

# The road to climate-neutral industry in a world market-oriented economy: challenges, key decisions and the broader framework

11<sup>th</sup> German Japanese Environment and Energy Dialogue Forum

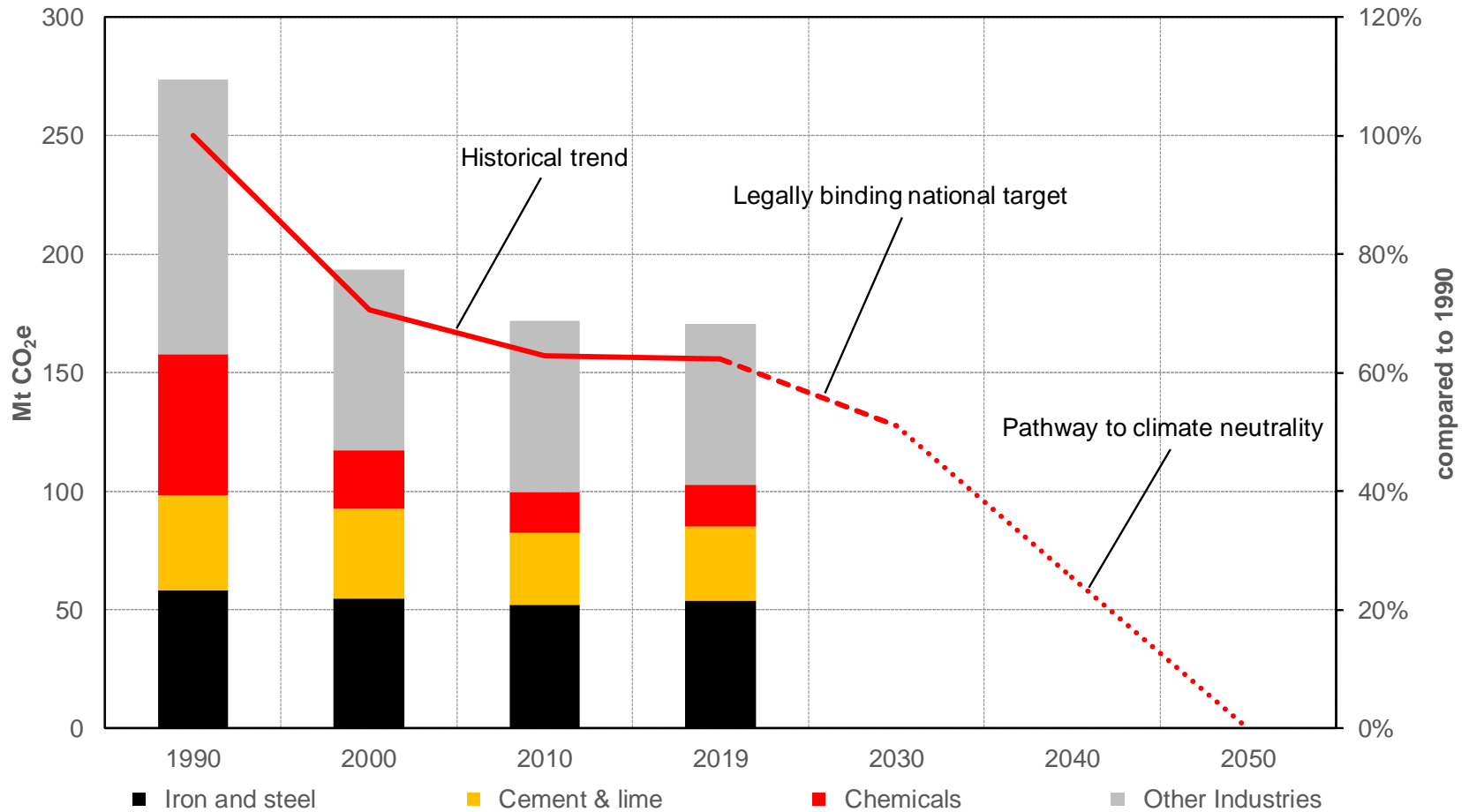
» The Industry of Tomorrow: Decarbonization as Industrial Policy  
- Political, Technical and Social Pathways to Greenhouse Gas  
Neutrality and the Role of Hydrogen «

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Berlin, 16<sup>th</sup> February 2021

# Industry on the pathway to climate neutrality

## 60% of total GHG emissions in three sectors



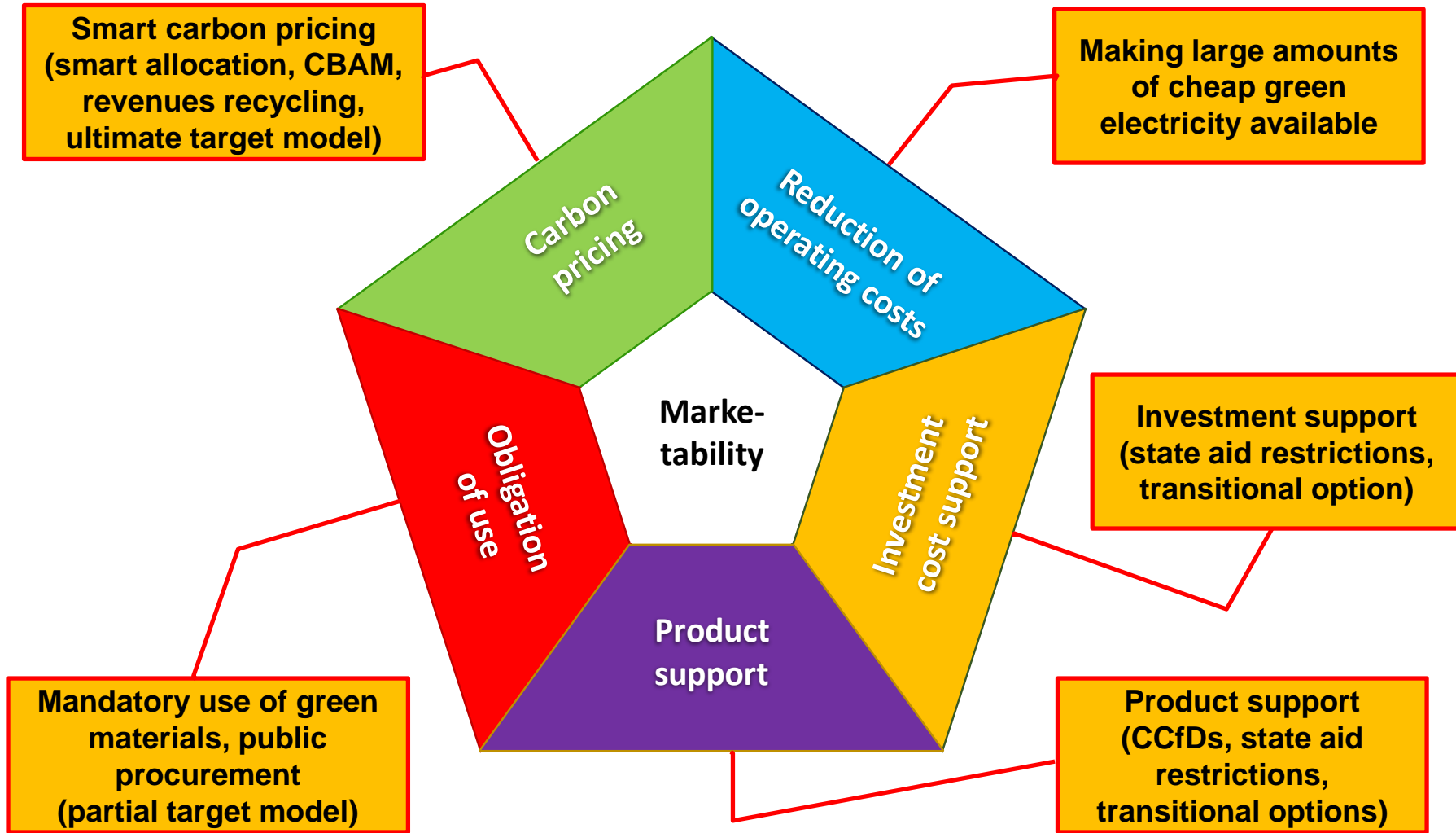
# Industry on the pathway to climate neutrality

## What it is all about

- **Industrial emissions need to go to (net) zero in three decades**
- **Energy and resource efficiency as well as electrification can deliver between 1/3 and 1/5 of GHG emission reductions**
- **Transformational GHG emission reduction options will be needed (hydrogen as crucial backstop technology, CCS for some sectors)**
- **Many transformational GHG emission reduction options are relatively high-cost options (100-150 €/t CO<sub>2</sub> even in the long term)**
- **Many industrial sectors are characterized by long-lived capital stocks (limited windows of opportunities, long ramp-up periods and lead times for infrastructure roll-out etc.)**
- **Some industrial sectors (those without strong value chain integration) could disappear**
- **Some industrial sectors are extremely important from a regional perspective**

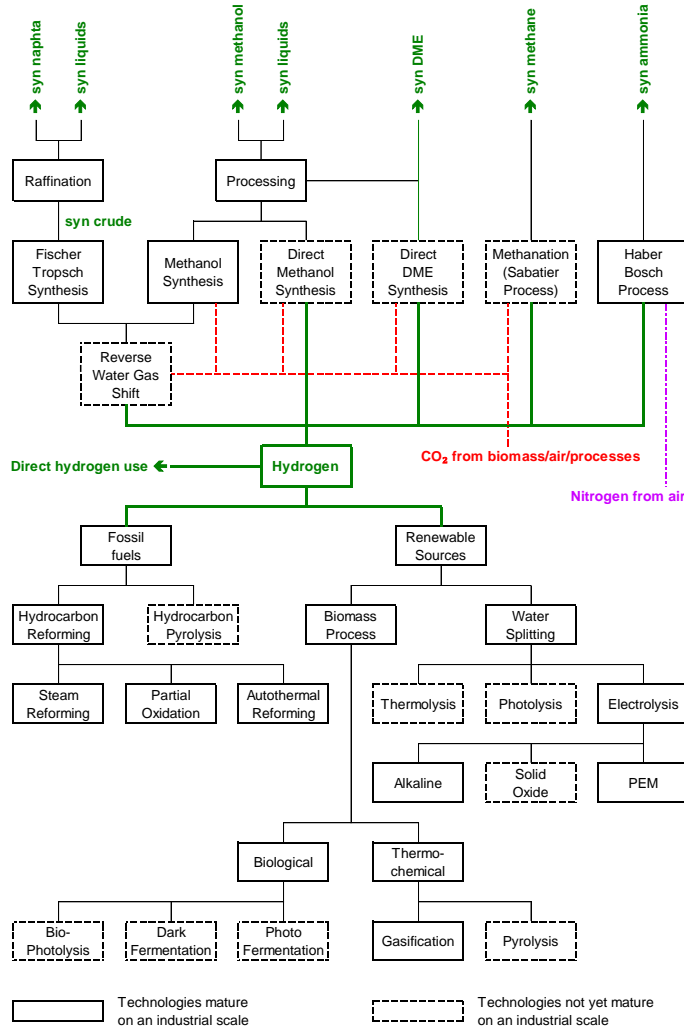
# Transformational changes in the industry

## Smart economic/financial framework needed



# Hydrogen in a climate-neutral economy

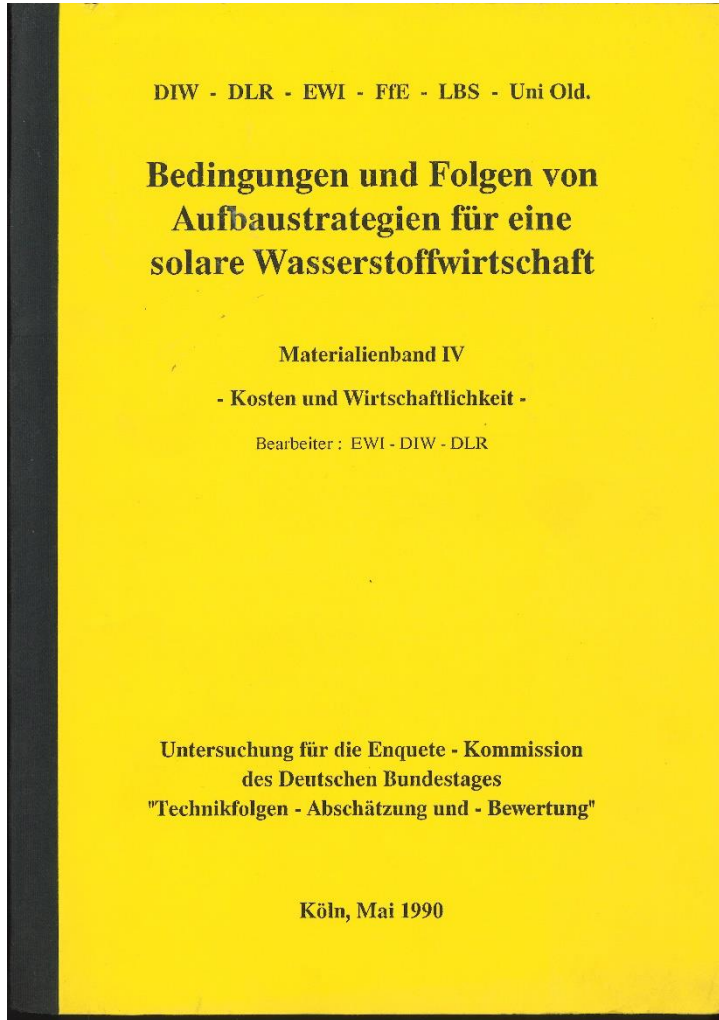
## More than a fuel: a platform – and a crucial backstop option



- many ways to produce hydrogen
    - domestic restrictions (land availability for green power)
  - direct use of hydrogen, many routes to produce hydrogen-based fuels and feedstocks
  - active sector allocation needed
  - climate neutrality of hydrogen needs to be ensured
    - green: based purely on RES-based electricity (electrolysis)
    - [blue: natural gas (steam reforming) + CCS]\*
    - [turquoise: natural gas (pyrolysis) + solid carbon]\*
- \* controversial in the German debate

# The hydrogen debate/hype is nothing new

## What is different this time?



- **There have been at least three waves of prominent hydrogen debates**
  - late 1980ies/early 1990ies
  - around 2000
  - since 2018
- **There is a new quality of the hydrogen debate**
  - large quantities of cheap power from renewables can be made available
  - climate neutrality by at least 2050 is the new energy policy paradigm (zero GHG options required for almost all sectors)

# Thank you very much

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