



POTSDAM INSTITUTE FOR
CLIMATE IMPACT RESEARCH

How to reform the European Emissions Trading System – Lessons to be learned from the EU ETS

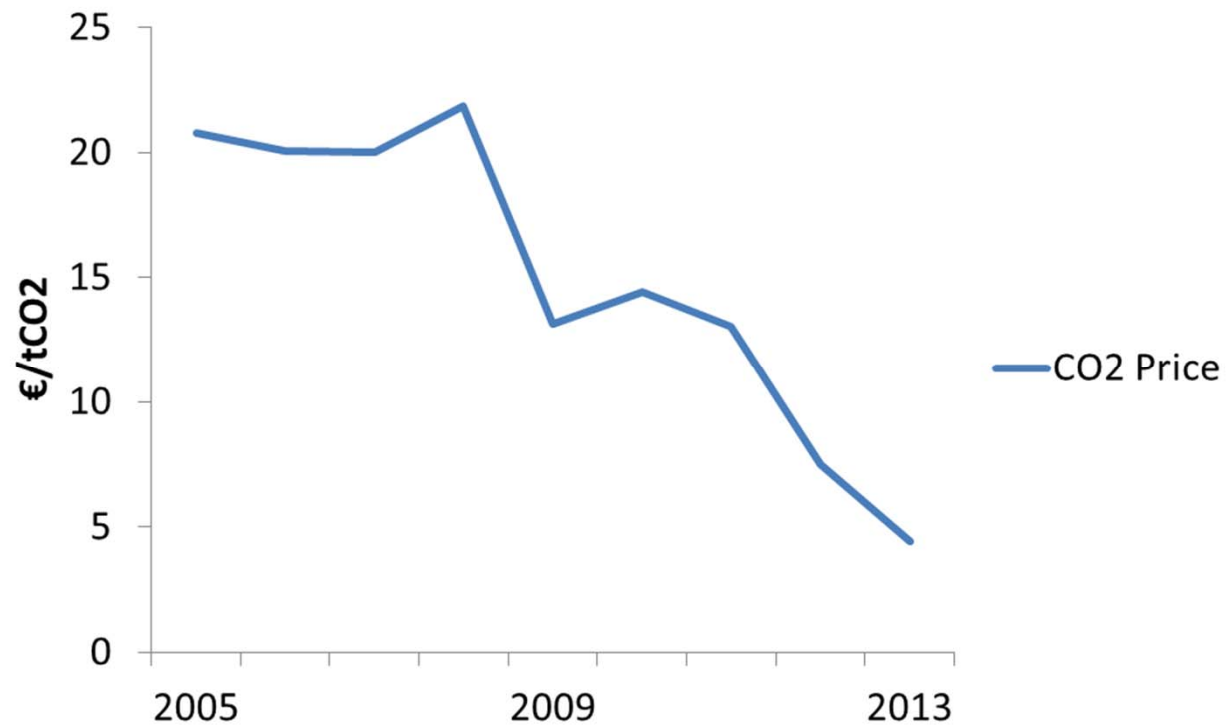
Potsdam, 17 June 2014

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with contributions by Christian Flachsland (MCC), Sabine Fuss (MCC), Godefroy Grosjean (PIK), Nicolas Koch (MCC), Michael Pahle (PIK), Michael Jakob (MCC)

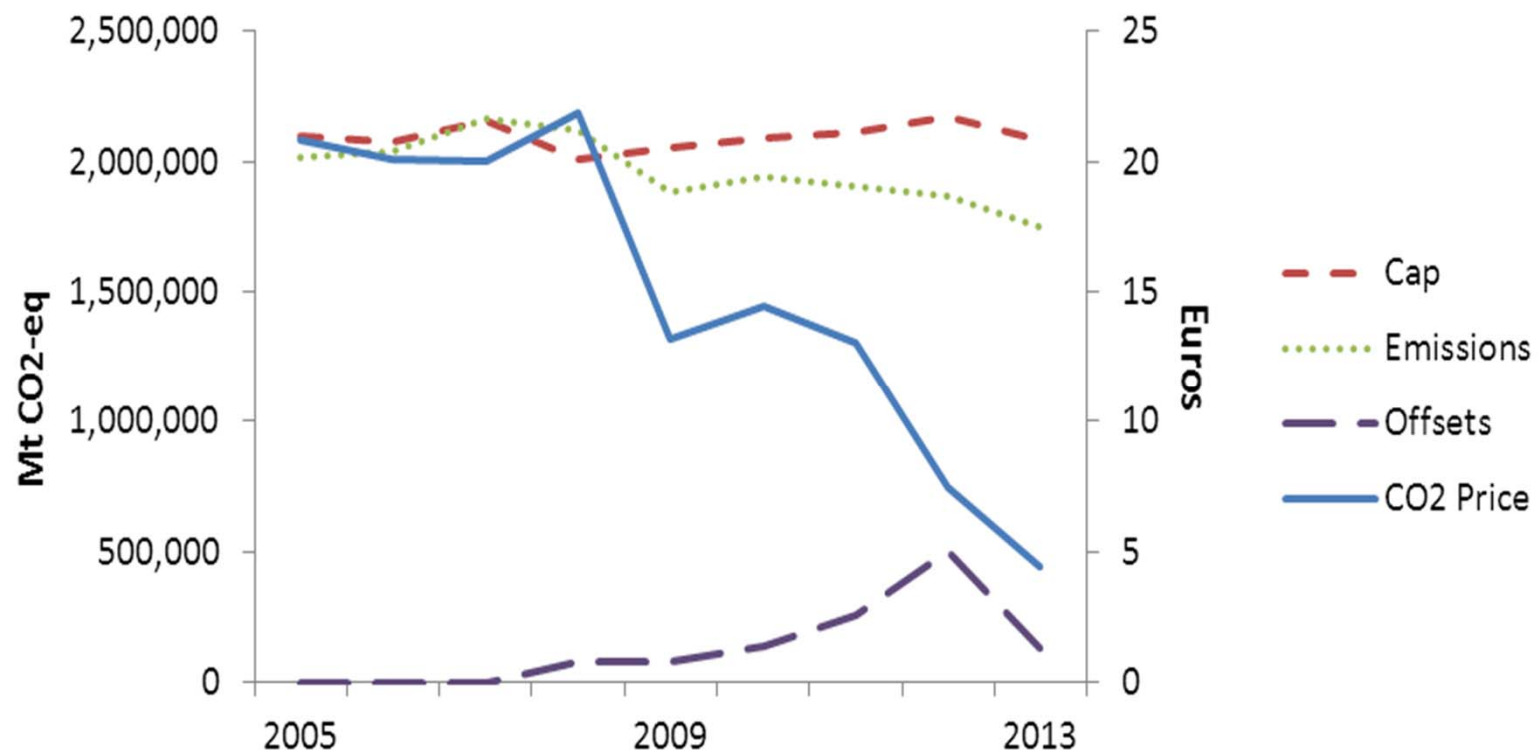
The EU ETS: ex-post analysis

- Strong decline of CO₂ price

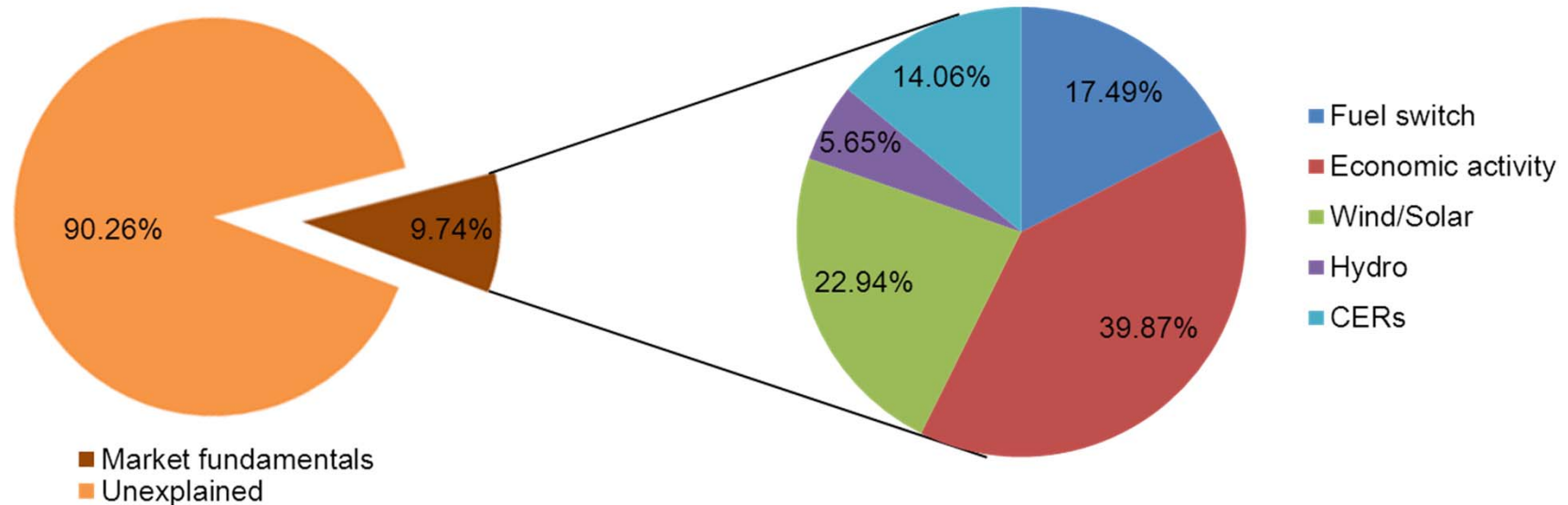


Evaluation of the environmental effectiveness

- Emission cap was legally binding. But it has not been physically binding as emissions stayed below the cap
- As the price was still positive, emission reduction was *temporarily* shifted to other means, e.g. renewables and energy efficiency (Alberola et al.)



Empirical evaluation of EUA price drivers

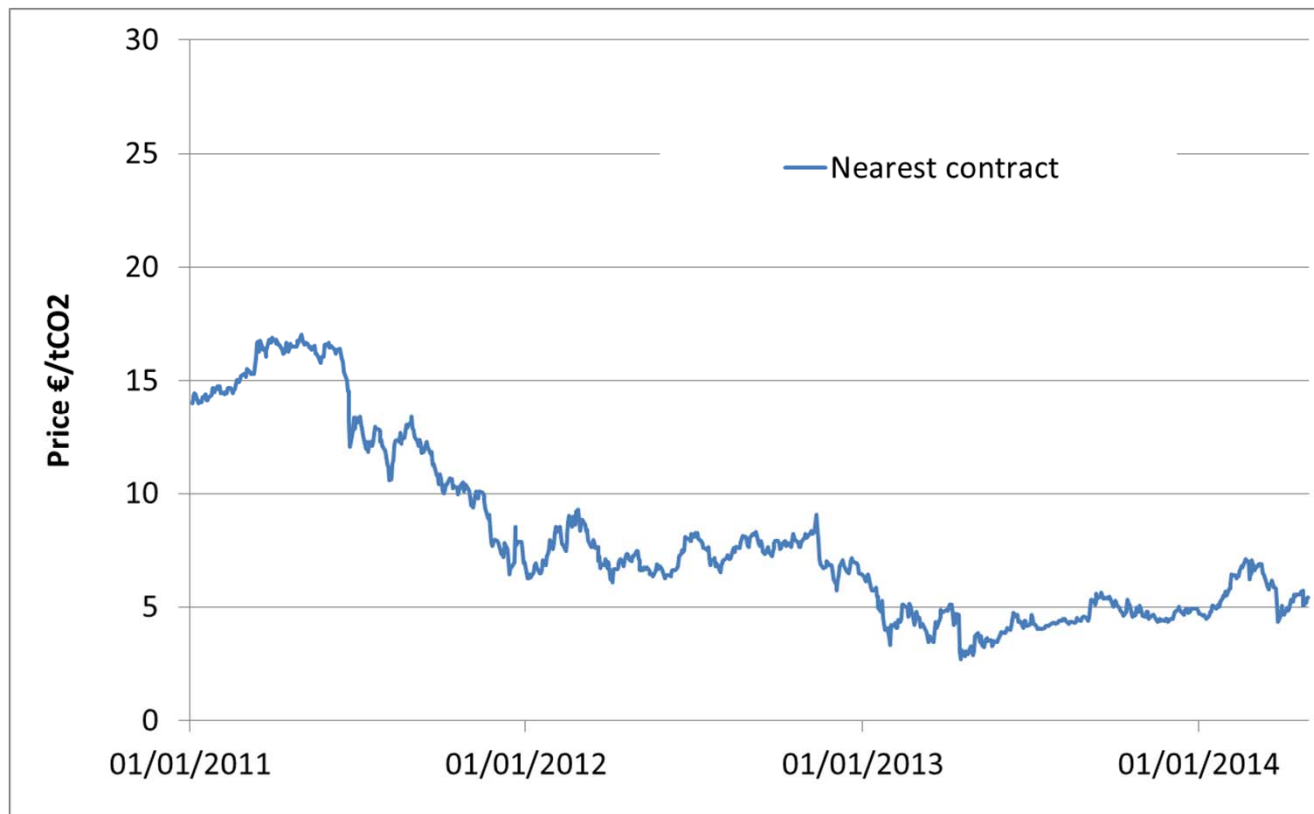


Koch et al (2014), in revision

- **Only 10% of price fluctuations can be explained by market fundamentals (renewable deployment, economic crisis, CDM, ...)**
- **But when taking into consideration policy events dummies (e.g. backloading vote) explanatory power jumps from 10% to 44%.**

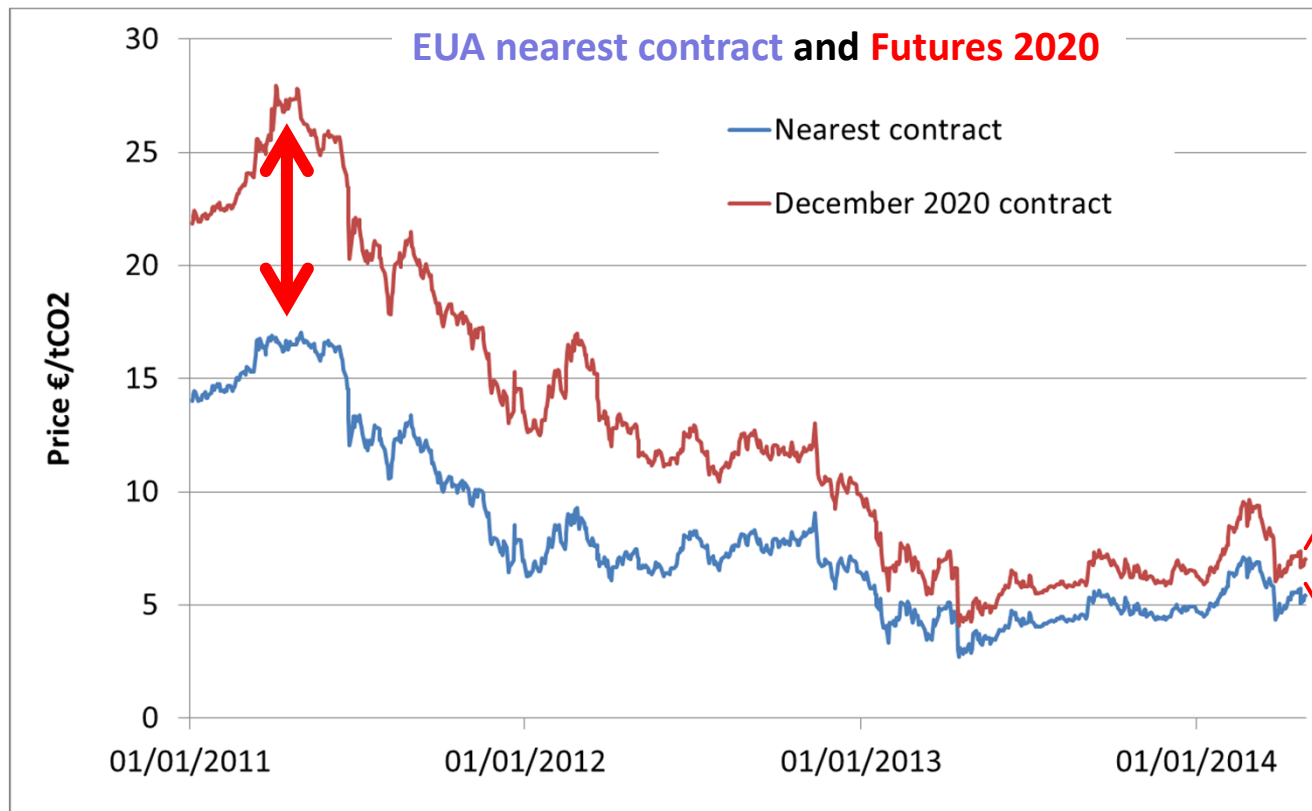
Dynamic cost-effectiveness of ETS is lacking

- Decreasing CO₂ price



Dynamic cost-effectiveness of ETS is lacking

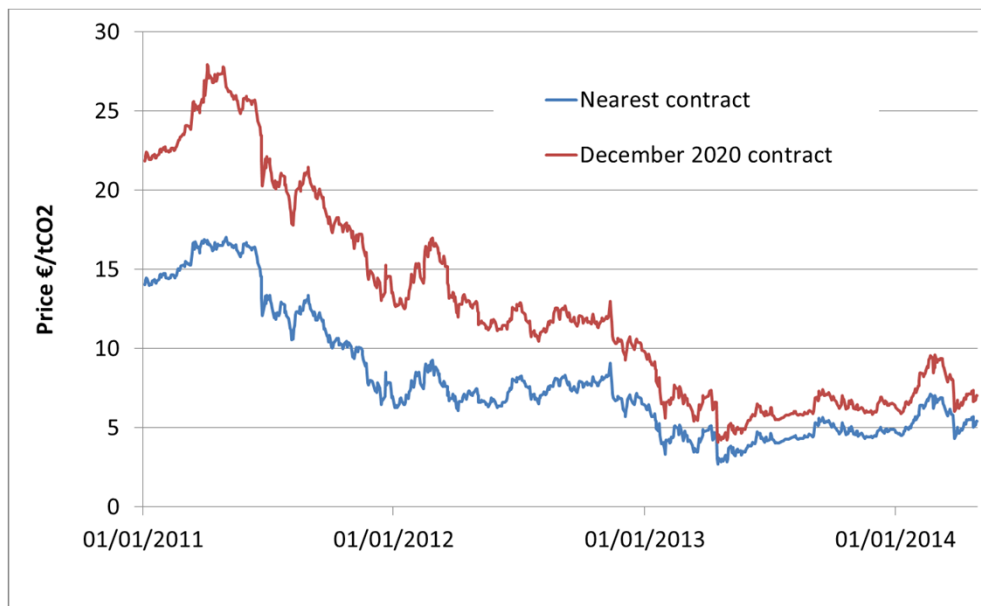
- Decreasing CO₂ price
- Also in the future, no substantial price increase is expected (only little spread between nearest contract and future contract for 2020)



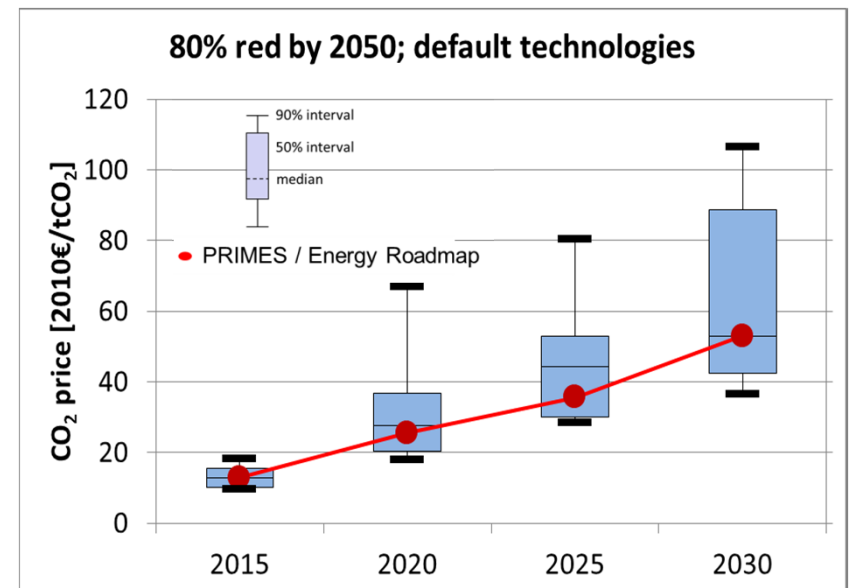
Dynamic cost-effectiveness of ETS is lacking

- Also in the future, no substantial price increase is expected
- Models show cost-effective price path with increasing prices of more than 20€/tCO₂ by 2020

EUA nearest contract and Futures 2020



Cost-effective CO₂ price from modeling



Knopf et al. (2013)

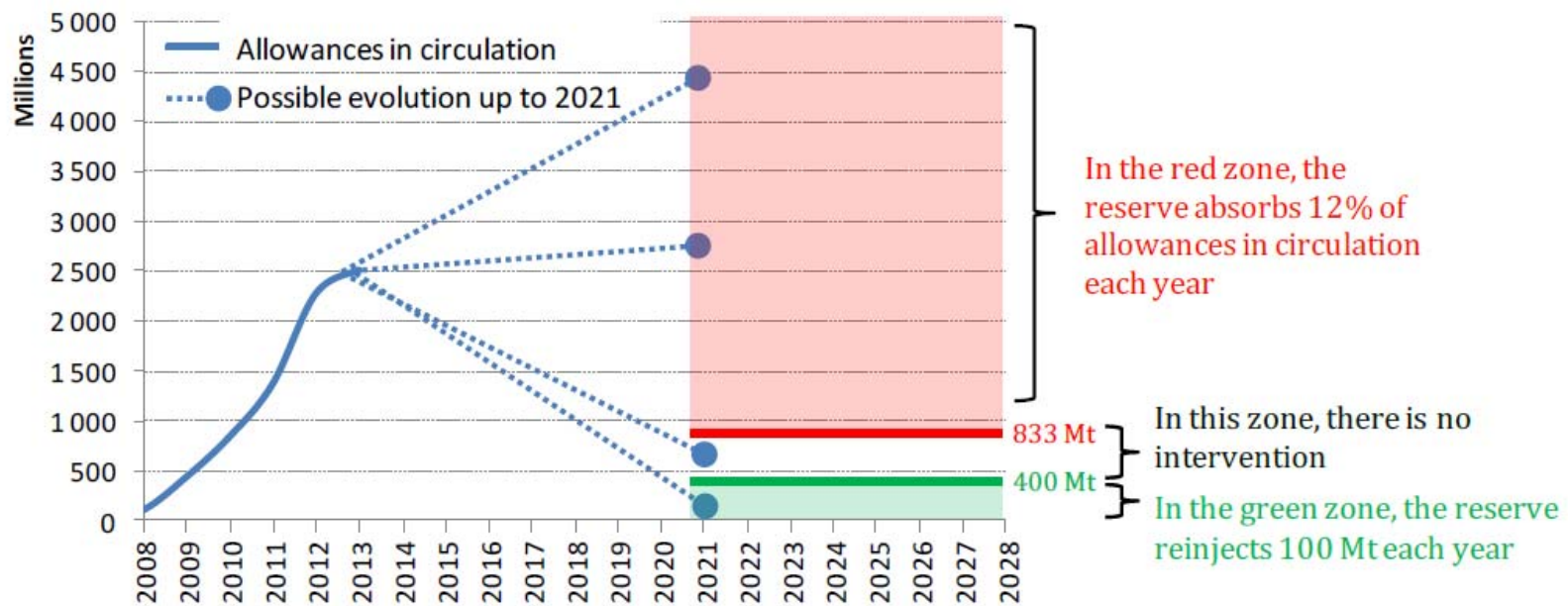
Summary of problem analysis

- The EU ETS is a market designed by the EU, where expectations of market participants on future political decisions matter
- Environmental effectiveness of ETS is given, the cap was in fact not binding as emissions were below the cap
- Dynamic cost-effectiveness is not given; prices are not expected to increase significantly until 2020
- Key question and requirements for ETS Reform to address:

➔ How to stabilize expectations of market participants?

Reform proposal by EU Commission: The Market Stability Reserve (MSR)

- In the course of the debate about the ETS reform, the EU Commission changes the wording from „too low price“ to „too high surplus“ of EUA certificates
- January 2014: proposal of MSR as a quantity based instrument

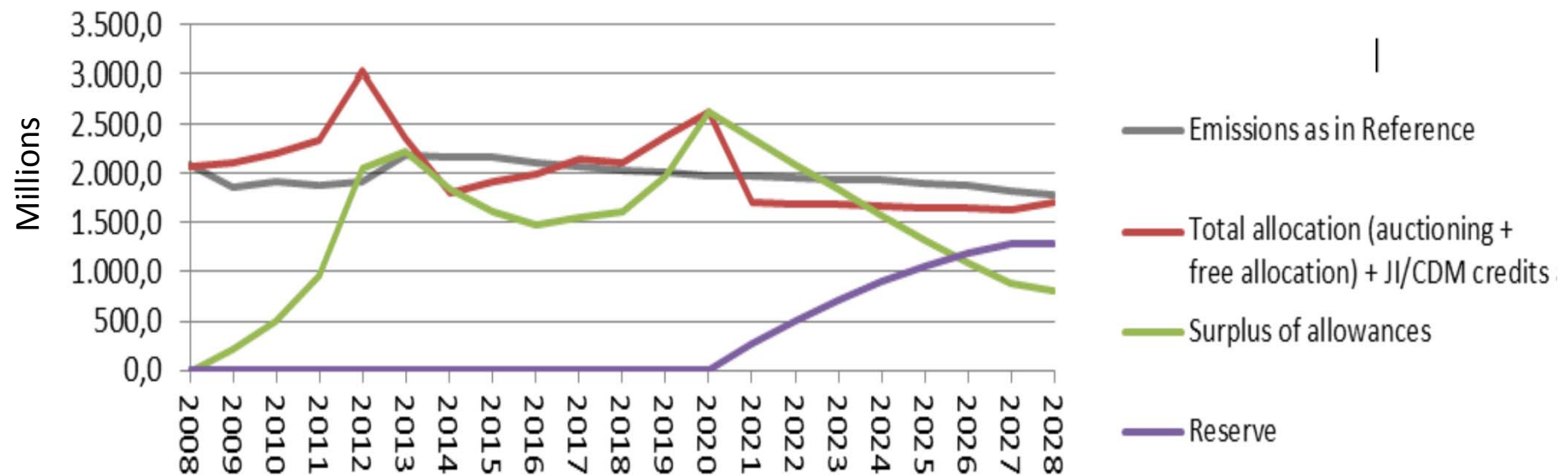


Climate Economics Chair, from European Commission

Trotignon et al. (2014)

Market Stability Reserve - Impact

- Does the MSR stabilise expectations?
 - Contributes to decrease **surplus** (due to exogenous shocks) of allowances in phase IV
 - But oversupply does not dissipate until 2030
 - Effect of MSR on price is unclear



Source: European Commission (2014)

Market Stability Reserve - Evaluation

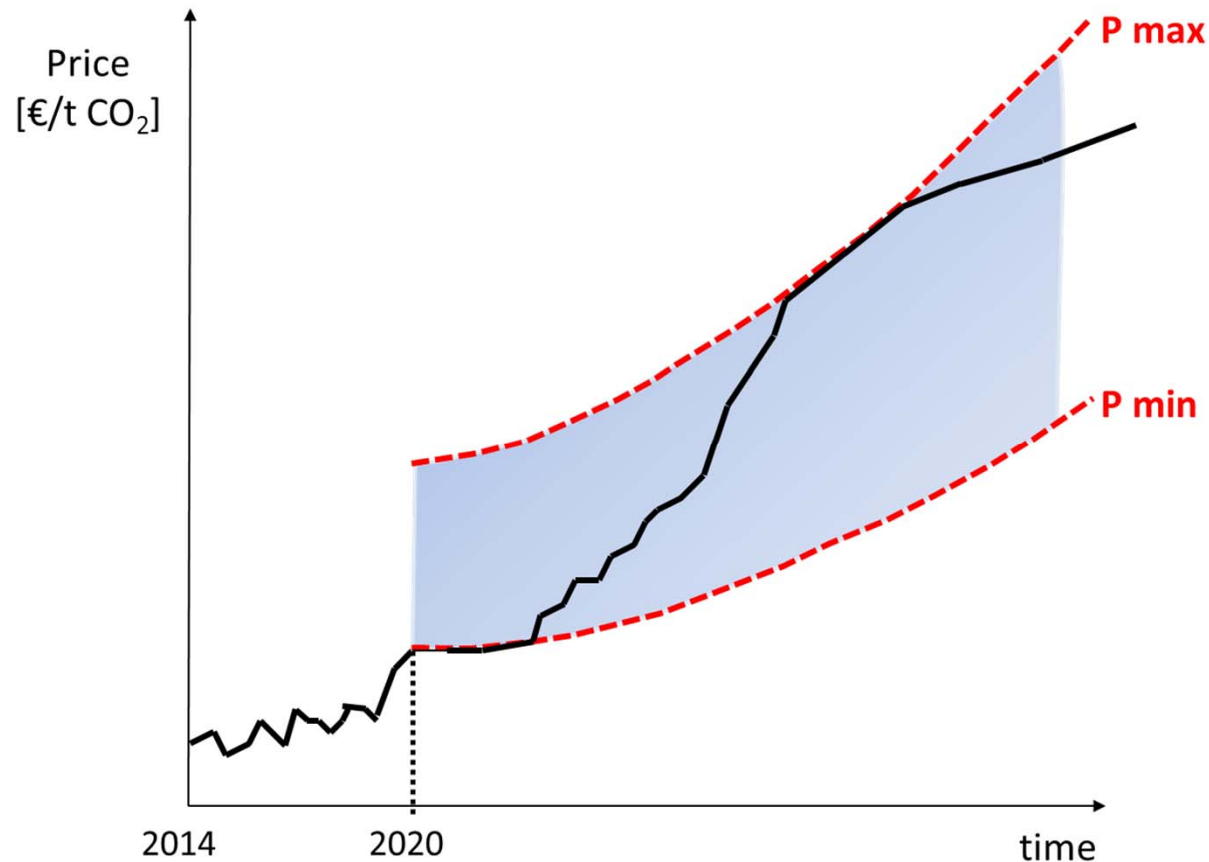
- The choice of a quantity instrument is questionable
 - Price effect is unclear (according to the Commission and also so far no scientific evaluation/modelling available)
 - MSR triggers of 400 and 833 million tCO₂ are set arbitrarily
 - If dynamic effectiveness is the problem, why not choosing a price trigger?
- Timing of the quantity effect
 - Too slow, it will always take about 2 years until quantity is adjusted, as it is based on varified emissions
- International dimension
 - Other cap&trade systems go in the direction of hybrid schemes. MSR might become difficult in the context of linking with other regions

Alternative reform proposal by Euro-CASE

1. **Setting a price collar**
2. **Sectoral expansion of the EU ETS**
 - a. **Revenue recycling: Auctioning of certificates versus free allocation**
3. **Policy instruments for innovation in addition to carbon pricing**
4. **Tackling carbon leakage**

1. Setting a price collar

- Reliable framework for investment decisions; price collar will stabilize expectations; dynamic cost effectiveness is assured



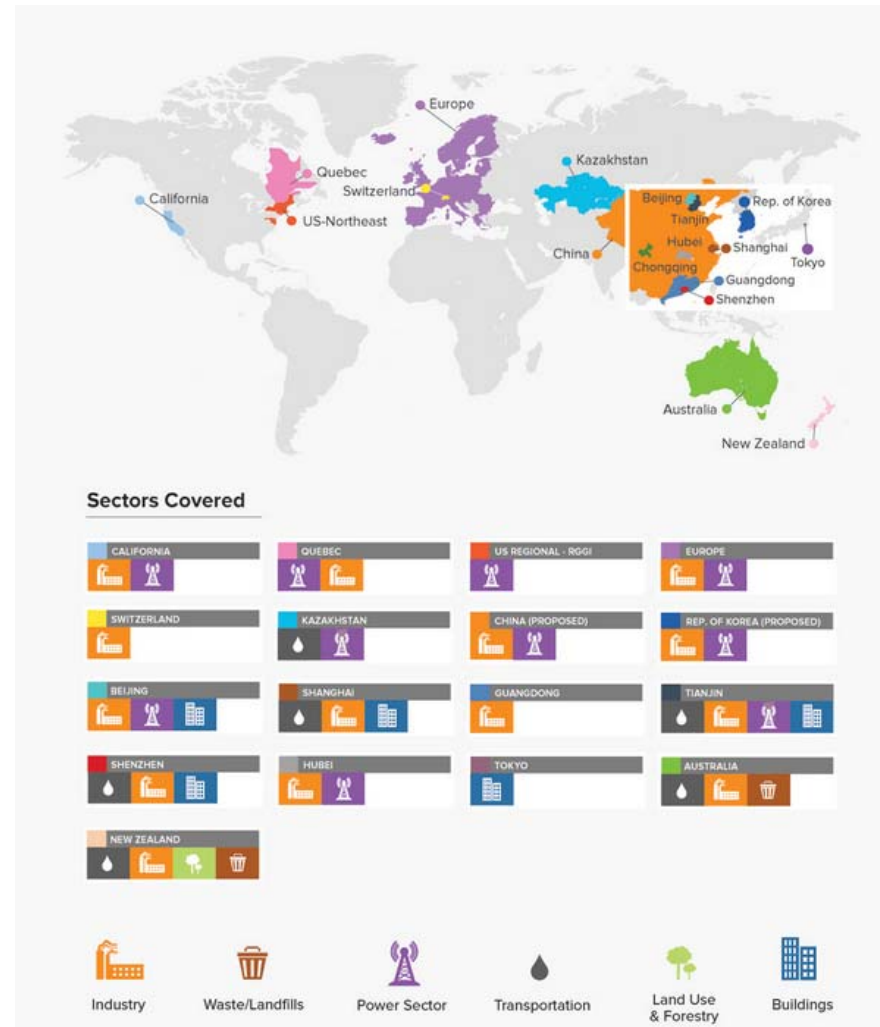
Advantages of a price collar

- **General: price collar will stabilize expectations and lead to dynamic cost-effectiveness**
- **Price floor (auction reserve price) would allow addressing national preferences, e.g. more ambitious domestic mitigation goals, without undermining the environmental effectiveness of the additional national policies**
- **Price ceiling is motivated by the fact that prices can also increase substantially through shocks. With setting a ceiling this risk is reduced symmetrically, what would be important for investors**

2. Sectoral Expansion of the EU ETS

- The ETS currently covers about 45% of all GHG emissions, but all sectors need to significantly reduce GHG emissions.
- Might increase the chance of a 2030 agreement, as it allows harvesting the least-cost options, which might in some Member States be in a different sector than the power sector, e.g. as is the case for Poland
- There are different options on how to add further sectors, but upstream inclusion is the most favorable.
- Revenue recycling (auctioning vs free allocation) important for sectoral expansion:
 - Possibility of lowering costs to particular industries by inframarginal exemptions and revenue-recycling (Goulder 2014)

Example of sectoral coverage of carbon markets worldwide



Distributional implications of sector-wide carbon pricing in addition to a floor price

Thought experiment (Flachsland 2014):

- Expanding EU ETS Sector Coverage to 90%
- Increasing Auctioning Shares to 80%
- Introducing a Rising Price Collar with Minimum Price 20€
- Yields Total EU Revenues of ~64bn€ (Factor 18 of Year 2013 Revenue)

Example Greece

	2013	Thought experiment
€ Revenue	0,15 bn	2,7 bn

3. Instruments in addition to carbon pricing

- In addition to carbon pricing, other policy instruments for innovation and diffusion of low carbon technologies might be required
- There are indications that especially the innovation spillovers are high
- R&D policies could therefore support innovation and should be part of the portfolio if market failures can be observed
- Address discrepancy between social and private investments in R&D and deployment

4. Tackling carbon leakage



4. Tackling carbon leakage

- Carbon leakage only affects a few sectors
- It can be addressed by expanding the group of countries that participate in the ETS or by linking it to other regions
- Within the group, free allocation of some emission permits as well as tailor-made trade policies should be considered
- Lowering costs to particular industries by inframarginal exemptions and revenue-recycling (Goulder 2014)

Conclusions

- **The MSR does not address the current problem** of the EU ETS of lacking dynamic cost-effectiveness. It might turn out to be a toothless tiger.
- The political feasibility of implementing the **Euro-CASE reform package with setting a price collar as the foremost element** might be limited.
- But without a comprehensive reform of the ETS, there is a clear **danger of a revival of fragmented climate and energy policies across Europe** which have the potential to increase the costs of climate policy substantially.
- By contrast, the proposed reform, and in particular the price collar, would **allow the Member States to implement their national energy and climate policies** according to their diverse preference about the technology mix, the level and timing of their emission reduction ambitions

BACKUP



Prof. Dr. Ottmar Edenhofer

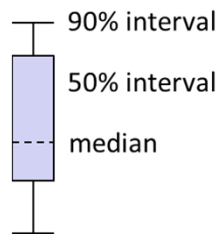
What happened to the price? Empirical evidence

	(1)	(2)	(3)	(4)	(5)
<i>Marginal Abatement Cost Variables</i>					
<i>Switch</i>	0.0679	0.0937**			0.027
<i>Gas</i>			0.2606*	0.3254**	
<i>Coal</i>			-0.0911	-0.1368	
<i>Economic Sentiment Index</i>	1.2820***		1.1622**		1.5853***
<i>Stock Index</i>		0.7058**		0.6679**	
<i>Wind/Solar</i>	-0.1462***	-0.1102**	-0.1408***	-0.1106**	-0.1849***
<i>Hydro</i>	-0.0275	-0.0282	-0.0258	-0.0246	0.0157
<i>Issued CERs (-1)</i>	-0.0067**	-0.0075**	-0.0066**	-0.0073**	-0.0014
<i>Policy Event Dummies</i>					
D(CER ban) +					0.0489***
D(Energy Efficiency) -					-0.2264***
D(Linking Australia) +					0.1737***
D(Backloading proposal) +					-0.3189***
D(Structural measures) +					-0.7094***
D(2030 framework) +					0.0298
D(Backloading vote 1) -					-0.4225***
D(Backloading vote 2) +					-0.0401
<i>R</i> ²	0.1782	0.1778	0.1952	0.1983	0.5487
<i>adj R</i> ²	0.0974	0.097	0.1013	0.1047	0.44

Source: Koch et al. (2014)

Potential indicators for a minimum price?

- Coal-gas switch price?
 - Average price 2008-2013: 36€/tCO₂
- Minimum price coherent with prices in early phase II?
- Asking market participants what would be the price necessary to foster investments?
- Experience from other countries/states? (UK, California)
- Model comparison gives indication of required price level
 - Lowest price of 20 €/tCO₂ after 2021 in mitigation scenario (whole economy)

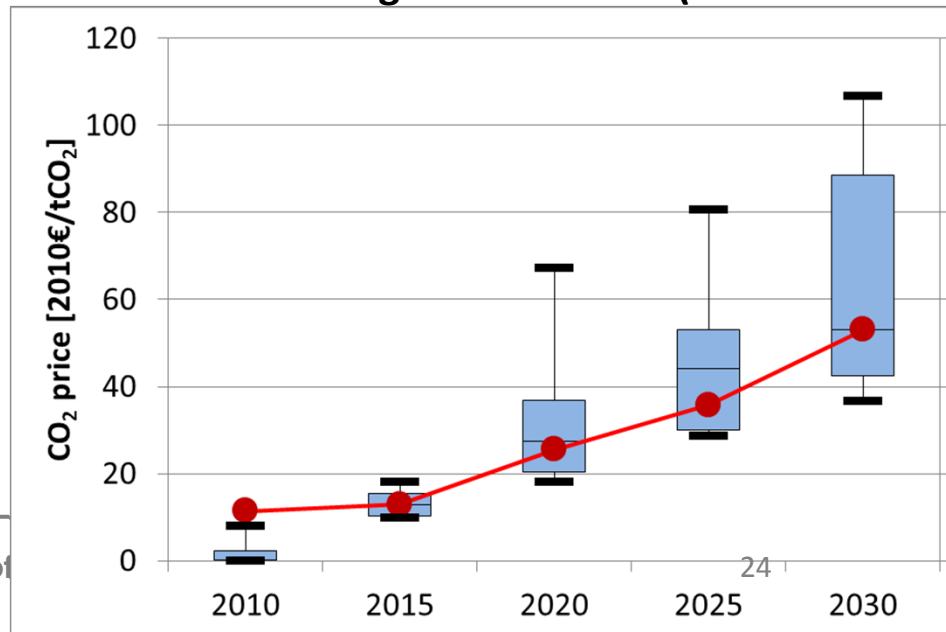


• PRIMES / Energy Roadmap

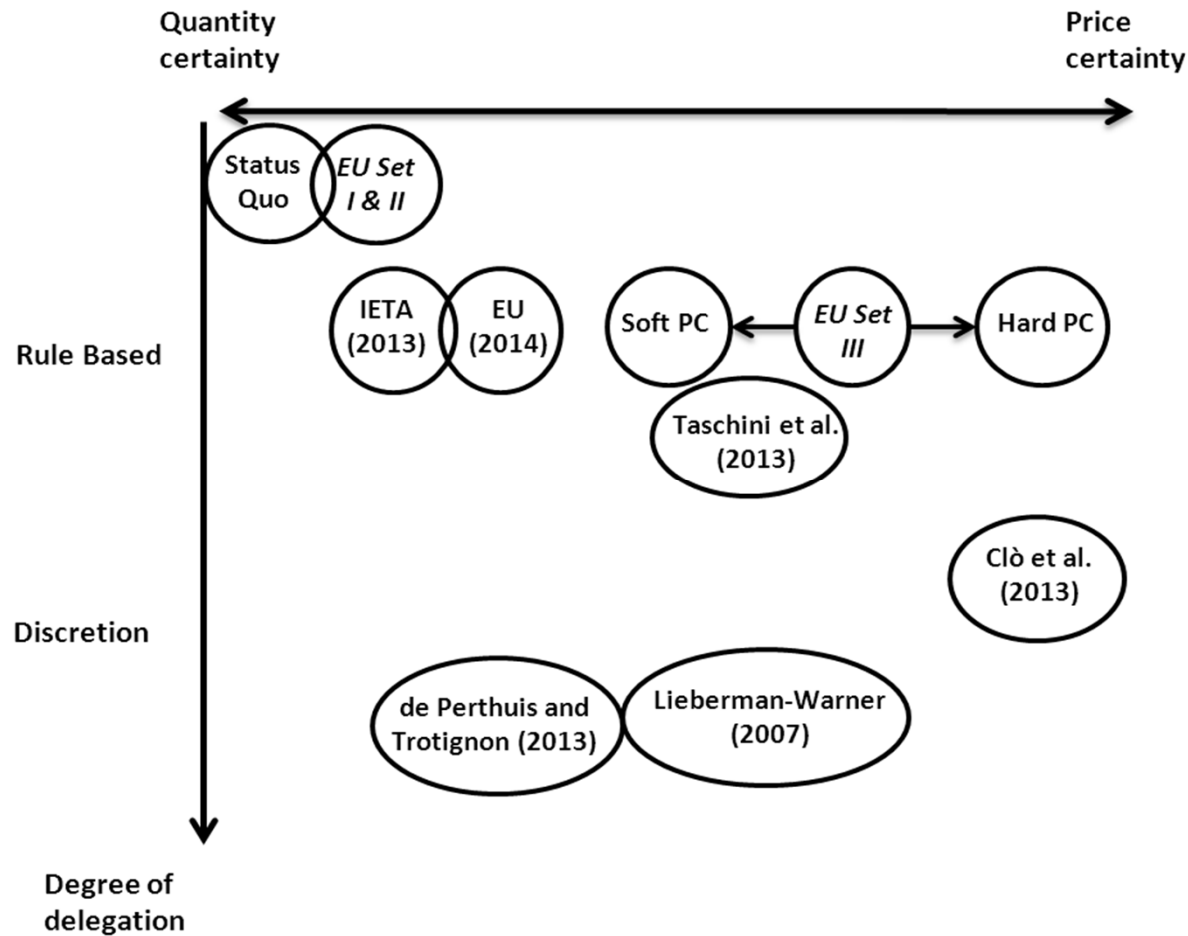
Source: Knopf et al. (2013)



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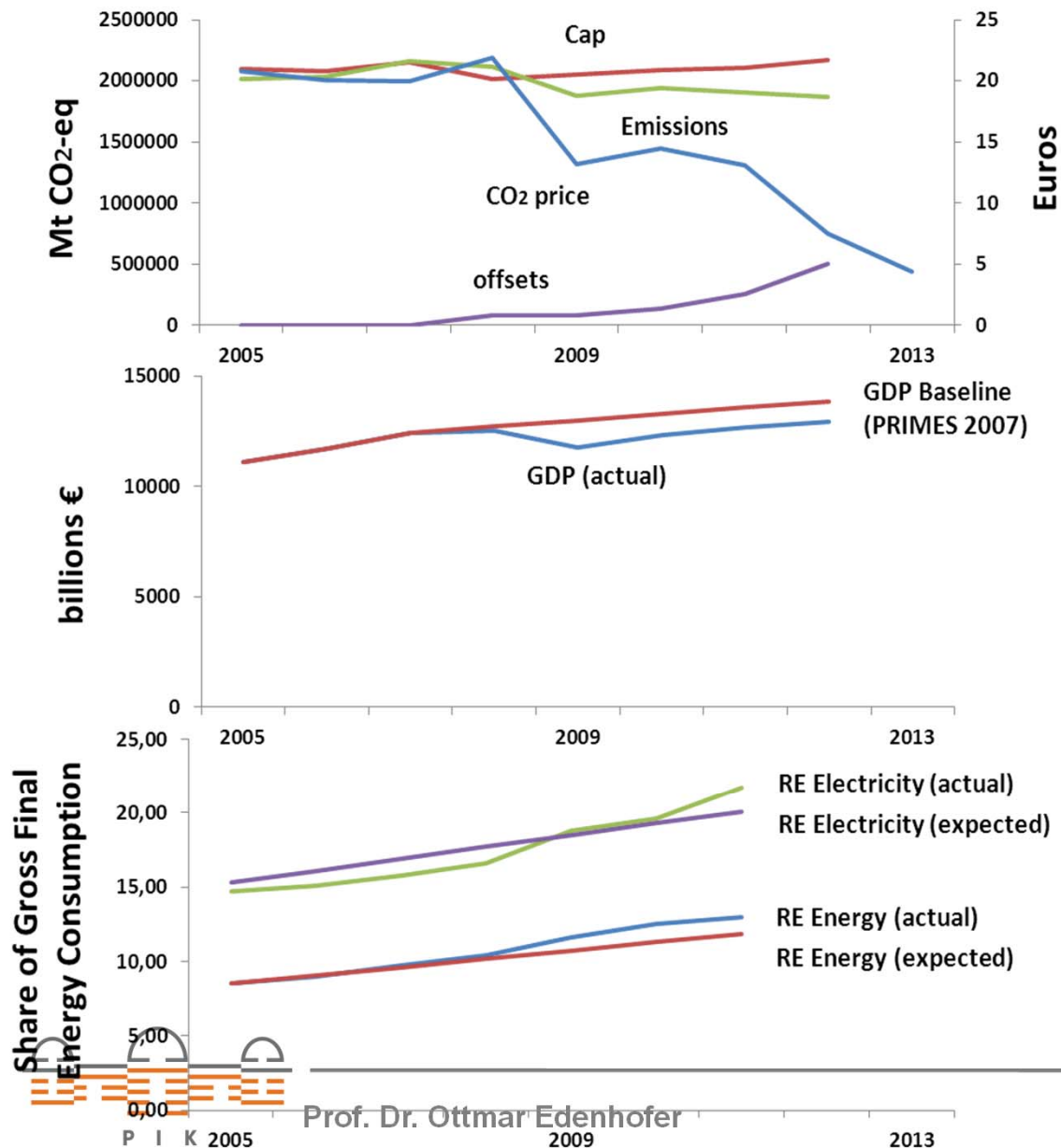


The ETS reform space



Source: Grosjean et al. (2014)

Empirical Price Drivers in the EU ETS



Potential Drivers

1) EU ETS Design

- Cap
- Offsets
- ...

2) Exogenous shocks

- Economic crisis
- Additional policies
- International policy
- Fuel prices
- Technology shocks
-

3) Credibility

- Credibility of long-term cap
- ...

4) Market Failures

- Suboptimal discounting?
- ...