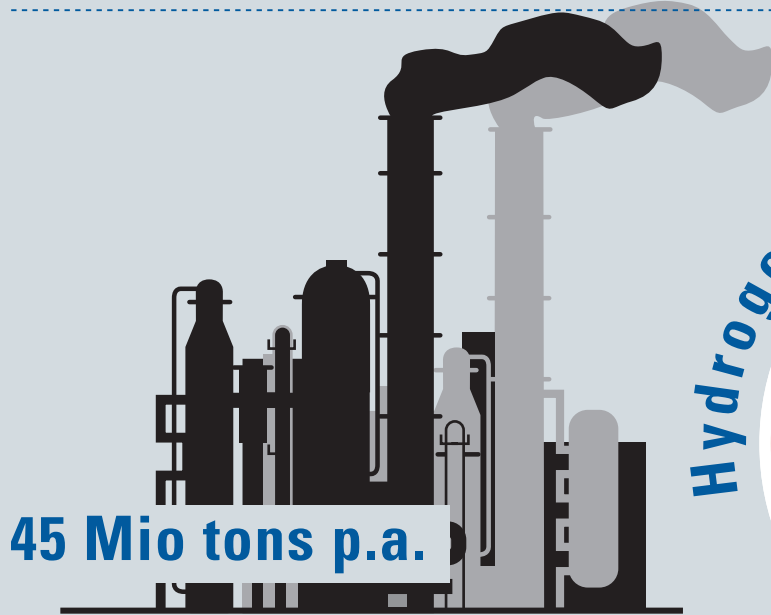


# Hydrogen is already on the market worldwide, but ....



**45 Mio tons p.a.**

Hydrogen Production worldwide



**USD 280 billion p.a.**

## Produced by:

- > Steam methane reformers (SME)
- > partial oxidation of heavy fractions of hydrocarbons
- > large (hydro) electrolyzers
- > coal and biomass gasification

## Utilized for:

- > Space flight business (NASA et al.)
  - > making of ammonia for fertilizer
  - > removing sulphur from gasoline
  - > production of semiconductors
  - > glass and food manufacturing

By far the largest amounts of hydrogen are produced and utilized captively in methanol and ammonia syntheses, and used in the refining industry for hydrogen treatment of heavy crude and the production of reformulated gasoline and desulphurization of middle distillate diesel fuel!

Source: Carl-Jochen Winter, First released: July 2009

# Hydrogen is already on the market worldwide, but ....



45 Mio tons p.a.



USD 280 billion p.a.

**Produced by:**

- > Steam methane reformers (SME)
- > partial oxidation of heavy oil

**At this time, hydrogen as an energy carrier is not produced renewable, therefore it is neither clean nor environmental benign worldwide ...**

**However, there are ways ....**

Source: Carl-Jochen Winter, Fir

