Agriculture, forestry and food in a climate neutral EU

The land use sectors as part of a sustainable food system and bioeconomy

Harald Grethe, 4th June 2026

Agora Agriculture

Objective of the study

Show that agriculture and forestry in the EU can contribute substantially to sustainability objectives such as:

- climate neutrality,
- biodiversity protection in the agricultural landscape and forests,

While

- supporting food security and a healthy diet for all EU citizens,
- producing more biomass than today for the bioeconomy,
- avoiding leakage to non-EU countries.

This is feasible, if land is used efficiently…

- Contributing to sustainability needs to turn into economic opportunities

…and biomass is consumed sustainably.

Methodology

1. Sketch a future scenario for agriculture, forestry, food, and biomass demand for the bioeconomy.
   - In large parts a quantitative analysis.

Sectoral coverage:
- Why not using a CGE model?

2. Use of a quantitative model (CAPRI) for agriculture and food demand to:
   - ensure the consistency of our assumptions.
   - derive economic & environmental results.

Regional coverage:
- Why having a „global model“ if we only analyze EU action?

3. Several side calculations for woody biomass and GHG emissions (e.g. for forests).

Remarks on the scenario:

Forests:
- What makes forests „difficult“ in simulation modeling??

- We do not say that this a likely scenario; it will only materialize, if we take ambitious action.
- This is one future scenario; of course other options are feasible, but…

Scenario design:
- Why only having one scenario?

Documentation:
- Technical Annex

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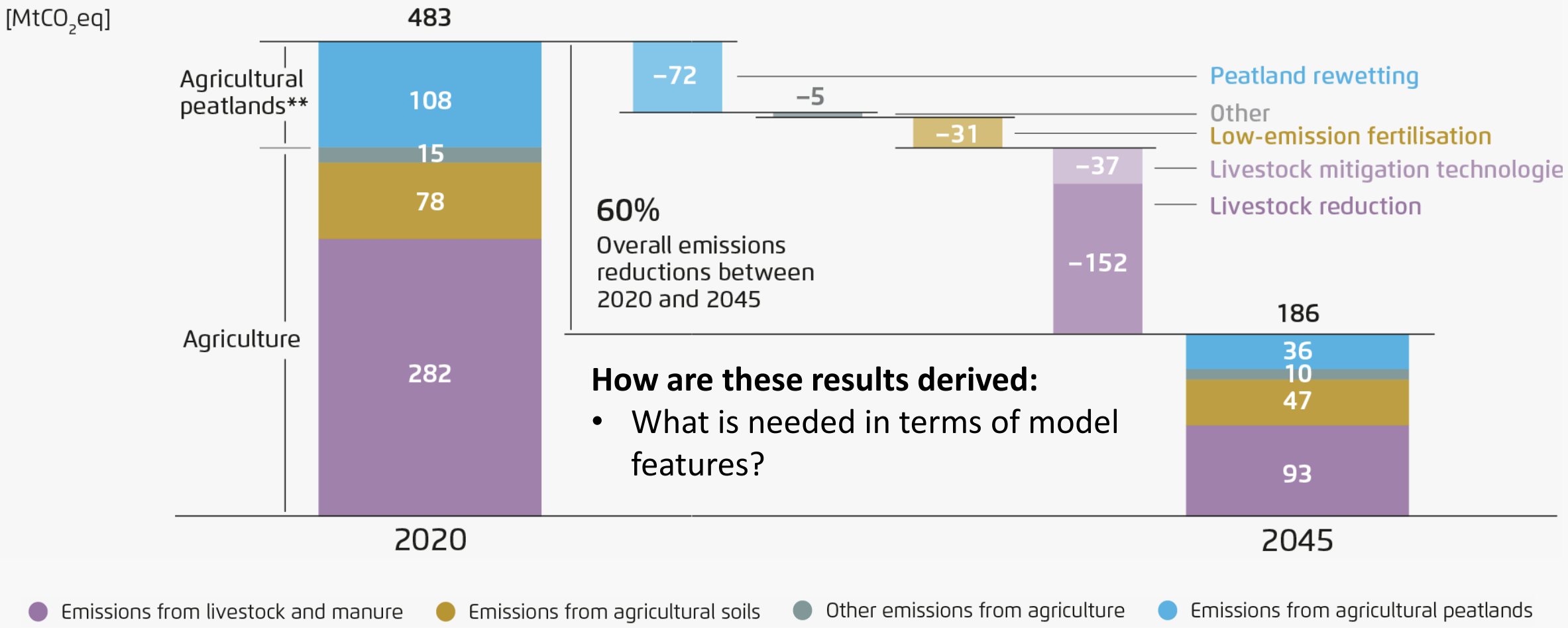
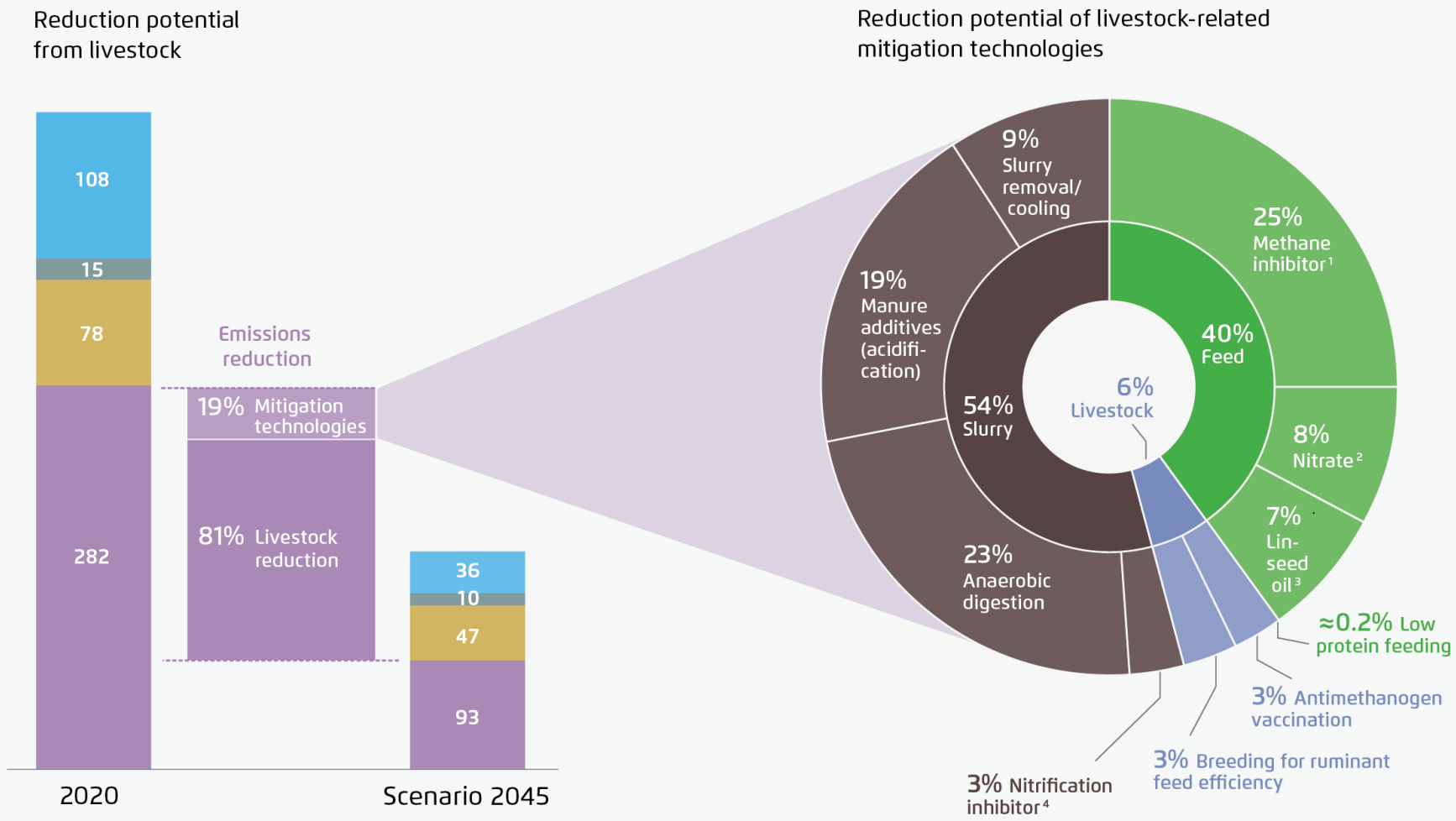
Greenhouse gas emissions reductions from EU agriculture and agricultural peatlands between 2020 and 2045



Agora Agriculture based on CAPRI results. * N_2O emissions from manure application under "livestock and manure", N_2O emissions from organic soils under "agricultural peatlands"; ** estimate for emissions from agricultural peatlands with CAPRI data on organic soils and emission factors from IPCC (2014), see Annex Chapter 7

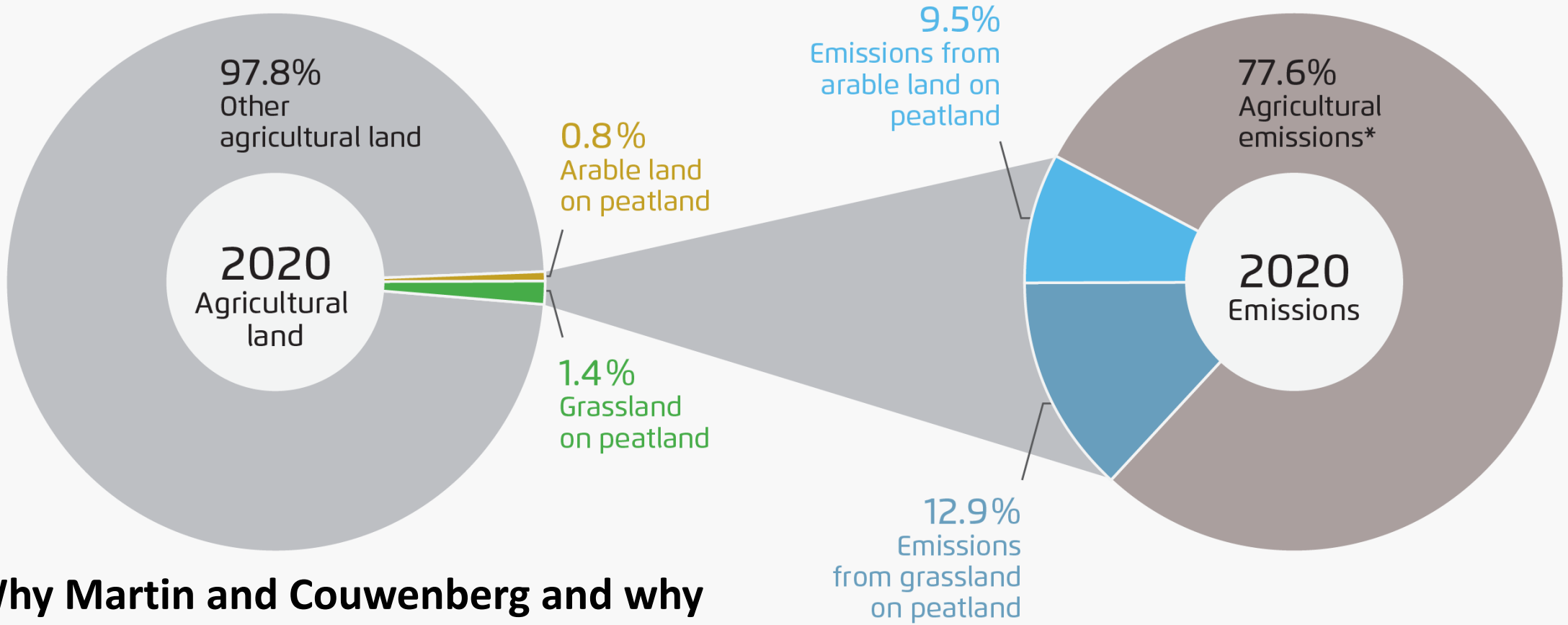
GHG emissions from livestock in 2020 and 2045 and the contribution of mitigation technologies



How can we know, whether these technologies will be applied in 2045?

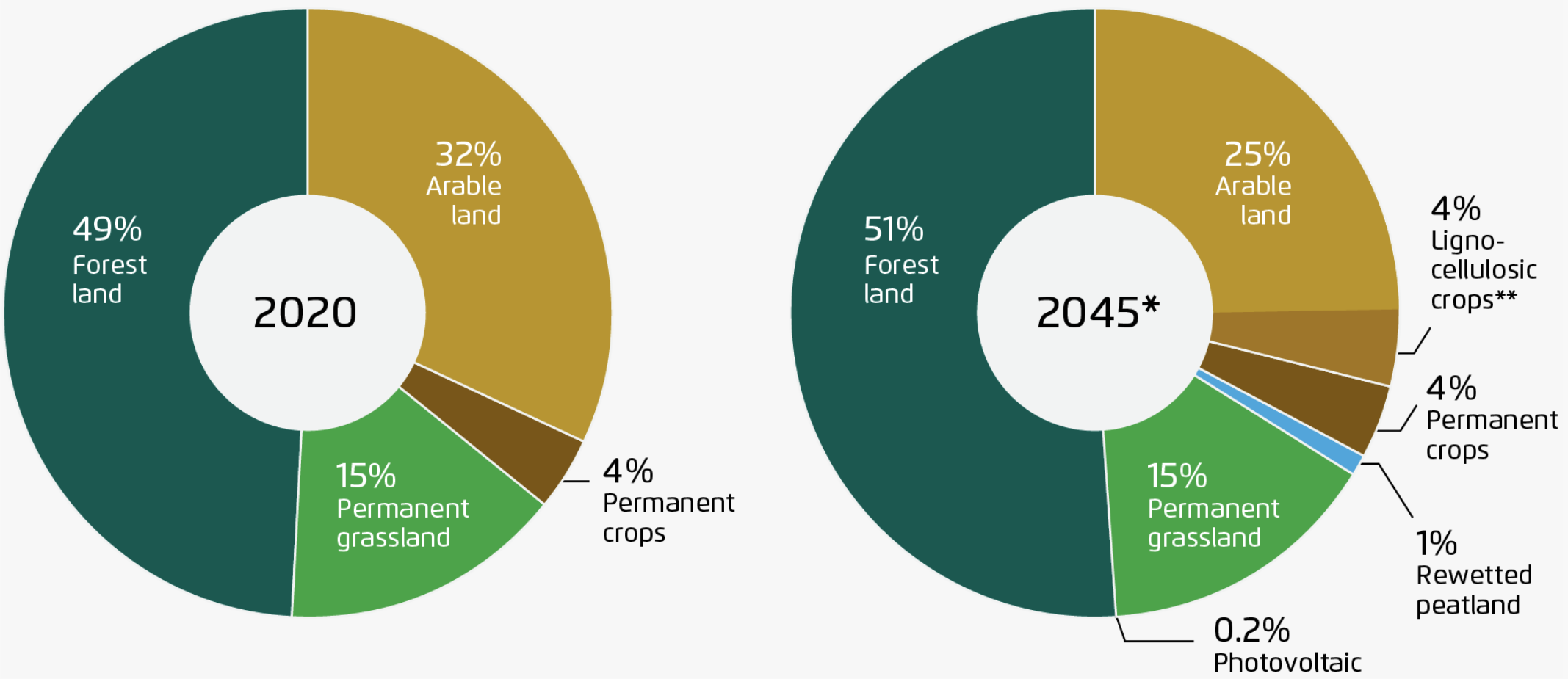
Source: Agora Agriculture (2024), not final and unpublished. Not for distribution.

Peatland – land use and greenhouse gas emissions in the EU in 2020



Why Martin and Couwenberg and why IPCC?

Land use in the EU agricultural and forestry sectors in 2020 and 2045

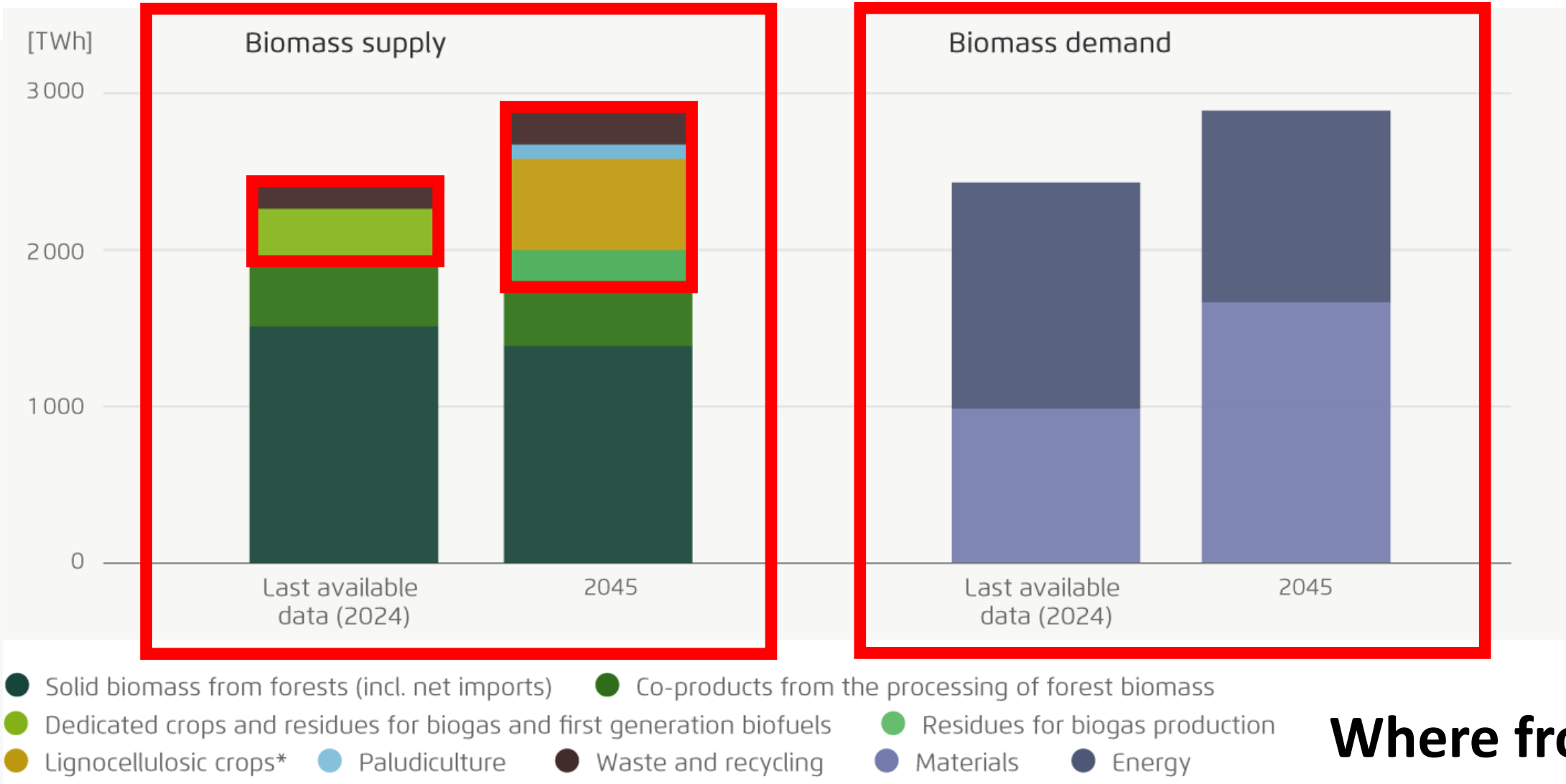


Food groups in EU average diets based on calories in 2020 and 2045

How to implement such a shift in a simulation model?

Source: Agora Agriculture (2024).

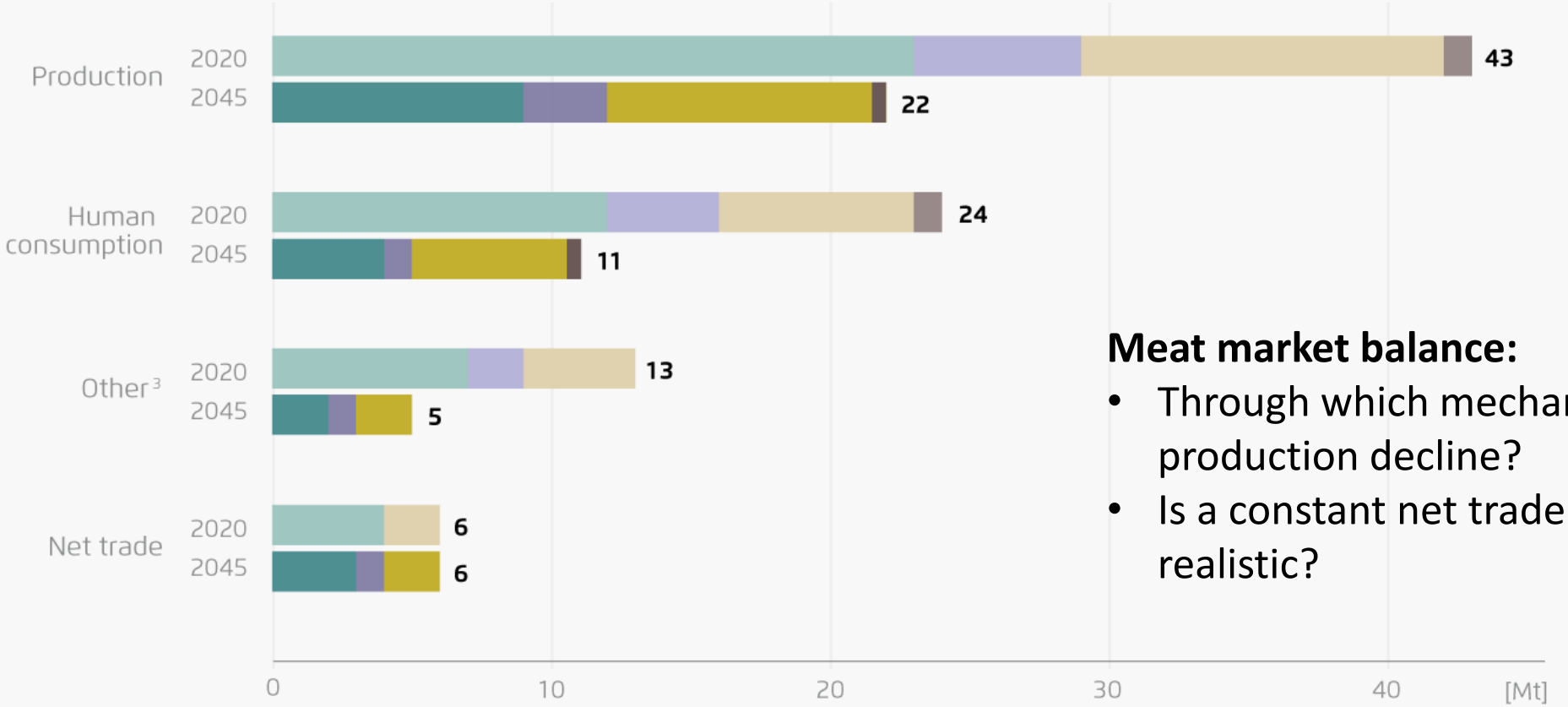
Demand and supply of biomass for the bioeconomy in 2024 and 2045



Where from?

Agora Agriculture based on Agora Energiewende (2023), Dahms et al. (2017), European Commission (2021k), Eurostat (2023h), Material Economics (2021). *e.g., short rotation coppices, agroforestry, miscanthus

EU meat market balances 2020 and 2045



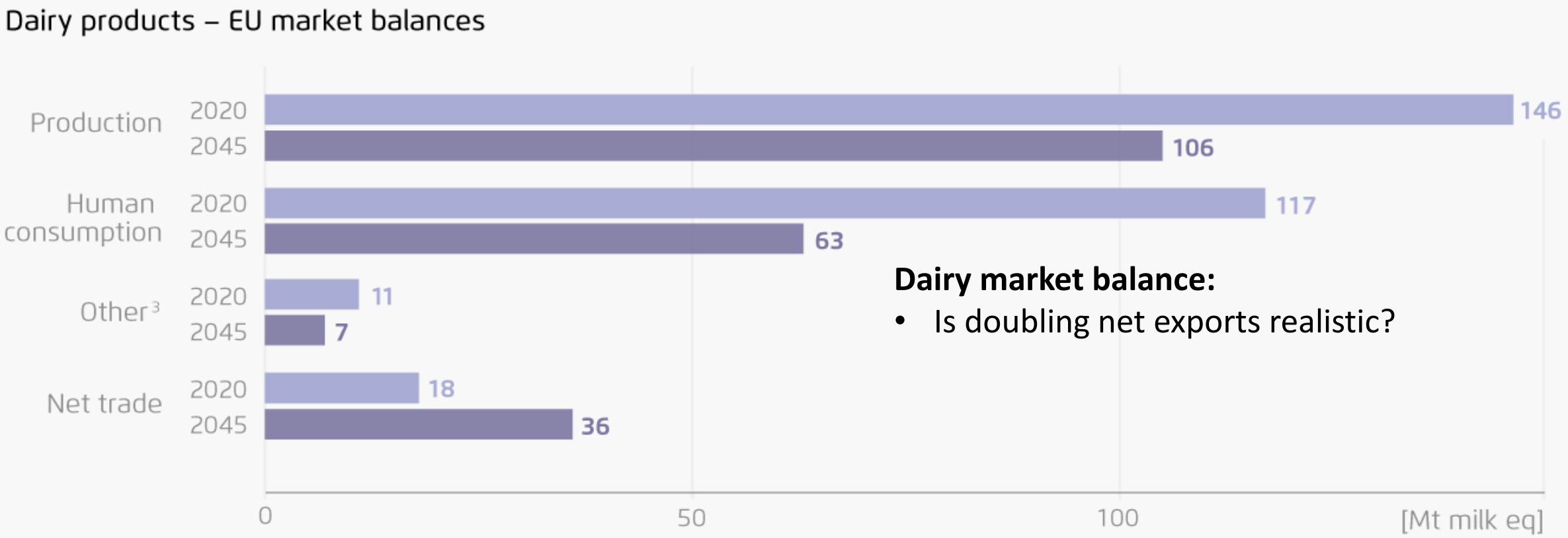
Meat market balance:

- Through which mechanism does production decline?
- Is a constant net trade situation realistic?

Pig meat 2020 | Beef 2020 | Poultry meat 2020 | Sheep and goat meat 2020
Pig meat 2045 | Beef 2045 | Poultry meat 2045 | Sheep and goat meat 2045

Agora Agriculture based on CAPRI results. [1]LSU = Livestock Unit; [2]UAA = Utilised Agricultural Area; [3]Other = waste, industrial and other uses

EU dairy market balances 2020 and 2045



Dairy market balance:

- Is doubling net exports realistic?

Agora Agriculture based on CAPRI results. [1]LSU = Livestock Unit; [2]UAA = Utilised Agricultural Area; [3]Other = waste, industrial and other uses

Additional estimated climate contributions

Emissions reductions

→ **131 $MtCO_2$** avoided emissions in 2045 by **substituting fossil feedstock** in other industries.

→ **127 $MtCO_2$** avoided emissions in 2045 through **solar PV**.

→ **Energy** emissions from agriculture and forestry (74 $MtCO_2eq$ in 2020) largely avoided in 2045.

Carbon removals

→ **290 $MtCO_2eq$** of **forest** net carbon removals in 2045 (i.e. harvest reduction, adaptive management, afforestation).

→ **58 $MtCO_2$** removals by **harvested wood products** in 2045 (increase by 17 $MtCO_2$).

→ **30 $MtCO_2$** annual removals from **fast-growing trees** on agricultural land 2025-2045.

→ **5 $MtCO_2$** annual removals from **hedges** on agricultural land 2025-2045.