

Energy Efficiency and Renewables: Conflicting Targets?

CEFIC

8th February 2011

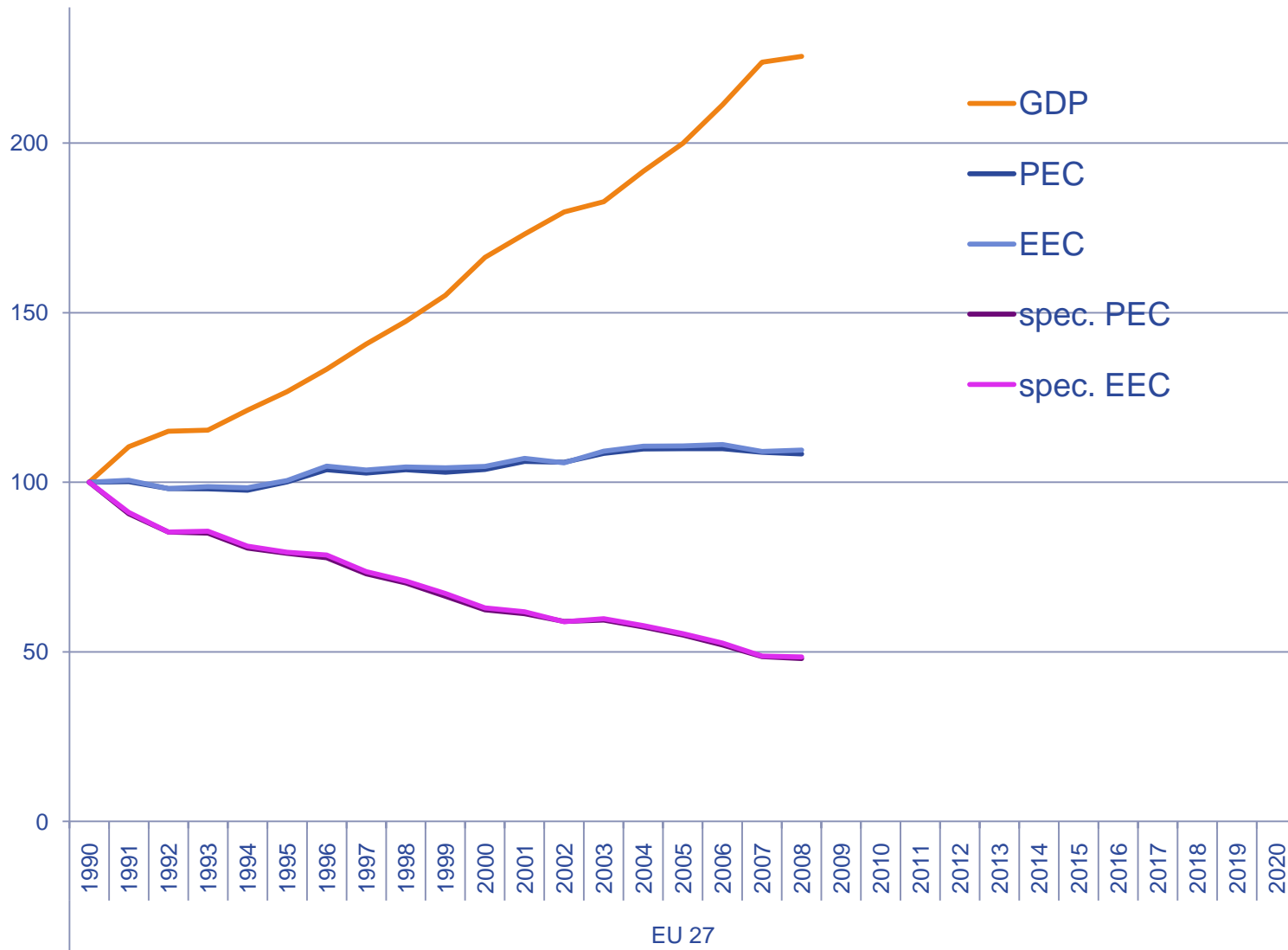
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- Definition of energy efficiency: different views
- Energy efficiency in Europe and Germany
- Interaction between different energy policy measures and instruments: Energy efficiency - Emissions Trading - Renewable Energy
- Energy efficiency in renewable energy production
- Energy efficiency and renewable energy in the German Energy strategy 2050 – how to do it in a wrong way
- Summary

- Energy efficiency target in the energy and climate change package:
 - 20% reduction of primary energy use compared to projected 2020 primary energy consumption
 - Cap: absolute energy consumption – no efficiency target!
- Energy consumption cap as a consequence of the greenhouse gas cap:
 - less (fossil) energy consumption - less Greenhouse Gas emissions
- Energy consumption cap does not take into account the situation and needs of industry:
 - energy consumption in industry is directly linked to amount of industrial production
 - Efficiency improvement is limited

- Efficiency must be expressed as a value of energy consumption in relation to
 - production ,
 - production value
 - production index,
 - or any other relevant factor (depending on the sector)
- Change in energy efficiency in this value depends on two factors:
 - Reduction or increase of the absolute energy demand in the numerator
 - Reduction or increase of the production or other factors in the denominator
- Efficiency increase in the view of the industry means to produce more with the same or less energy

Development of primary energy consumption (PEC) and end energy consumption (EEC) in the EU 27



Source: EUROSTAT

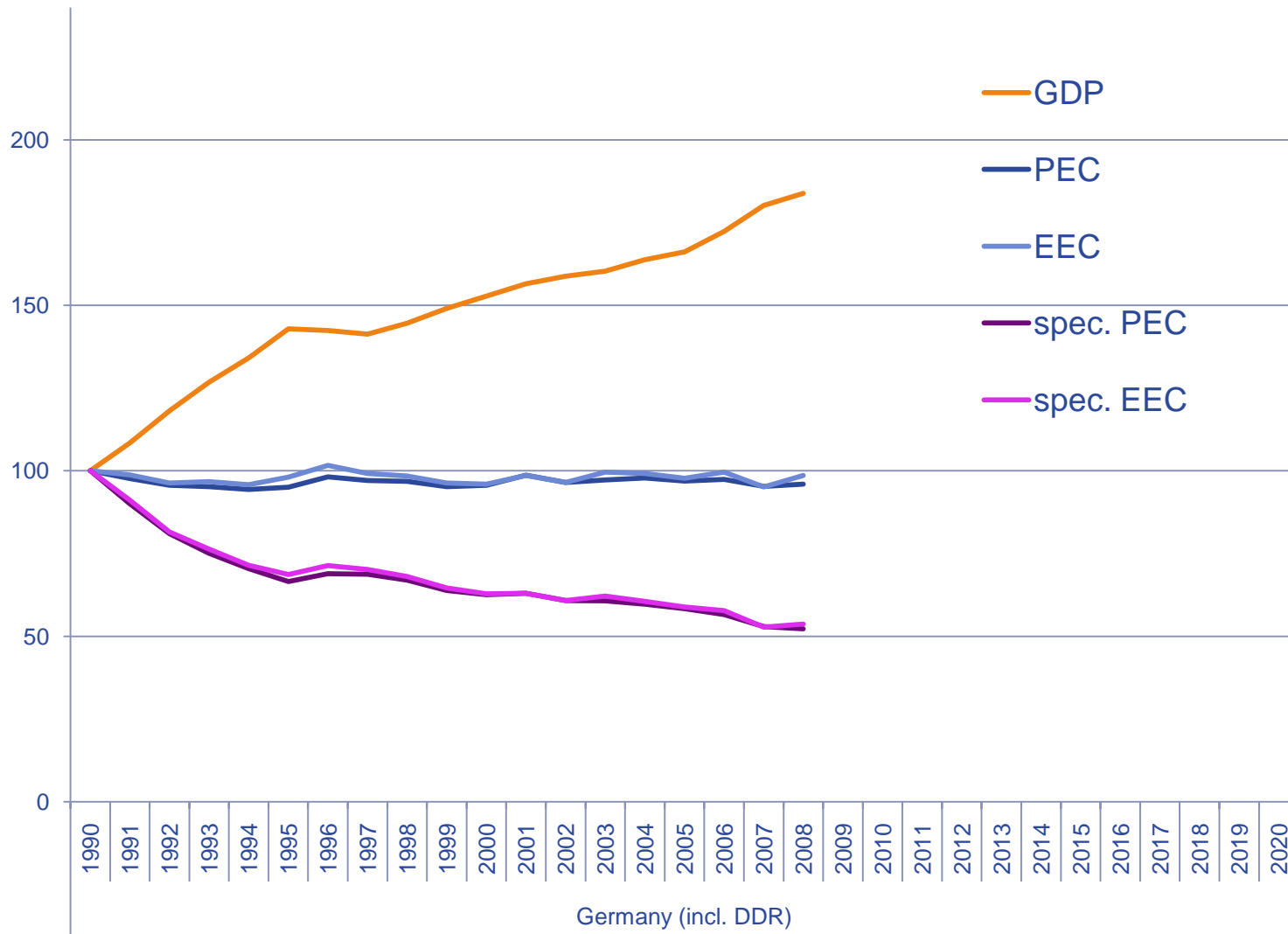
Energy efficiency and renewables
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Development of primary energy consumption (PEC) and end energy consumption (EEC) in Germany



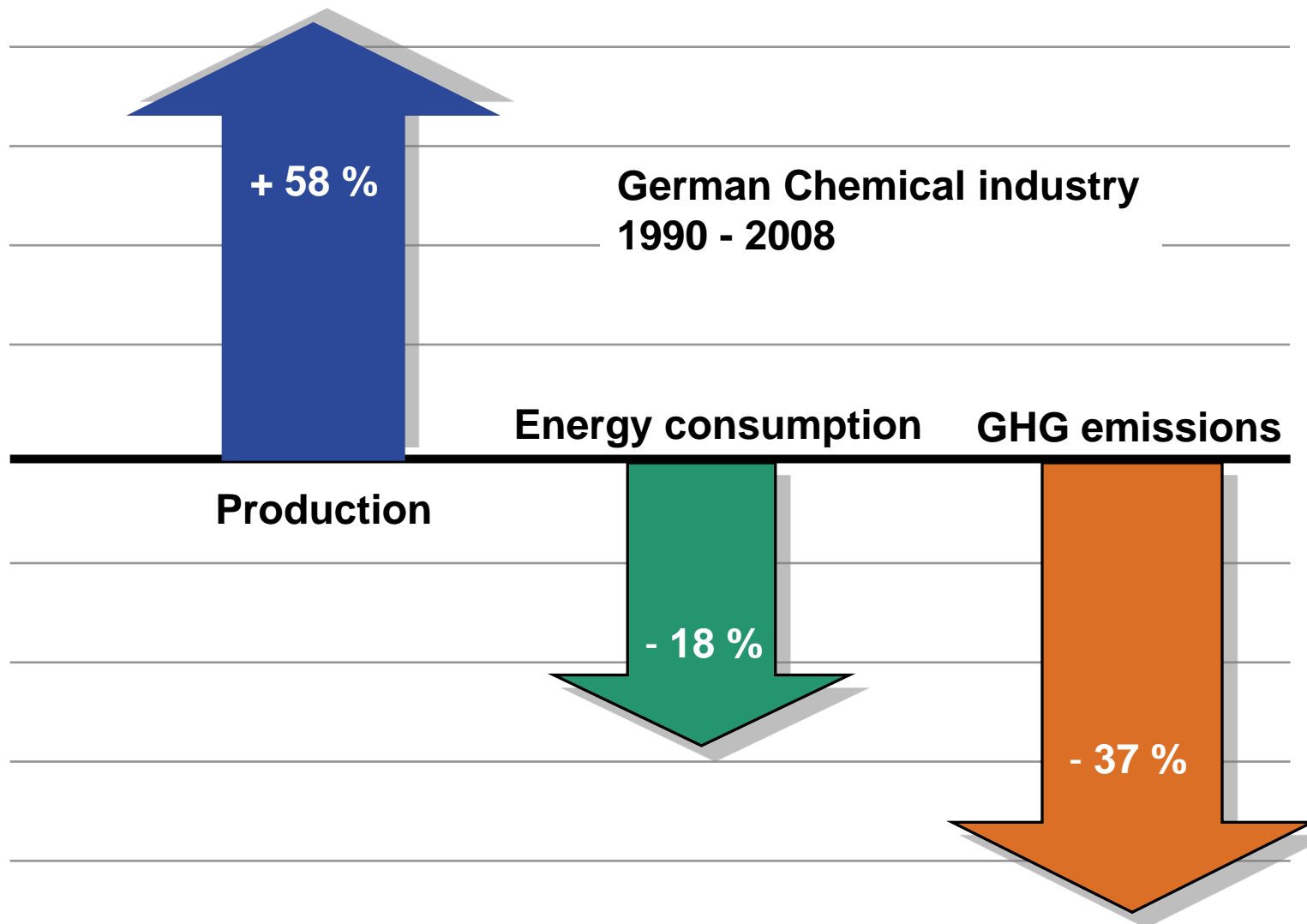
Source: EUROSTAT

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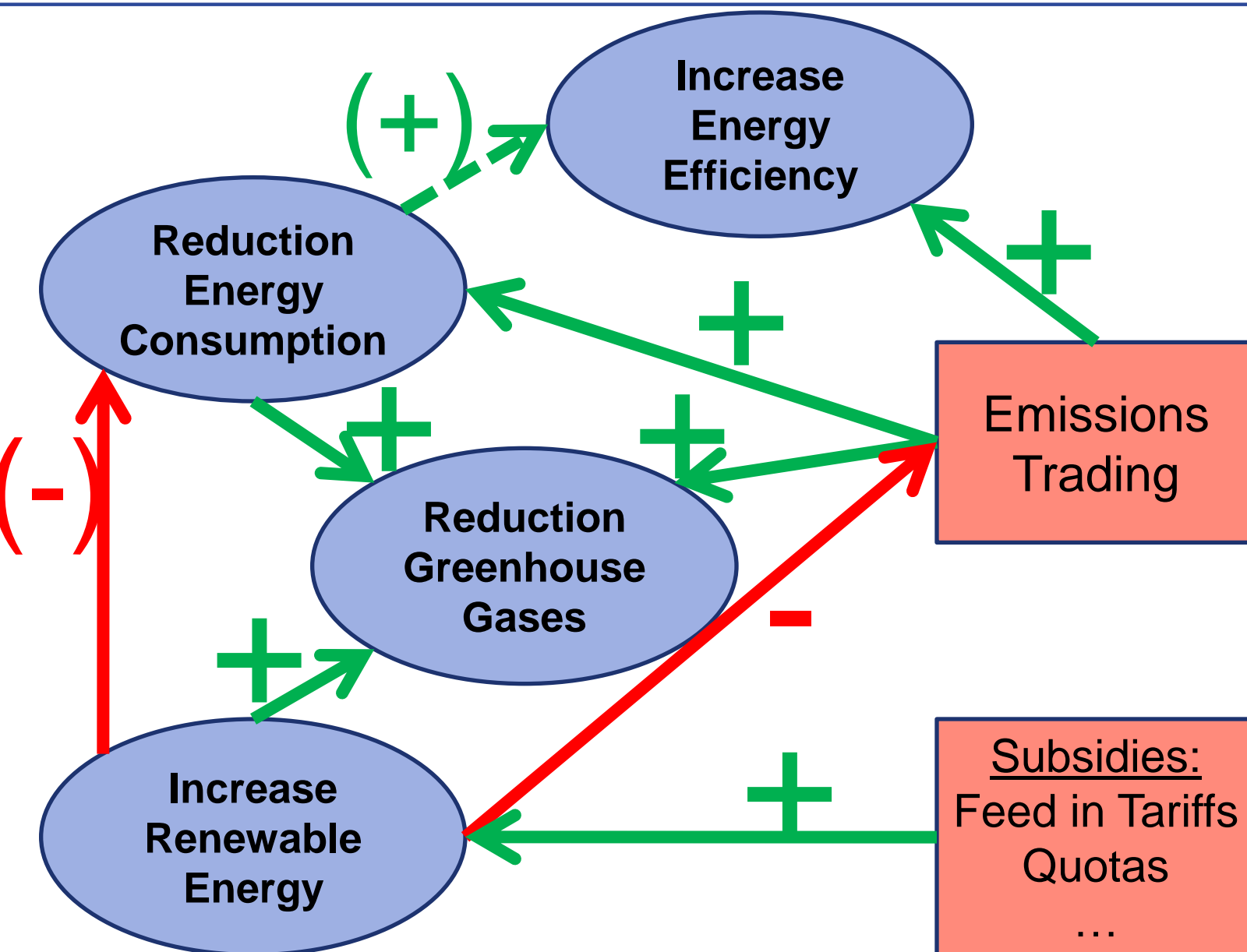
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Conflicting target?



Energy efficiency and renewables
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- Reduction of energy consumption
 - leads to reduction of (fossile) energy production
 - leads to reduction of energy related greenhouse gas emissions
 - **may** lead to higher energy efficiency if it is accompanied by stable or even increasing production
- Emissions trading as the leading climate change instrument in Europe regulates
 - Absolute energy consumption
 - Energy efficiency (minimizing the energy/CO₂-costs per production unit)
 - Greenhouse gas emissions
 - kind of used energy (less carbon containing fuels): increased consume of renewable energy is incentified

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Conflicting target?

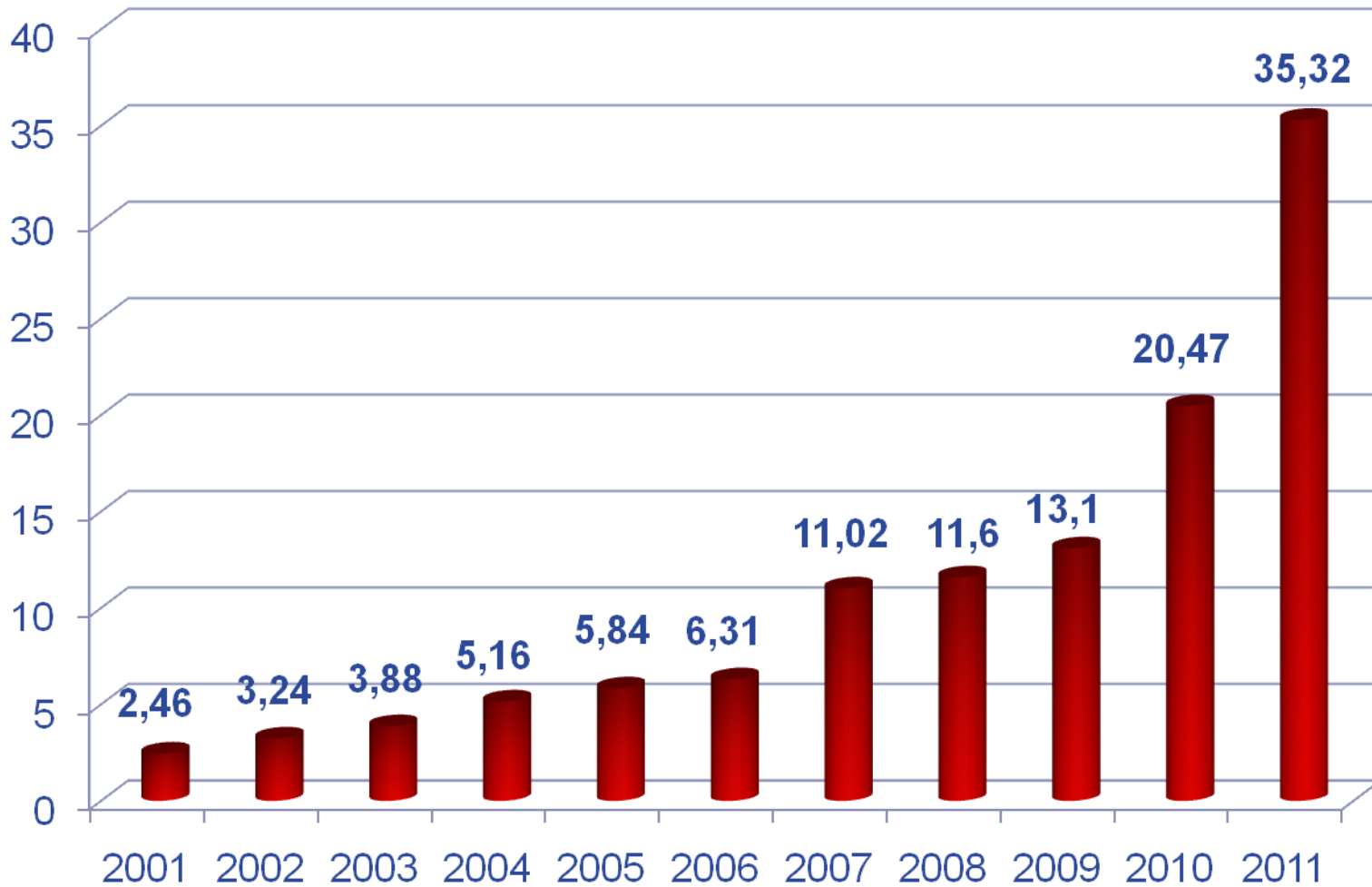
- Renewable energy as carbon free (or in the case of biomass „carbon neutral“) reduces greenhouse gas emissions
- Because of heavily fluctuating availability of renewable energy fossile based energy is still needed: greenhouse gas emission reduction is never 100%: statistical increase of the CO₂-footprint of fossile fuel based energy
- Because of high production costs of renewable energy is not competitive to usual energy production:
 - Subsidies up to factor 10 or quotas fixed by law are necessary to increase the share of renewable energy
 - Incentive from emissions trading system at the moment not high enough (acording to EU Commission an allowance price of at least 50 to 60 € is necessary to stimulate the renewable energy market)

- Emissions trading as instrument to reduce greenhouse gases in the most economic way
- Producing energy by wind, solar or other renewable technologies can also reduce greenhouse gases but costs are high:
 - Water ■ 20-75 €/t
 - Wind ■ 30-300 €/t
 - Biomasse ■ 50 €/t
 - Geothermal power ■ 75-160€/t
 - Solar ■ 500-1000 €/t

- New coal power station ■ 10-30 €/t
- Energy efficiency buildings ■ 0 or negative

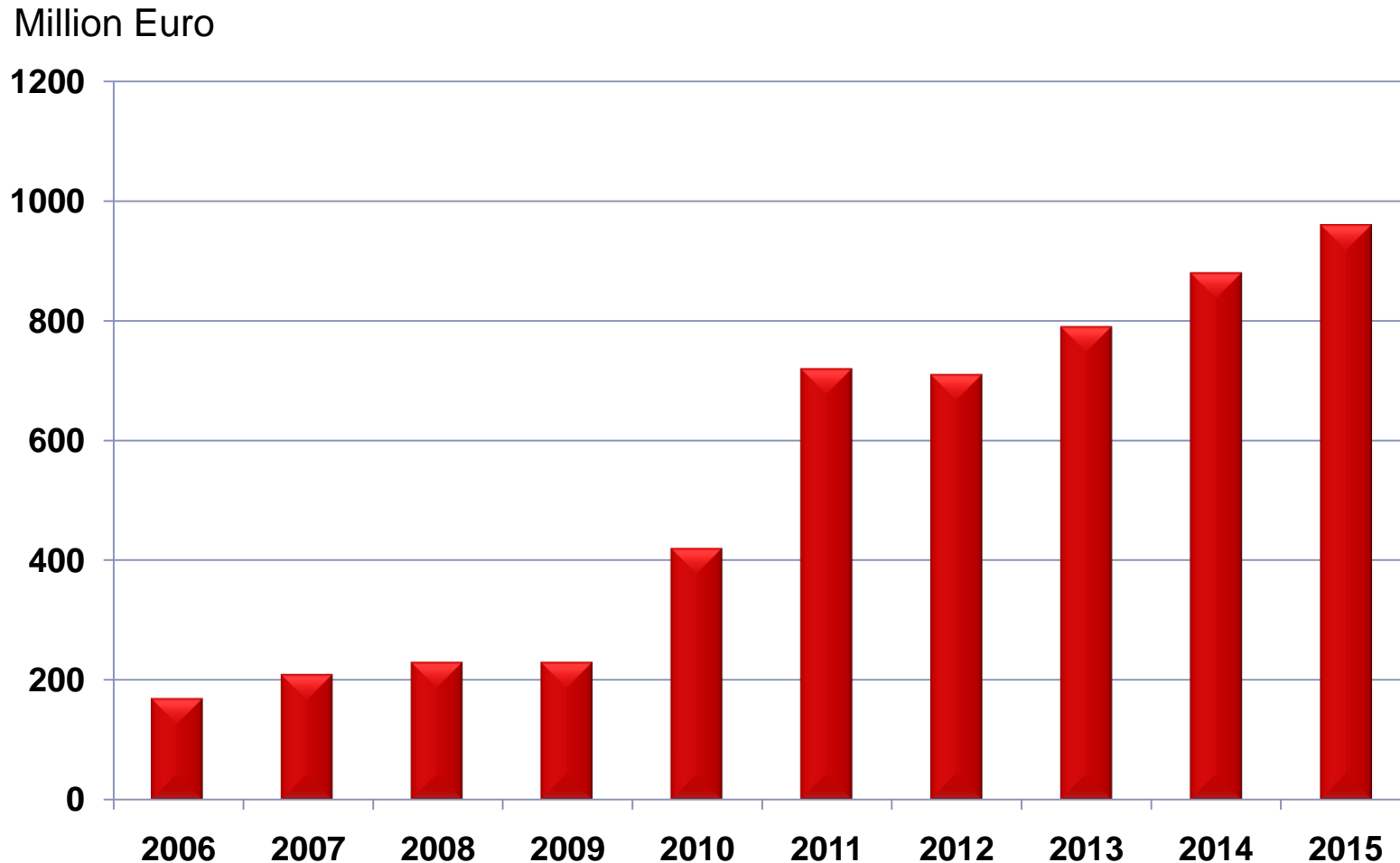
Subsidies for renewable energy production

Development of feed in tariffs in Germany (€/MWh)



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Subsidisation costs for the German chemical industry as biggest electricity consumer



Quellen: Statistisches Bundesamt, VIK, BDEW, ÜNB, VCI

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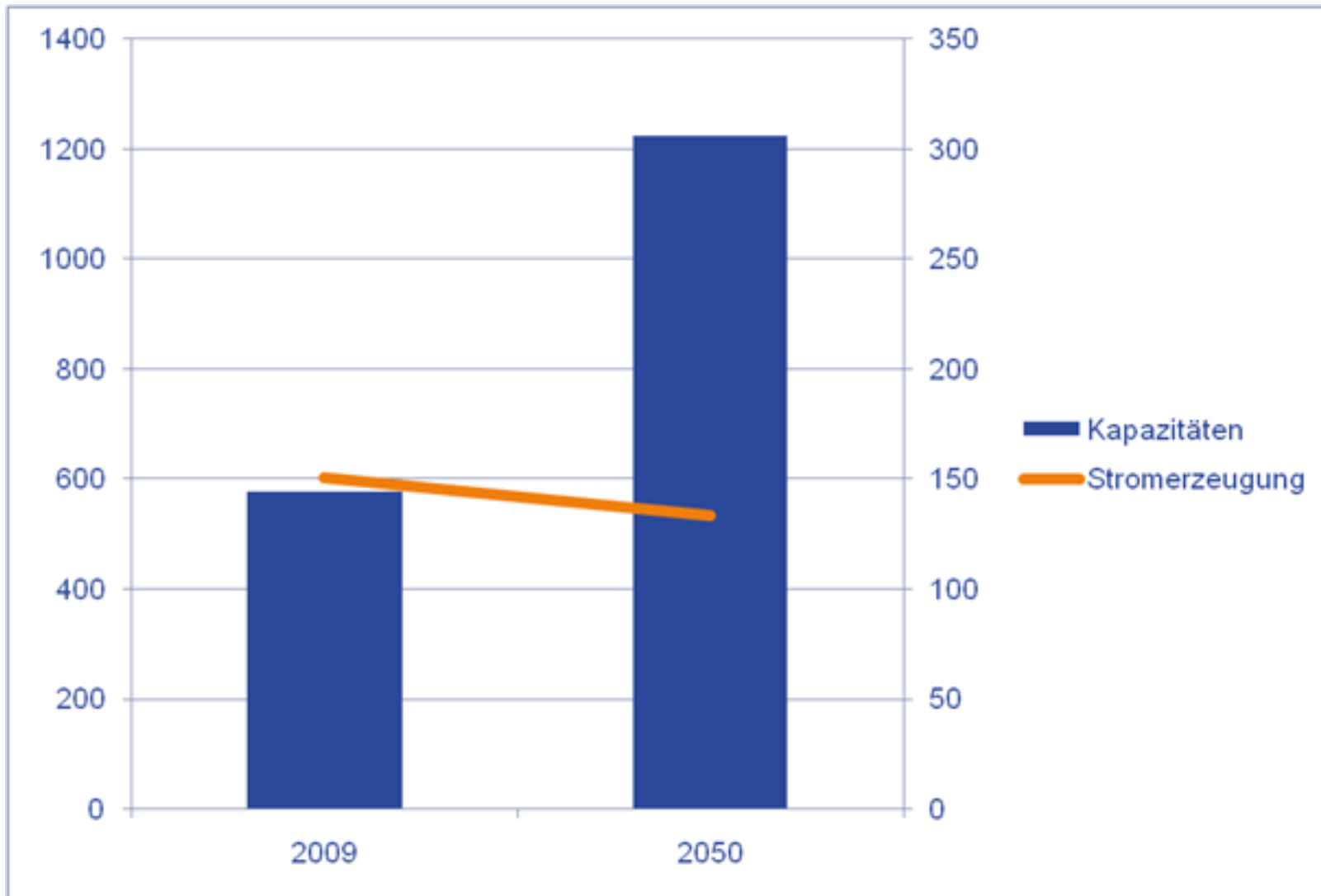
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- Actual allowance prices (about 15 €/t) in emissions trading are too low to initiate an increased use of renewable energy
- Renewable energy needs much more subsidisation to be competitive, which causes higher cost for consumer
- Using renewable energy (at least in Europe) is an expensive way to do climate protection
- **Subsidisation of renewable energy and emissions trading are conflicting instruments!**

- To produce energy by wind, solar, biomass and other renewable technologies is only one way to produce energy
- Energy consumption will not be reduced by using renewable energy
- in contrary: readiness to reduce energy consumption (to get more energy efficient) may be smaller because of greenhouse gas free energy
- On the other hand: renewable energy targets in Europe will not be met if energy consumption will stay on present level

- Efficiency of renewable energy production is very low, e.g. Germany:
 - Solar: only 800 h/year full availability
 - Wind onshore: 1800 h/year full availability
 - Wind offshore: 2800 h/year full availability
- Much more installed capacity is needed to get the same electricity like with fossil based power stations
- Subsidies do not reflect the efficiency of renewable energy production but the need

Electricity production capacities and real electricity production: Objectives in the German energy strategy 2050

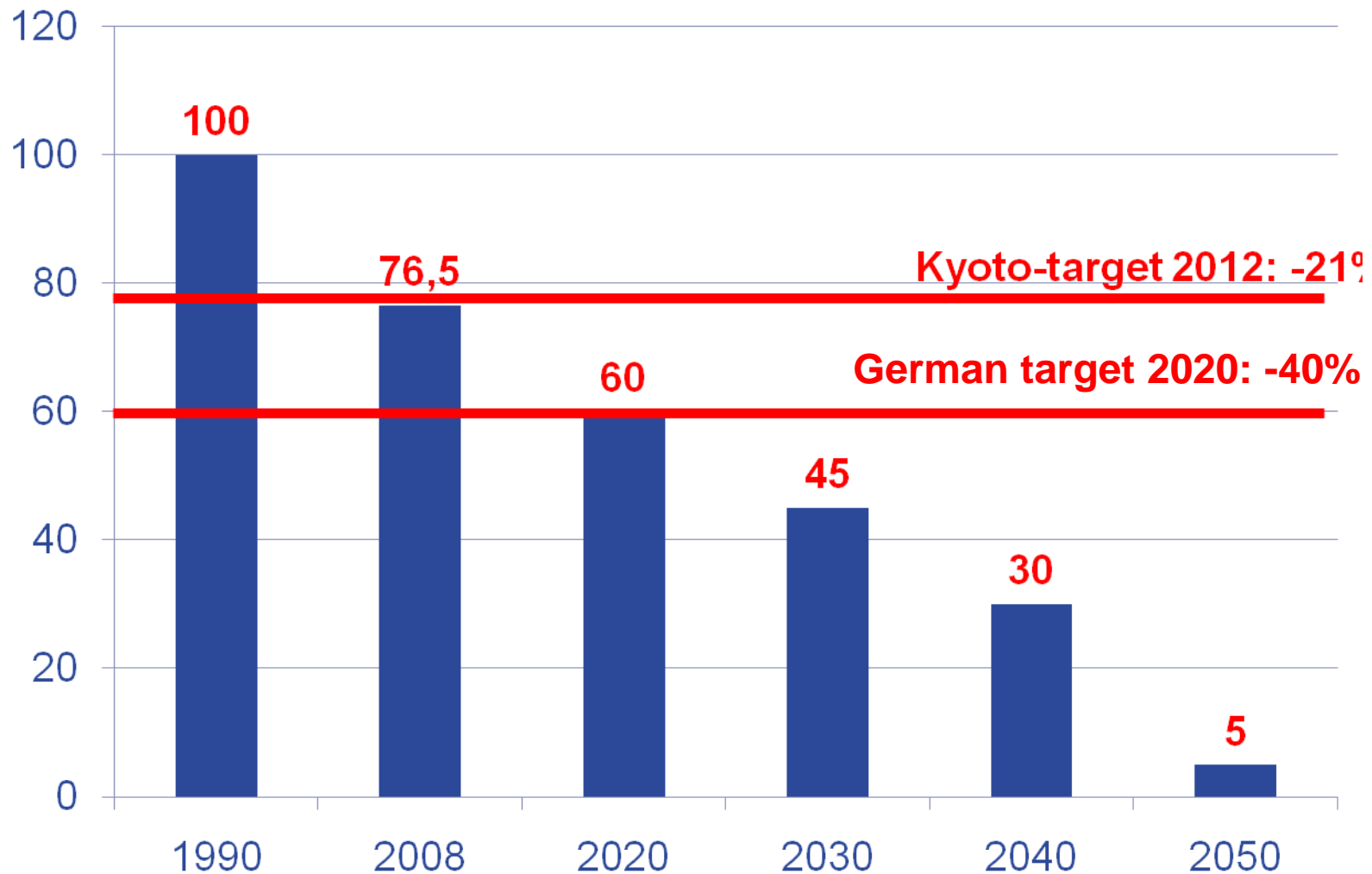


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- Solar energy: 210 -280 €/MWh
 - Wind energy, on shore: 91 (down to 49) €/MWh
 - Wind energy, off shore: 130 (down to 35) €/MWh
 - Biomass: 77 – 115 €/MWh
 - Water: 76 -127 €/MWh
 - Geothermal energy: 10 – 16 €/MWh
-
- Feed in tariffs are covering the needs but do not reflect efficiency of the renewable energy production

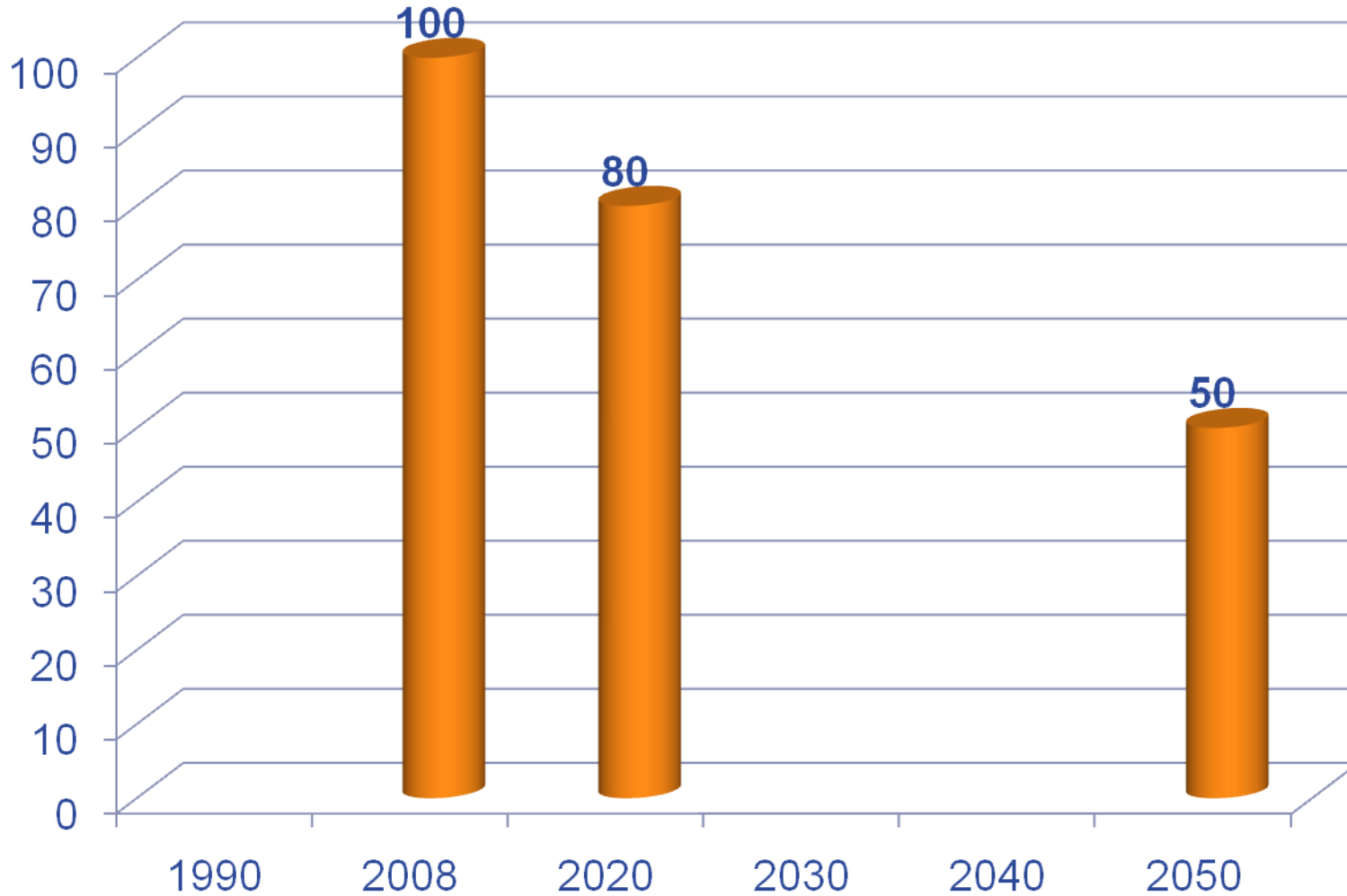
- German government published the energy strategy 2050 in 2010
 - Reduction **CO₂-emissions** by 40% until 2020 and 80 bis 95% until 2050 (base year: 1990)
 - Reduction **primary energy consumption** 20% until 2020 and 50% until 2050 (base year 2008)
 - Reduction **electricity consumption** by 10% until 2020 and 25% until 2050 (base year 2008)
 - Increase **share renewable energy** of end energy consumption up to 18% until 2020 and 60% until 2050
 - Increase **share of renewable electricity** of total electricity consumption up to 35% until 2020 and 80% in 2050
 - Increase **energy efficiency** by 2,1 %/year
- Important premise: relatively small economic growth and reduction in production of energy intensive industries

Greenhouse gas emissions (%)



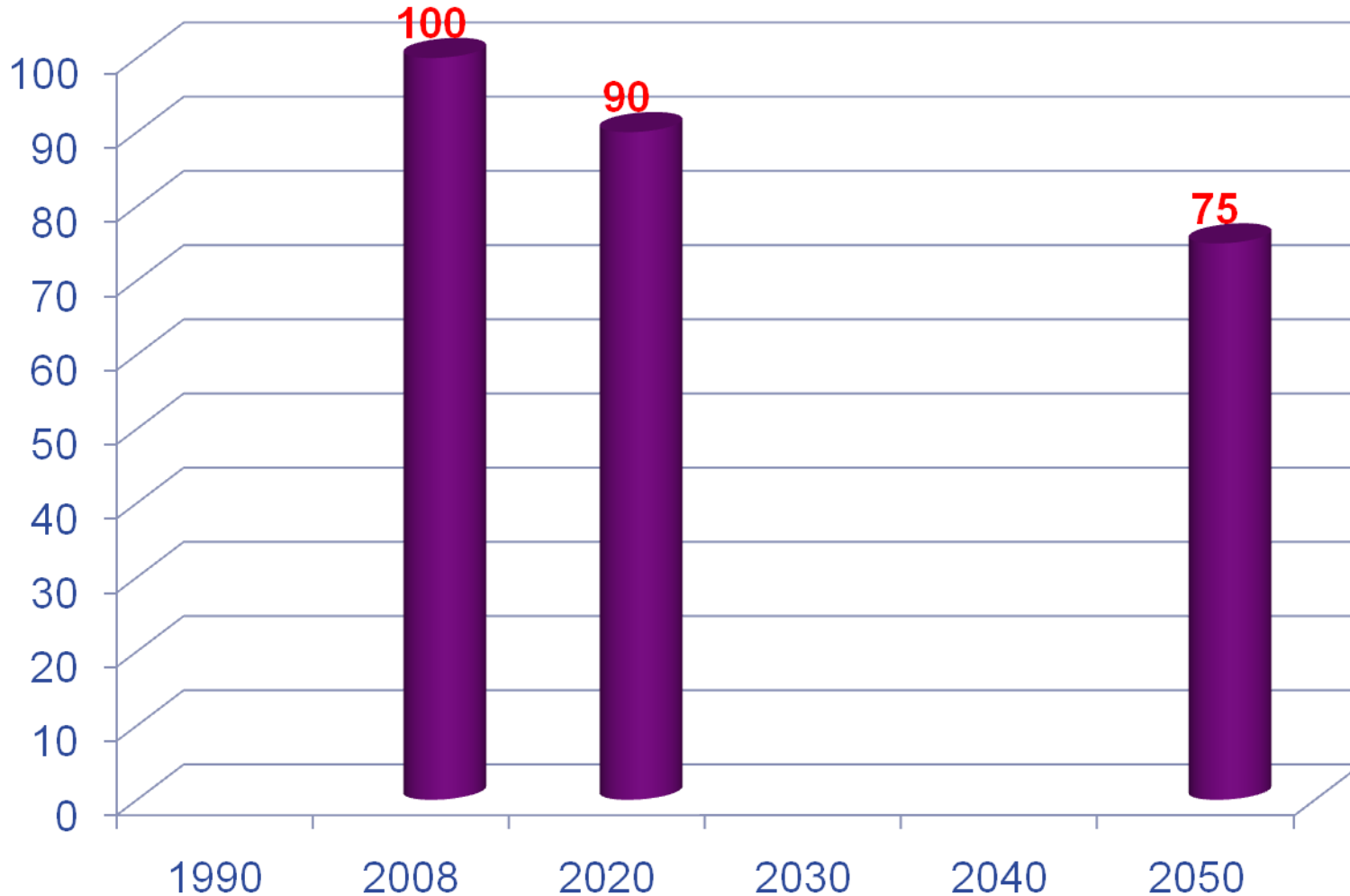
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Primary energy consumption (%)

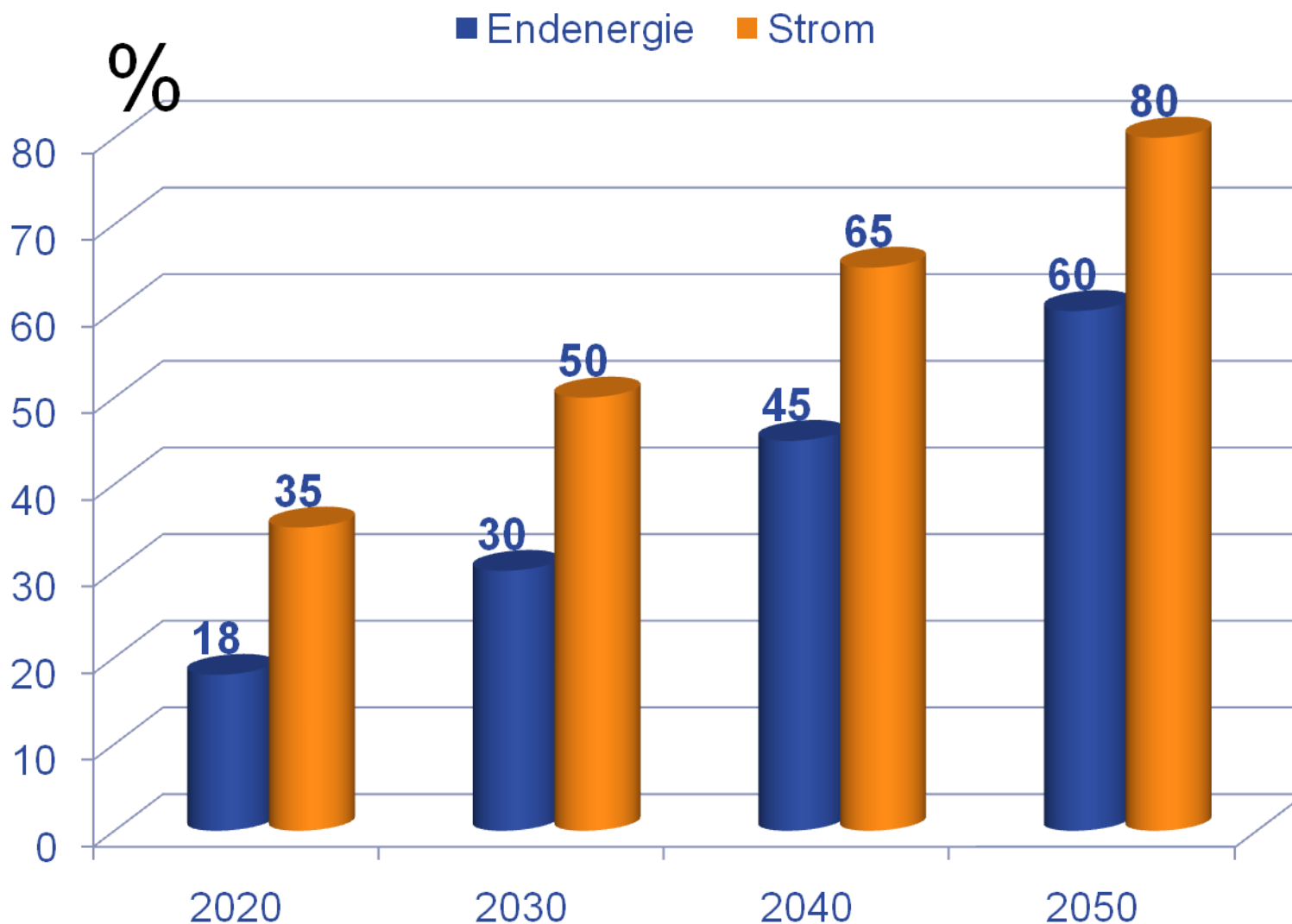


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Electricity consumption %



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- There is no direct conflict between energy efficiency and renewable energy production
- Connection between energy efficiency and renewable energy in the complex system of European climate change instruments
- Renewable energy does not necessarily support energy efficiency
- Efficiency of renewable energy production itself is relatively low
- Efficiency does not play any role in the European subsidisation systems for renewable energy