LIFE VIIEW 2050

Centre for Climate and Energy Analyses

National Centre for Emissions Management
Institute of Environmental Protection
National Research Institute

VIIEW on EU ETS 2050:

The future of the EU ETS –

impact on the power sector, transport and agriculture

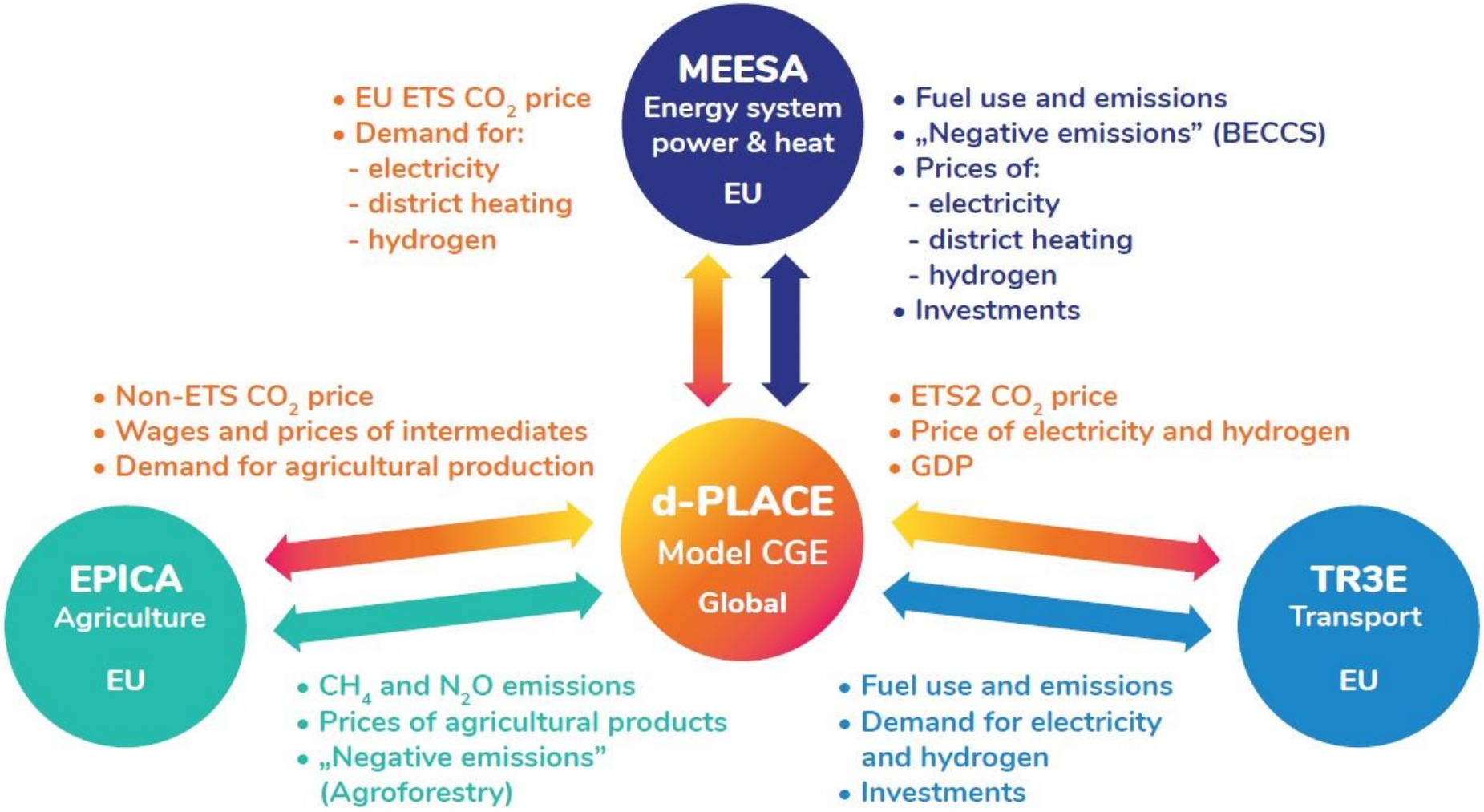
Warsaw, 25 October 2024

#LIFEVIIEW2050 www.climatecake.pl

Project entitled „The impact assessment of the EU Emission Trading System with the long-term vision for a climate neutral economy by 2050 (LIFE VIIEW 2050 – LIFE19 GIC/PL/001205)" is co-funded by the Life Programme of the European Union and the National Fund for Environmental Protection and Water Management.

NFEPWM

CAKE modelling toolkit



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Life

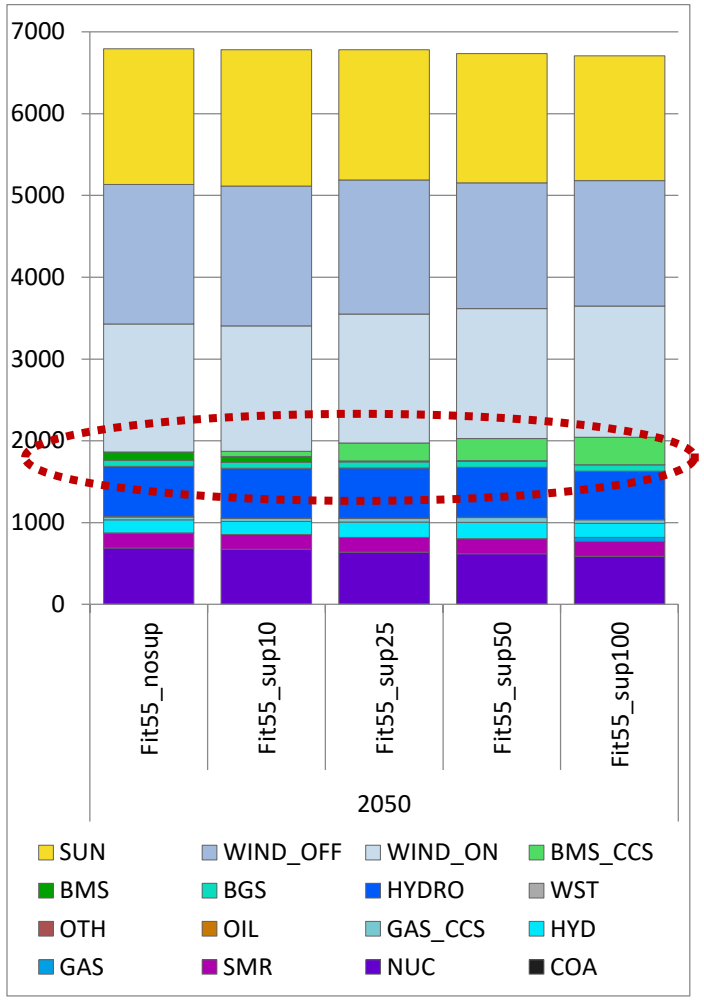
Energy sector

Power sector and BECCS

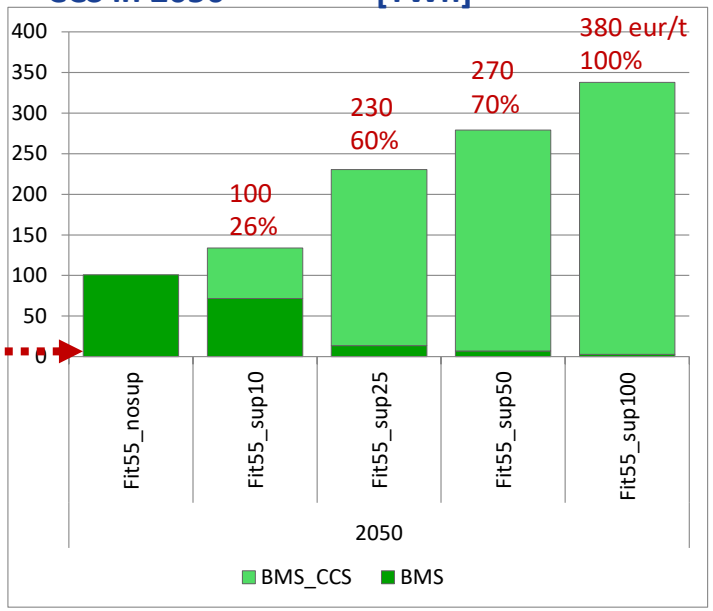
- Sensitivity analysis of different scale of BECCS development and its impact on:
  - emission reduction in EU,
  - carbon price in EU ETS,
  - electricity prices in Poland.
- Main assumptions:
  - limited availability of biomass (we assume only biomass of domestic origin),
  - limited potential for carbon storage - around 550 Mt/y (A Clean Planet for all - COM(2018) 773. CCS storage potential for energy sector ~350 Mt/y).
- Demand and carbon price established endogenously in iterations between CGE model d-Place and three sectoral models for power sector, transport and agriculture.

Power sector in EU+

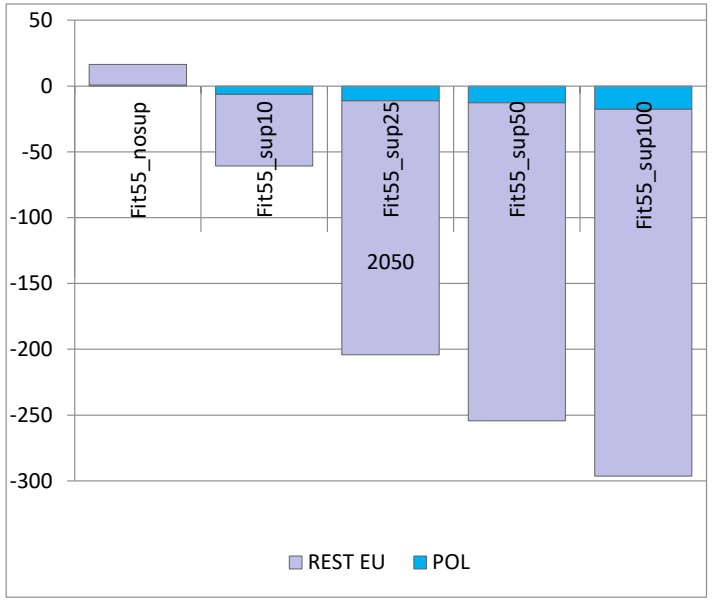
Electricity generation in EU+, 2050 [TWh]



Electricity from biomass with and without CCS in 2050 [TWh]



Emission balance in 2050 [Mt CO2]

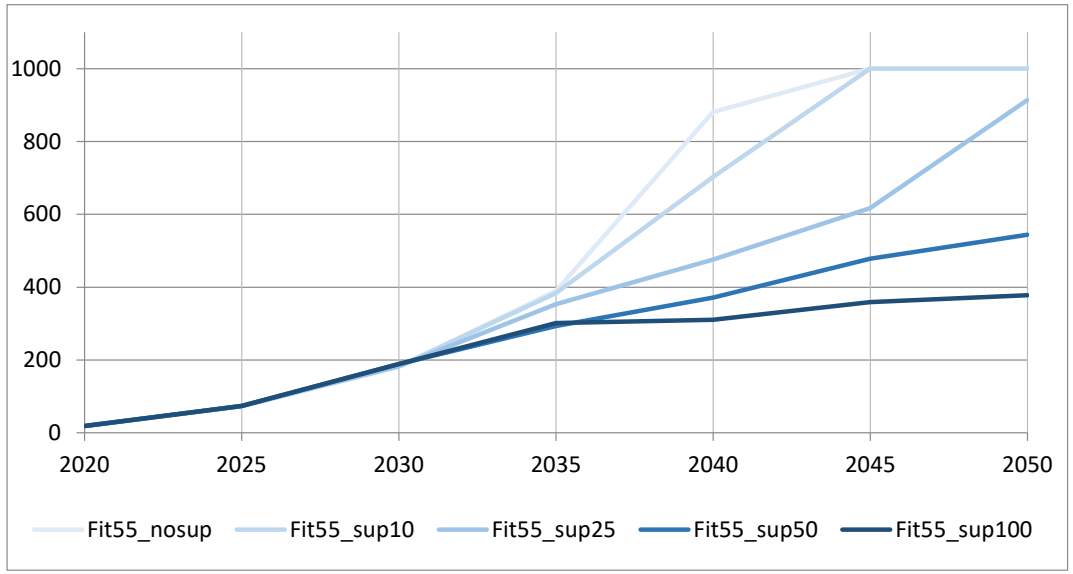


- No major differences in electricity generation mix except BECCS and pace of hydrogen development.
- Significant impact of revenue level for negative emissions on BECC use.
- Large differences in emission balance (it will impact emission reduction cost in other sectors).
- It is necessary to increase the level of support due to the rising costs of biomass.

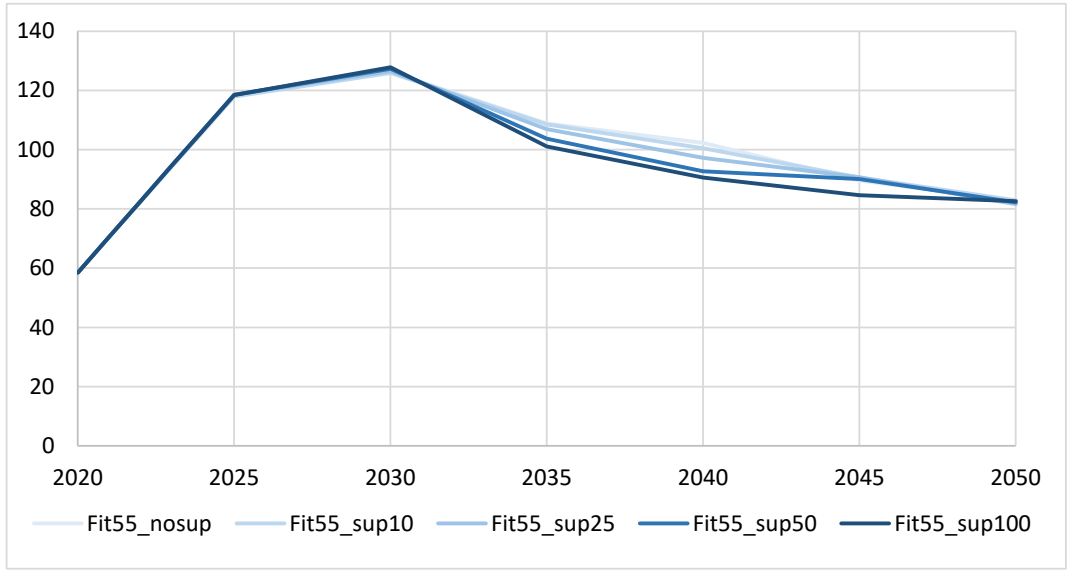
Source: CAKE/KOBiZE

Power sector – emission, prices

Carbon prices in EU ETS [EUR/t CO2]



Average cost of electricity generation in Poland [EUR/MWh]



- Significant impact of BECCS activity and negative emission achieved in power sector on carbon prices in EU ETS.
- EU ETS price in 2050 is very sensitive to small differences in emission balance.
- Poland will be particularly exposed to increases in energy costs due to the high share of fossil fuels, for other regions energy prices are much more stable.
- The impact of carbon prices on energy prices is decreasing (due to the increasing decarbonization of the sector).

Source: CAKE/KOBiZE

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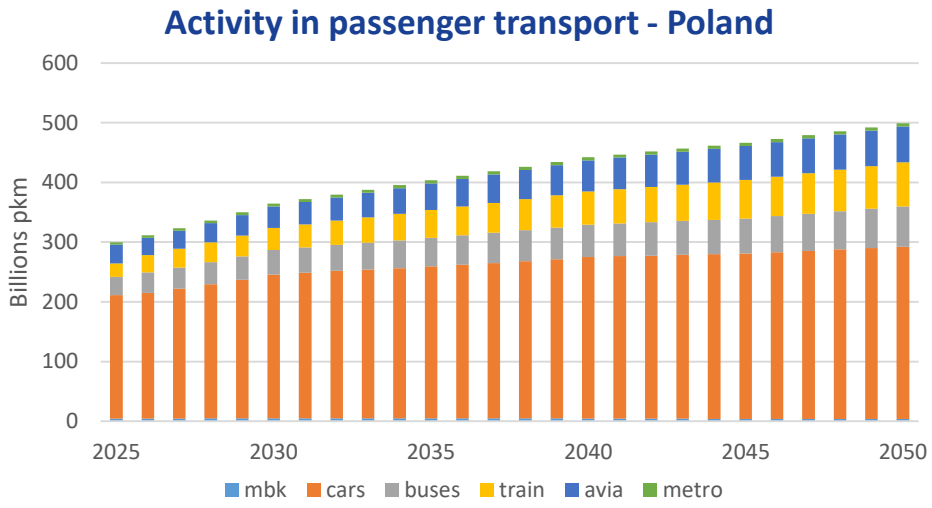
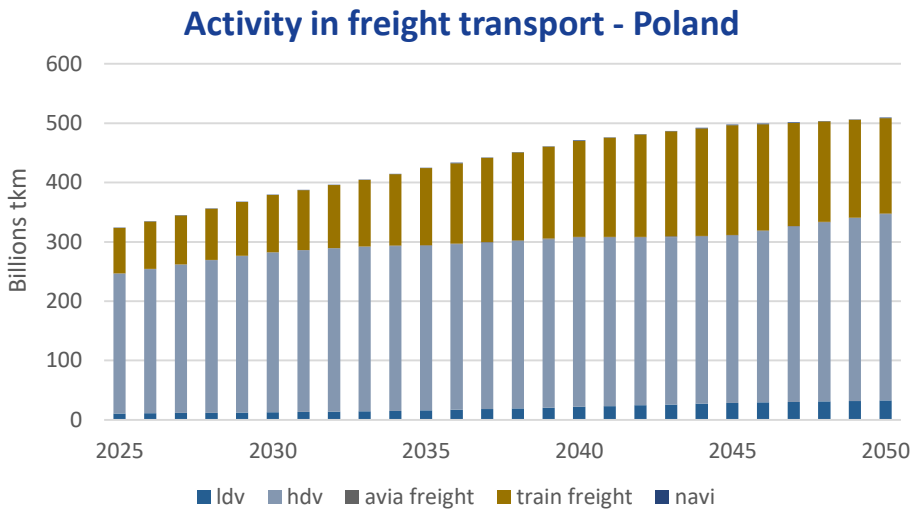
Transport sector

Transport activity in FIT55 scenario





Average growth in **passenger activity** [y/y]

EU+UK	Poland
1.0% ↑	**2.1%** ↑

Average growth in **freight activity** [y/y]

EU+UK	Poland
1.5% ↑	**1.8%** ↑

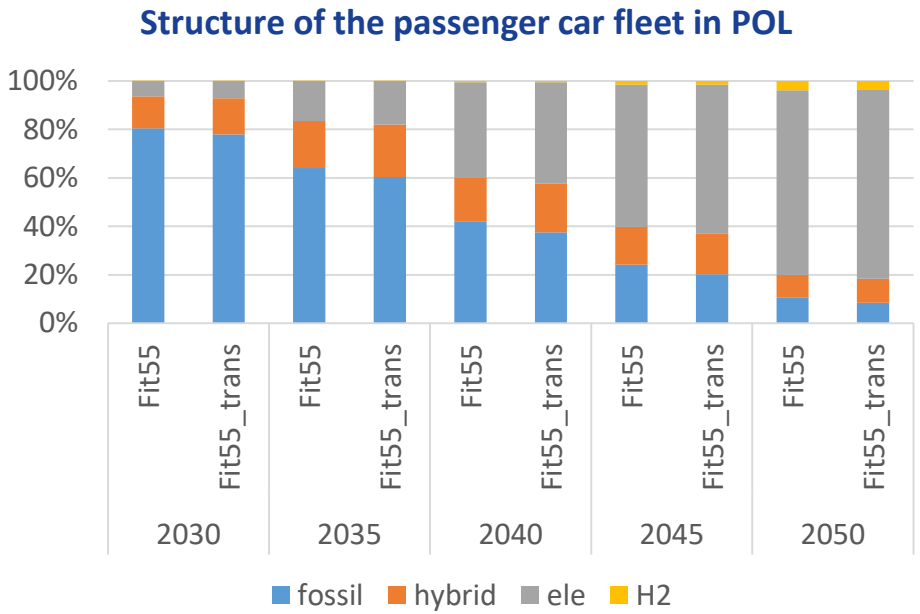
Source: CAKE/KOBiZE

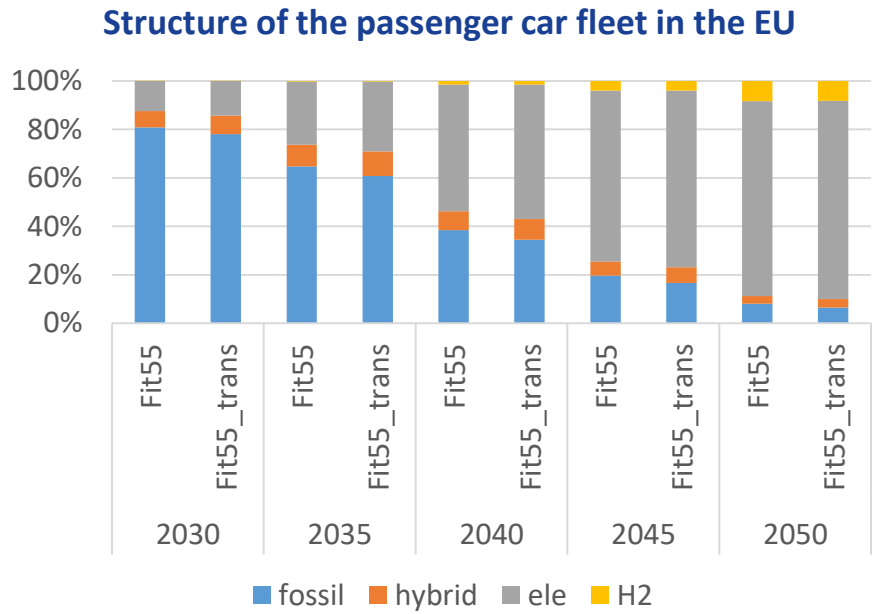
Recent applications of the TR3E model The Fit55_trans scenario

- The scenario considers an **increased scrappage rate** for fossil fuel-powered passenger cars.
- We assume a **reduction in the average lifespan** of these vehicles from an EU-wide average of 10.3 years to 7.8 years. This change is modeled by adjusting the parameters of the Gompertz distribution, which describes the yearly survival rate of vehicles.
- Additionally, we anticipate the **implementation of more stringent emission standards** for new heavy-duty freight transport vehicles and trailers in the transport sector.

- The Commission regulation aims to gradually implement stricter CO2 emission standards for new CO2-certified heavy-duty vehicles, relative to 2019 levels. The goal is to reduce the average CO2 emissions of the EU fleet of new heavy vehicles compared to the average emissions recorded in 2019 by:
  - 45% in the reporting periods 2030-2034,
  - 65% in the reporting periods 2035-2039,
  - 90% in reporting periods from 2040.

Deployment of electric and hydrogen cars fleet

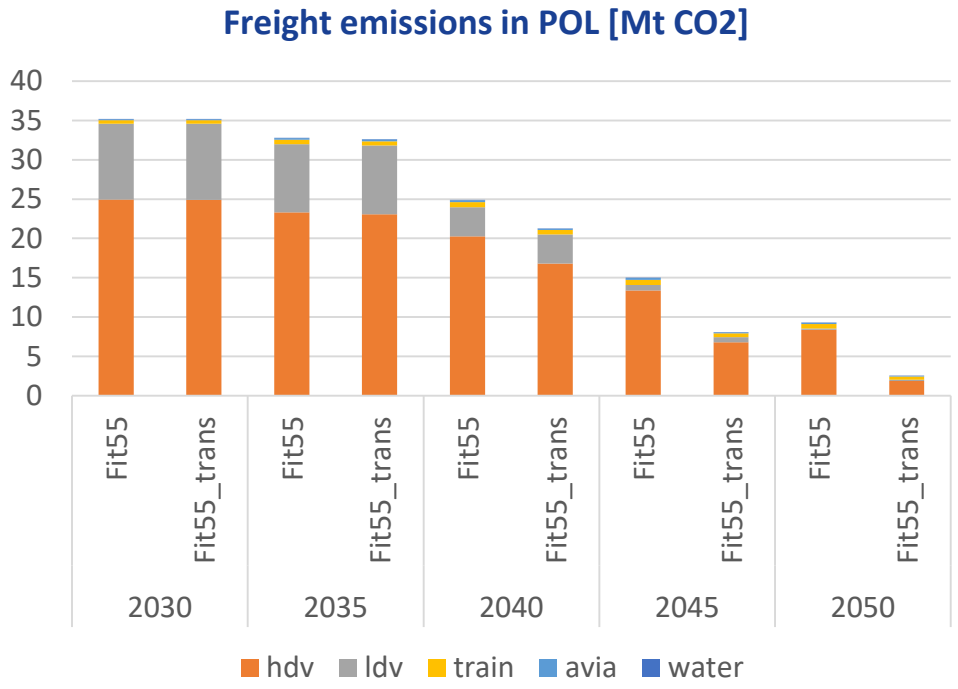


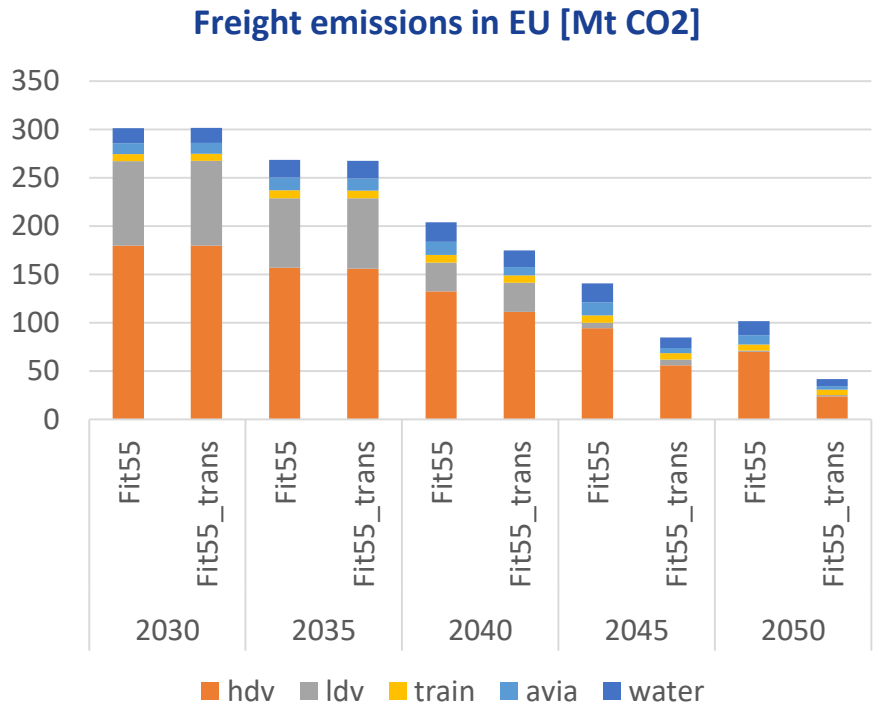


- An increase in the scrappage rate of petroleum-fueled cars will result in only a slight change in the overall structure, amounting to a few percentage points.
- Emissions from passenger transport are expected to decrease by 0.5 Mt CO2 in Poland and by 6.8 Mt CO2 in the EU by 2050.

Source: CAKE/KOBiZE

Emissions in freight transport could fall at a much faster rate



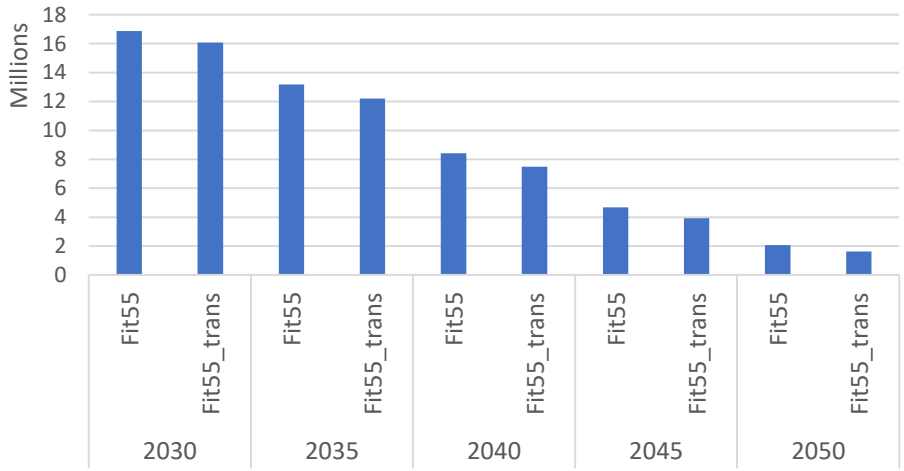


- Freight transport emissions are projected to be reduced by more than half by 2050 due to stricter emissions standards.
- Stricter emission regulations for new trucks will have a significant impact on the composition of the vehicle fleet by 2050.

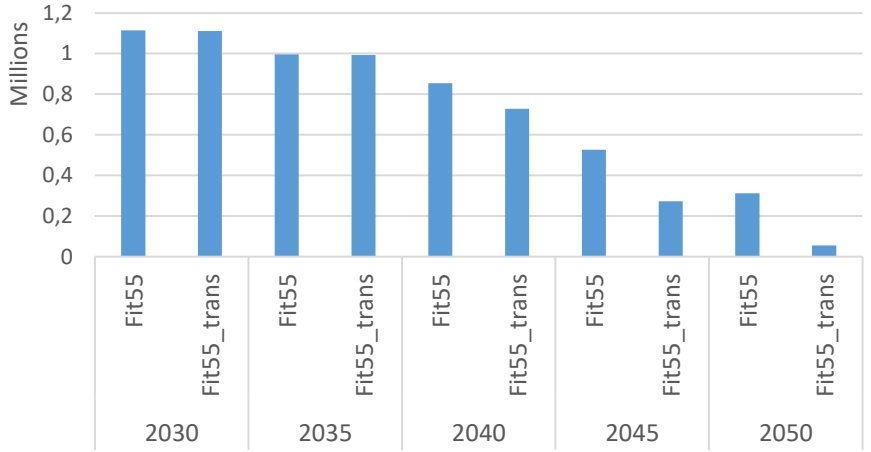
Source: CAKE/KOBiZE

Selected outcomes for Poland

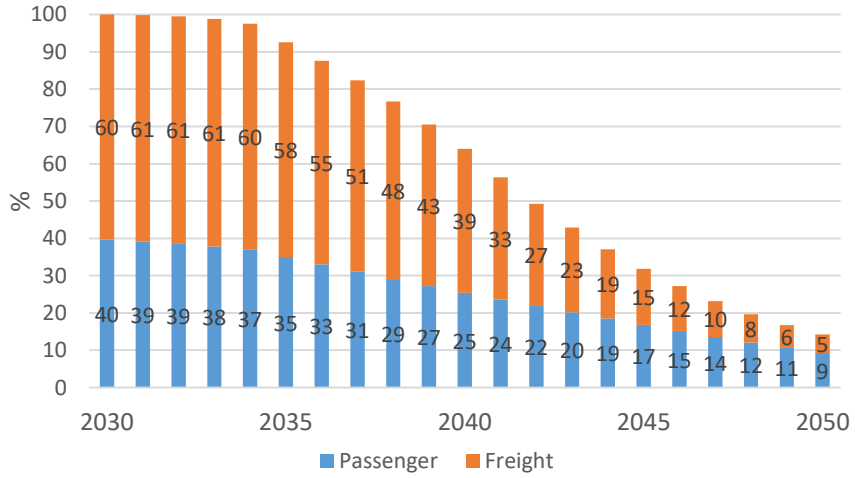
ICE CARS



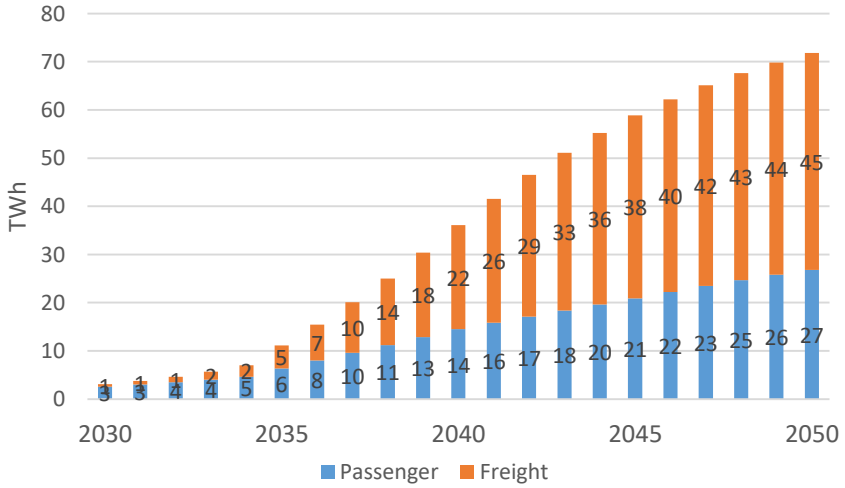
HDVs - diesel



Oil products use in transport [2030=100%]



Electricity demand in transport [TWh]



Source: CAKE/KOBiZE

Future development of the transport model

- Cost curves and JRC IDEES database update
- E – fuels usage (in aviation, maritime and road transport)
- Enhancement of consumer preferences for mode choice and infrastructure development
- ENSPIRE project – database extended to include Ukraine, Moldova, the Balkans, and Türkiye
- Extension of the time horizon up to 2070

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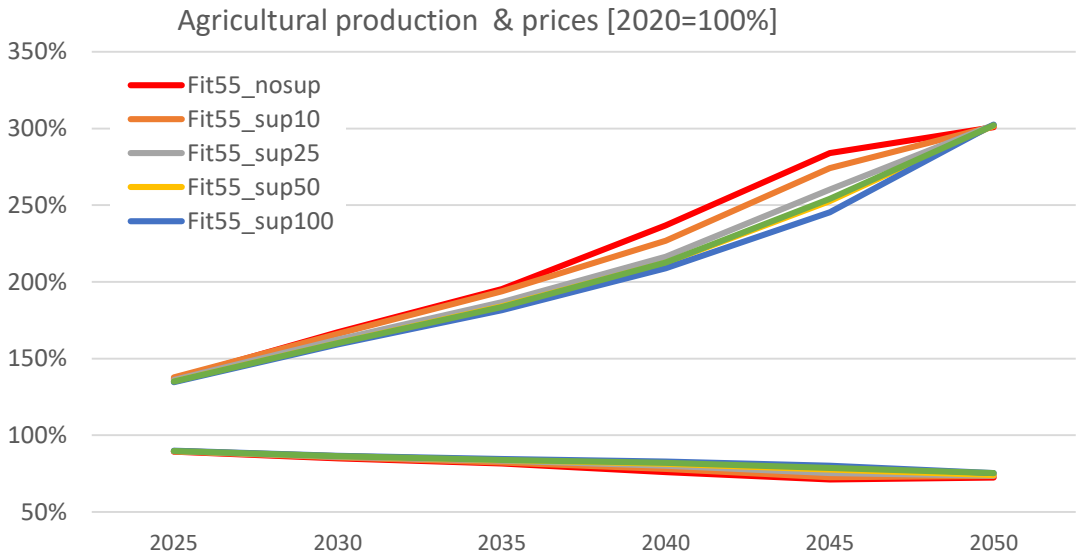
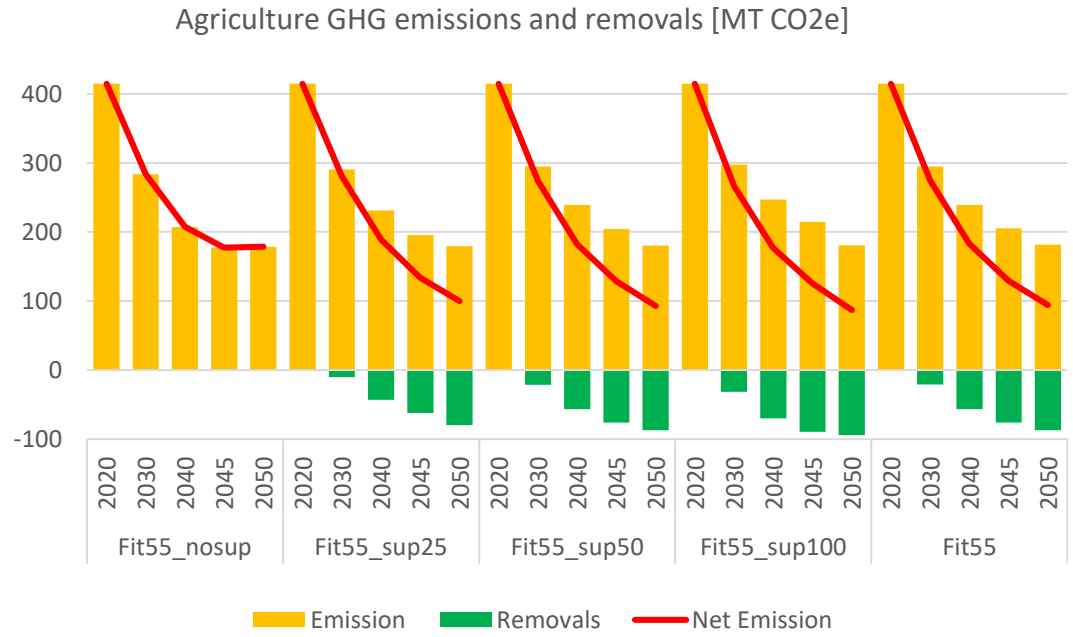
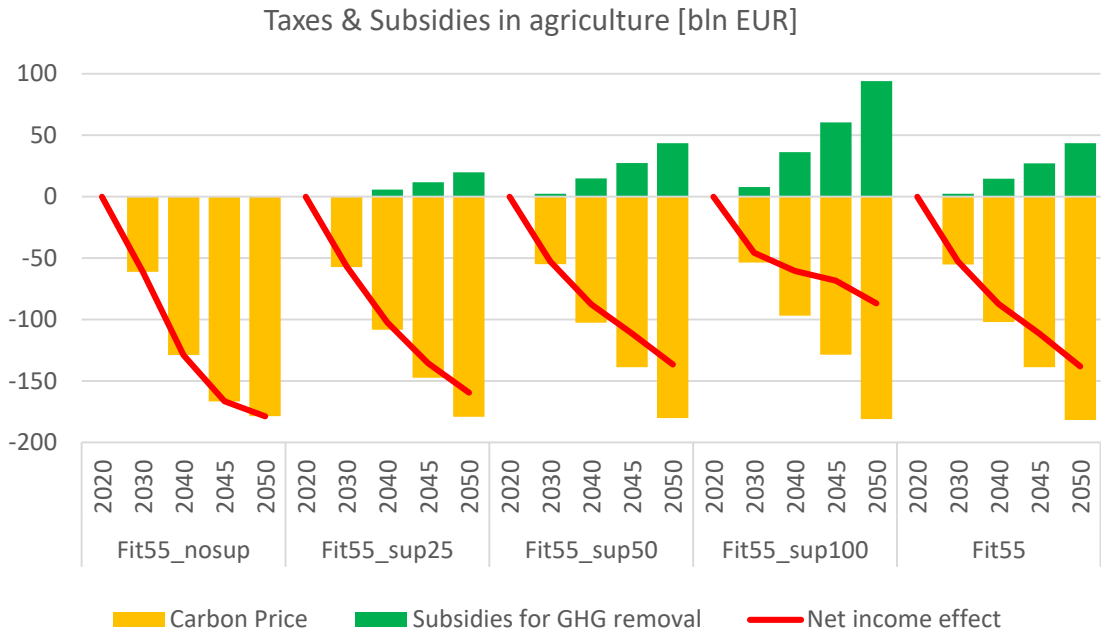
Agriculture sector

Removal units support in EU agriculture

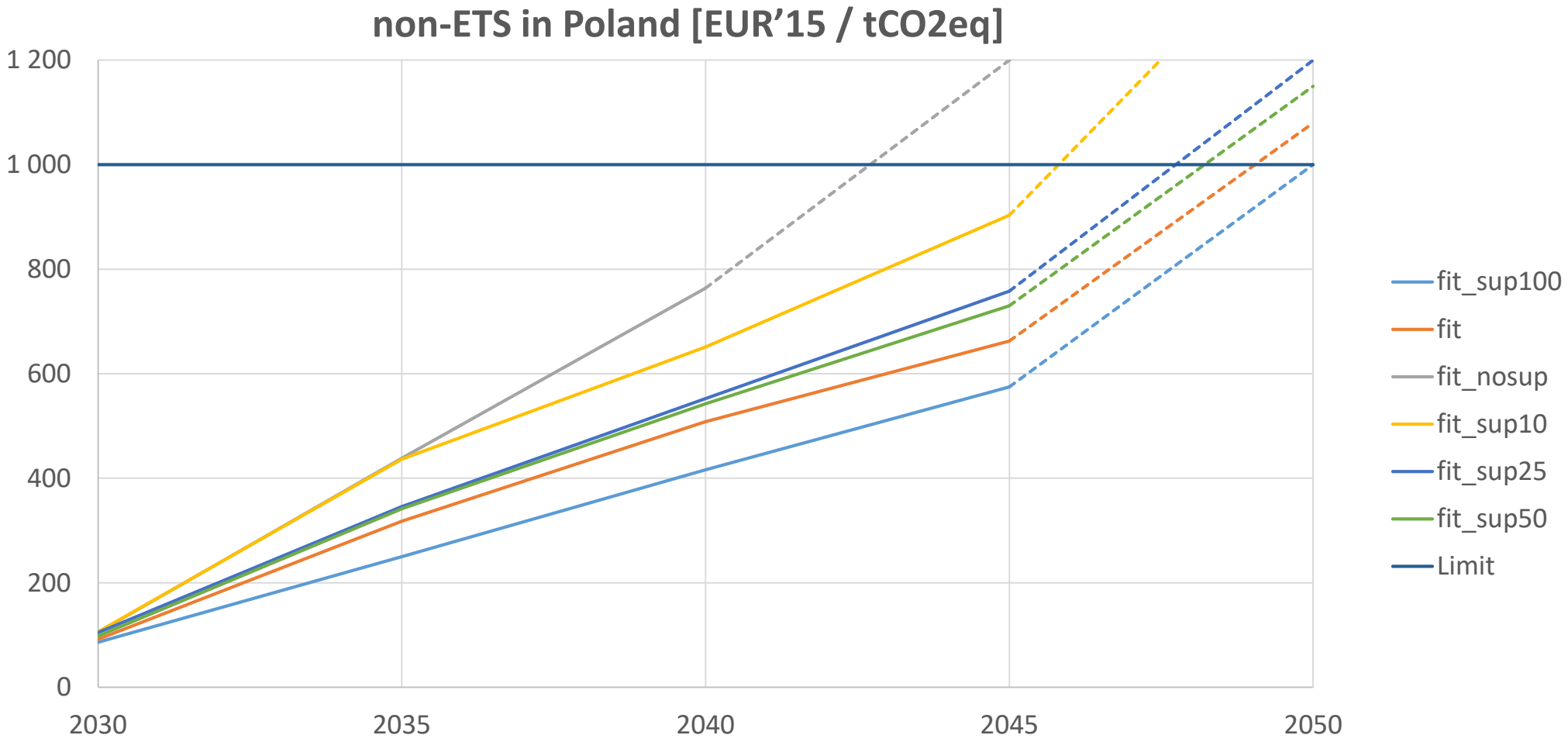


- Reduction of GHG emissions in agriculture leads to decreased production and a strong price increase of agricultural products
- Using GHG removals strongly depends on the amount of subsidies proposed
- Climate policy imposes significant fiscal burdens on the agriculture sector



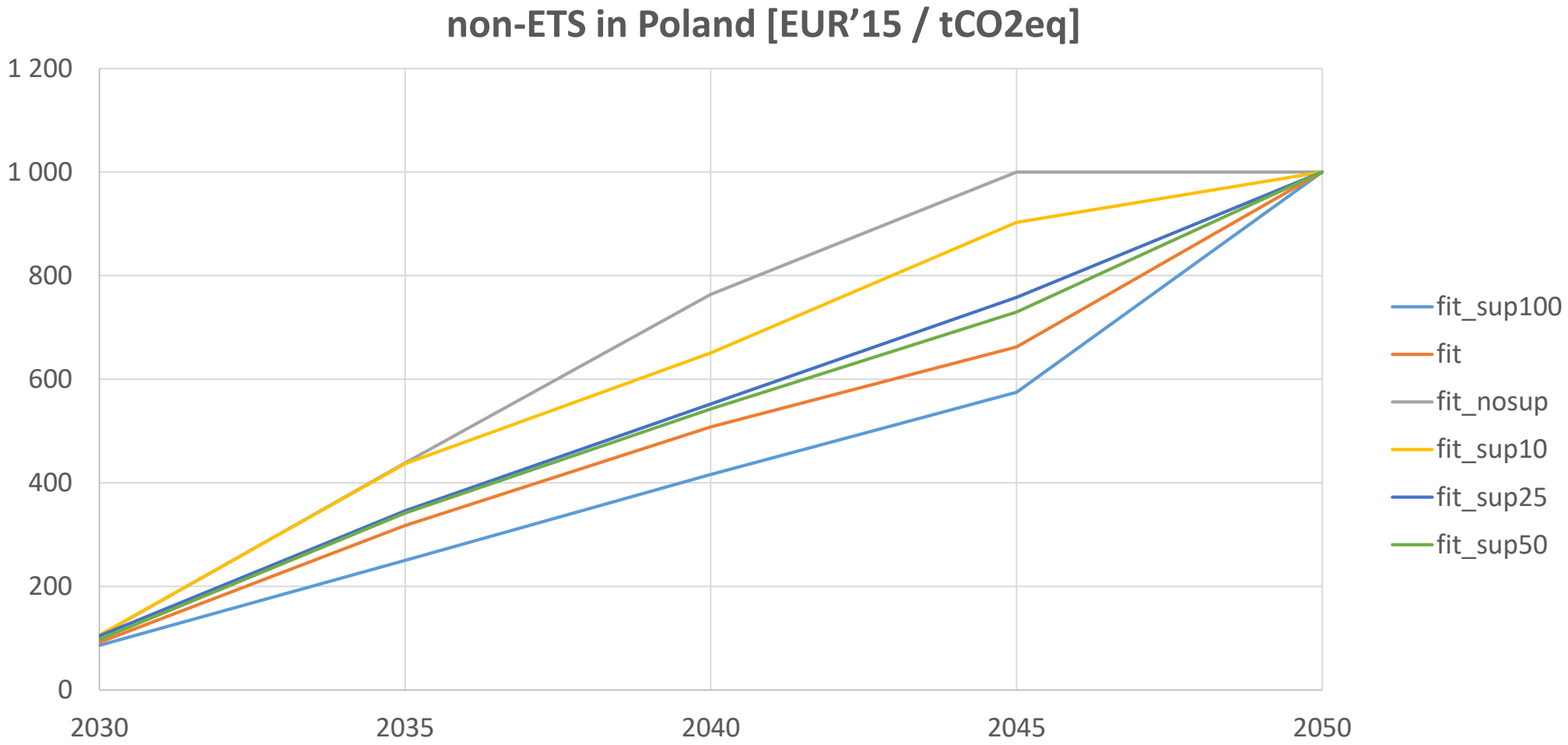


Pricing removals: impact on carbon prices - PL



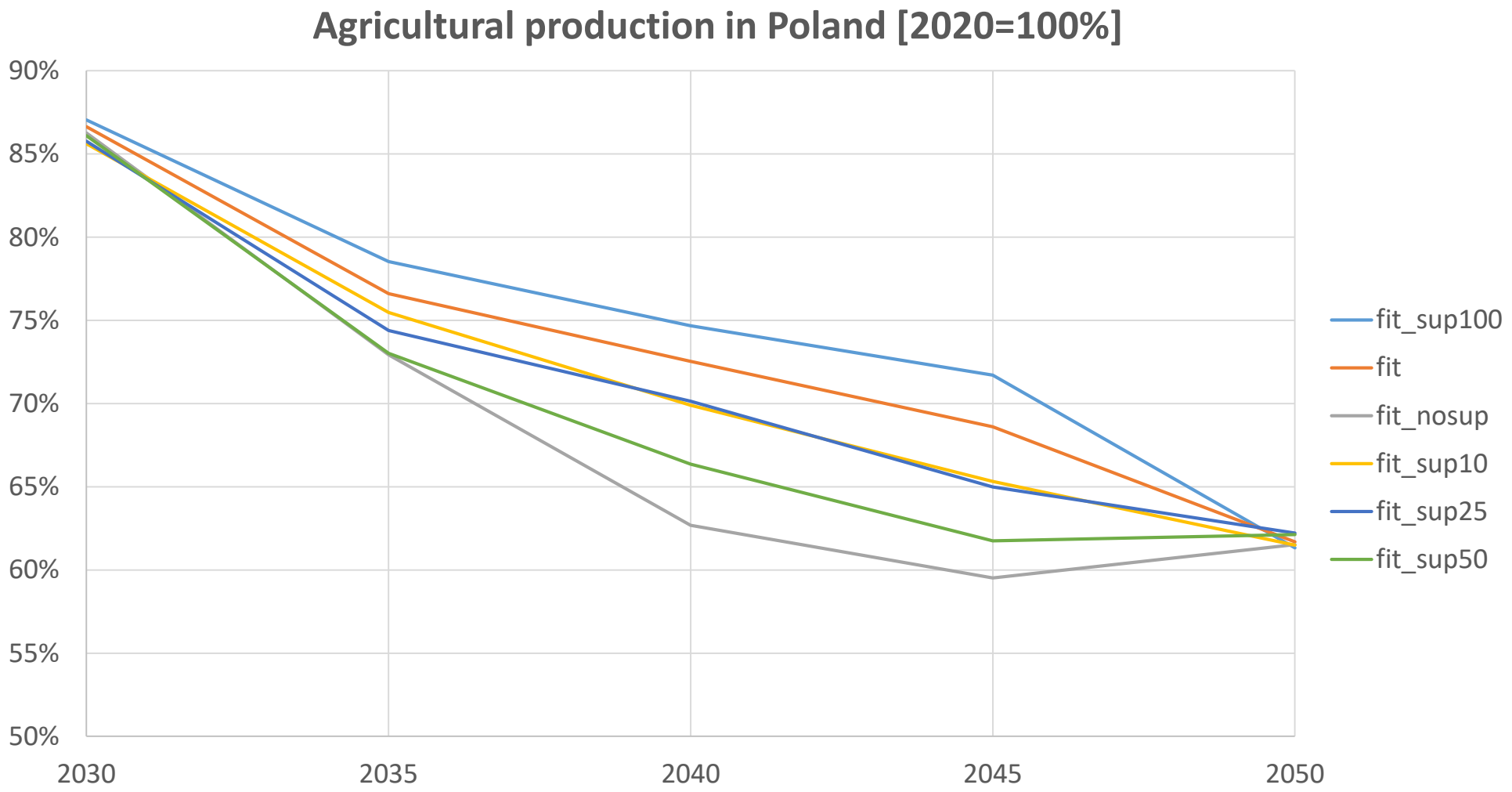
Source: CAKE/KOBiZE

Pricing removals: impact on carbon prices - PL



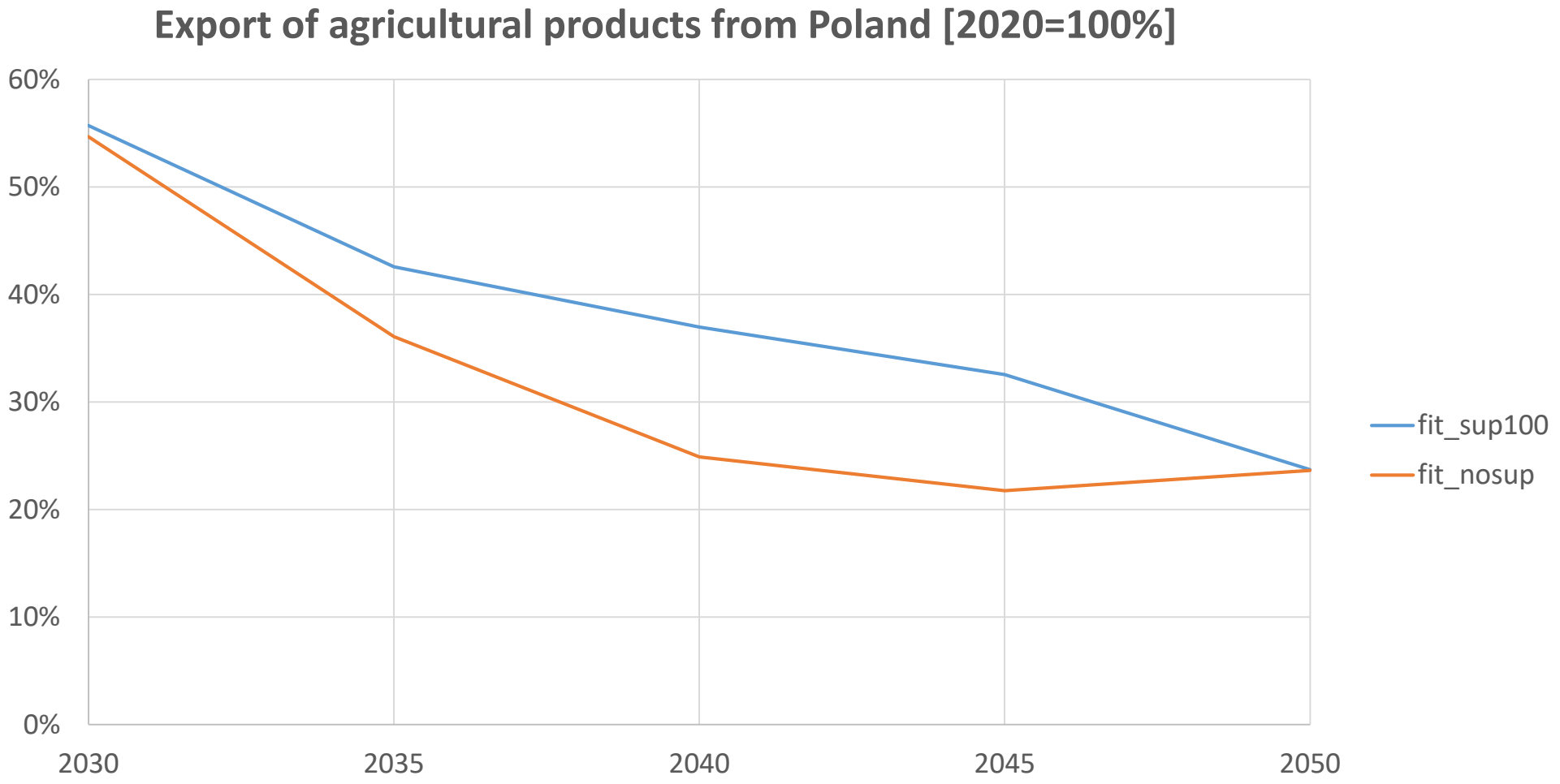
Source: CAKE/KOBiZE

Pricing removals: impact on agricultural production - PL



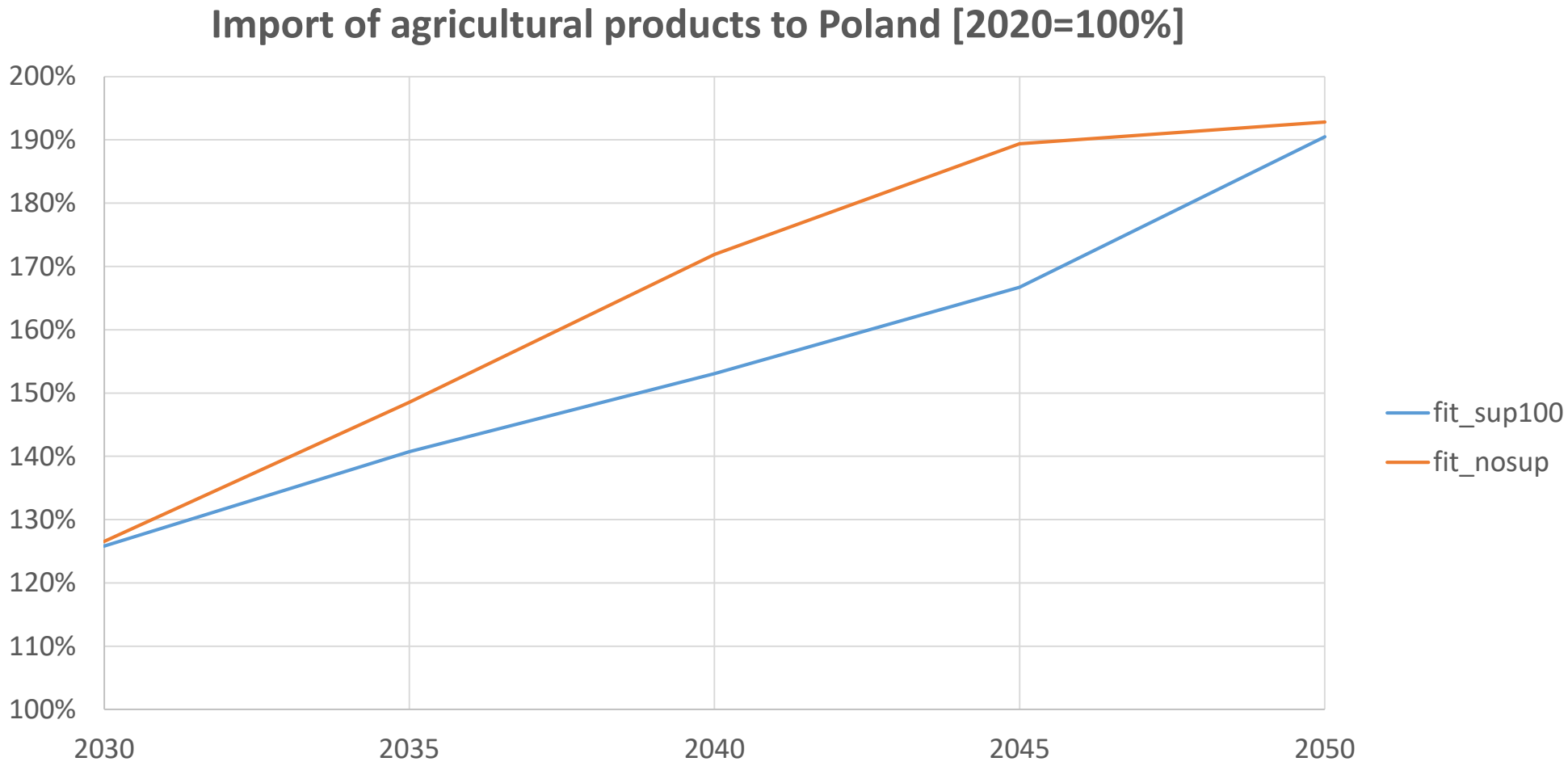
Source: CAKE/KOBiZE

Pricing removals: impact on export of agricultural products - PL



Source: CAKE/KOBiZE

Pricing removals: impact on import of agricultural products - PL



Source: CAKE/KOBiZE

Thank you!

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