

Impact of suboptimal design features in the EU ETS

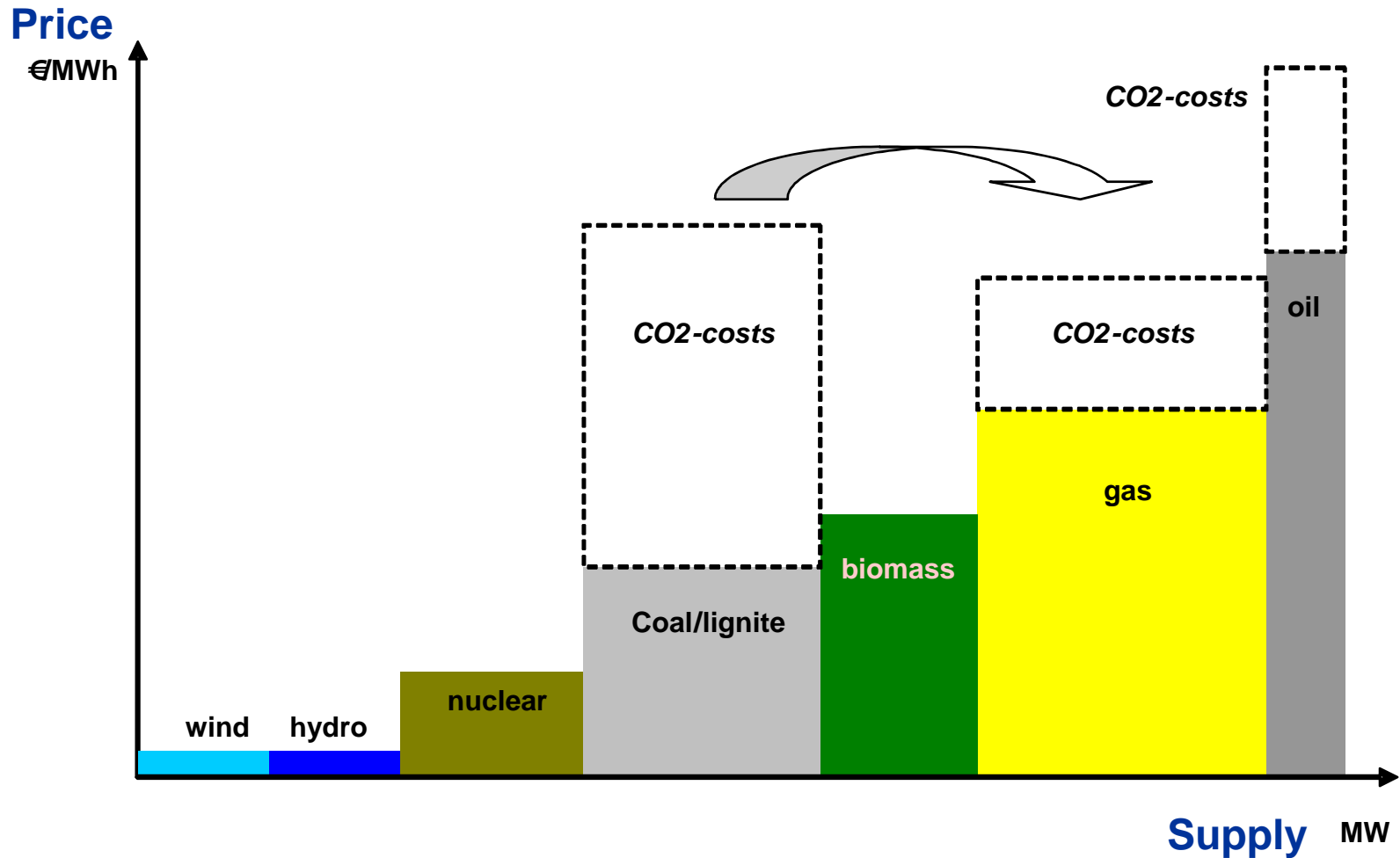
- Allocation in the electricity market -

22 May 2007

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Ea Energy Analyses

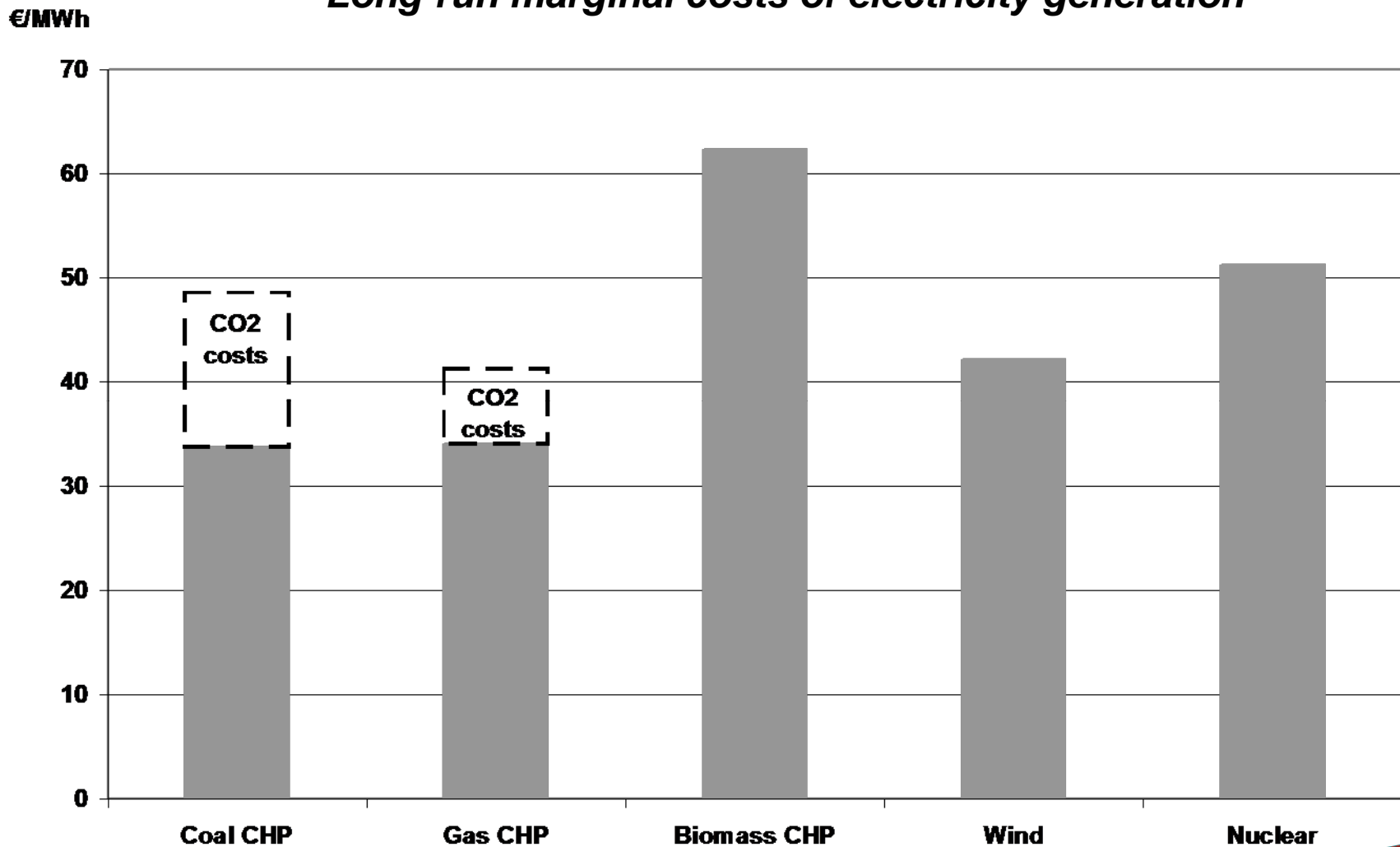
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ETS: Impact on spot market dispatch



ETS: Impact on investments

Long-run marginal costs of electricity generation



Impacts of emissions trading on the electricity sector (optimal design)

- Spot market

- Ensures efficient CO2 reduction



- Investments

- Provides incentive to invest in low carbon technologies



Project outline

- **Goal:** Assess **impact of free allocation to new entrants** in the EU ETS
- **Scope:** Investments in the North European Electricity Market in years 2006 – 2022
- **Methodology:** Use of Partial Equilibrium model
- **Output:** Investment impact, emissions, electricity prices, welfare economy
- **Funded by:** Danish Environmental Protection Agency

NAPs for 2005-7

Allocation to new entrants

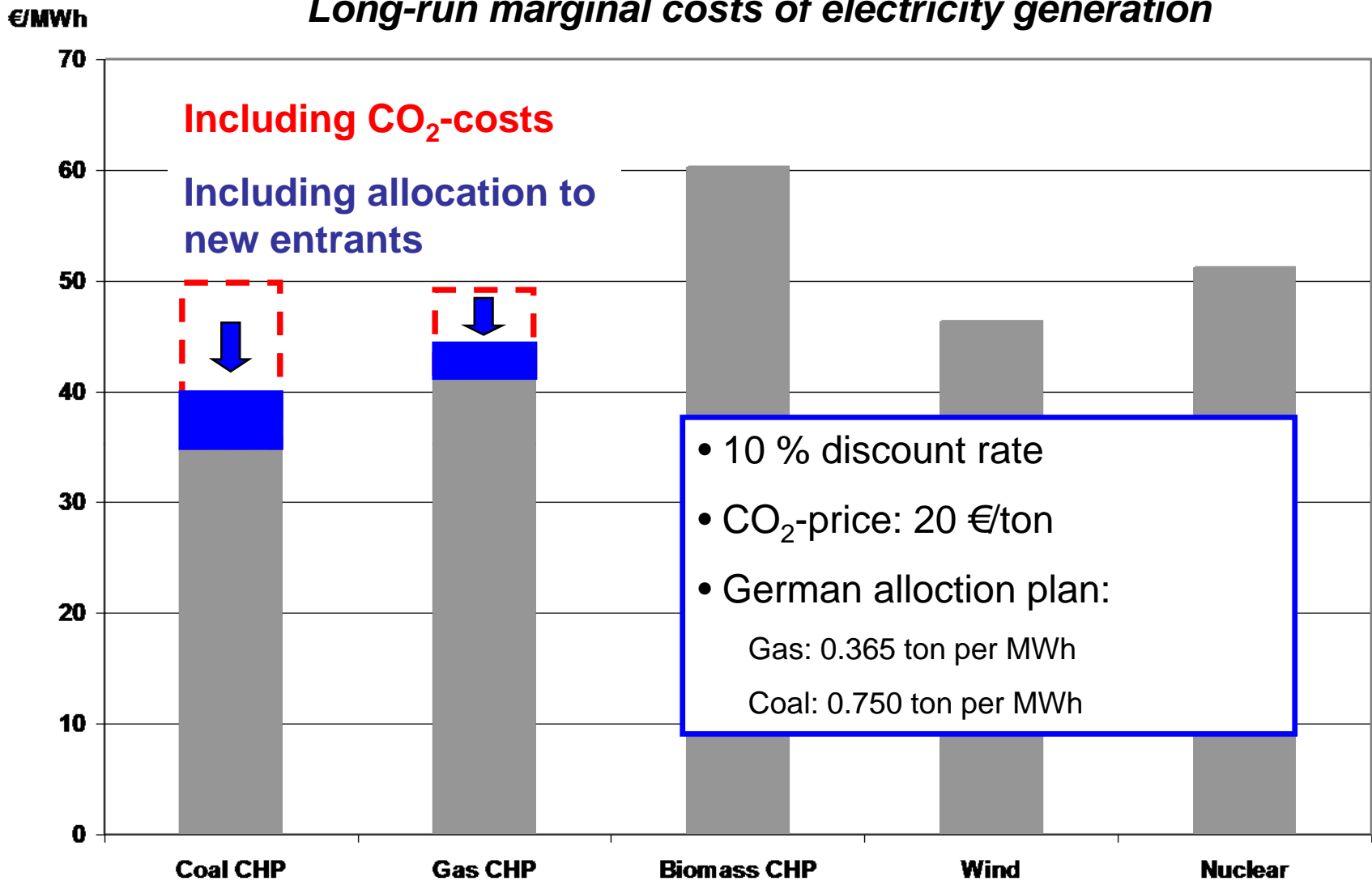
.... is an investment subsidy potentially affecting investors' decisions regarding:

- What technology to choose
- Where investments are situated
- When investments are made

Market distortion => Welfare economic losses

What technology?

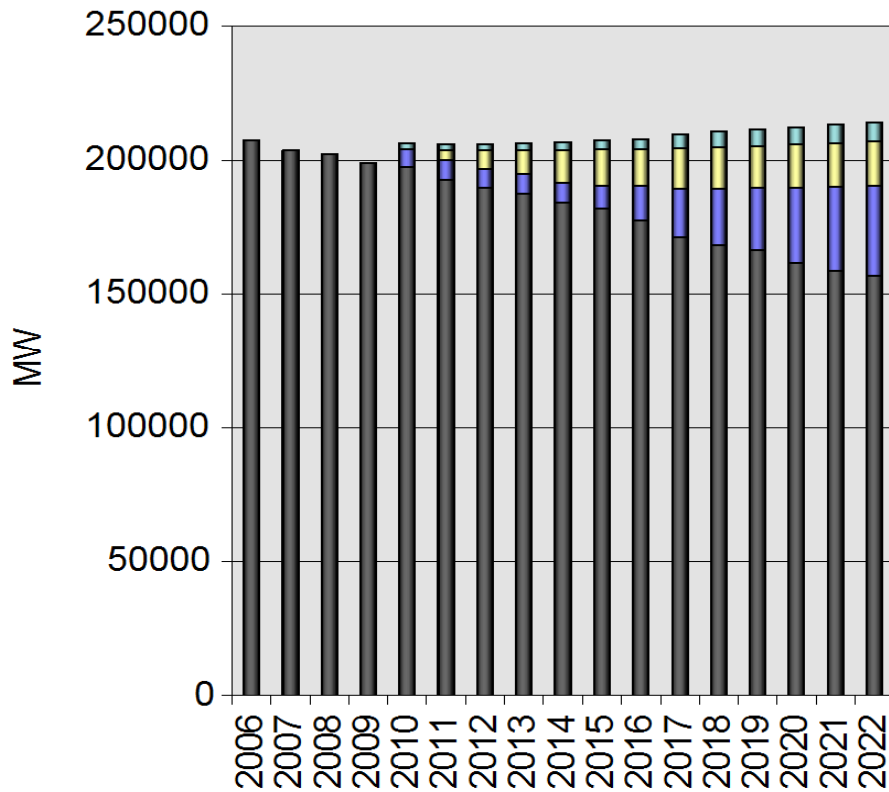
Long-run marginal costs of electricity generation



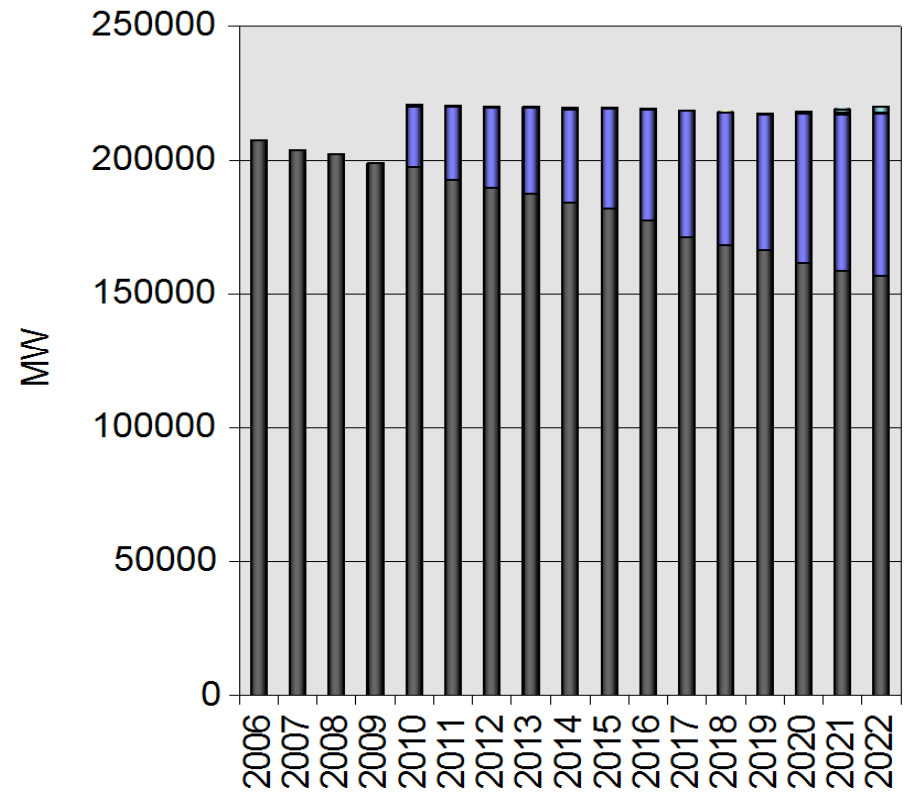
Modelling results

Investments by fuel

Reference



New entrants

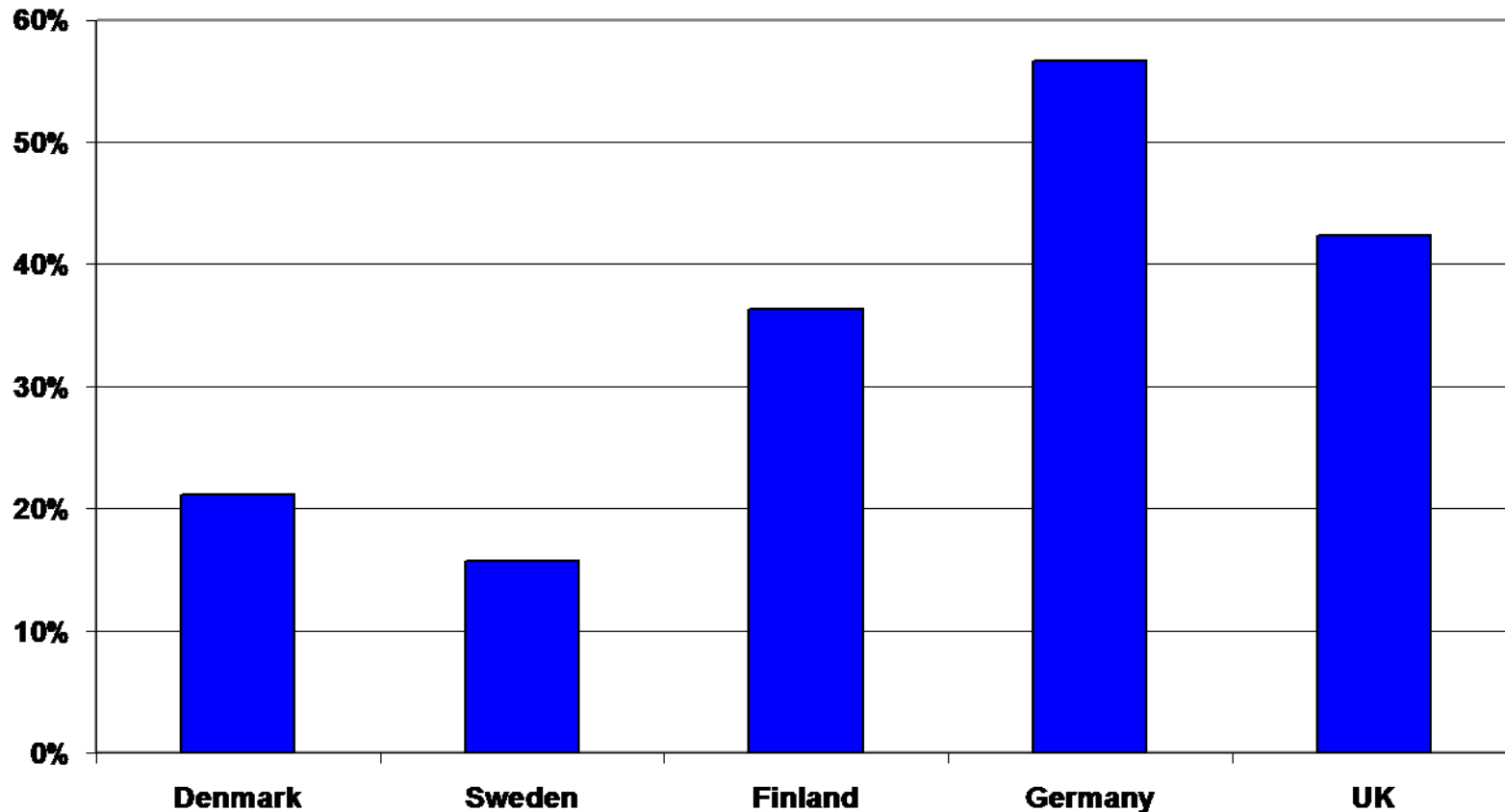


WIND NAT_GAS COAL Already existing

Where investments are made?

Coal CHP

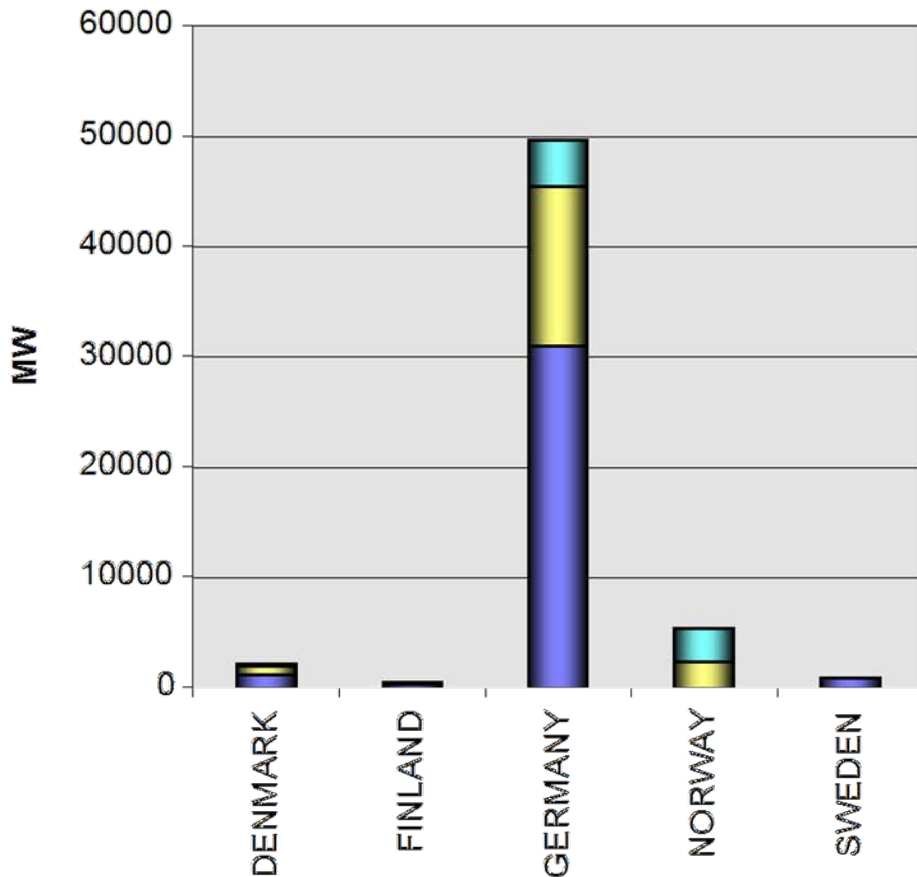
CO₂-price: 20 €/ton



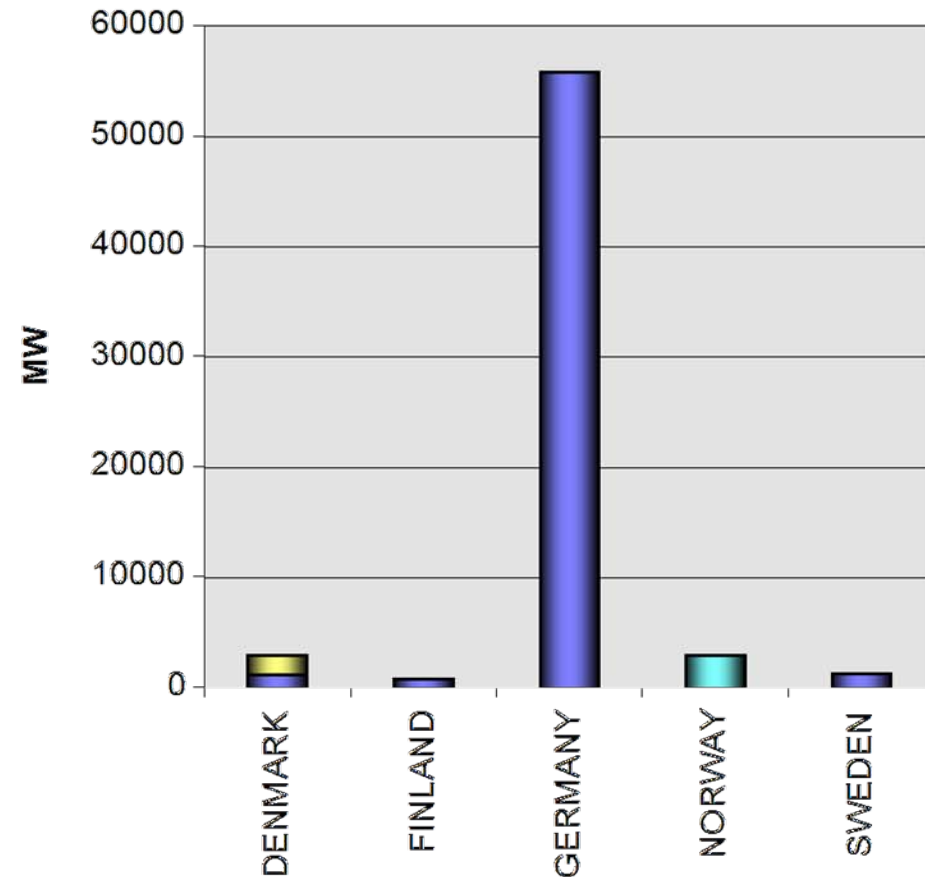
Coal CHP: Share of total capital cost covered by CO₂-allocation

Geographical distribution of investments (1)

Reference - 2022



New_entrants - 2022

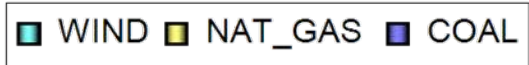
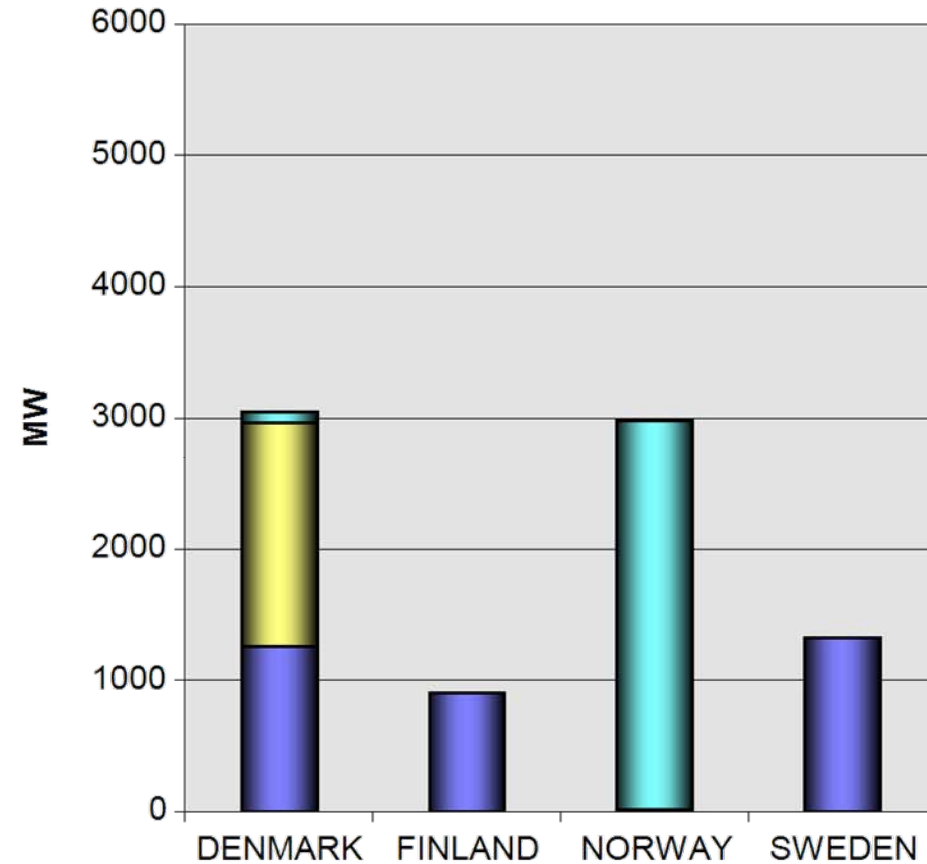
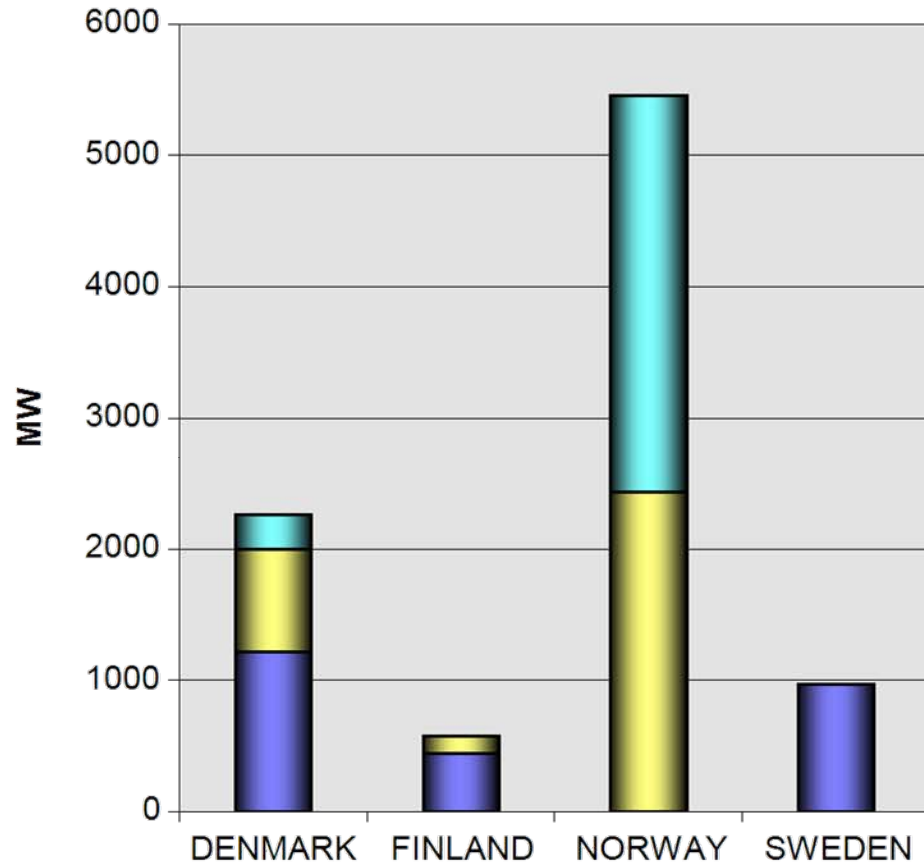


WIND NAT_GAS COAL

Geographical distribution of investments (2)

Reference - 2022

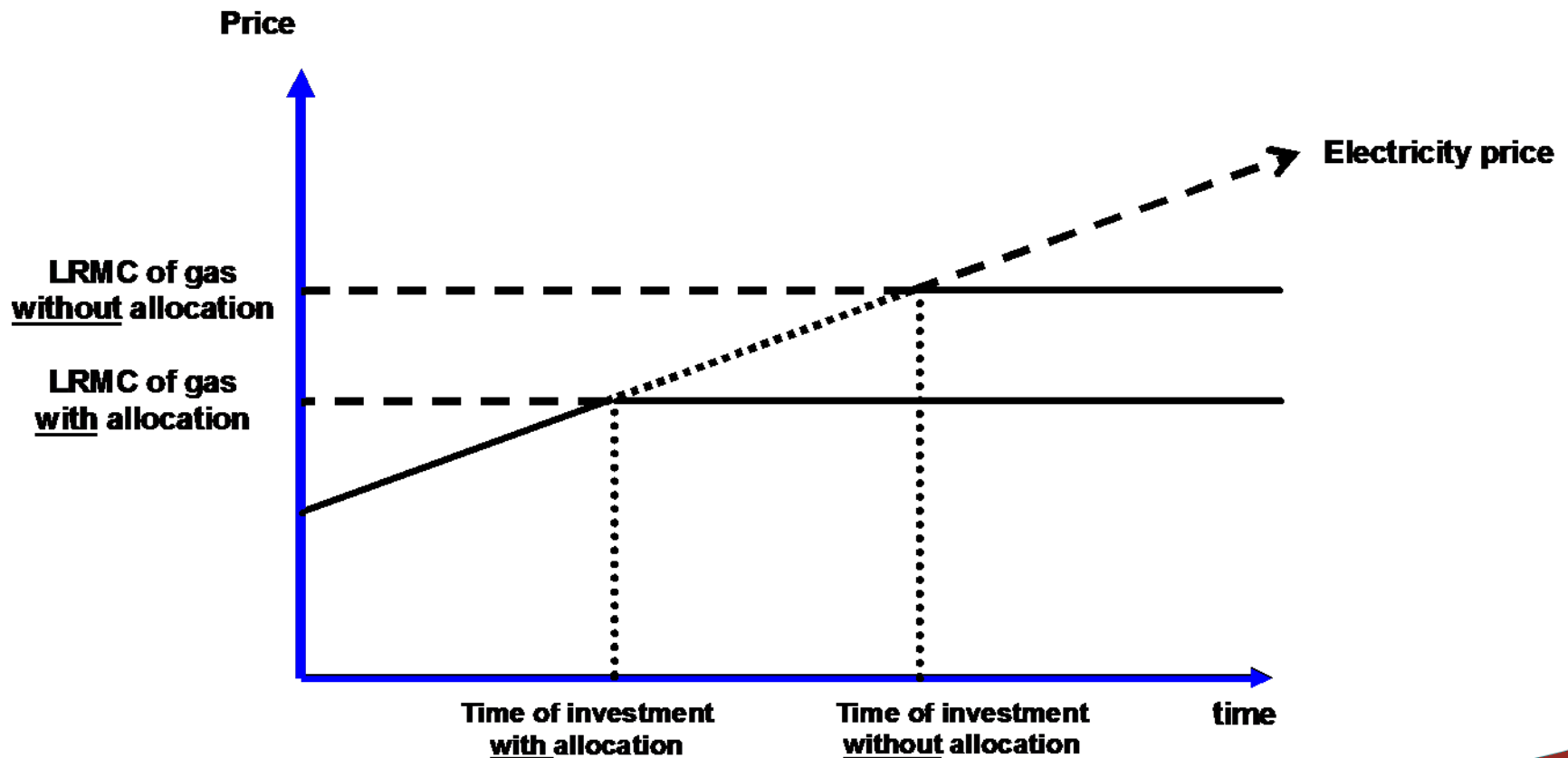
New_entrants - 2022



When investments are made?

Rule of thumb:

In an underinvested market the electricity price will increase until it reaches the LRM of a new power plant



Allocation to new entrants distorts the market

- Spot market

- Ensures efficient CO2 reduction



- Investments

- What? Incentive towards coal/lignite
- Where? Investment move to countries allocating generously
- When? Investments are moved forward in time



Welfare economic consequences

Norway	
10 €/t:	158
20 €/t:	118
30 €/t:	-10

Sweden	
10 €/t:	-187
20 €/t:	-252
30 €/t:	-42

Finland	
10 €/t:	18
20 €/t:	62
30 €/t:	184

Denmark	
10 €/t:	-134
20 €/t:	-211
30 €/t:	-325

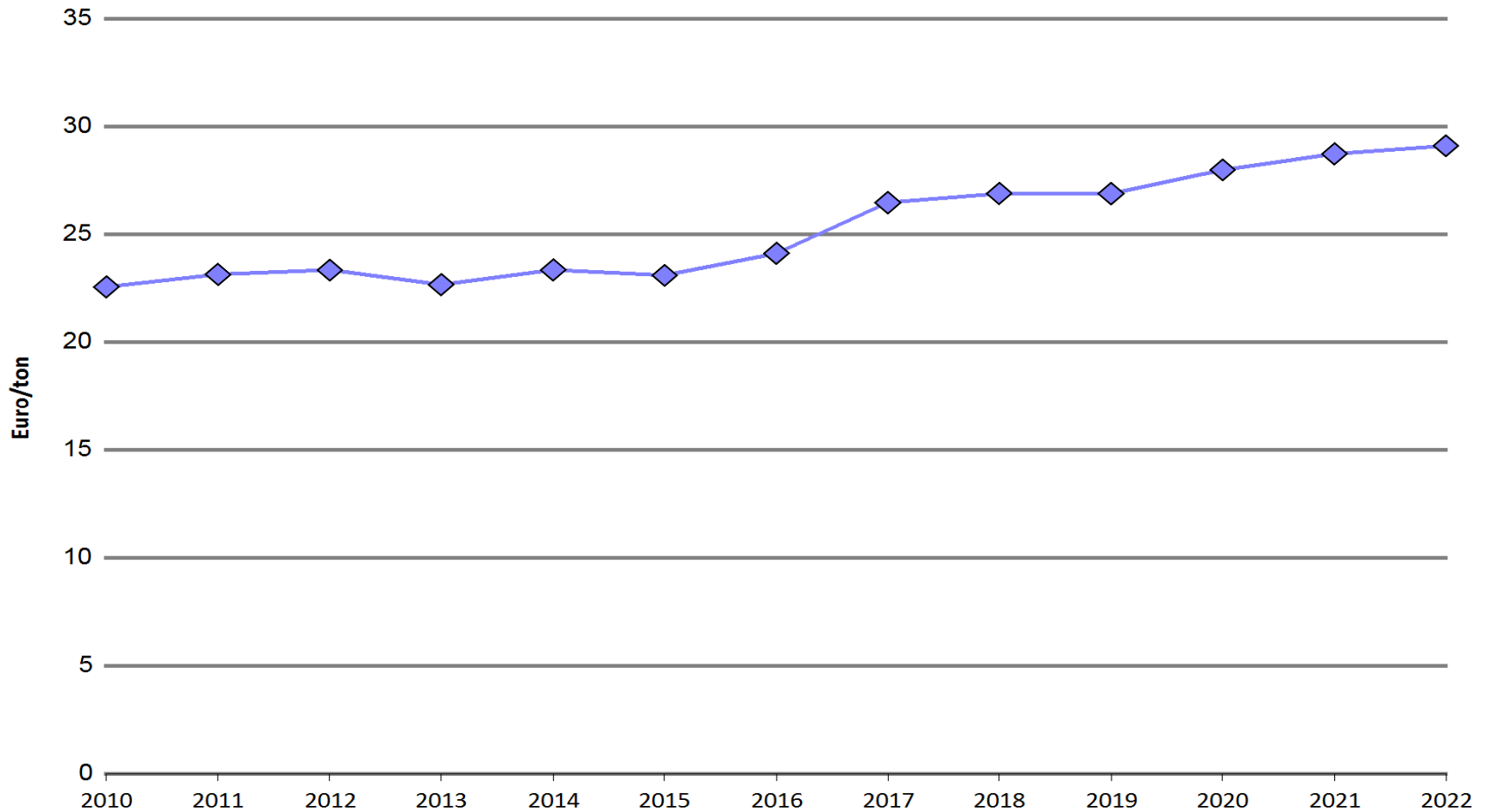
Germany	
10 €/t:	-694
20 €/t:	-4.403
30 €/t:	-15.578

Total	
10 €/t:	-839
20 €/t:	-4.685
30 €/t:	-15.771

Mill. Euro

CO₂-price with fixed cap

no allocation to new entrants



Conclusions on new entrant allocation

- Even more investments in coal power capacity
- Investments move to Germany
- Lower electricity prices
 - Consumers benefit in the short term
 - Existing electricity producers lose
- CO₂- prices will increase to an extent where the subsidy-effect exceeds the total cost.
- Welfare-economic loss 25% of investment
- 2nd order effects not analysed, e.g. impacts on the carbon price