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The Impact of a Carbon Price-floor on the German Power Sector

Université Paris-Dauphine, Chaire European Electricity Markets (CEEM)

Seminar on European Electricity and Carbon Markets after the ETS reform

Session 2

» Could a Carbon Price Floor Support a more Ambitious Decarbonisation of the Power Sector? «

Dr Felix Chr Matthes

Paris | 8th November 2018

Starting point #1: Where do we stand on the EU ETS? For the time being it‘s about economic core beliefs

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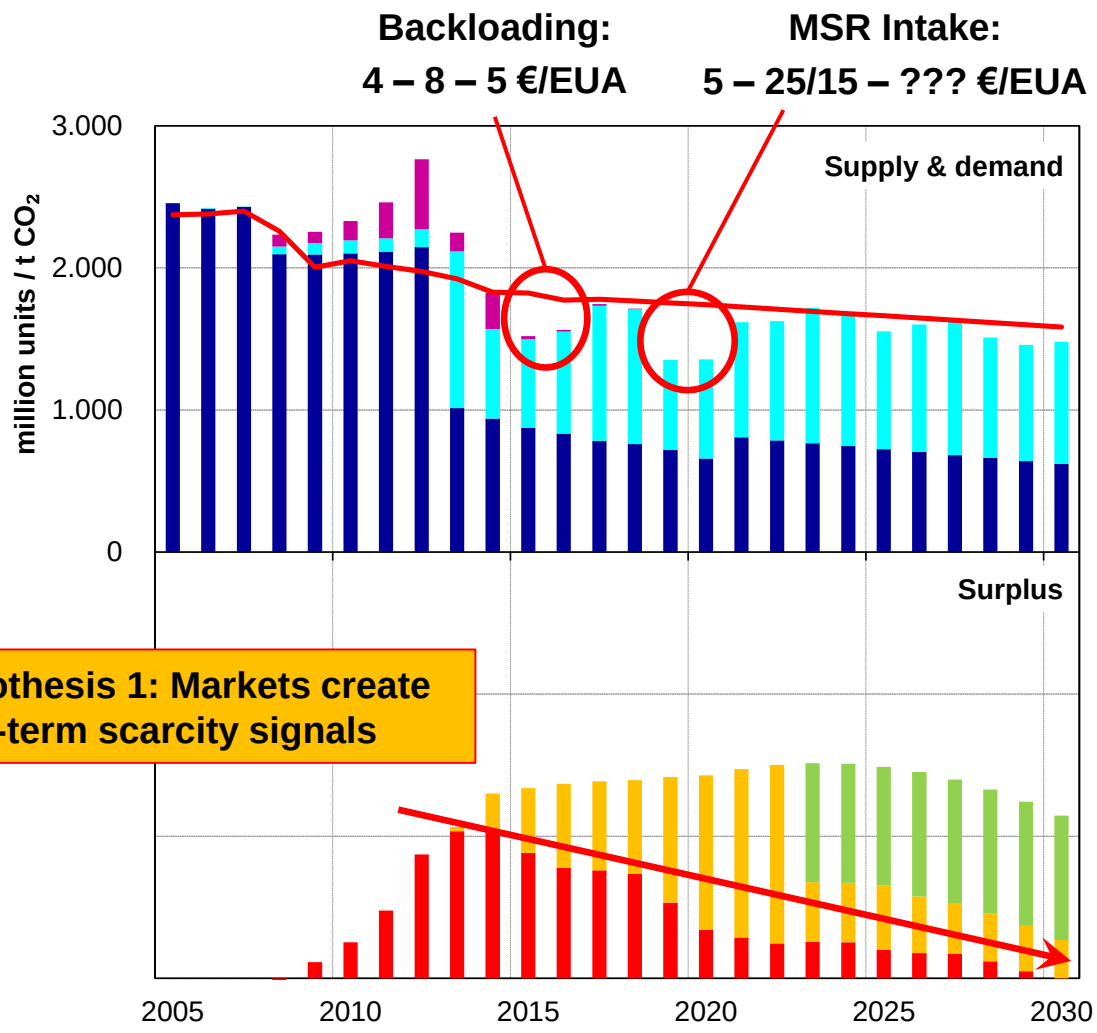


Hypothesis 1: Markets create long-term scarcity signals

Hypothesis 2: Short-term market drivers determine price effects

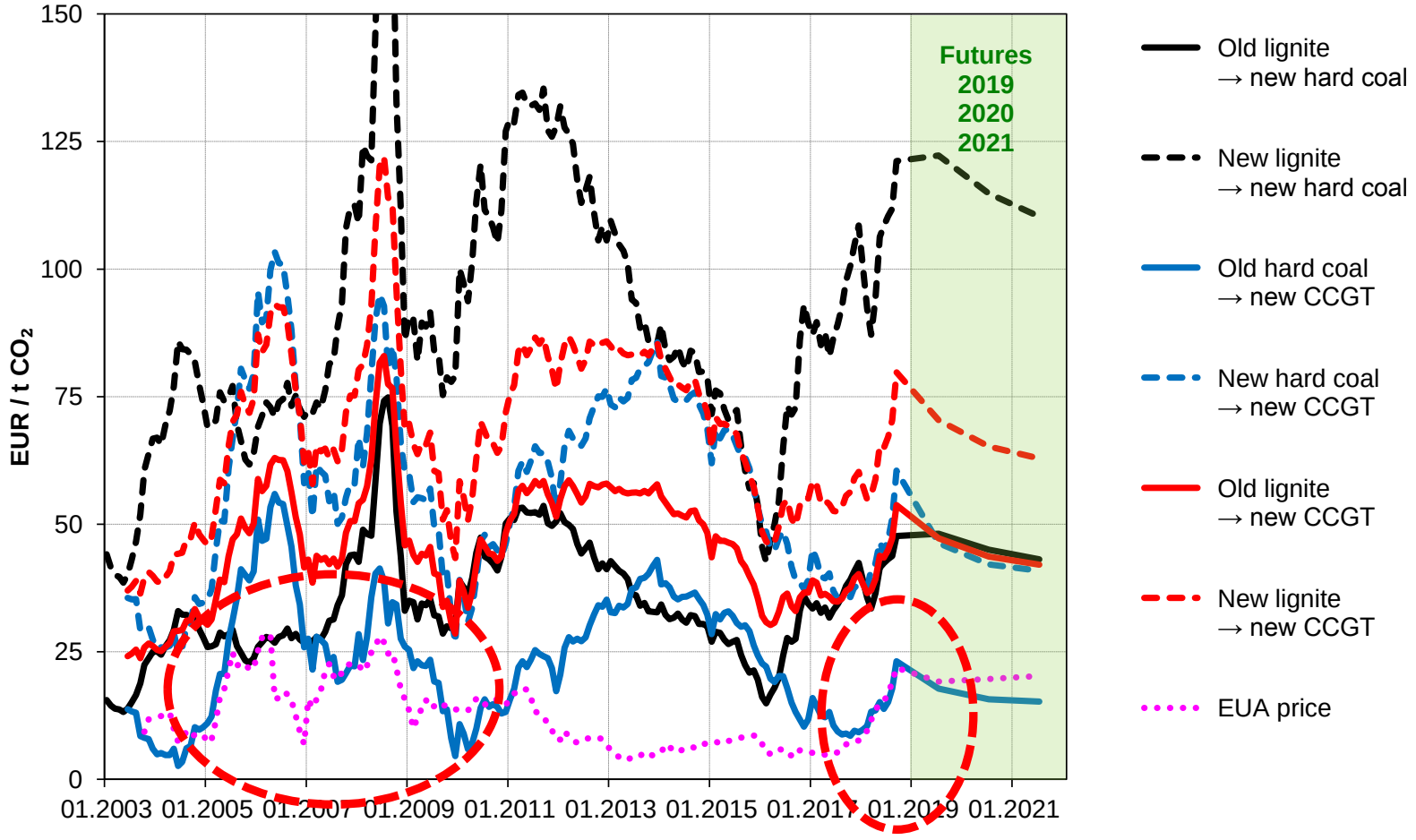
- Surrendered CER/ERU
- Auctions & sales
- Free allocation*

Challenge: What trajectories of carbon prices will be suitable to sectors with long-living capital stocks: is ‘sailing into the cliff’ a (efficient) real-world option?

- Cancellations
- Surplus (not available to the market)
- Surplus (available to the market)
- Verified emissions*

* incl. scope corrections

Memo item: the EU ETS reform is not the only game in town – fuel switch benchmarks & EUA prices



Fuel switch costs in the Central Western European electricity market and EUA prices

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Starting point #2: Phase-out of coal in Germany
Firmly on the agenda: the "Coal Commission"

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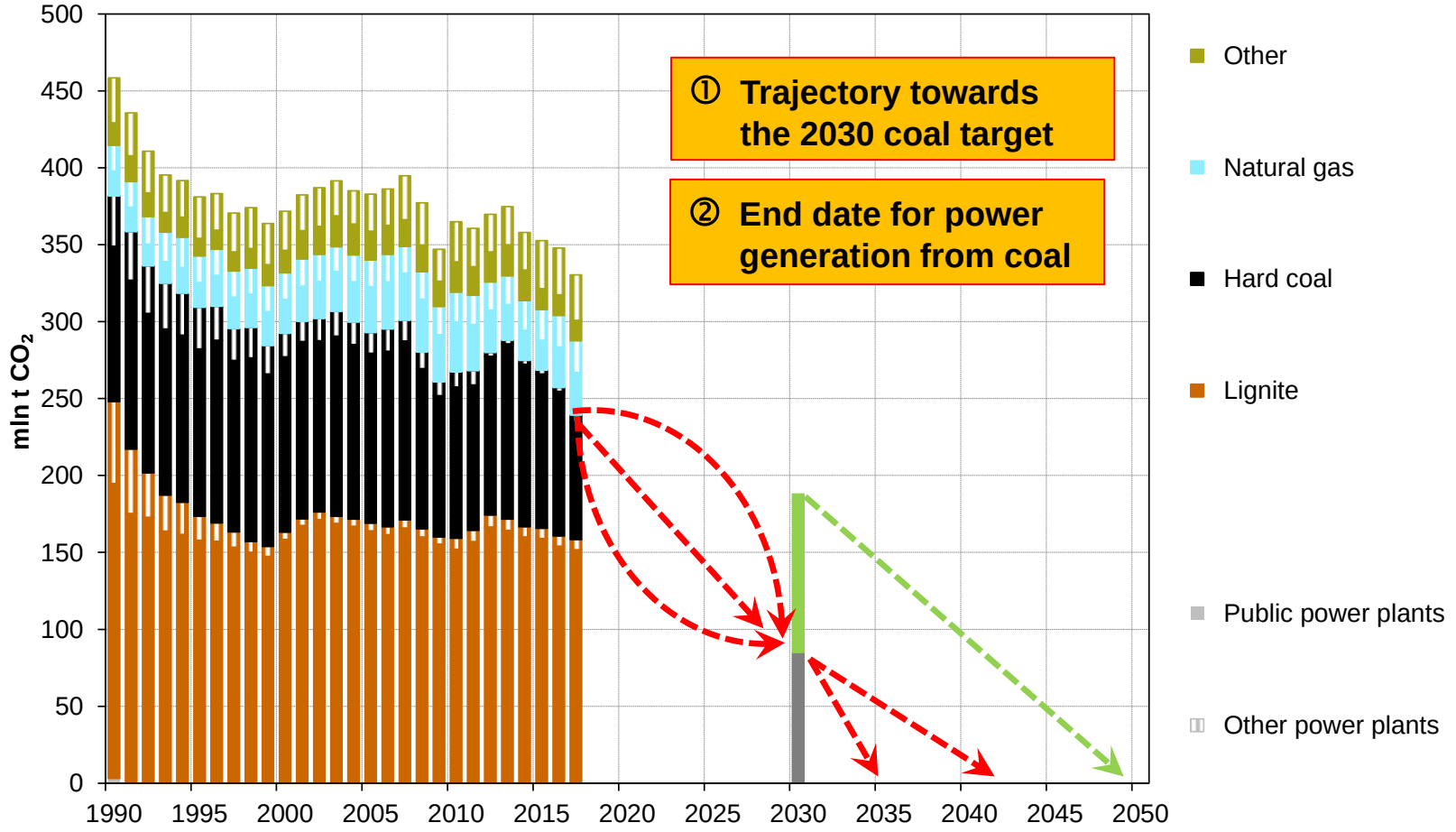

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The role of carbon pricing for power sector decarbonization (not only in Germany)

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- **The contribution of the EU ETS in its recent design & parameterization for (rapid) power sector decarbonization**
  - is questionable or at least uncertain
  - at least for the next decade
  - when the next window of opportunity will open (at which level)?
- **Carbon pricing is not without alternatives for power sector decarbonization (what ever one might think on cost-effectiveness)**
  - what are the alternatives (push-out, buy-out)
  - what are the implications of carbon pricing approaches and alternatives
    - national and European CO_2 emissions
    - security of supply (capacity trends)
    - cross-border electricity exchange
    - wholesale and retail electricity prices and electricity costs
  - with respect to the specific characteristics of (integrated) lignite utilities

The WWF carbon floor-price projects
Overview

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- **Three studies (#1 in 2014, #2 and #3 in 2018)**
- **Study #2 (published)**
  - an unilateral carbon floor-price for Germany at various levels
  - a carbon floor-price for the CWE countries at various levels
  - two different forced shut-down strategies
  - hybrid approaches (floor-price and forced shut-downs)
  - one fuel price scenario, time horizon 2020
- **Study #3 (forthcoming)**
  - carbon floor-price for the CWE countries at various levels
  - two different forced shut-down strategies
  - hybrid approaches (floor-price and forced shut-downs)
  - two different fuel price scenarios, time horizon 2025 and 2030
- **Modelling framework: European dispatch model with additional modules for economic assessment of avoidable fixed costs for power plants and lignite mining systems**

LignIx35 – The clean brown spread to cover avoidable fixed costs of older power plants & mines

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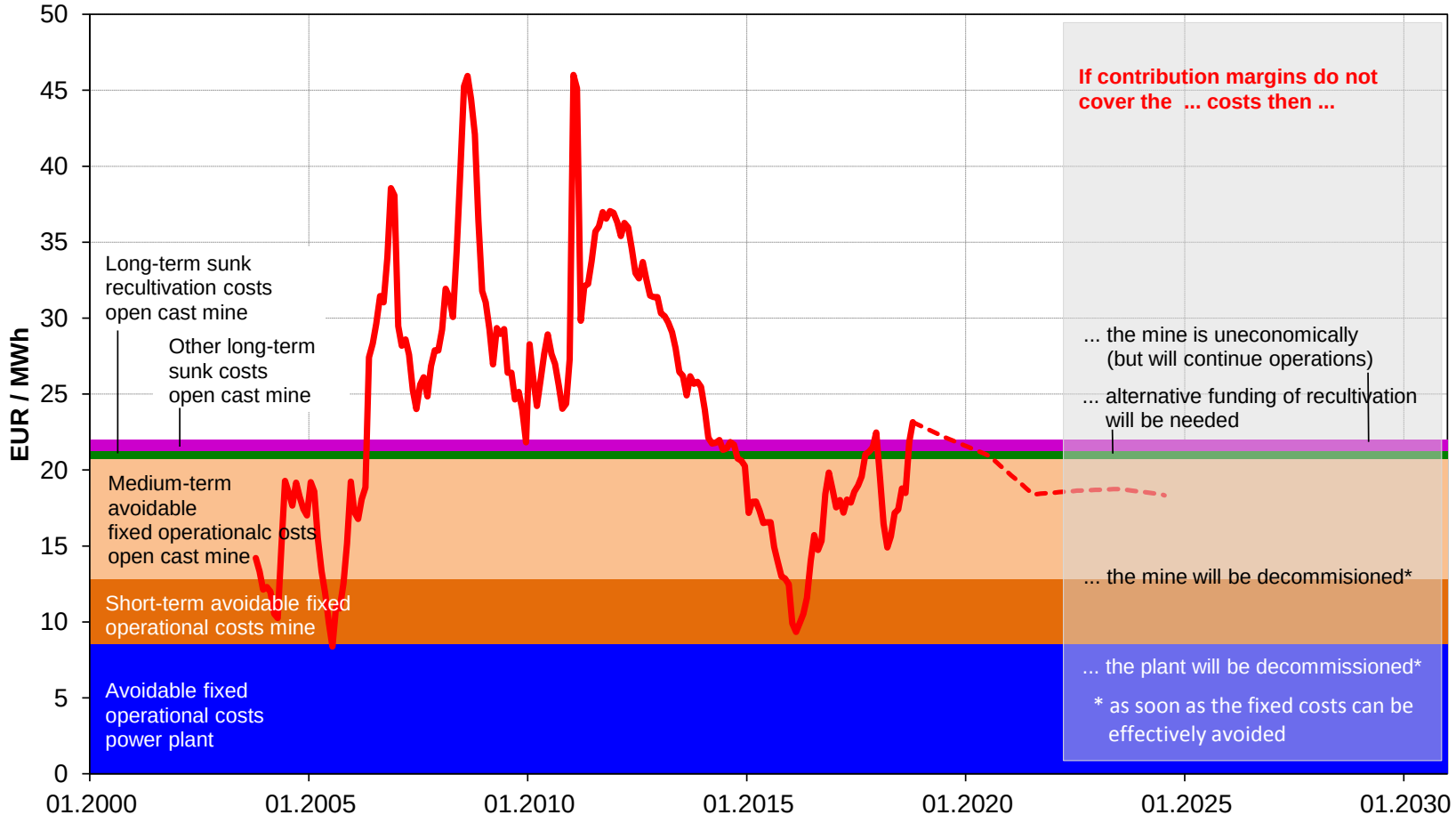

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Emission reductions in the German power sector from different policy tools (2020, Study #2)

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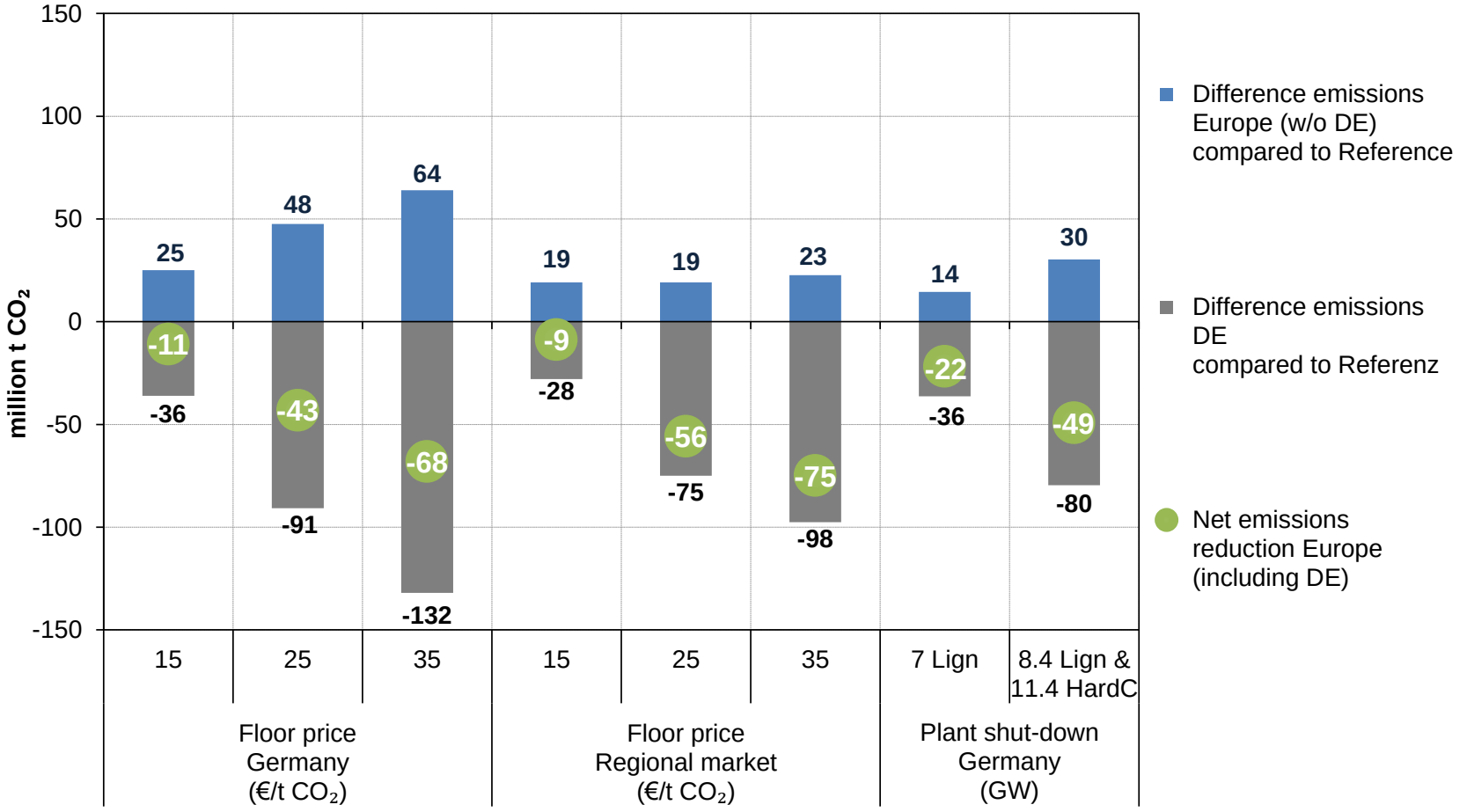
The challenges from national floor-prices
Significant cross-border effects (2020, Study #2)



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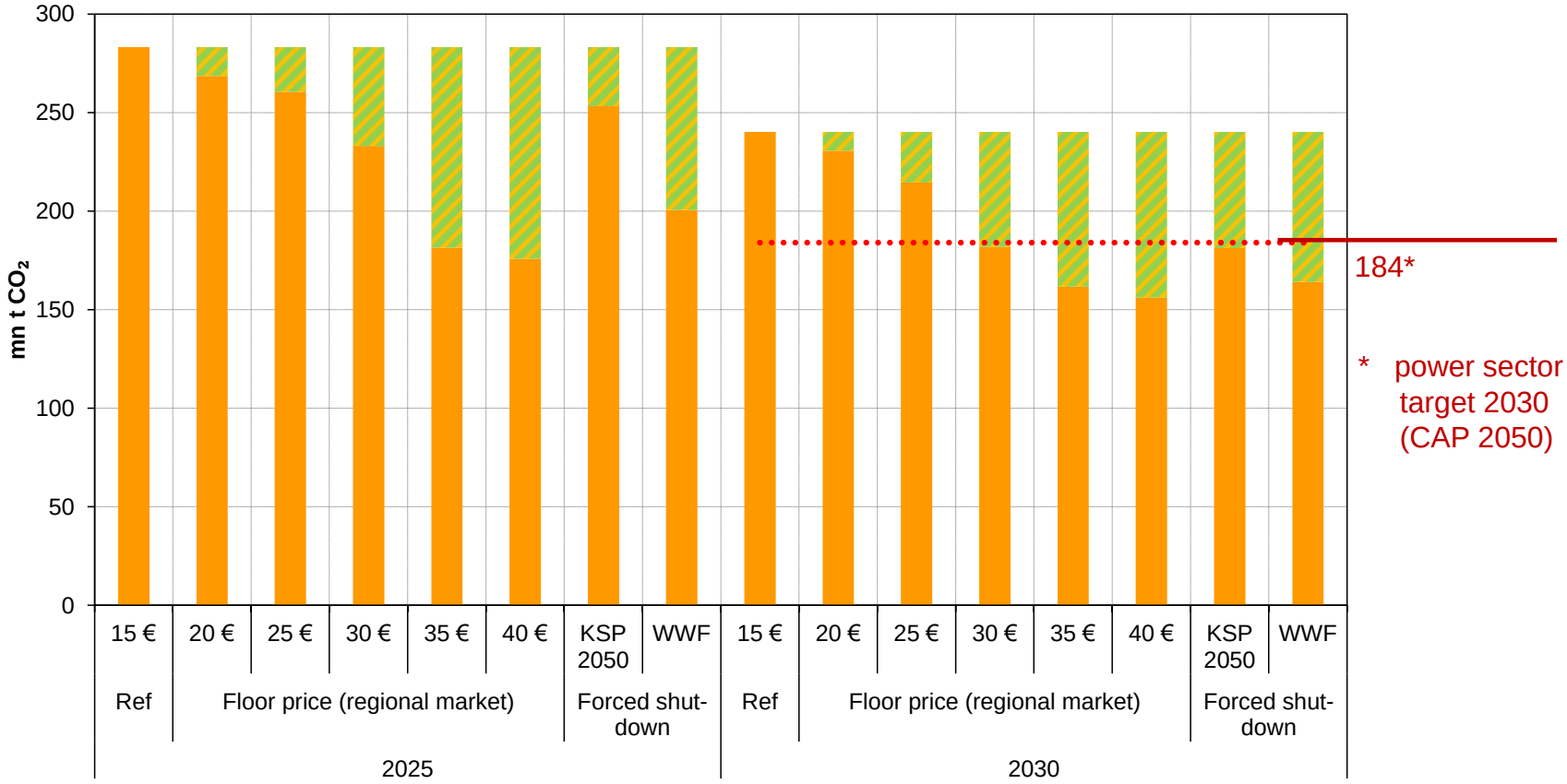
The longer time horizon (2025, 2030, Study #3)
Effects on German CO2 emissions



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The longer time horizon (2025, 2030, Study #3)
Effects on German and European CO2 emissions

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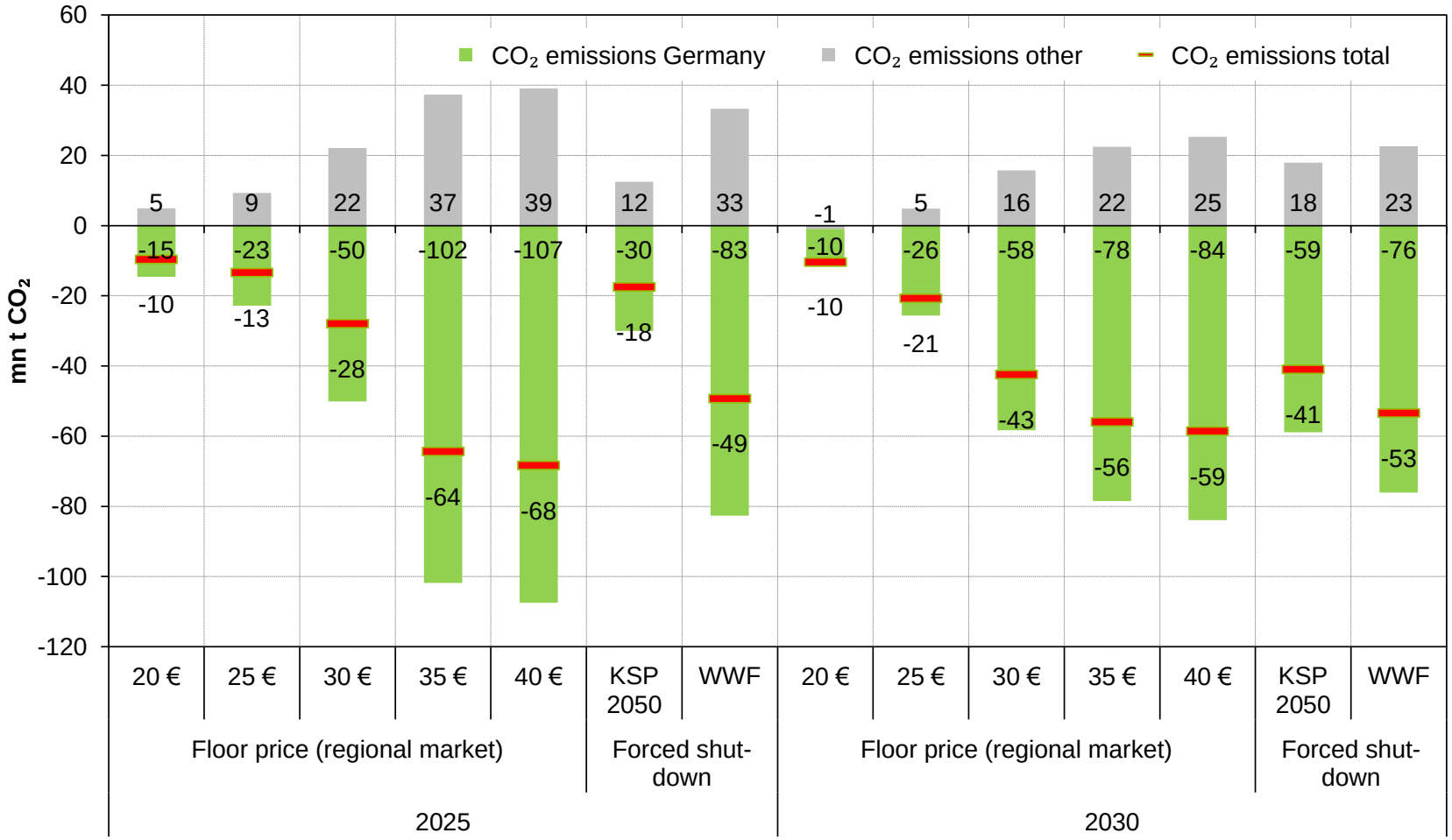

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The longer time horizon (2025, 2030, Study #3)
Effects on German generation capacity

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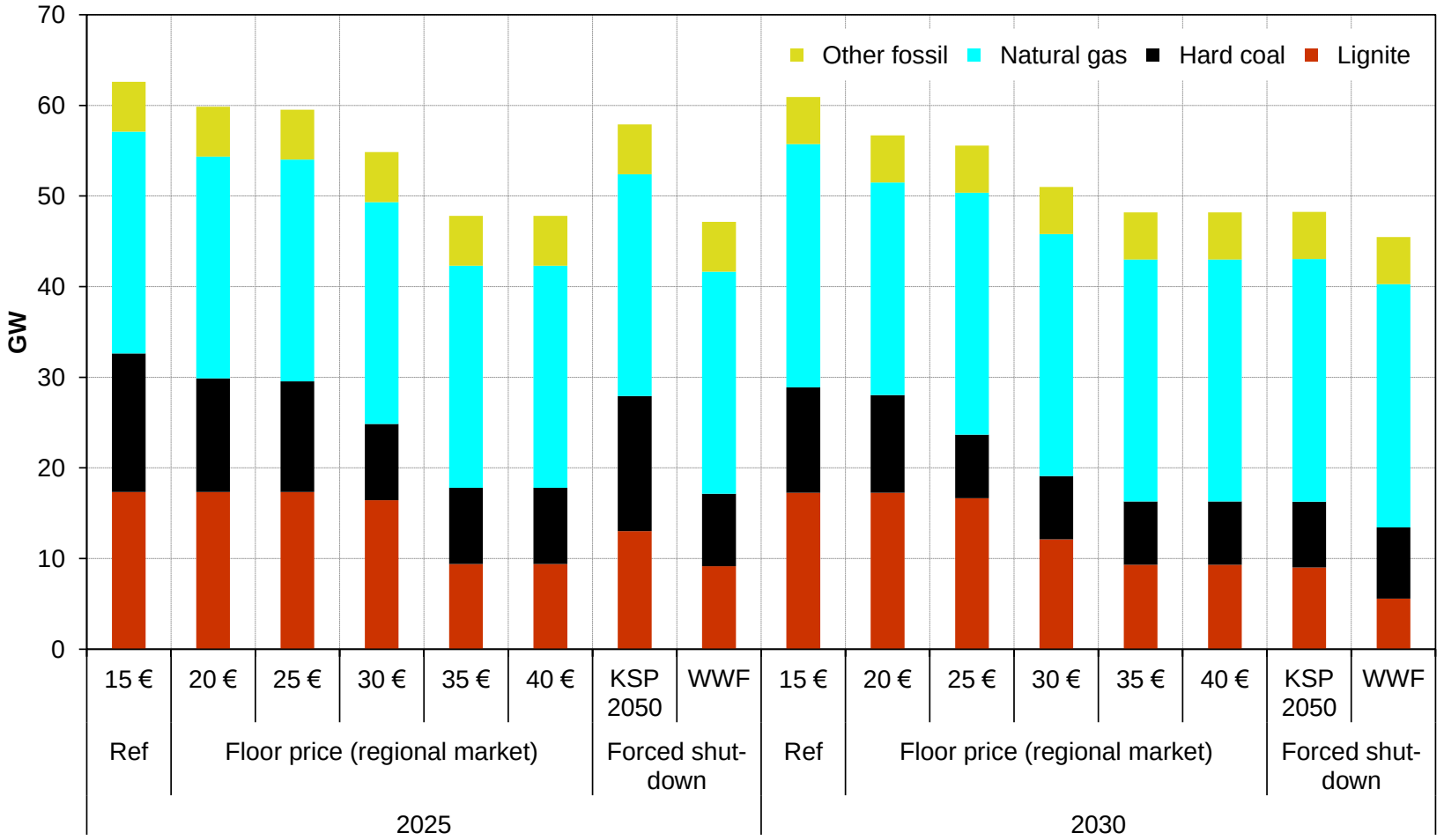

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The longer time horizon (2025, 2030, Study #3)
Effects on cross-border electricity flows

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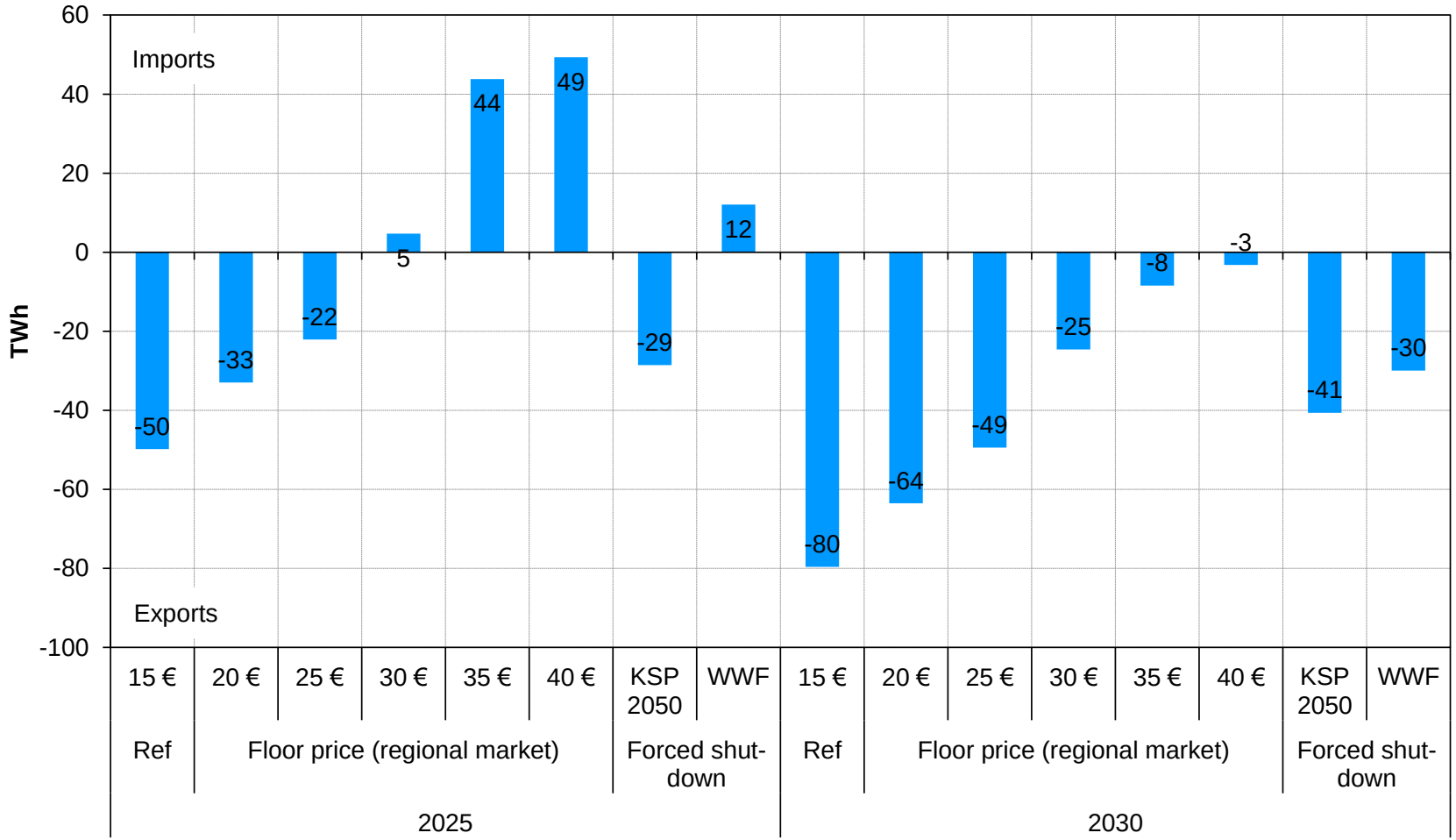

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The longer time horizon (2025, 2030, Study #3)
Wholesale market prices (≠ costs!) in Germany

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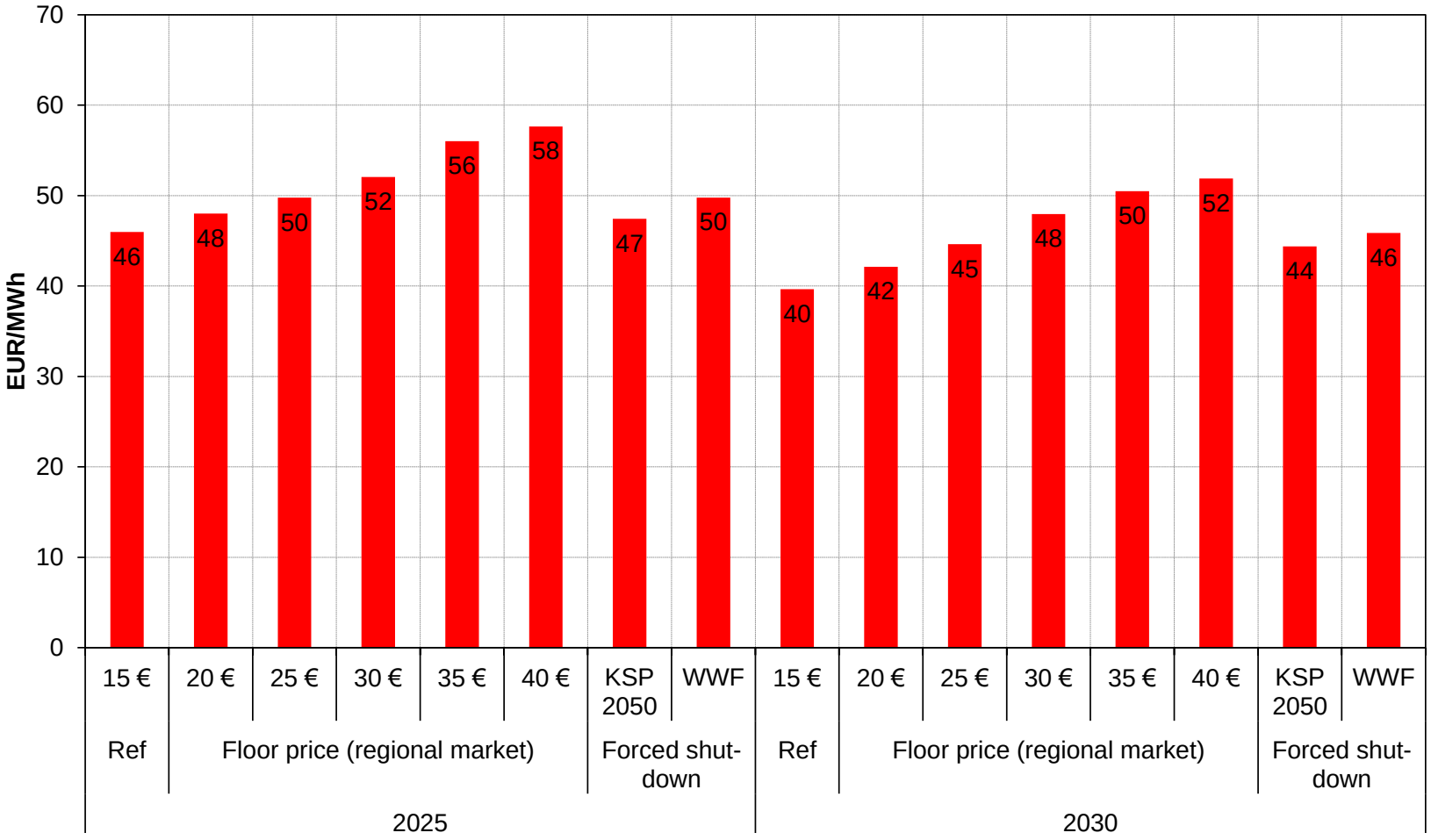

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A carbon floor-price for CWE power plants
Implications for German retail prices & costs

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- **Wholesale market price effects of a carbon floor-price are higher than for exclusive forced shut-down policies**
- **Some interactions with other mechanisms need to be considered for assessing the retail price effects or effective costs**
  - interactions between German RES surcharge and wholesale market prices will compensate >50% of wholesale market effects for non-privileged end-consumers (approx. 2/3 of total consumption), this is, however, not a unique feature for carbon floor-price
  - a floor-price add-on to the EUA price should be eligible for compensation of indirect CO2 costs, for a carbon floor-price this will lead to effective electricity costs which are ~10% less than for the wholesale price effects of exclusive forced shut-down mechanisms that trigger comparable CO2 emission reductions
- **A carbon floor-price will create significant additional revenue streams**
  - for most producers (at different levels)
  - for the public budget (50% of additional revenues would, however, be needed for compensation of indirect CO2 costs - in the German case)

A carbon floor price for the power sector
A realistic option?

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- **Coal phase-out and carbon pricing are on the political agenda, will it be possible to advance on both issues or linking them?**
  - probability is still 40:60
- **Modelling and analysis of policies and politics shows**
  - many benefits from a FR-Benelux-DE carbon floor price (overall efficiency gains, higher emission reductions with lower losses of firm capacity, lower electricity costs for electricity-intensive industries due to compensation of indirect CO_2 costs)
  - Dutch approach (start with ~20 €/t CO_2 -> 40 €/t CO_2 in 2030) is an interesting blueprint for a CWE carbon floor price
  - British model needs to be the role model for implementation (legal constraints for Germany, compensation of indirect CO_2 costs for electricity-intensive industries)
  - overcoming the political narrative “French nuclear is the big/only beneficiary” against the carbon floor price is crucial
  - hybrid approach (carbon floor price + some (early) capacity buy-out) seems to be a promising approach for Germany

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Thank you very much

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