



CLEAN ENERGY FOR ALL EUROPEANS

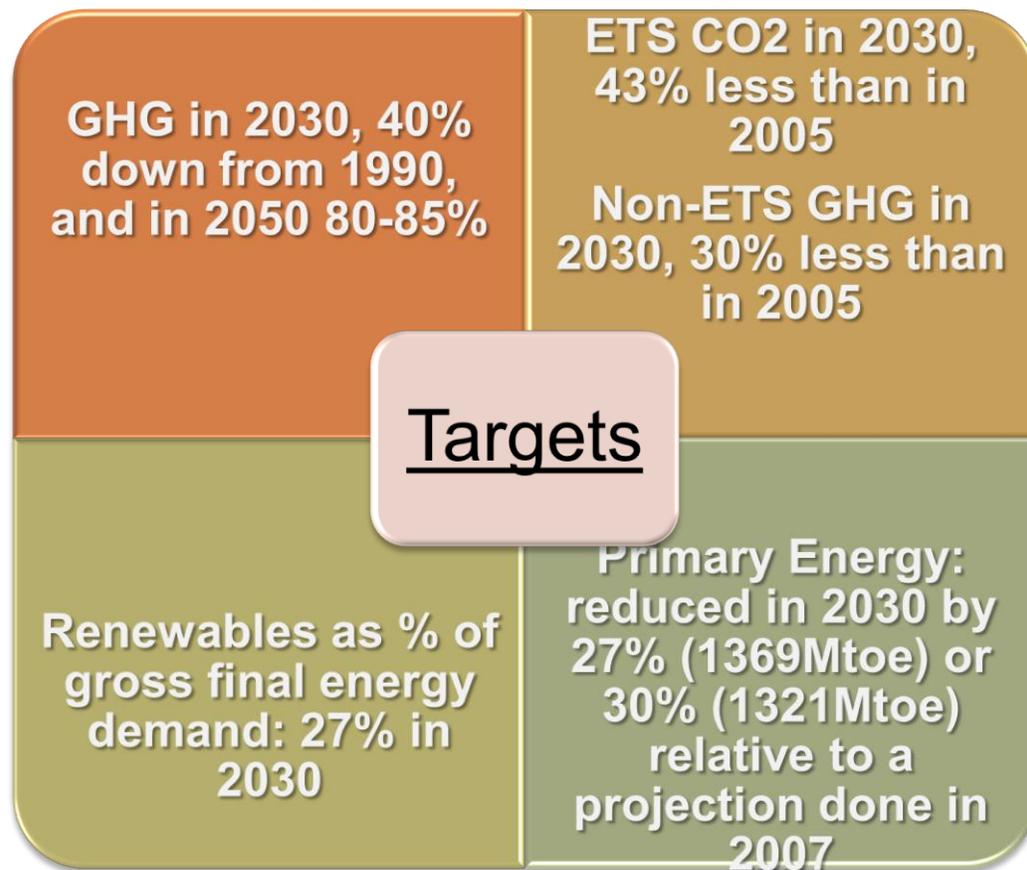
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The “Clean Energy for all Europeans” Package and the role of ETS

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CLEAN ENERGY FOR ALL EUROPEANS announced in Nov. 30, 2016: Commission proposes new rules for consumer centered clean energy transition

- The proposal mainly uses two policy scenarios, EUCO27 and EUCO30, quantified using the PRIMES model of E3MLab/NTUA (also used for numerous sensitivity variants)
- Conceived using a combination of targets and concrete bottom-up policy measures



Policies ETS	Increase of ETS linear factor to 2.2% for 2021-30 Market Stability Reserve
Policies RES	RES-E policies: new guidelines for auctions Policies for biofuels Support of RES in heating
Policies Efficiency	Energy efficiency of buildings: new EED, enhancement of article 7 More stringent eco-design Support of heat pumps Best available techniques in industry
Policies Transport	CO2 car standards (70-75gCO2/km in 2030, 25 in 2050) and for Vans (120 in 2030, 60 in 2050) Efficiency standards (1.5% increase per year) for trucks Measures improving the efficiency of the transport system

Storyline of EUCO scenarios

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- The Targets are defined for 2030 but also for 2050
- The EUCOs are decarbonisation scenarios, compatible with a 2°C global scenario and the EU INDC in Paris-2015 COP
- ETS drives strong emission reduction in the power sector and mainly pushes development of RES which benefit from learning-by-doing requiring low or no out-of-the-market support
- The reforms of the EU internal markets of electricity and gas enhance integration of balancing and competition, supplemented by new interconnections
- Energy efficiency measures strongly reduce demand, including for electricity
- Transport achieves significant emissions cut in the long term, through electrification of cars and LCVs and increased use of advanced biofuels in non-electrified transport modes

2020 – 2030

- Energy Efficiency
- Renewables
- Power sector Decarbonisation
- Infrastructure
- Completion of Internal Market

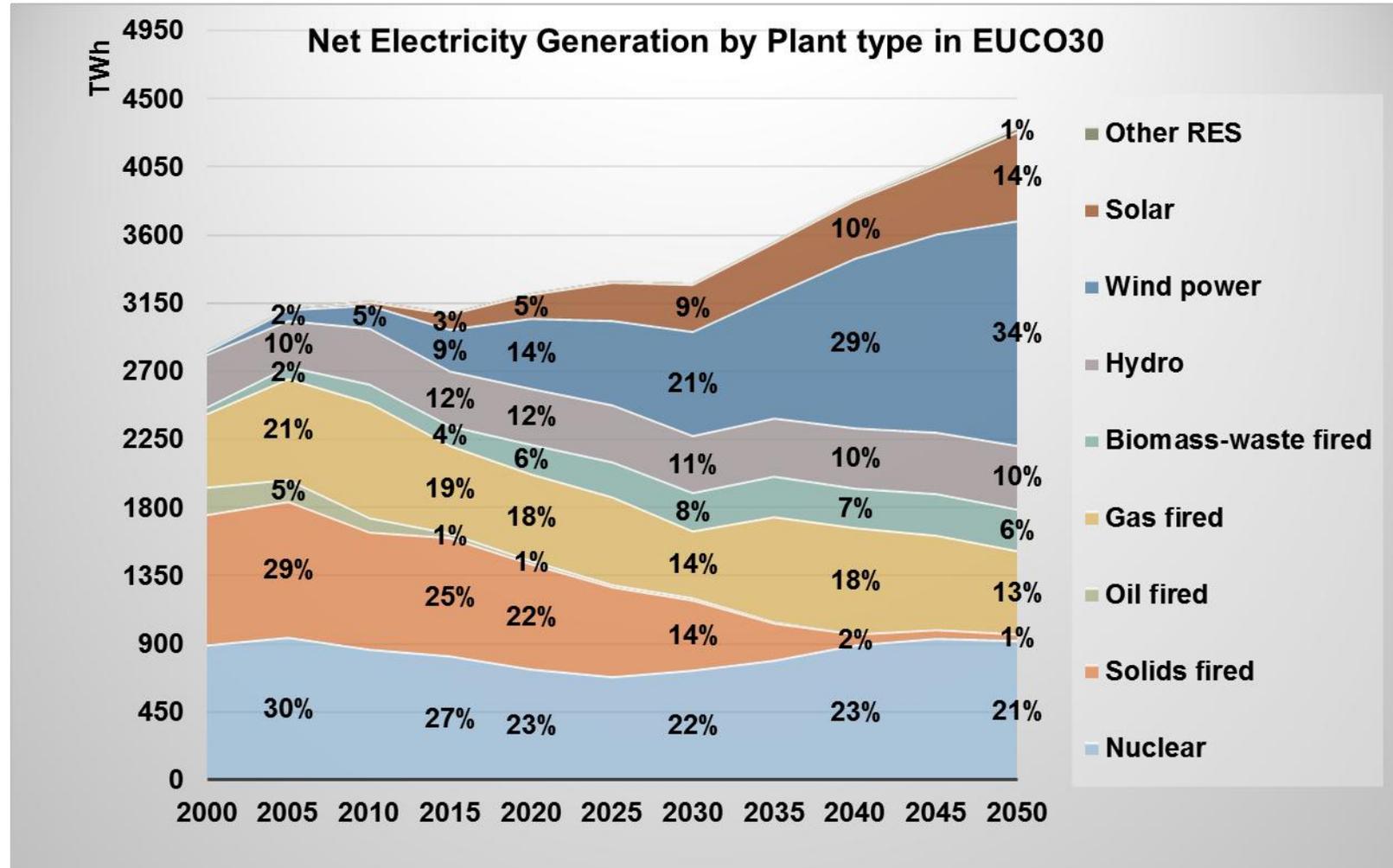
2030 – 2050

- Deep decarbonisation of the power sector
- Transport sector electrification
- Heating: electrification and further efficiency
- Advanced Biofuels in some transport sectors

Structure of Power Generation

The ETS prices drive profound transformation of power generation

- Solid fuels strongly decline
- Nuclear maintains a rather stable share
- Gas has a significant share and plays an important balancing role in the system
- Emergence of storage systems in the long term reduces gas importance
- Hydro power and biomass are stable
- The variable RES (solar PV, wind onshore and offshore) is the strongly emerging power generation industry:



E³M-Lab 4 July 2017

- 30% of total in 2030 (50% all RES)
- 50% in 2050 (65% all RES)

The Energy Efficiency pillar

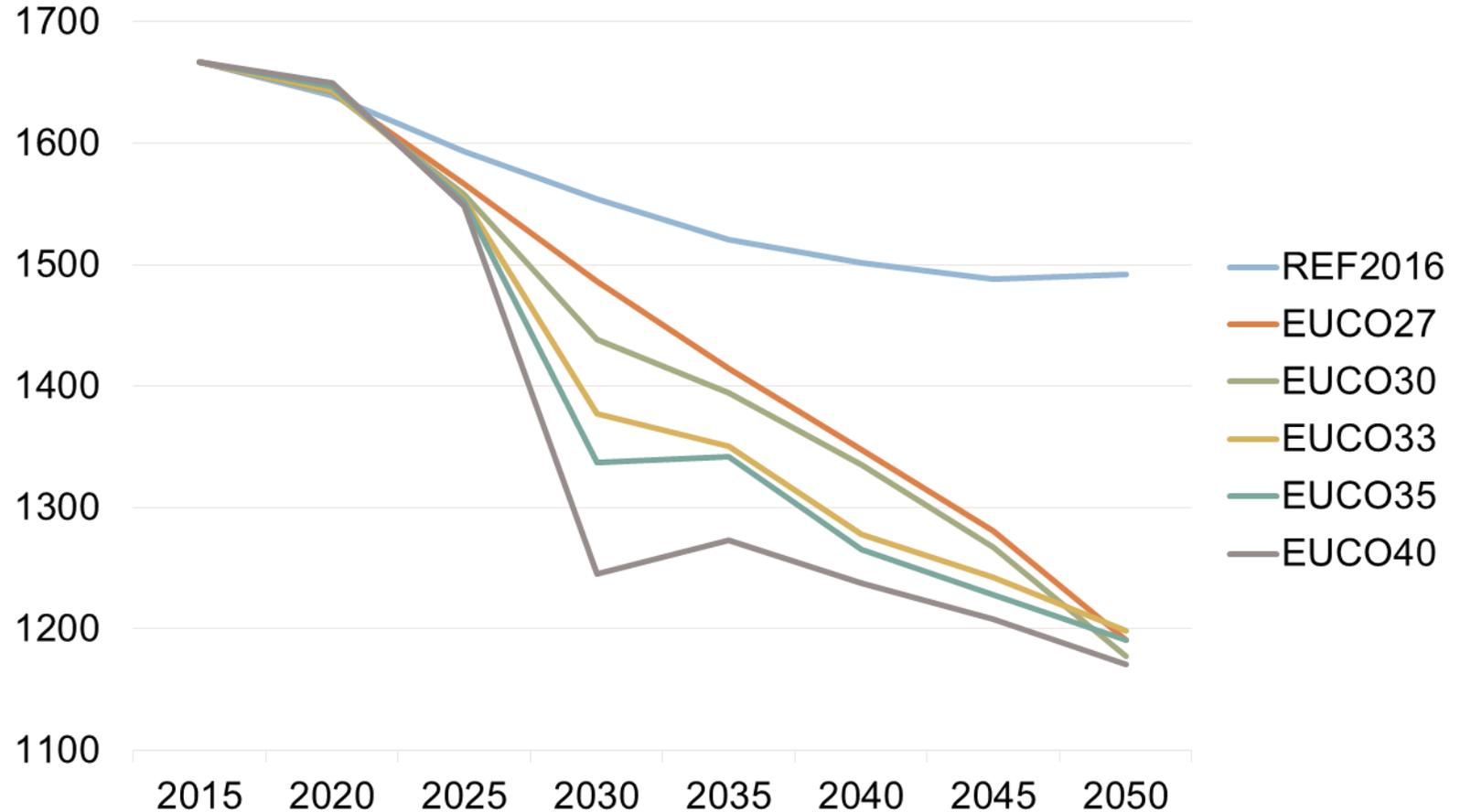
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Enablers:

1. Renovation of houses and buildings
2. Eco-design regulation
3. BAT in industry
4. Transport electrification and energy efficiency standards

Based on cost-effectiveness analysis,
EUCO30 is selected

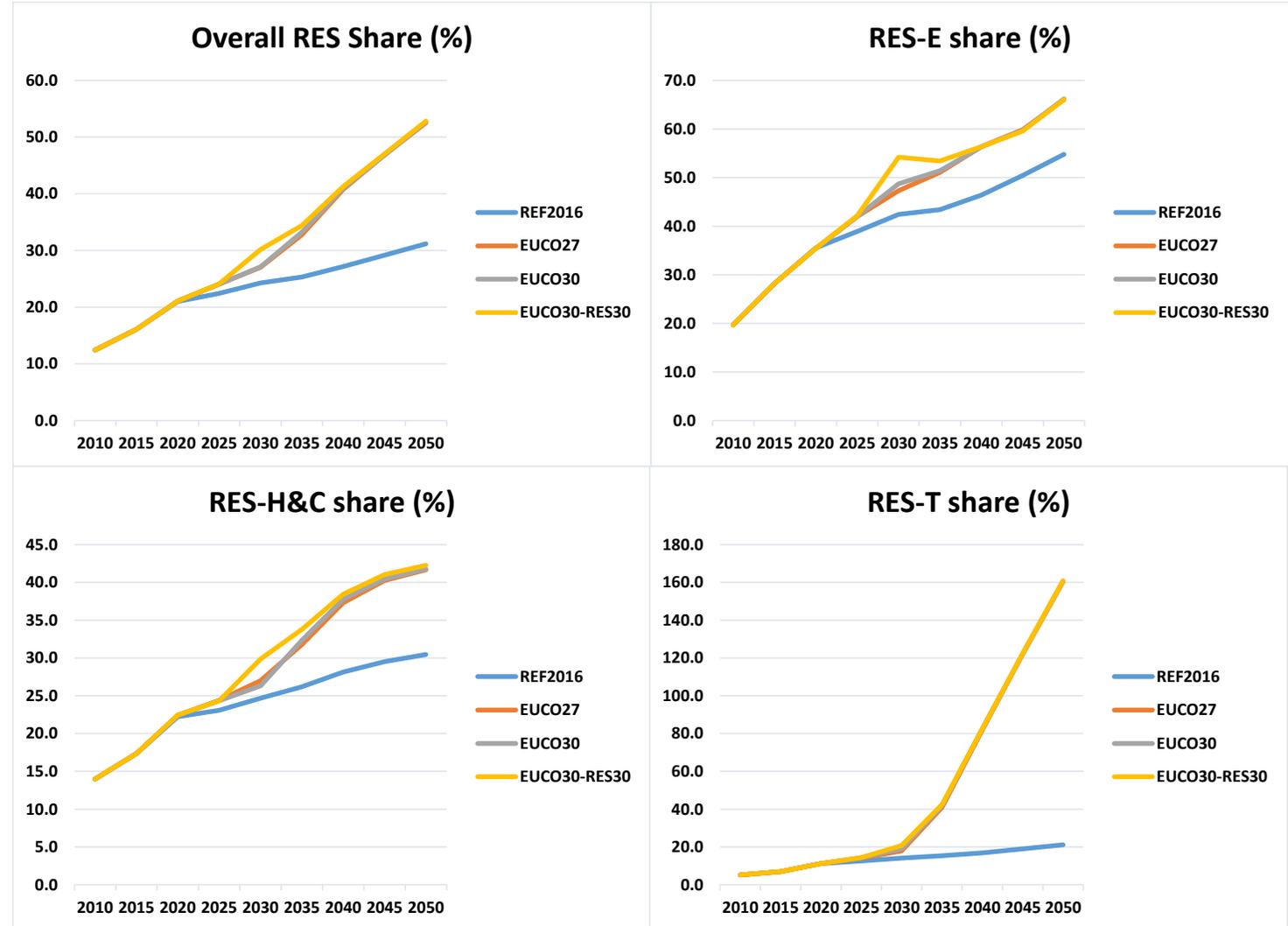
Gross inland consumption (Mtoe) EU28



The RES Pillar

- Solar and wind deploying in the power sector are the main drivers of the increase in the renewables
- Renewables in heating and cooling also develop, albeit at a slower pace, driven by heat pumps and RES-based production of heat
- The biofuels in transport constitute the main growing market for bioenergy, as biofuels are essential for reducing emissions in non-electrified transport segments (the RES-T includes for electricity used in transport the RES used in power sector)

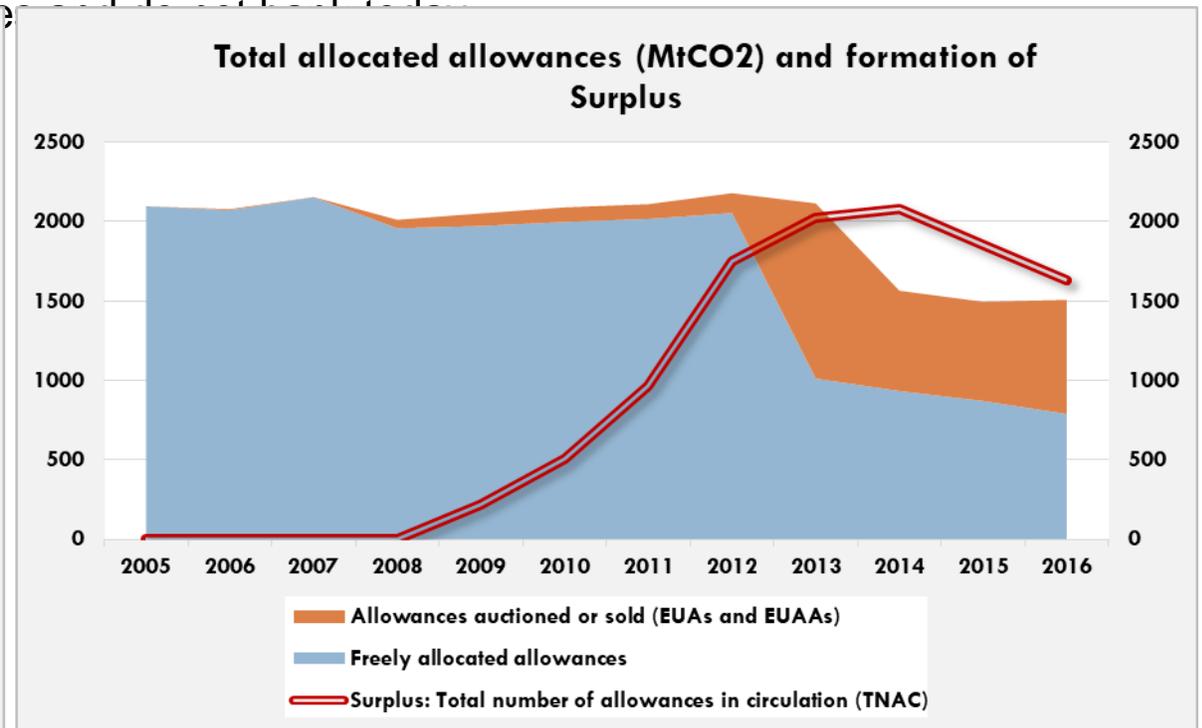
Note: The EUCO30-RES30 variant was only a sensitivity analysis



ETS Historical Outlook

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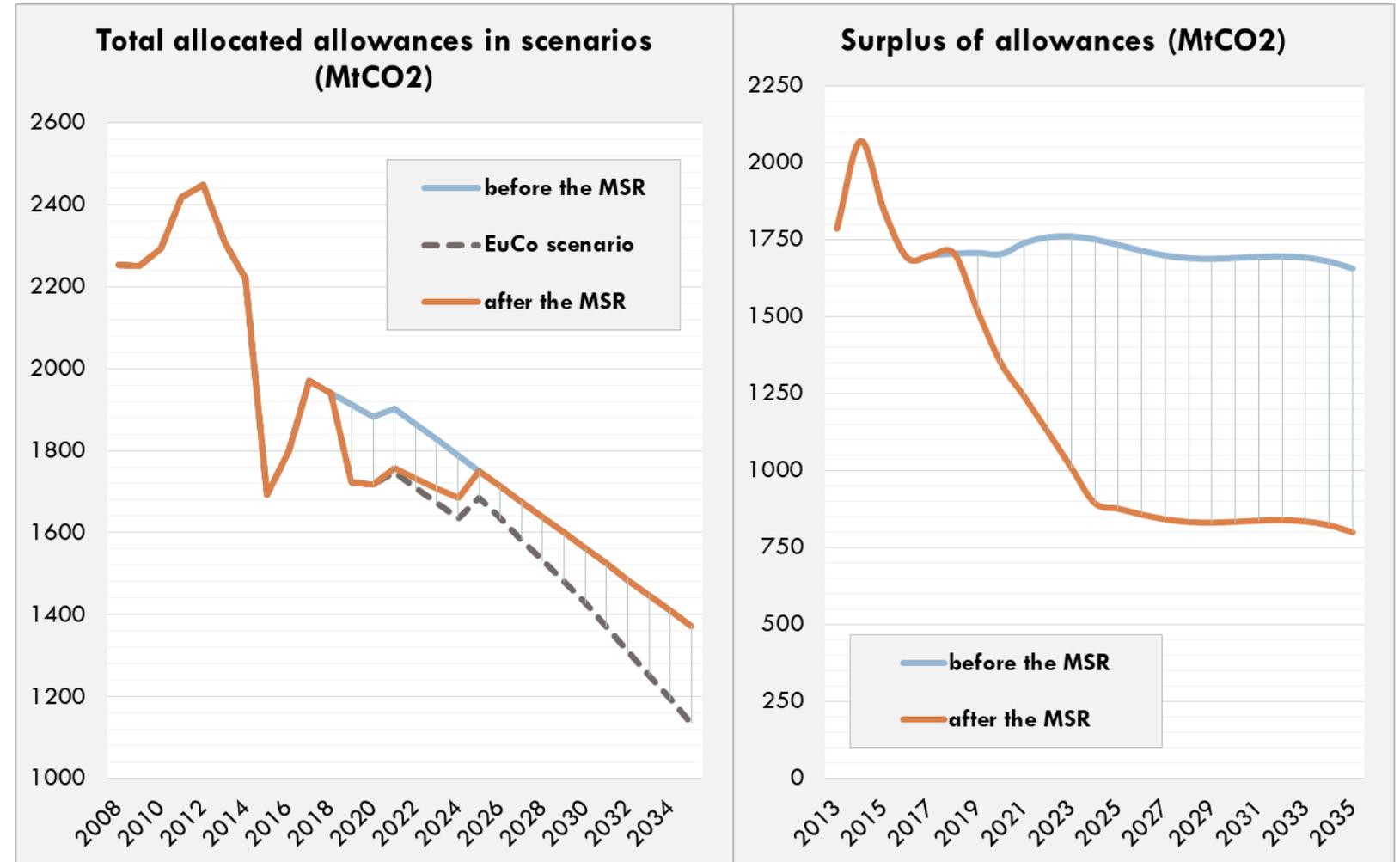
- The ETS prices are currently low and do not provide sufficient signal to reduce emissions
- From 2013 onwards, the allowances are auctioned and free allocation decreases
- But in the past, the allowances allocated were in excess of emissions, as they have been below forecasts, due to the economic slowdown
- The surplus (total number of allowances in circulation) explains the persistence of low ETS prices
 - Actors with a long position do not expect future returns and sell them



The Market Stability Reserve and PRIMES-based projections

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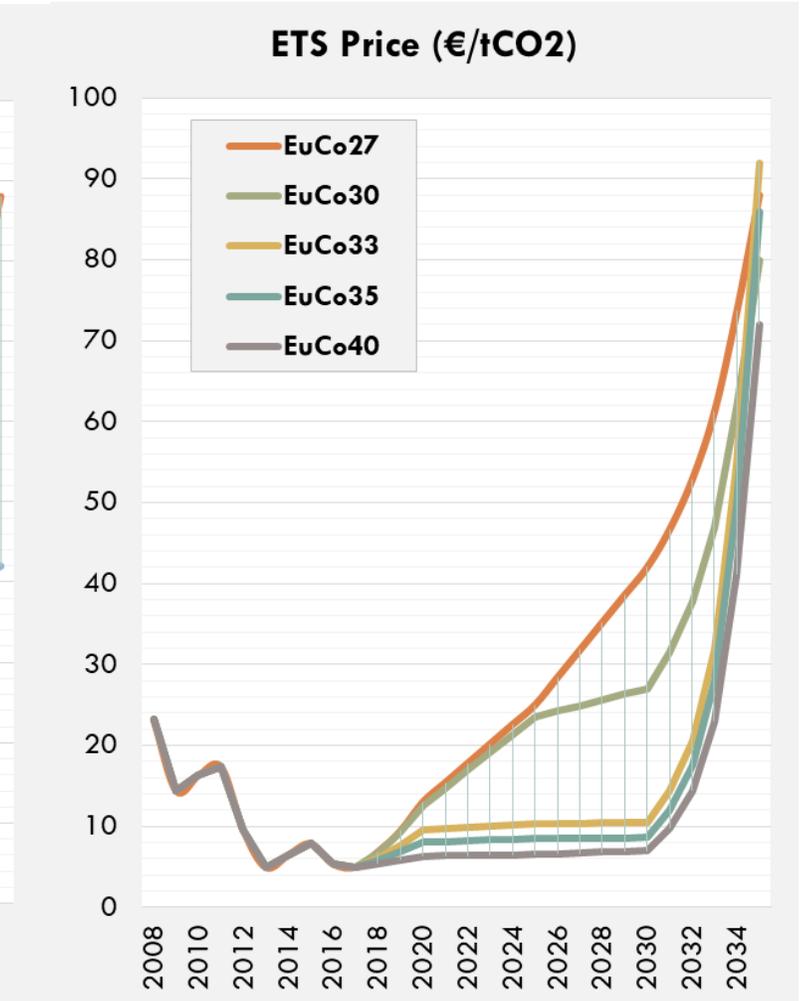
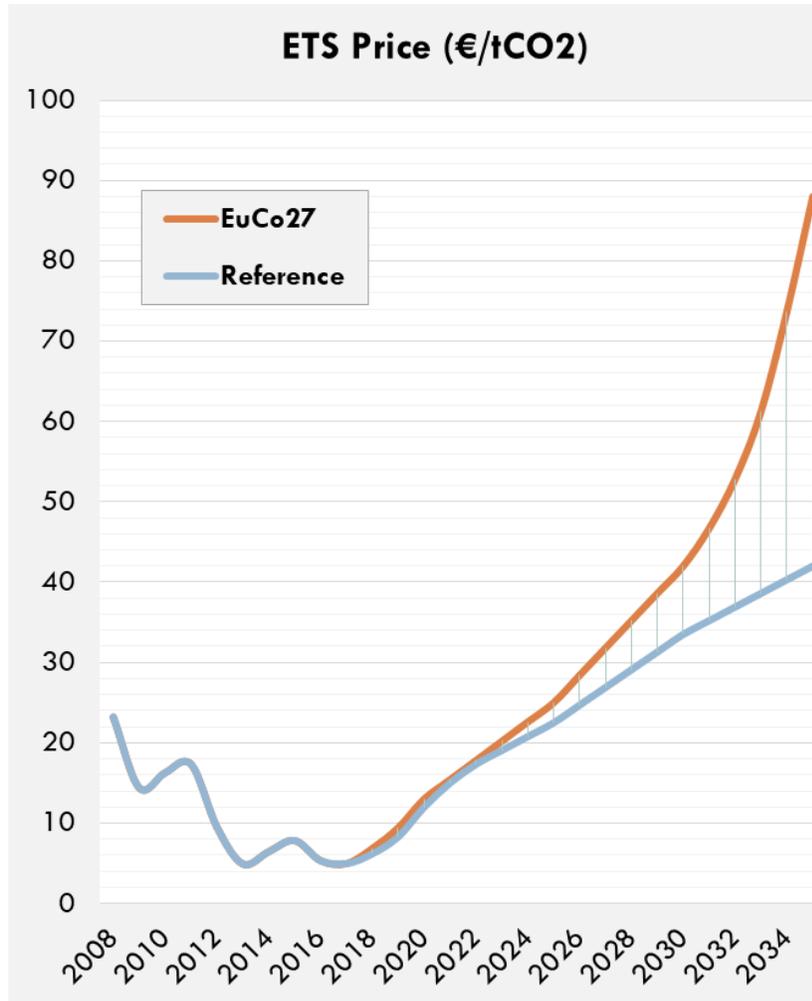
- ‘Back-loading’: postpone the auctioning of 900 million allowances until 2019-2020
- 550 to 700 million allowances unallocated until 2020 go to the reserve
- Linear Reduction Factor set at 2.2% up from 1.74%
- Surplus: Allowances in circulation
 - If above 833 MtCO₂, 12% go to the reserve
 - If below 400 MtCO₂, 100 Mt are released from the reserve



Projection of ETS prices (PRIMES model)

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- The MSR is of critical importance, because
 - It reduces the surplus mechanically
 - It is applied automatically
- Both encourage positive anticipation that ETS prices will rise in the future
- Scarcity of allowances also depends on the linear reduction factor
- Sensitivity scenarios (using PRIMES) show that the emissions in the future mainly depend on demand for electricity.
- For example, a decline of demand as a result of strong efficiency policies (or a slowdown of economic growth) can lead to continued persistence of low ETS prices despite the MSR.



Concluding Remarks

- The legislative package proposed by the Commission defines mandatory targets for 2030 within a decarbonisation roadmap to 2050. The policy ambition is without precedent.
- The role of electricity is central in the transition, and the main two pillars are energy efficiency and renewables.
- The EU ETS price is a major driver of the transformation in the power sector, which is crucial for enabling emissions cuts in the entire energy system.
- However, the EU ETS must provide sufficient certainty regarding the price signal.
- The Market Stability Reserve (MSR) and the decrease in the Linear Reduction Factor are of utmost importance to enable positive anticipation.
- Nonetheless, if demand for electricity declines, the EU ETS may not deliver despite the MSR.