Impact of suboptimal design features in the EU ETS

- Allocation in the electricity market -

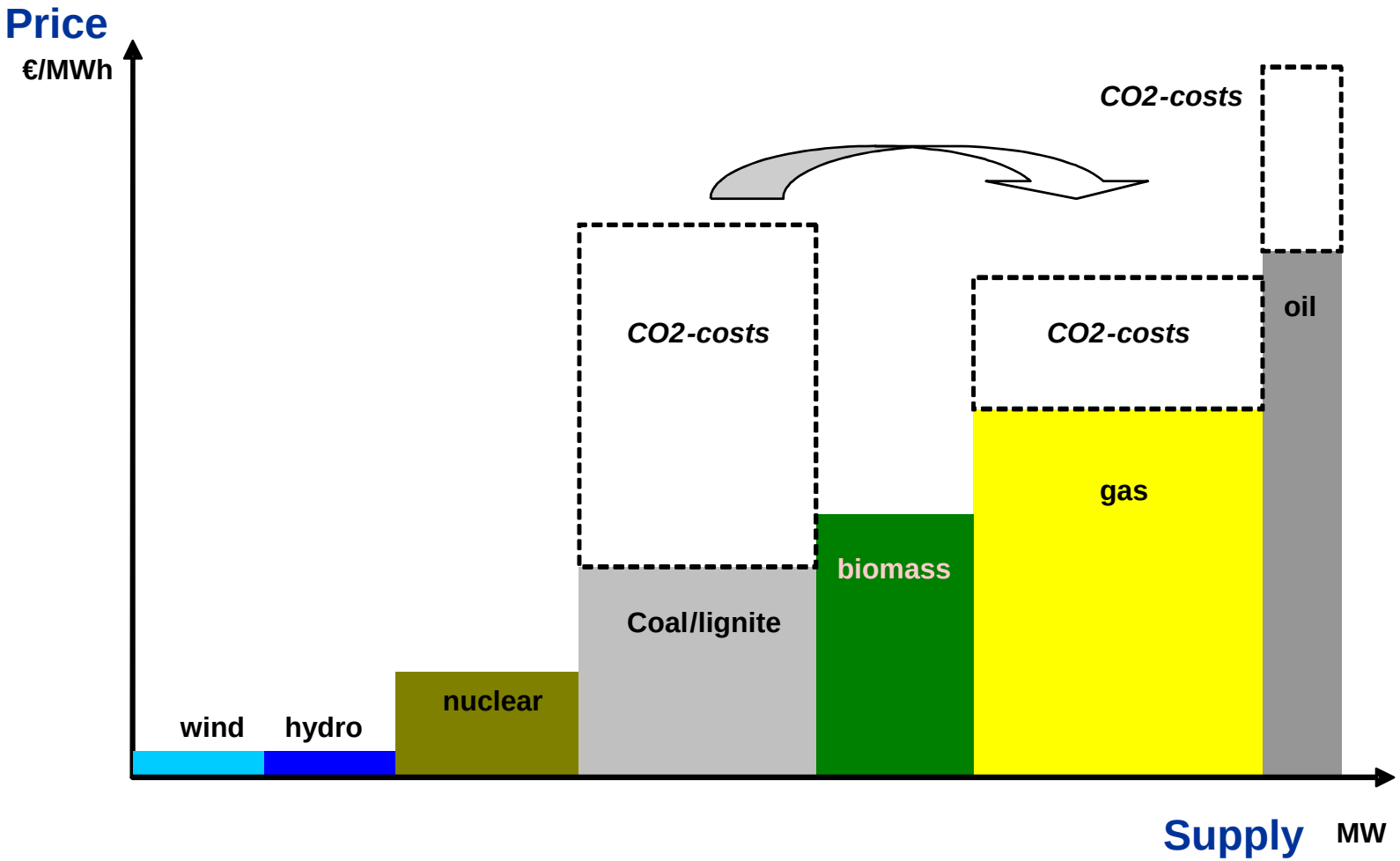
22 May 2007

Hans Henrik Lindboe

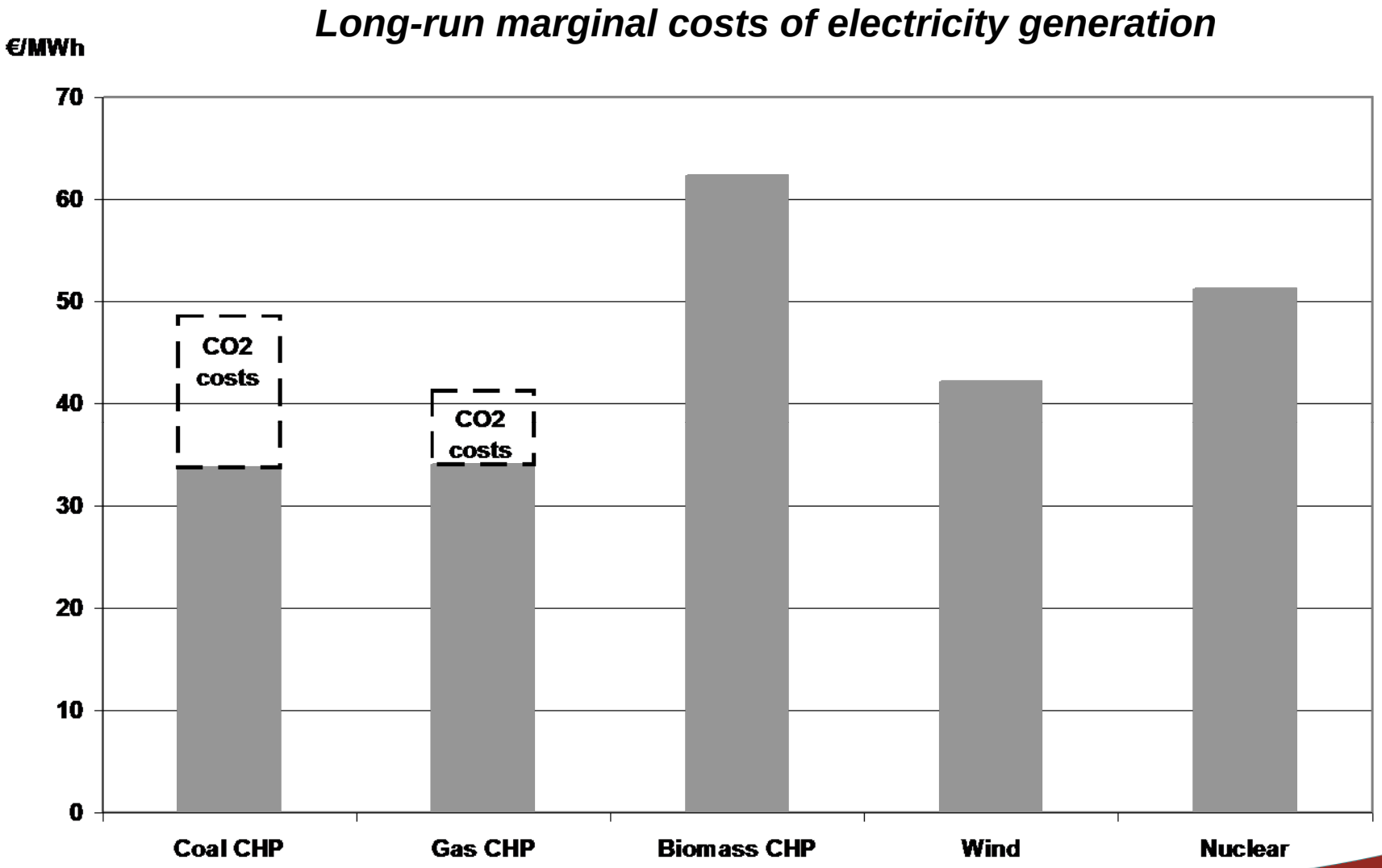
Ea Energy Analyses

www.eaea.dk

ETS: Impact on spot market dispatch



ETS: Impact on investments



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

NAPs for 2005-7

- **Funded by:** Danish Environmental Protection Agency

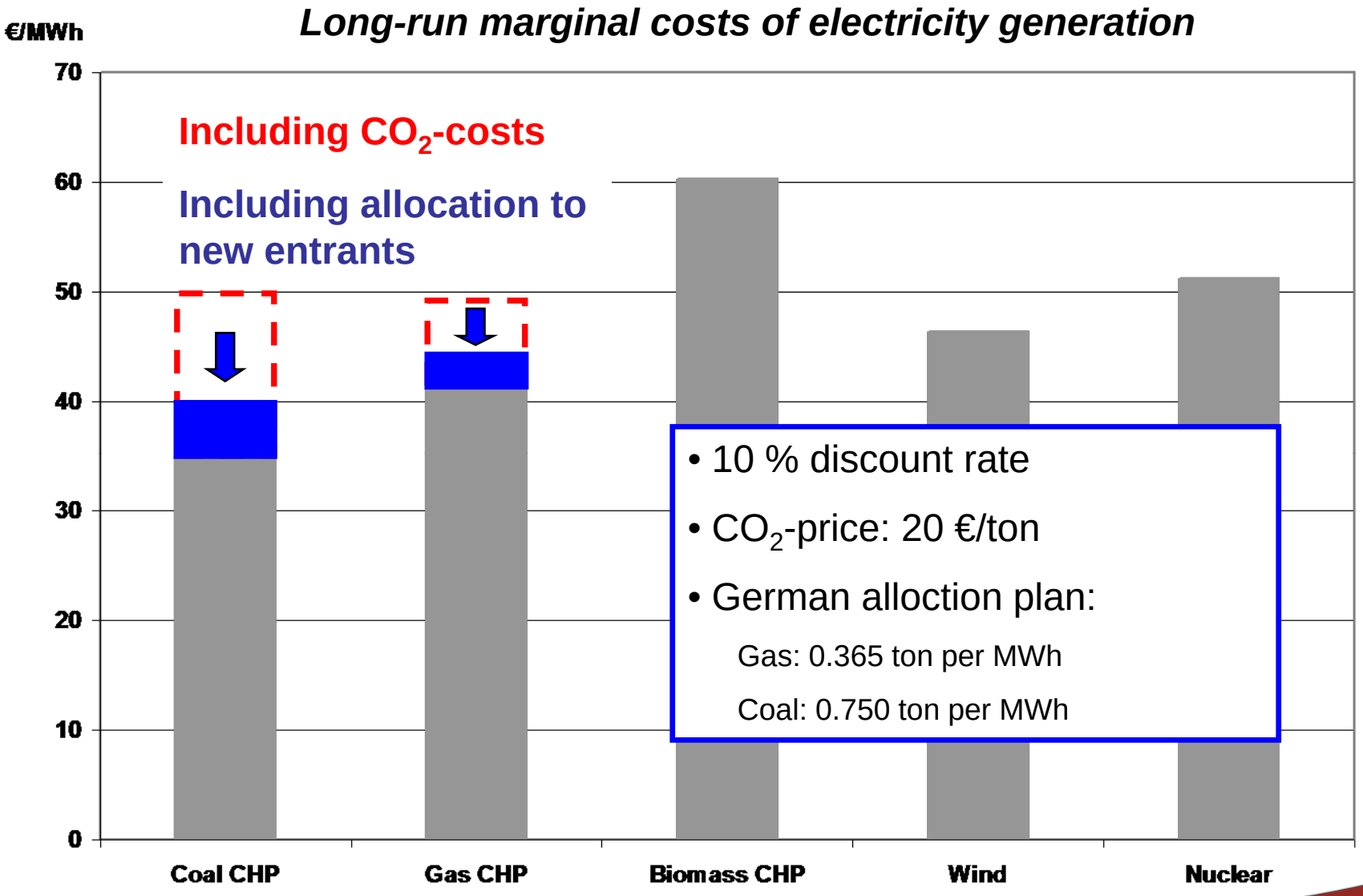
Allocation to new entrants

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

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

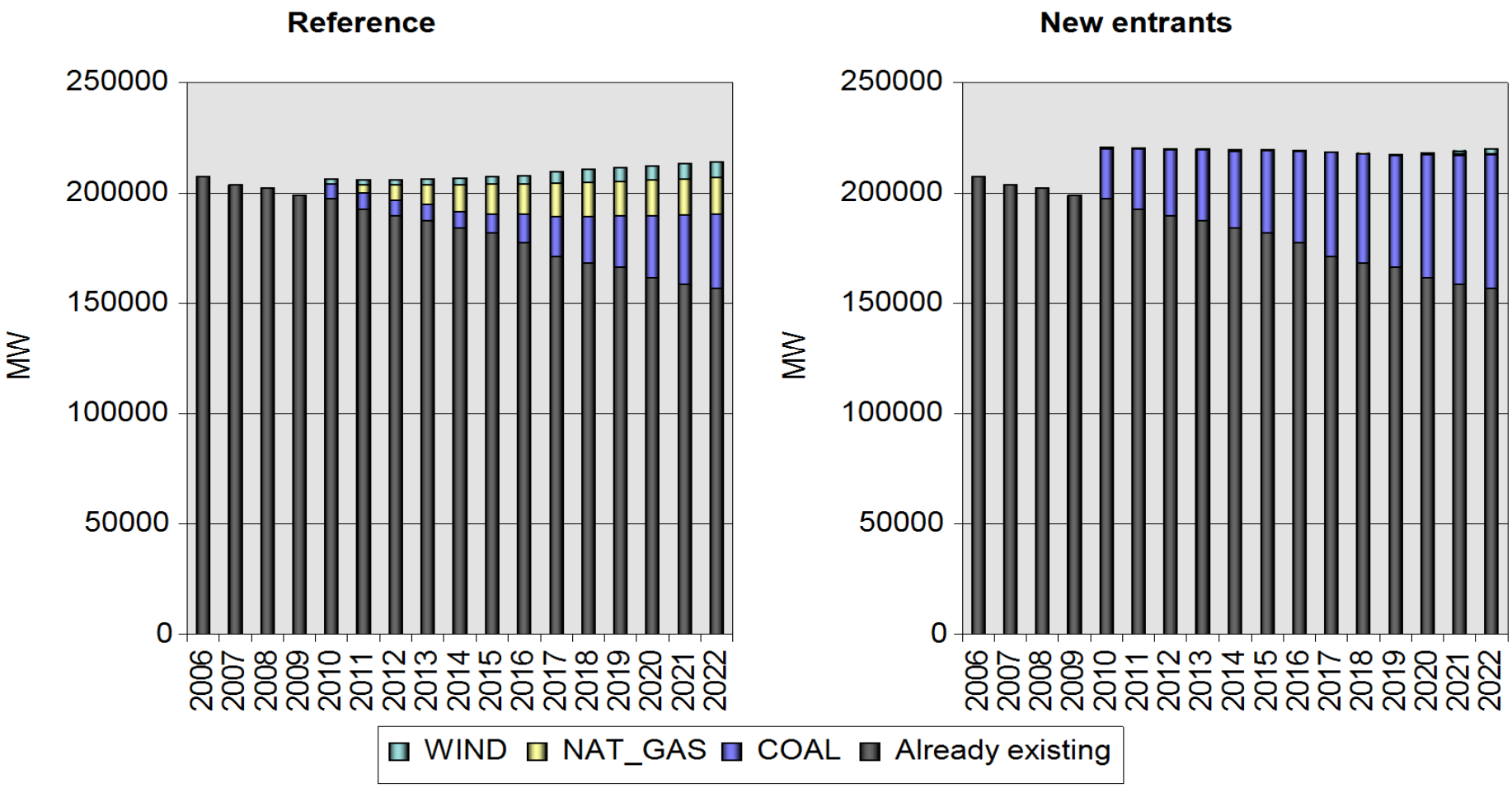
Market distortion => Welfare economic losses

What technology?

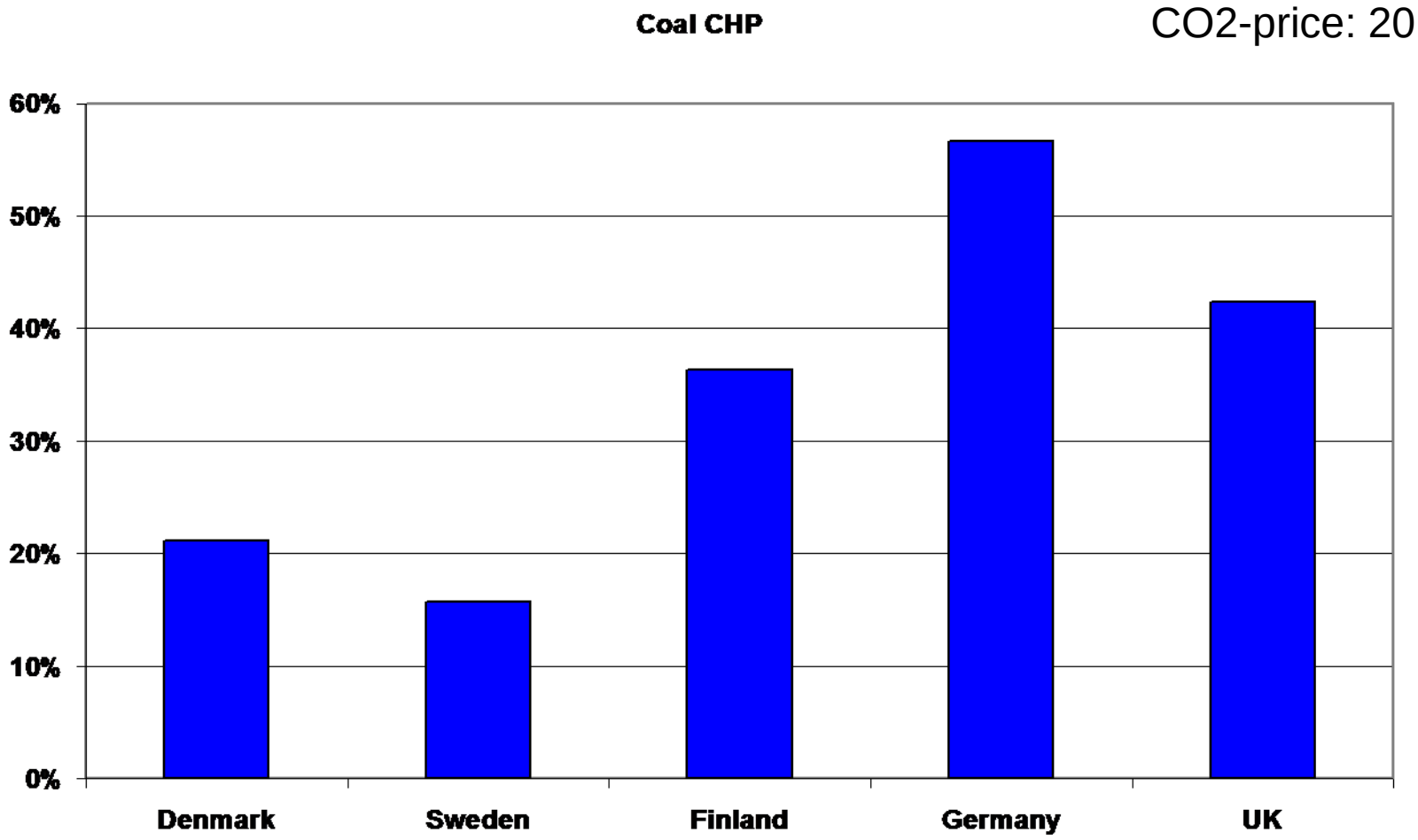


Modelling results

Investments by fuel

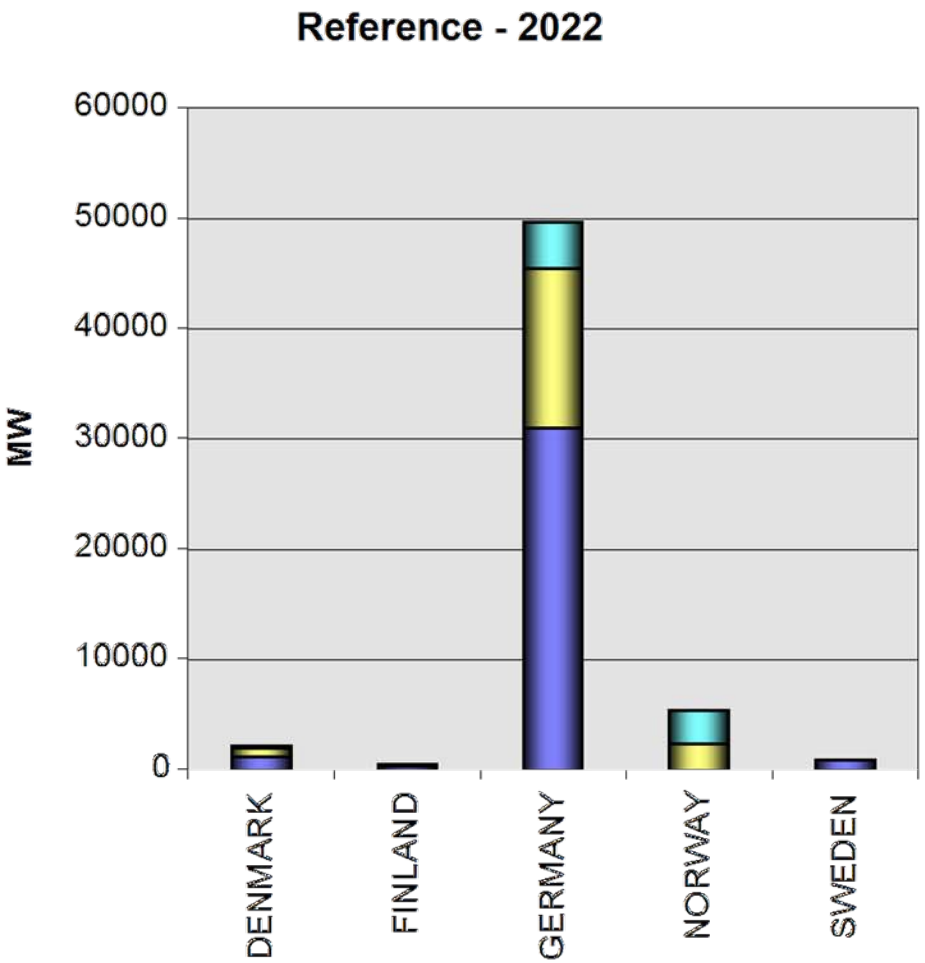


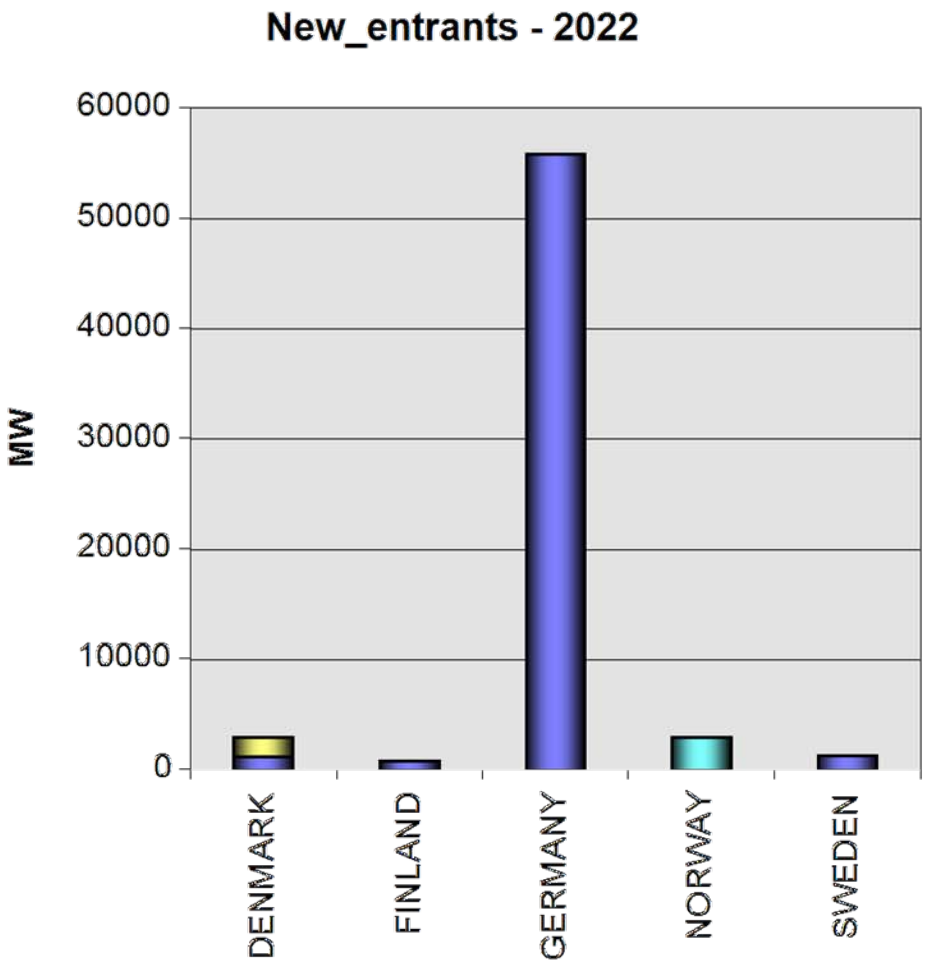
Where investments are made?



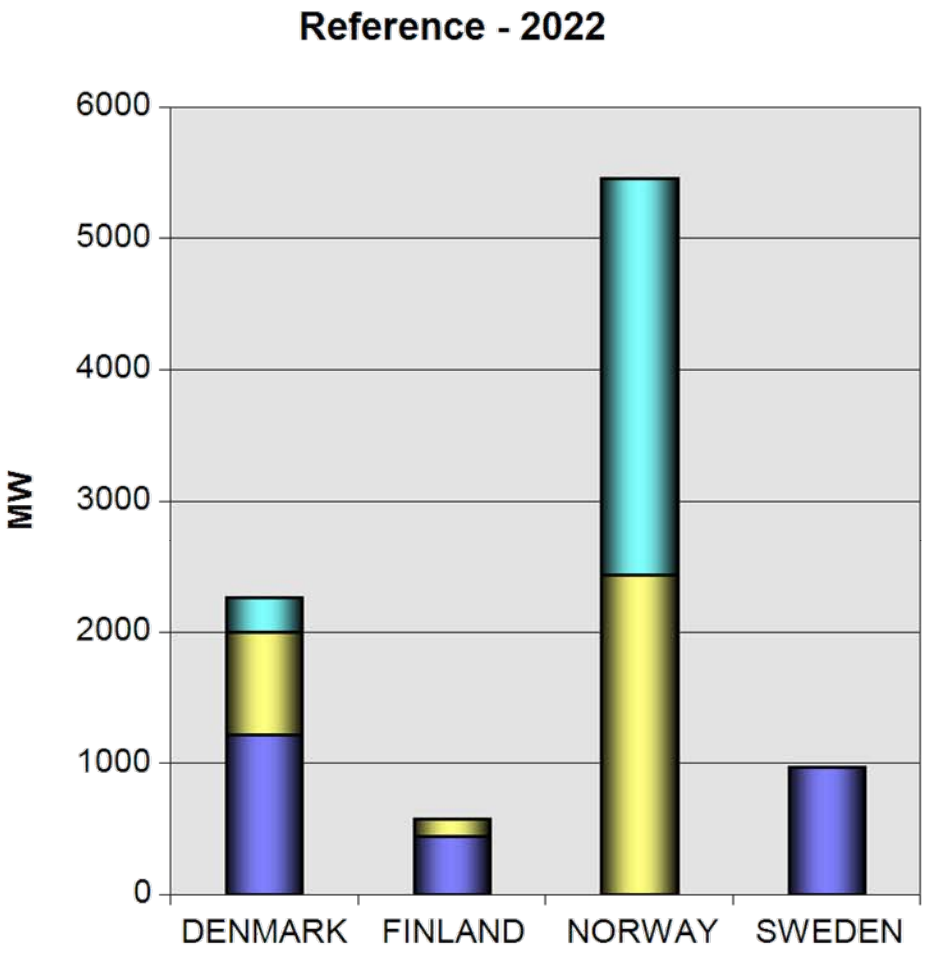
Coal CHP: Share of total capital cost covered by CO2-allocation

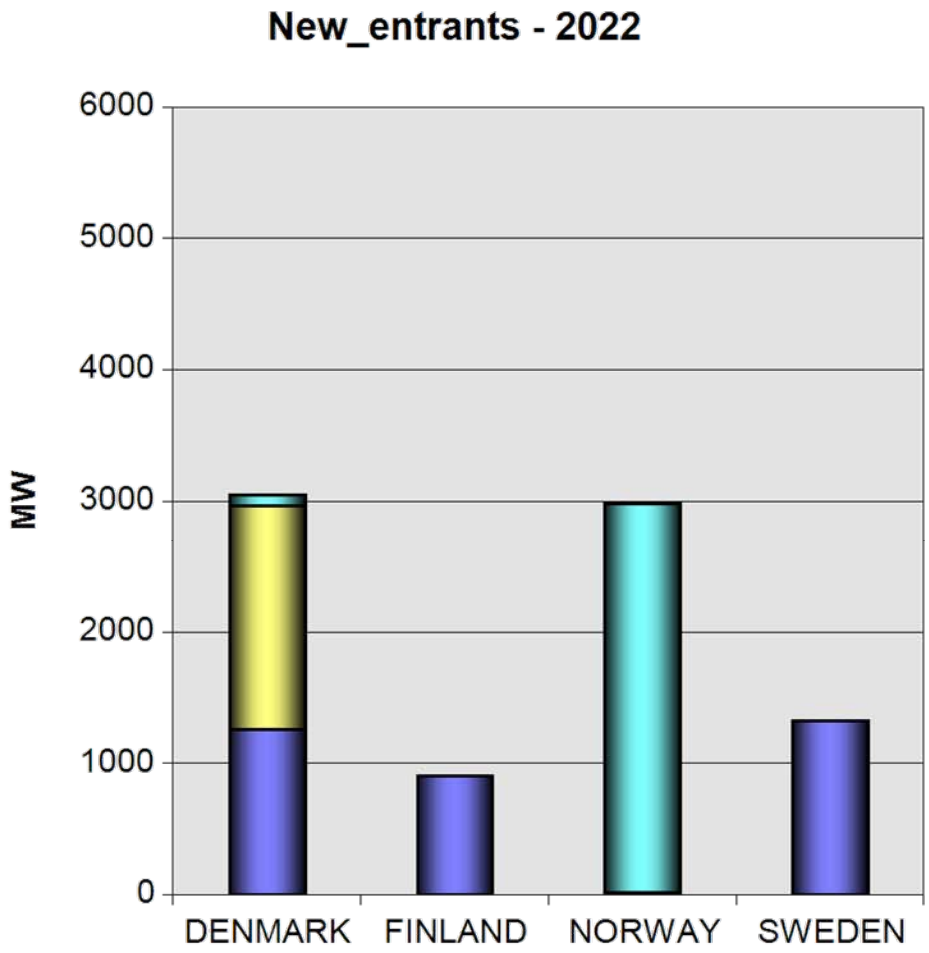
Geographical distribution of investments (1)





Geographical distribution of investments (2)

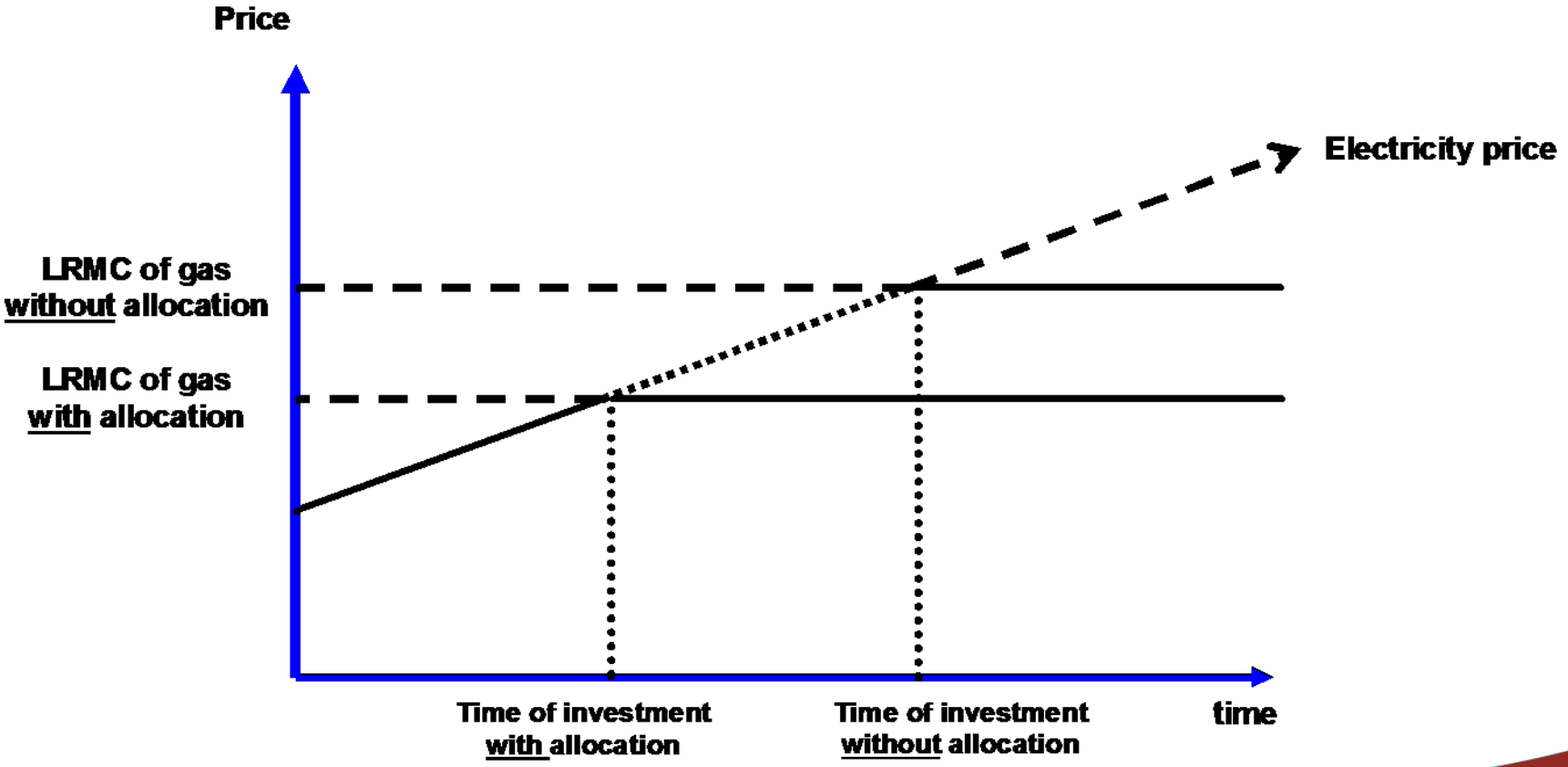




WIND NAT_GAS COAL

When investments are made?

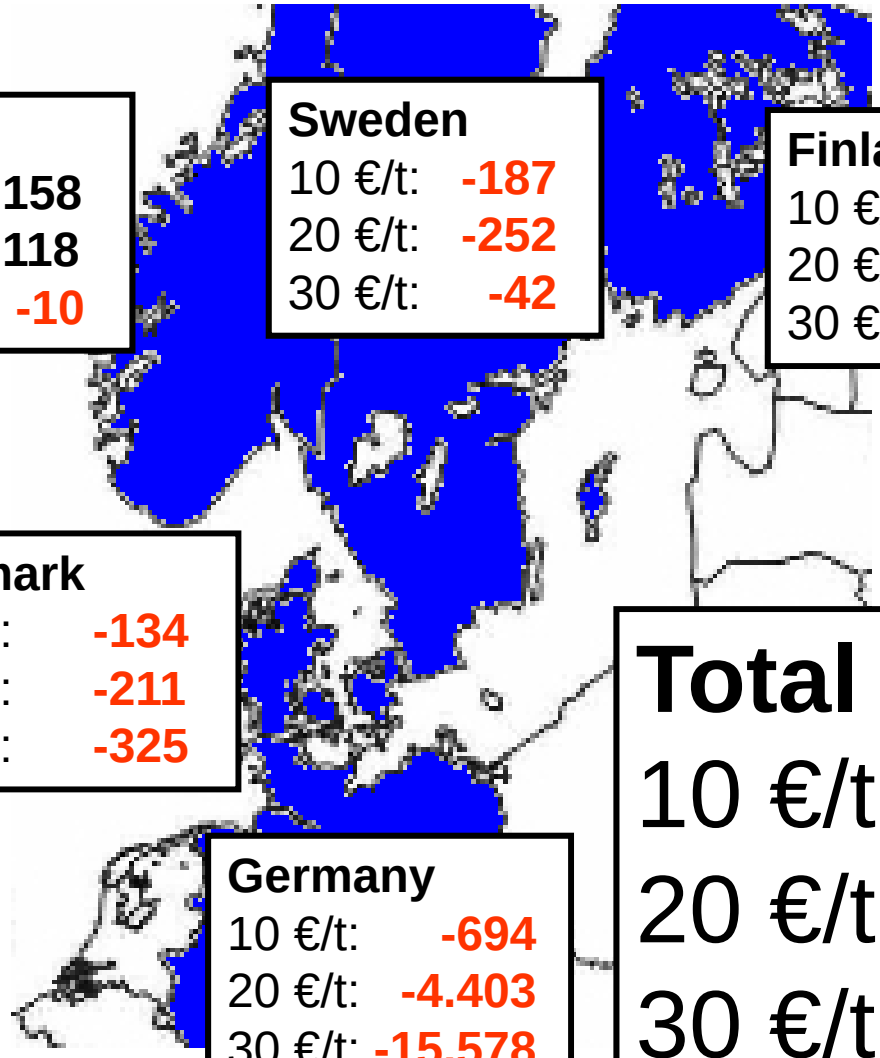
Rule of thumb:
In an underinvested market the electricity price will increase until it reaches the LRMC of a new power plant



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**

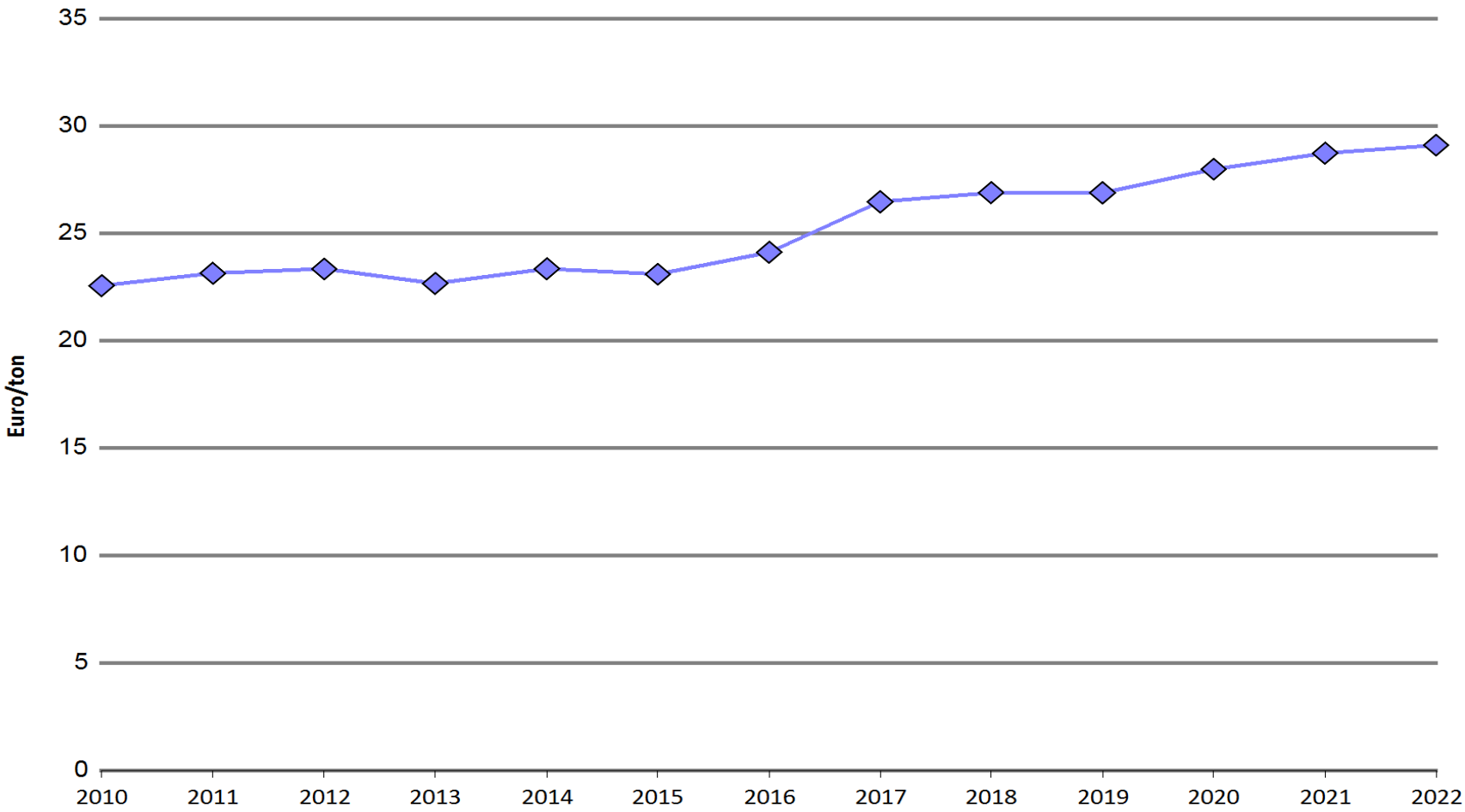
Total

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