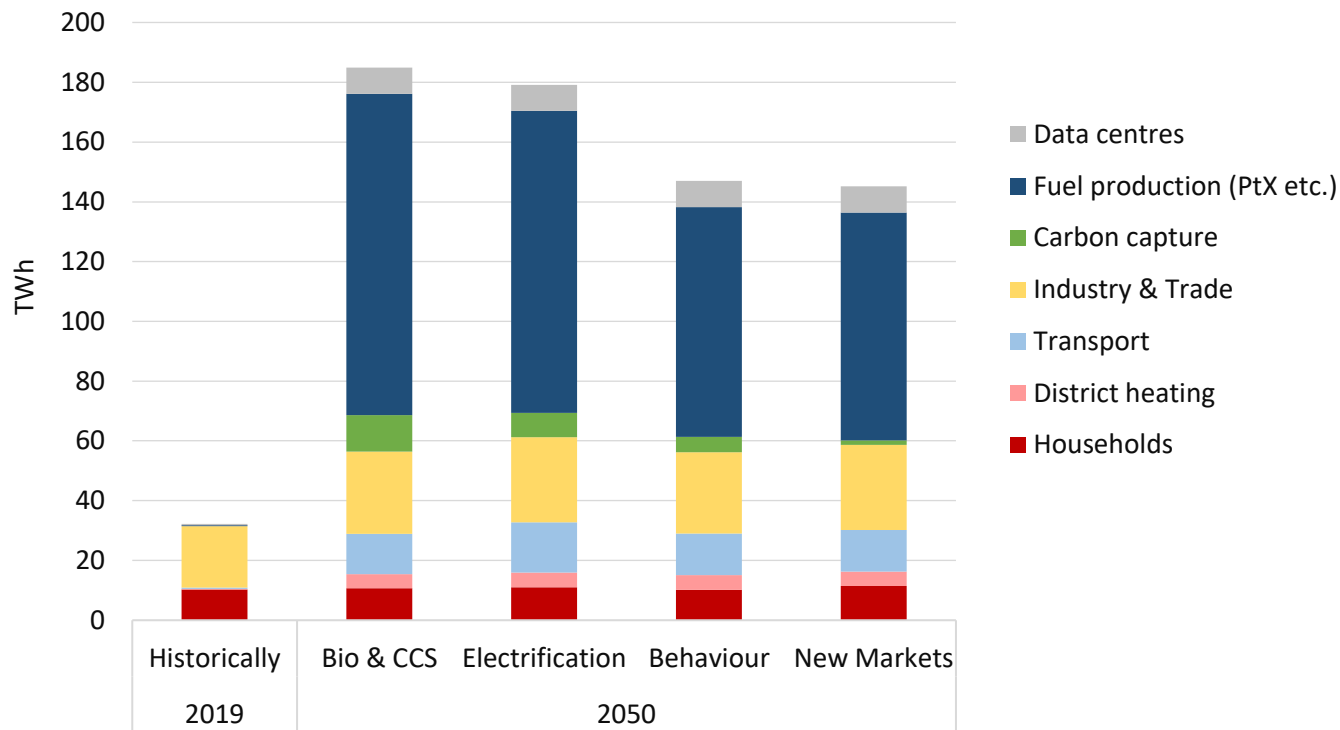
EMISSIONS BALANCE - 2050



DACCS: Direct Air Carbon Capture and Storage
BECCS: Bio Energy Carbon Capture and Storage
CCS: Carbon Capture and Storage

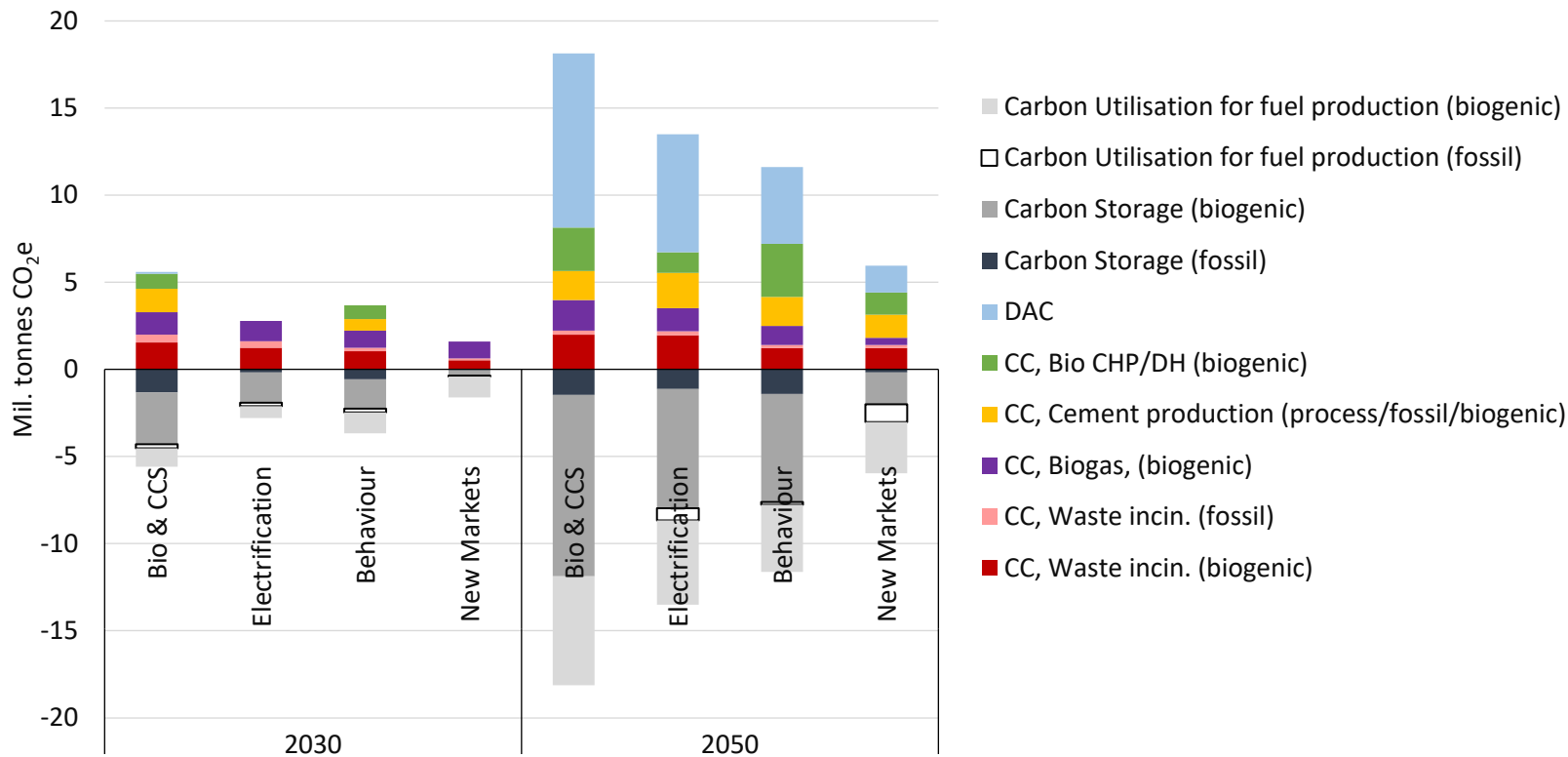


ELECTRICITY CONSUMPTION






CARBON CAPTURE, STORAGE, AND UTILISATION



Messages on the transition to climate neutrality

- Need for extensive electrification
- PtX could play a huge role
- Behavioural changes and EE can contribute significantly
- Dietary changes in DK have limited effect on national GHG emissions
- Changing agriculture from animal-based to plant-based production can have a large effect
- The need for negative emission tech's could become large
- DAC could become necessary if biomass consumption is to be limited
- *...in addition to other messages*



Thank you for the attention Questions?

For more info:

<https://ens.dk/service/fremskrivninger-analyse-modeller/tekniske-analyse-til-baggrund-klimaprogram-2022>

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