E3M - Lab

Bundesministerium für Wirtschaft und Energie

Additional Scenario of the Primes Modelling on the EU Climate and Energy Framework 2030

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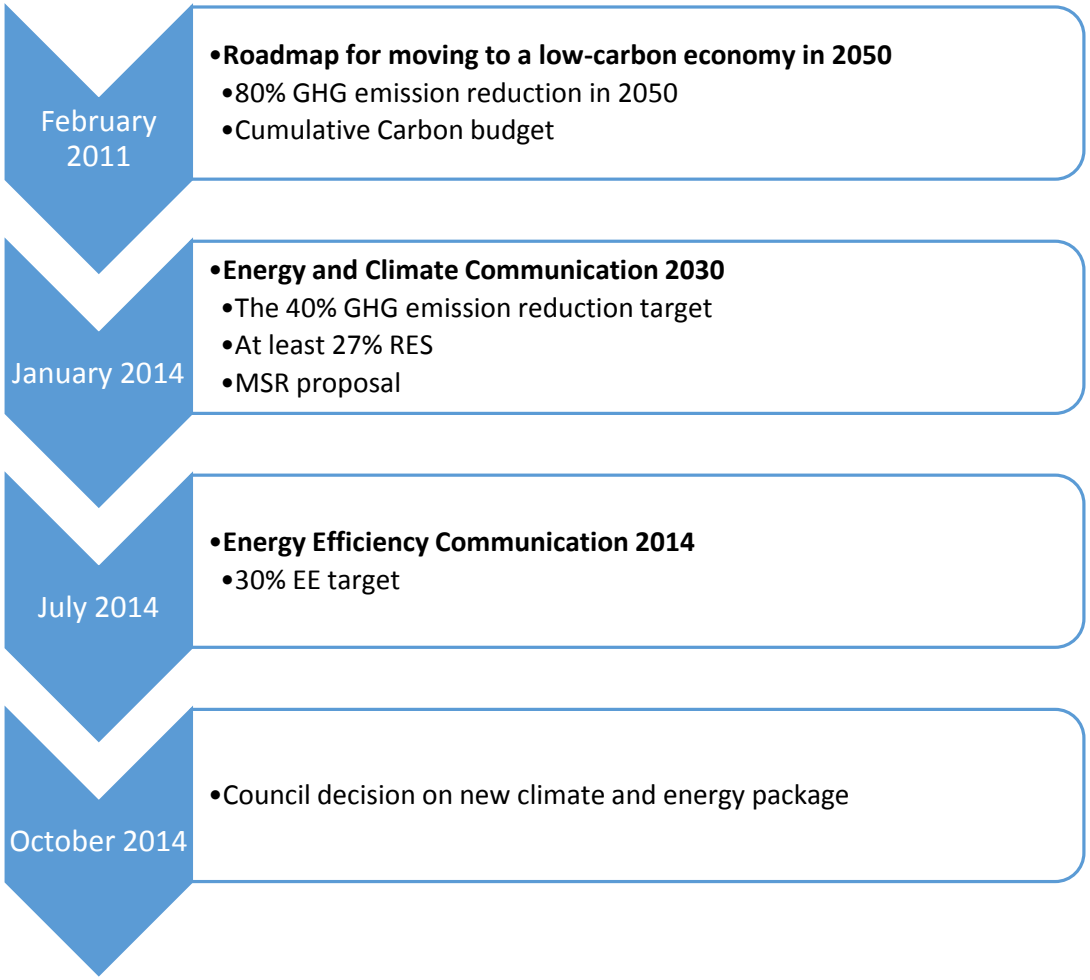
Discussion so far..



Purpose of the additional scenario

Question to be analysed:

In the context of introducing a trio of targets for 2030: GHG (40%), RES (30%) and Energy Efficiency (30%), would structural reform of EU ETS, such as the Market Stability Reserve (MSR), help reaching a workable policy combination?

Background:

So far PRIMES results have shown that pursuing high RES and EE targets is likely to weaken price signals of ETS expected for the period 2020-2030.

PRIMES Model

- Detailed energy demand and supply model for each EU MS with sectorial-modular organization.
- PRIMES simulates price-driven equilibrium in simultaneous energy and emission markets driven by actors' behaviours, technology change and policy instruments.
- Demand, supply, prices and investments are endogenously projected over long term by Member-State and for the EU as a whole, incl. the EU-wide markets for electricity and ETS.
- The modelling of behaviours is founded on micro-economics and is subject to engineering-type constraints with explicit present and future technologies
- Generally perfect anticipation is assumed for the actors but risk-averse behaviours are also modelled

Assumptions of the scenario

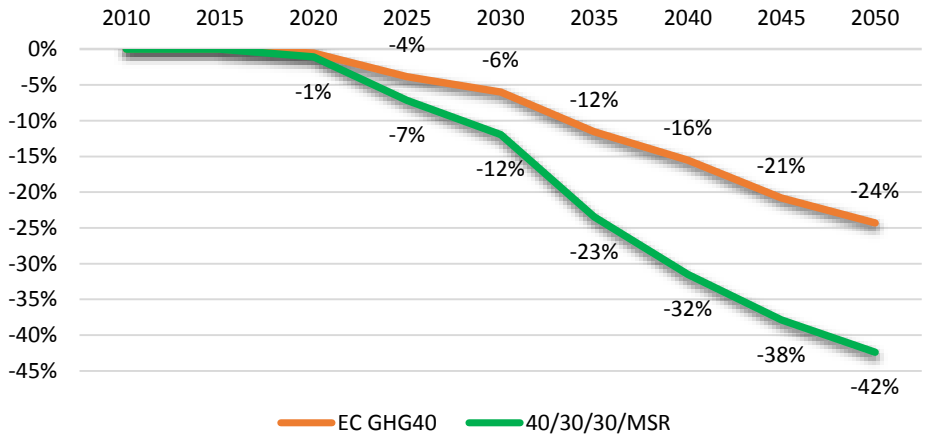
Targets:

- 2030:
  - 40% GHG emission reduction
  - 30% Energy Efficiency target
  - 30% RES target
- 2050:
  - Decarbonisation: 80% GHG emission reduction and carbon budget

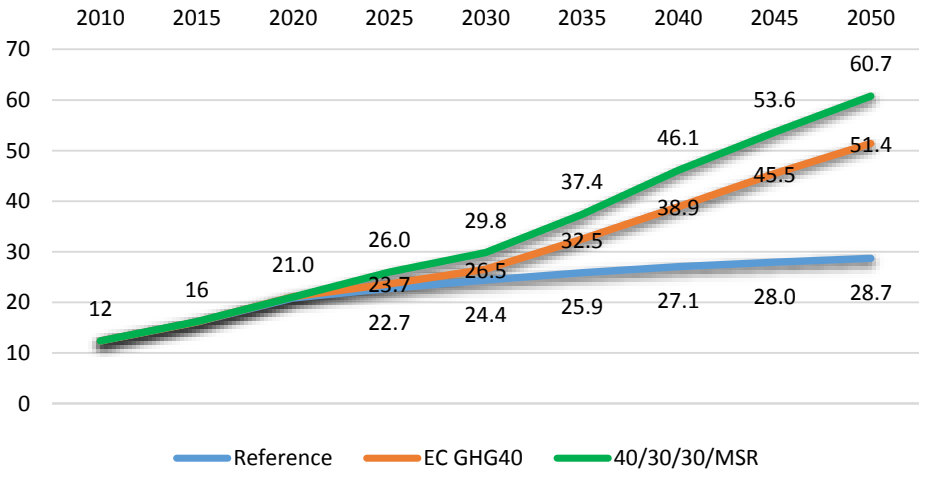
Scenario assumptions concerning direct effects of the sectorial targets:

- Capital cost reduction for investors
  - Reduction of cost of capital (equity and lending) to average 6% for RES and EE investments only
- Sector-specific measures focusing on addressing non-market barriers allowing earlier and less costly uptake of EE and RES technologies

Final energy consumption in stationary uses (reduction to Reference projection)



RES-Share (%) - RES over Gross Final Energy



Introducing the MSR

Background

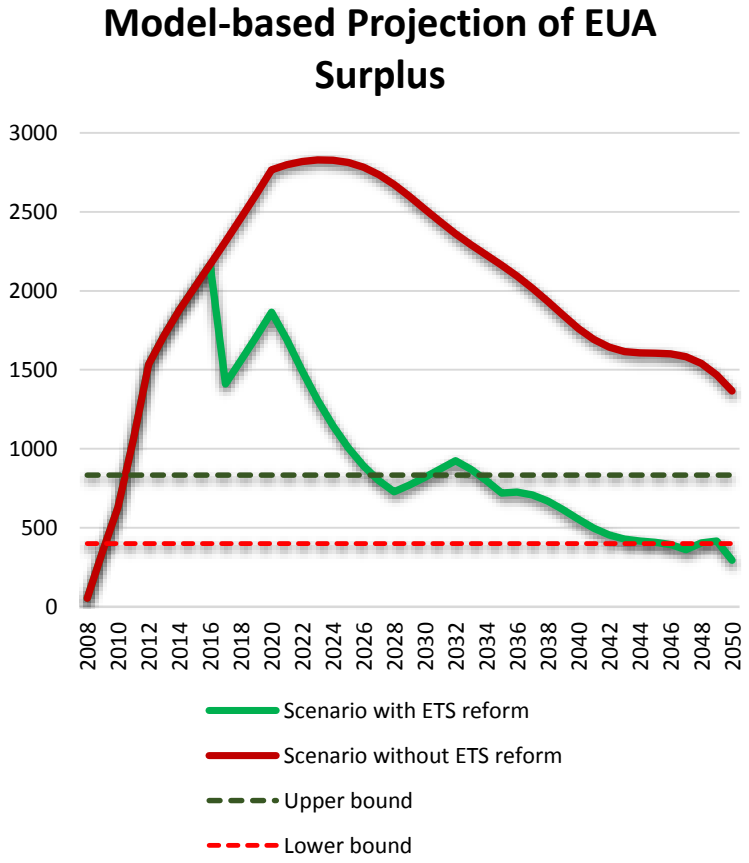
- The basic PRIMES projection shows that the currently high EUA surplus will peak by 2020 and will slowly decrease post-2020.
- Due to uncertainty, low ETS carbon prices risk to persist over a long period of time weakening price signals to investors.
- The projections have shown that low prices do persist mainly when pursuing a trio of targets while keeping current ETS regulations unchanged.
- A structural reform of ETS aims at improving predictability of convergence towards a stable market with surplus confined within a reasonable range.

Scenario assumptions:

- Issuance of allowances post 2020 follows the -2.2% rule
- MSR places 12% of surplus (of t-2) in reserve if surplus is above 833MtCO_2 and releases 100 MtCO_2 from the reserve when surplus is below 400MtCO_2
- 900 MtCO_2 are placed in reserve before 2020

Simulated Effects:

- Reduction of the risk of holding banked allowances by those being long and incentive to those being short (such as power generators) to buy allowances at periods of low prices
- Stable system under all circumstances (change in external drivers e.g. fuel prices or GDP growth; or policy changes) due to automatized system
- Smoother ETS price trajectory avoiding persistence of low prices followed by a sharp increase in the long term

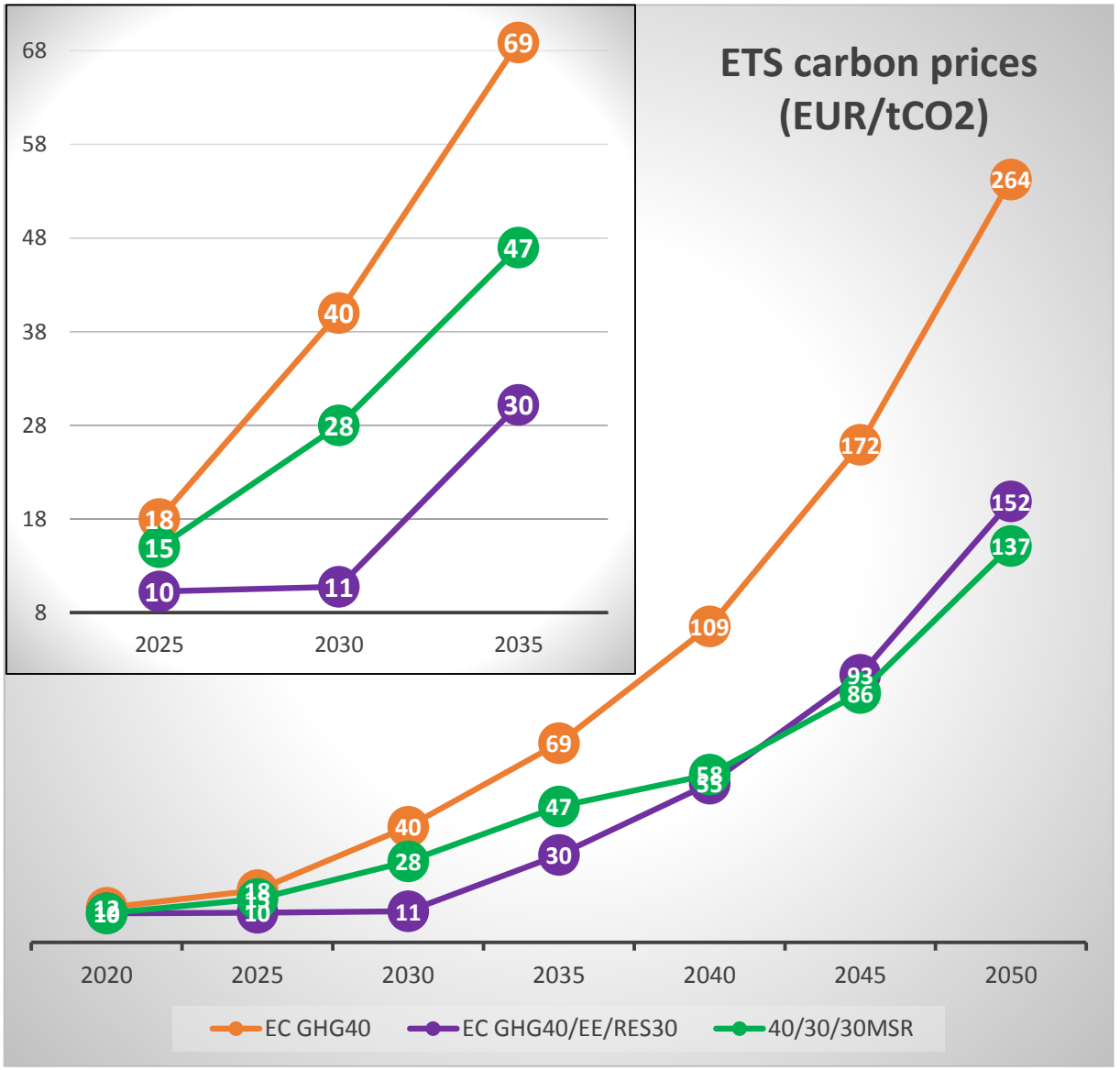


Model-based projection of ETS prices

The EC GHG40/EE/RES30 scenario illustrates the risk of low ETS price persistence when pursuing a trio of targets

The 40/30/30/MSR scenario shows significantly higher ETS prices until 2030, compared to the EC GHG40/EE/RES30 scenario, due to the ETS reform

The EC GHG40 scenario involves higher ETS prices by 2030, compared to the 40/30/30/MSR scenario, but the trajectories are similar, despite the trio of targets in the latter scenario. This is also due to the MSR.

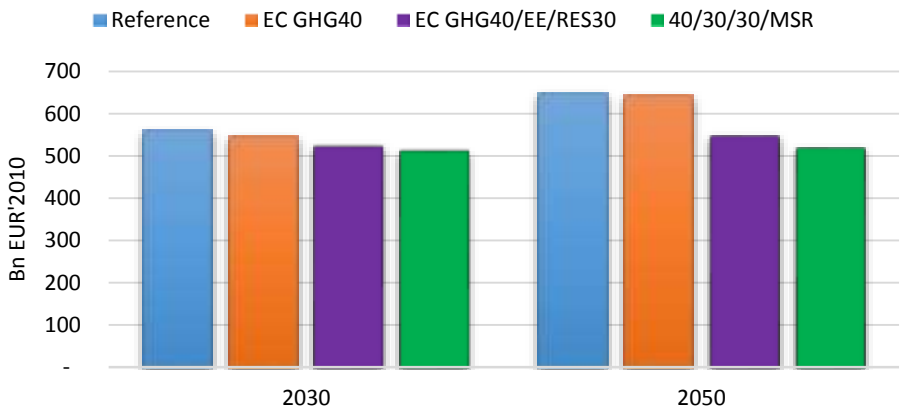


Effects on Electricity Costs

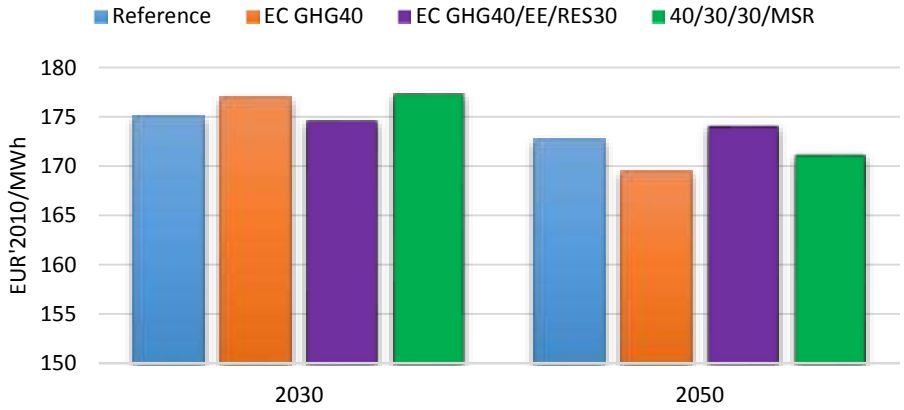
The 40/30/30/MSR scenario has higher average electricity prices in 2030 compared to the EC GHG40/EE/RES30, due to higher ETS prices, and compared to the EC GHG40, due to higher RES

Nonetheless, the 40/30/30/MSR involves lower expenditures for electricity by final consumers compared to all other scenarios, because of the combination of energy efficiency and the reduction of capital costs for RES

Total expenditures for electricity by final consumers



Average Price of Electricity at Final consumption after taxes



Total energy system costs

	2030			2011-2030	
	GHG[a)]	RES[b)]	EE[c)]	Average annual costs [d)]	Difference to 40/30/30/MSR
GHG40	-40.6%	27%	-25%	2068.50	0.00%
GHG40/EE/RES30	-40.7%	30%	-30%	2089.18	1.00%
40/30/30/MSR	-40.2%	30%	-30%	2068.53	
[a)]Greenhouse gas emission reductions domestically in the EU compared to 1990					
[b)]Share of renewable energy sources in gross final energy consumption					
[c)]Primary energy savings compared to the Baseline 2007					
[d)] Average annual energy system costs, calculated from the perspective of final users of energy inclusive of all expenditures and investment for energy purposes, excluding. auction payments and disutility (bnEUR'2010)					

Total energy system costs, cumulatively until 2030, are found in 40/30/30/MSR similar to the EC GHG40 scenario despite the addition of the sectoral targets and the ETS reform.

The scenario assumption that the measures and sectorial targets in EE and RES reduce capital costs for investors is the main explanation of the lower costs.

Conclusions

The PRIMES-based projections confirm that there exist a workable combination of a trio of targets (GHG, RES and EE) with an ETS reform based on MSR which is able to ensure market stability in ETS, fair price signals and include sectorial measures which are effective in addressing non market barriers in EE and RES.

The structural reform of the ETS, based on the MSR, is anyway necessary to induce stability of the ETS and to avoid long periods of low prices followed by strong price increases, as shown in some of the PRIMES scenarios in the absence of ETS reform

Regarding costs it is important to consider focused measures which eventually remove barriers and facilitate reduction of capital costs in EE and RES; this is found beneficial for compliance costs of the entire system

The ETS reform is found to exert small upward effects on average electricity prices but combined with efficiency can drive reduction of the electricity bill for final consumers

Clearly the combined trio-target and MSR scenario has merits regarding policy implementation, reduction of uncertainty and stability/predictability of price signals for investors