



WHAT IS THE FUTURE FOR FOSSIL FUEL RESOURCES IN TERMS OF INNOVATION?

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BUSINESS VIEW ON INNOVATIONS IS VERY PRAGMATIC...



- **Innovations are to generate profit**
- Innovations in power sector are expensive, and therefore need long time to pay back

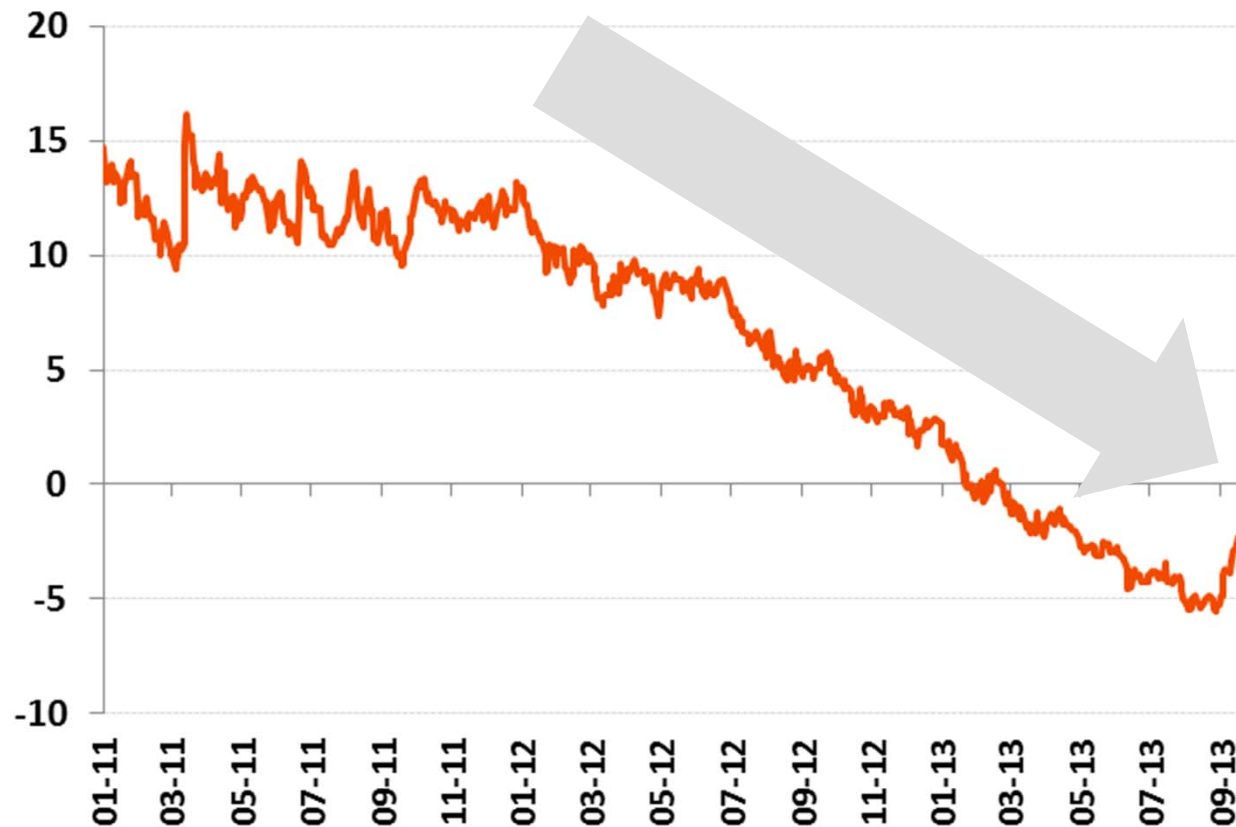


- Innovations in power sector need **stability and predictability of the business environment**

... AND THIS IS WHY THERE IS NO CLEAR DEMAND FOR INNOVATIONS AT THE MOMENT



Clean spark spread based on the Peak load contract
EUR/MWh, Cal14



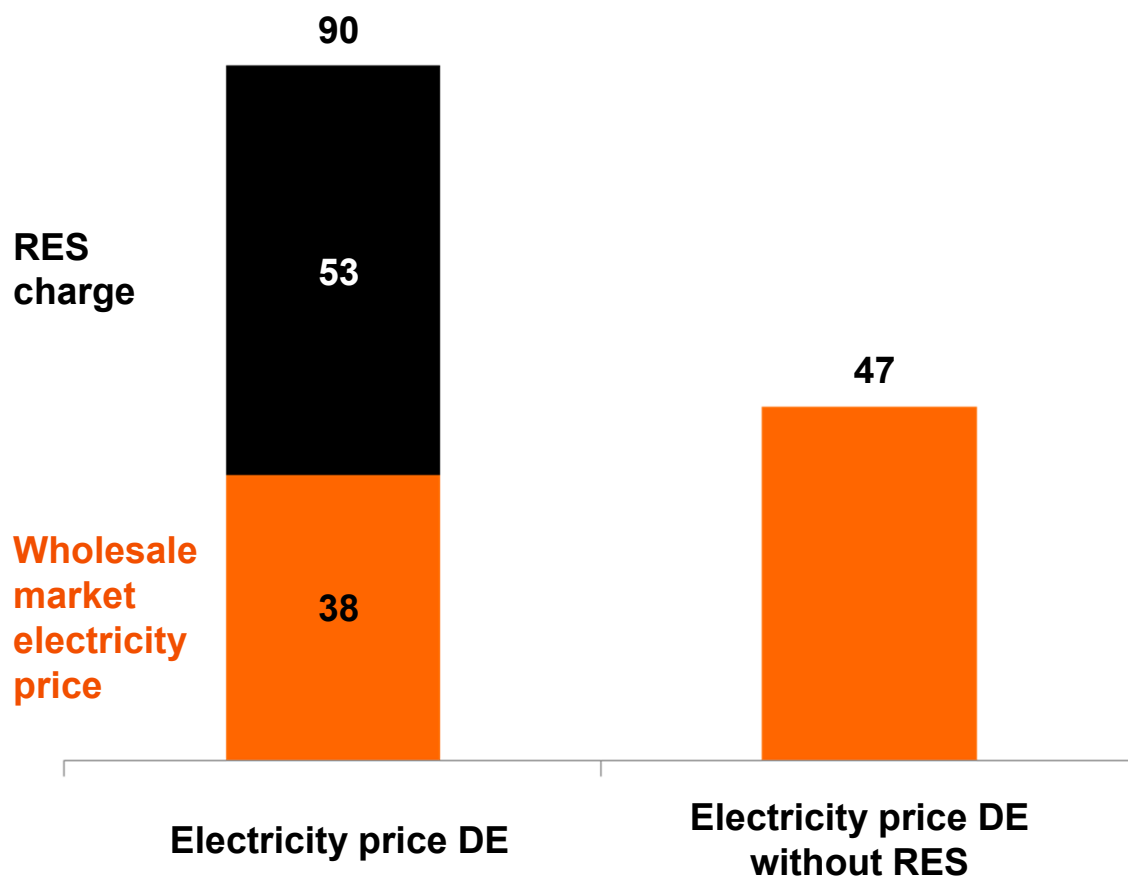
- Clean spark spread for the most efficient gas plant (58%) is negative even during the peak load
- No major improvement is expected in the foreseeable future
- Therefore, no incentive for further investment and innovation
- On the contrary, many news about shutting down, mothballing or even delocalization of the newest gas plants have appeared in the past months
- Two major reasons:
 - 1 RES
 - 2 CO2 price drop

ARTIFICIAL RENEWABLE GROWTH, THOUGH FOR HUGE COSTS, DECREASES WHOLESALE POWER PRICE



1

Electricity price in Germany
EUR/MWh



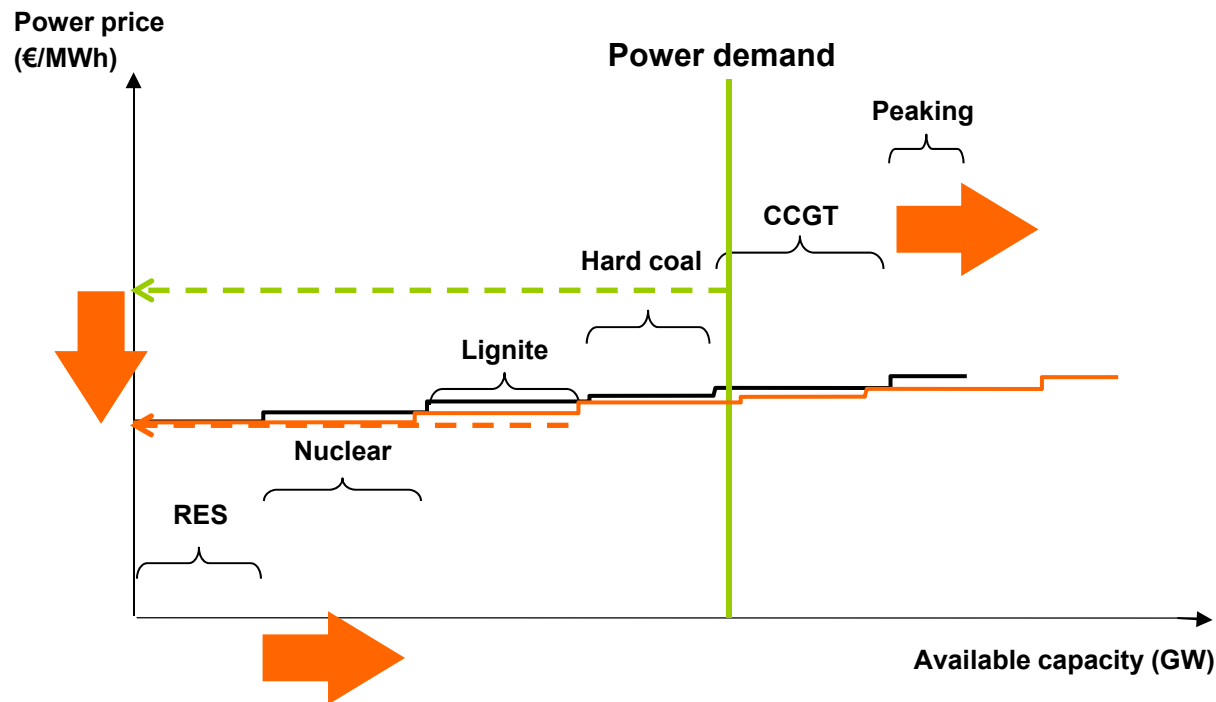
- Working EU ETS would mean that the wholesale power price would be sufficient to incentivize new innovations which would be needed to continue with the decarbonization
- Today, with the targets driven by subsidies, final electricity is very high but at the same time the wholesale part is insufficient to cover any new investments
- Moreover, the weakening of the market induces further costs needed to assure the security of supply

THERE IS NOT MUCH ROOM LEFT FOR INVESTMENTS INTO THE FOSSIL FUELS IF THE MAIN FOCUS CONTINUES TO BE ON ARTIFICIAL RES GROWTH



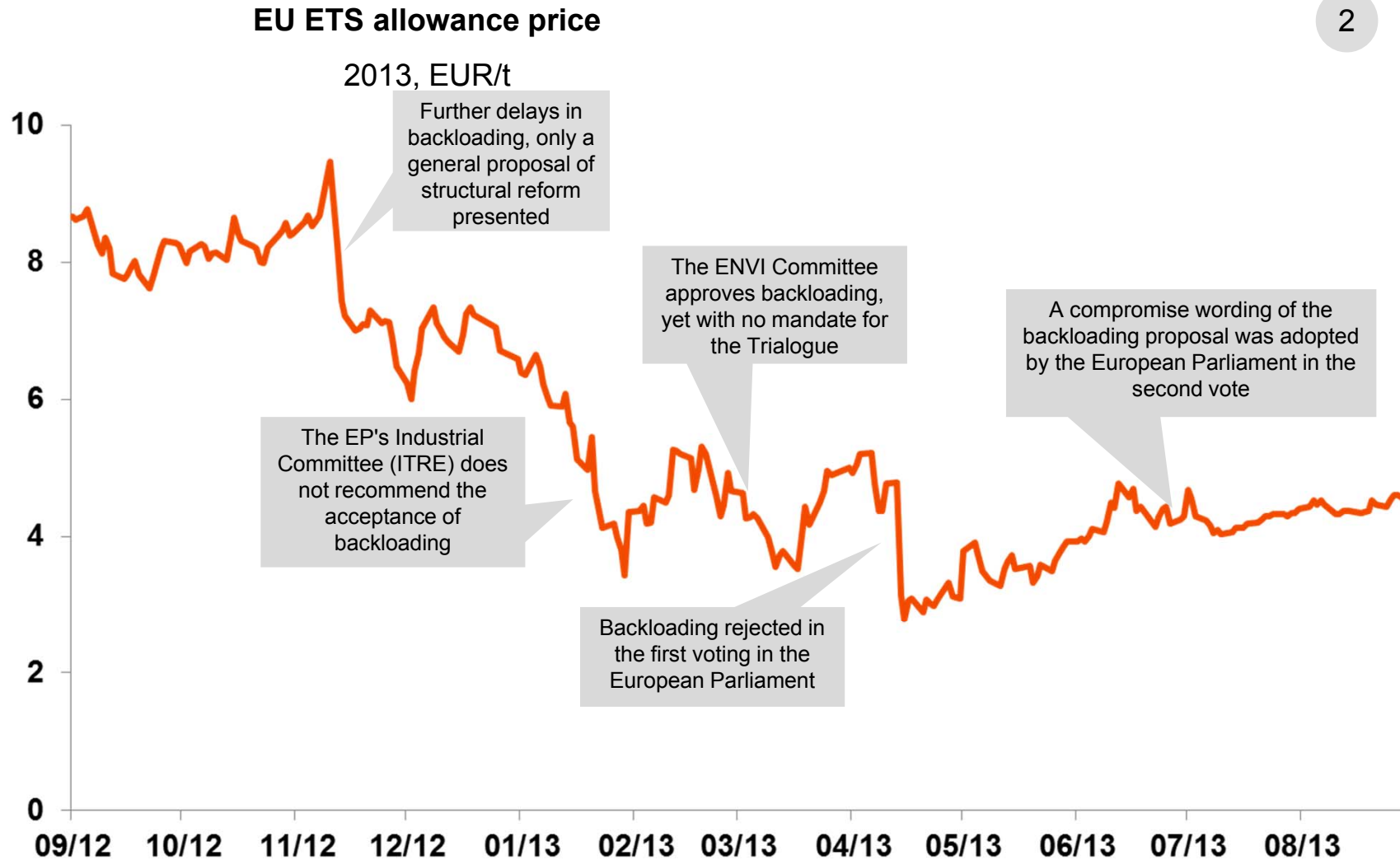
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Impact of growing installed capacity in renewables on the merit curve and on the power prices



- Steep increase in renewables push the traditional sources out of the merit curve which threatens their profitability and makes new investments risky
- System does not create incentives for developing low-carbon technologies for fossil fuels

CO2 PRICE IS HIGHLY UNSTABLE...

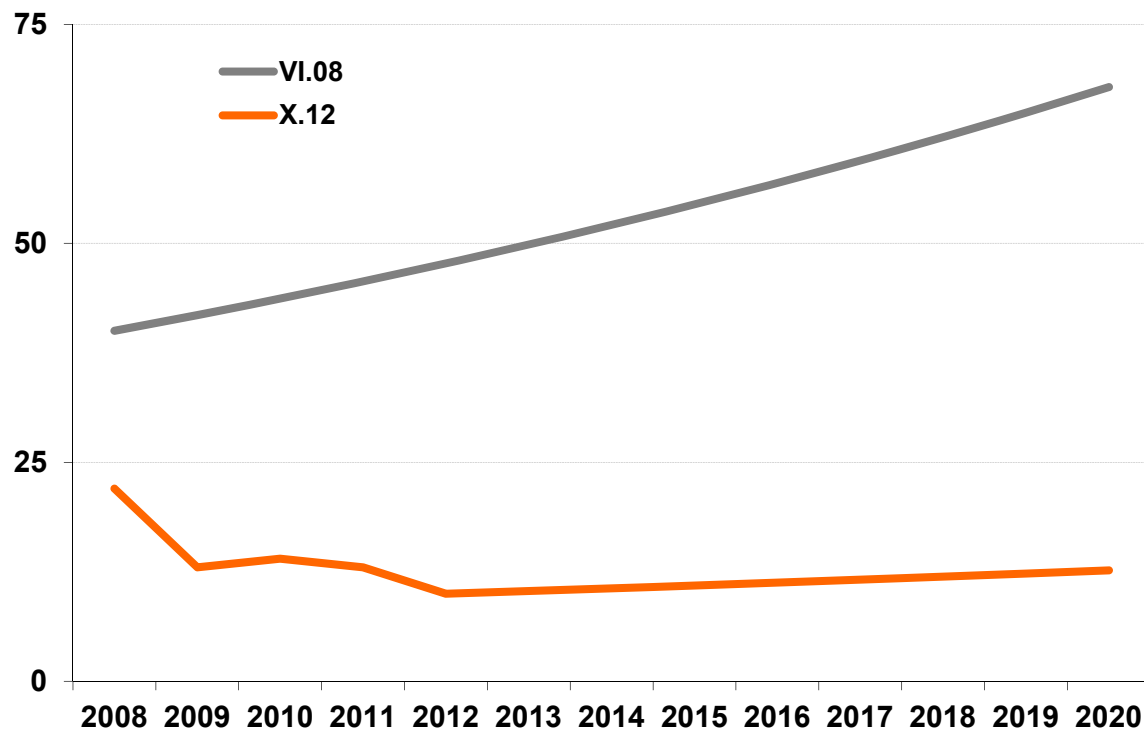


... AND CO2 PRICE PREDICTABILITY IS NEGLIGIBLE



2

Future EUA dynamics forecasts in 2008 and 2012
EUR/t



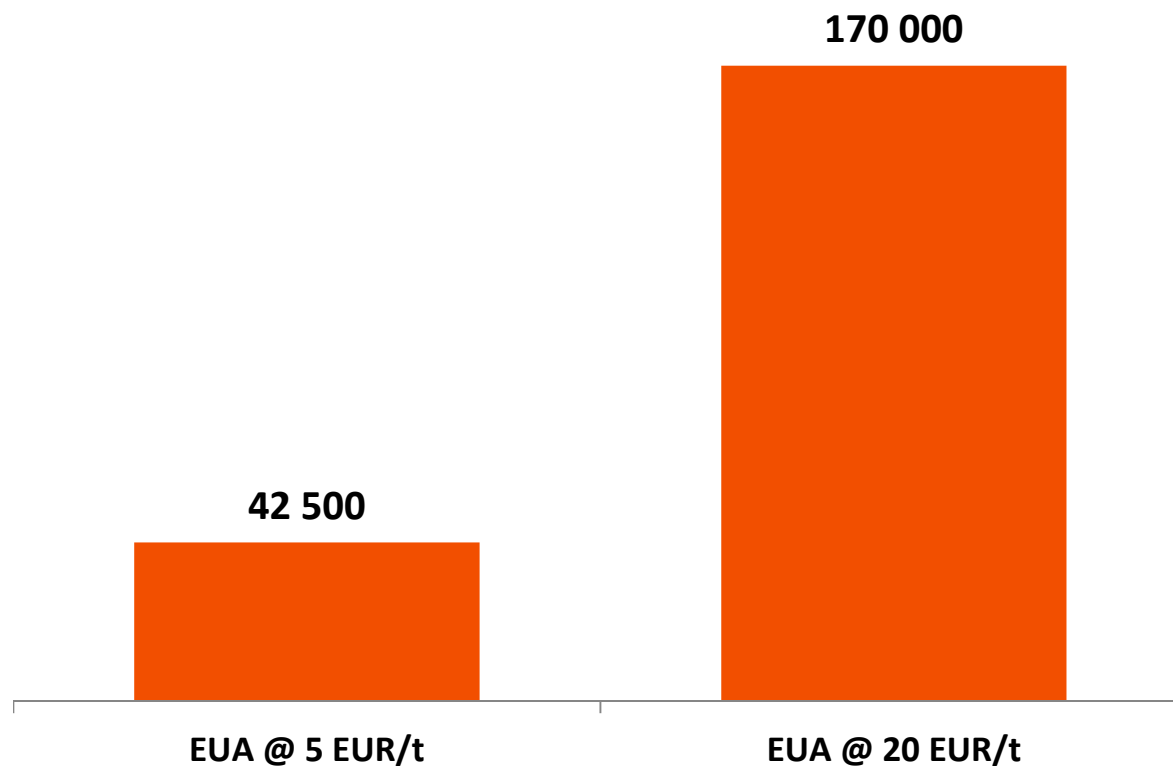
- Europe claims its willingness to have a modern, clean and innovative economy
- However, it fails in sending a clear and robust economic and regulatory signals which undermines the credibility of the above stated targets
- Decarbonization policy is a good example of such inconsistency
 - there are ambitious targets implying a huge need of technological innovation
 - in practice, the practical tool (EU ETS) does not provide any incentive for these innovations

MOREOVER, LOW PROCEEDS FROM EUA AUCTIONS MEANS LESS FINANCIAL INCENTIVES DEDICATED TO INNOVATIONS



2

Expected proceeds from the EUA auctioning in the Phase 3
mil EUR

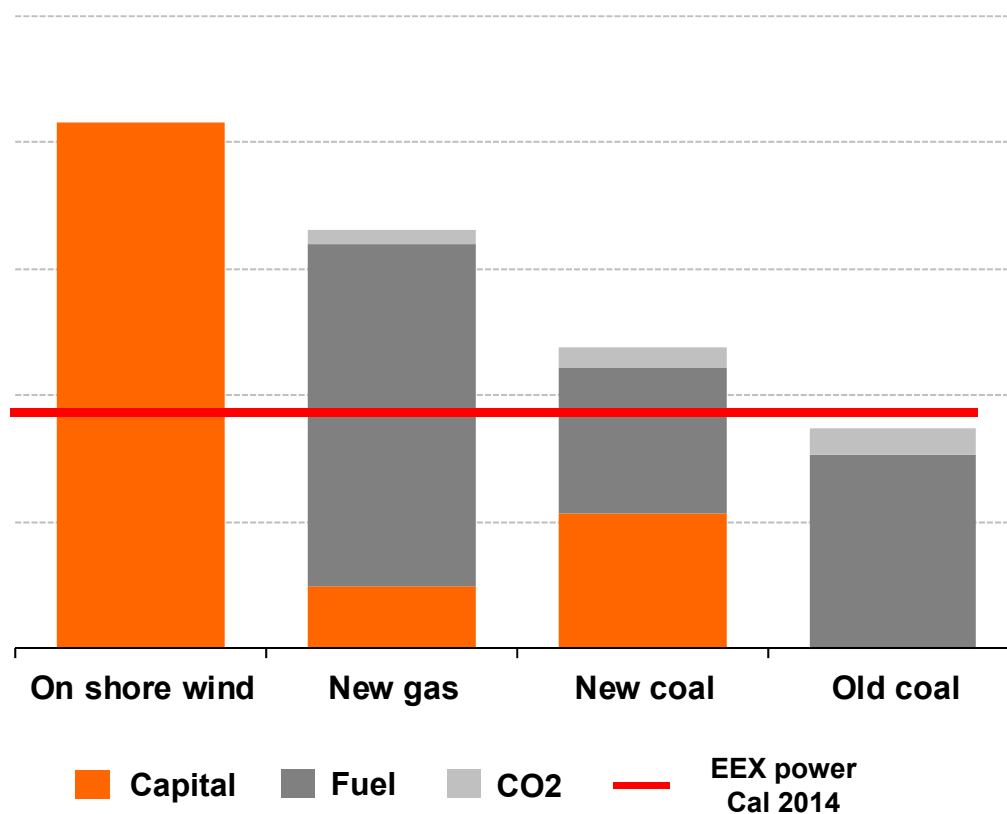


- Some 8500 Mt of allowances should be auctioned in the Phase 3
- At least half of the proceeds of the EUA auctioning have to be used to promote further decarbonization – potential financial resource for innovations
- For example, proceeds from the NER300 auctions have been dedicated to fund the innovative low carbon energy demonstration projects like CCS
 - 8 CCS projects were supposed to be financed in the first round
 - In reality, not a single project realized in this first round
 - Only one project submitted in the second round

IN REALITY, THE BEST STRATEGY TODAY IS TO GENERATE IN OLD EXISTING PLANTS INSTEAD OF INVESTING INTO INNOVATIONS



Full costs of wind, new gas, new coal and old coal plant
EUR/MWh



- Operating existing coal and lignite plants is economically attractive in the current situation
- Consequently, the originally planned decommissioning of these plants is being delayed
- As the CEO of E.ON, Mr. Teyssen observes *“European power is getting dirtier.”*
- RES are completely uncompetitive, but still pushed artificially into the generation portfolio by heavy subsidies

RENEWABLES ARE MATURING – AND ITS TIME TO INCORPORATE THEM INTO THE STANDARD MARKET



- Feed in Tarrif



- Green Certificates or Fixed Price Adder to the market price

- Mandatory offtake

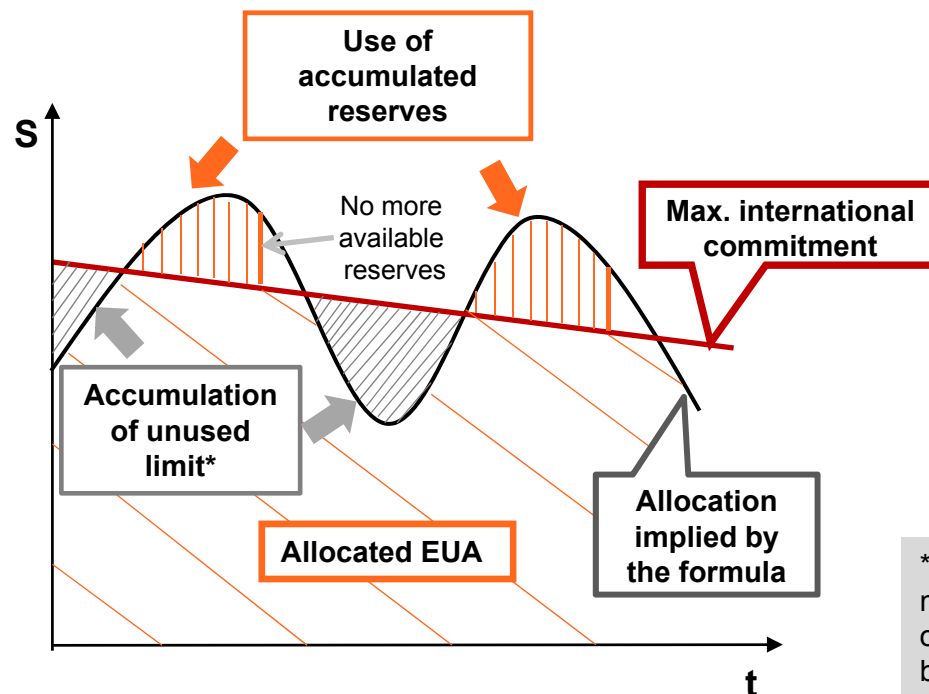


- Nomination of RES production
- Balancing responsibility

A FLEXIBLE CAP-AND-TRADE MECHANISM CAN BRING BACK THE ORIGINAL EU ETS EFFICIENCY



- In case of a GDP drop, the system prevents price collapse but maintains the pace of decarbonization
- In case of a substantial GDP rise, stabilization is incomplete
- There are a number of ways to implement this (i.e. reserve fund, automatic intensity adjustment)



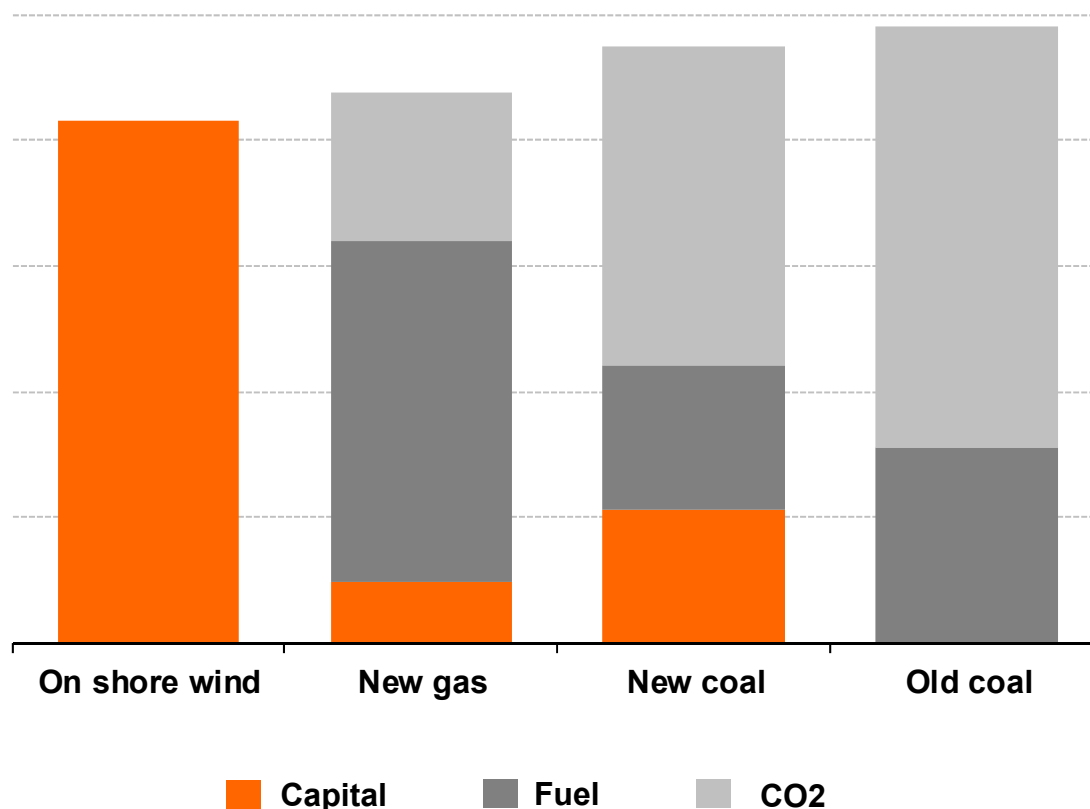
- A reserve fund is set up at the beginning (analogy of current NER)
- During recession, the difference between the committed and auctioned volume goes to the fund
- During economic growth, allowances from the fund are used

* Ex.: The EU commitment allows to emit 100Mt max, but due to weak economic activity the supply on the market is only 95Mt. The remaining 5Mt can be used later, during a potential economic boom.

IF THE MARKET REALLY GETS A CHANCE, THE NEW INNOVATED FOSSIL FUEL SOURCES WOULD GET A COMPARATIVE ADVANTAGE



Full costs of wind, new gas, new coal and old coal plant
EUR/MWh



- Under the 2008 assumptions, growing CO2 price would favor the new sources
- This would create a pressure for a constant improvement of the plant efficiency
- Eventually, also the RES sources would find their place on the market naturally