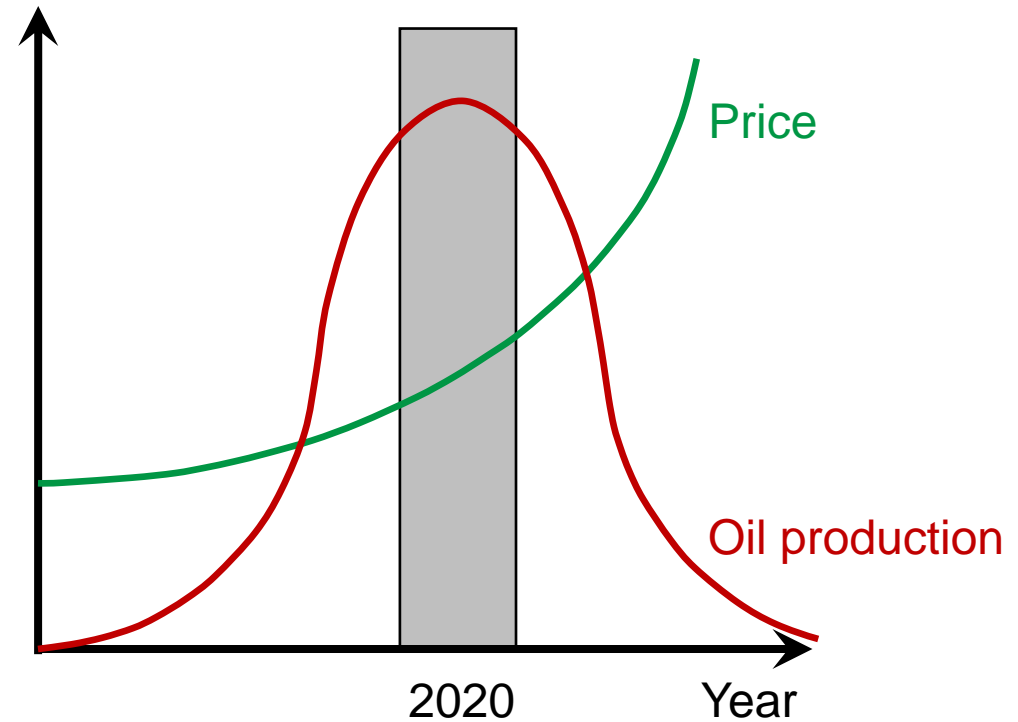


Hydrogen Production from Renewable Biomass



Situating the problem of the chemical industry

- Declining petroleum reserves
 - Climate change, greenhouse effect: N_2O , CH_4 en CO_2
- Search for sustainable alternatives



Peak Oil - Hubberts Peak

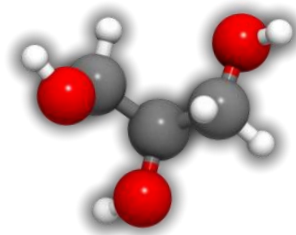
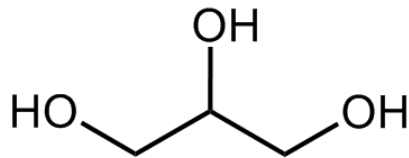
Renewable biomass

Future of biofuels

- EU wants 10% biofuel by 2020
- Bioethanol and biodiesel
- Algae as biofuel

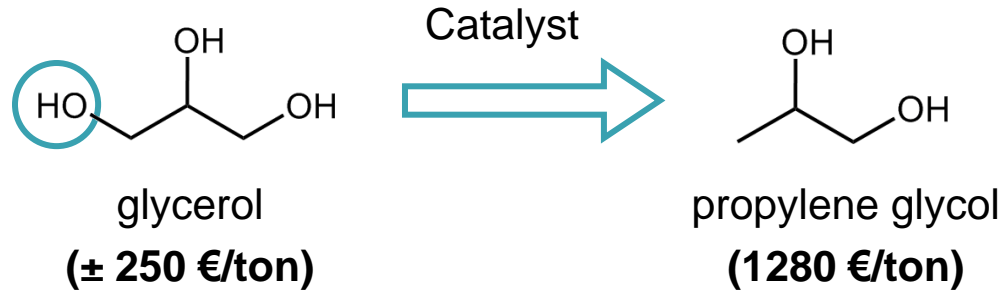
Glycerol as waste of biodiesel

- 1 kg glycerol per 9 kg biodiesel
- Surplus of 8,5 million ton glycerol



From byproduct to high value product

A renewable route to propylene glycol

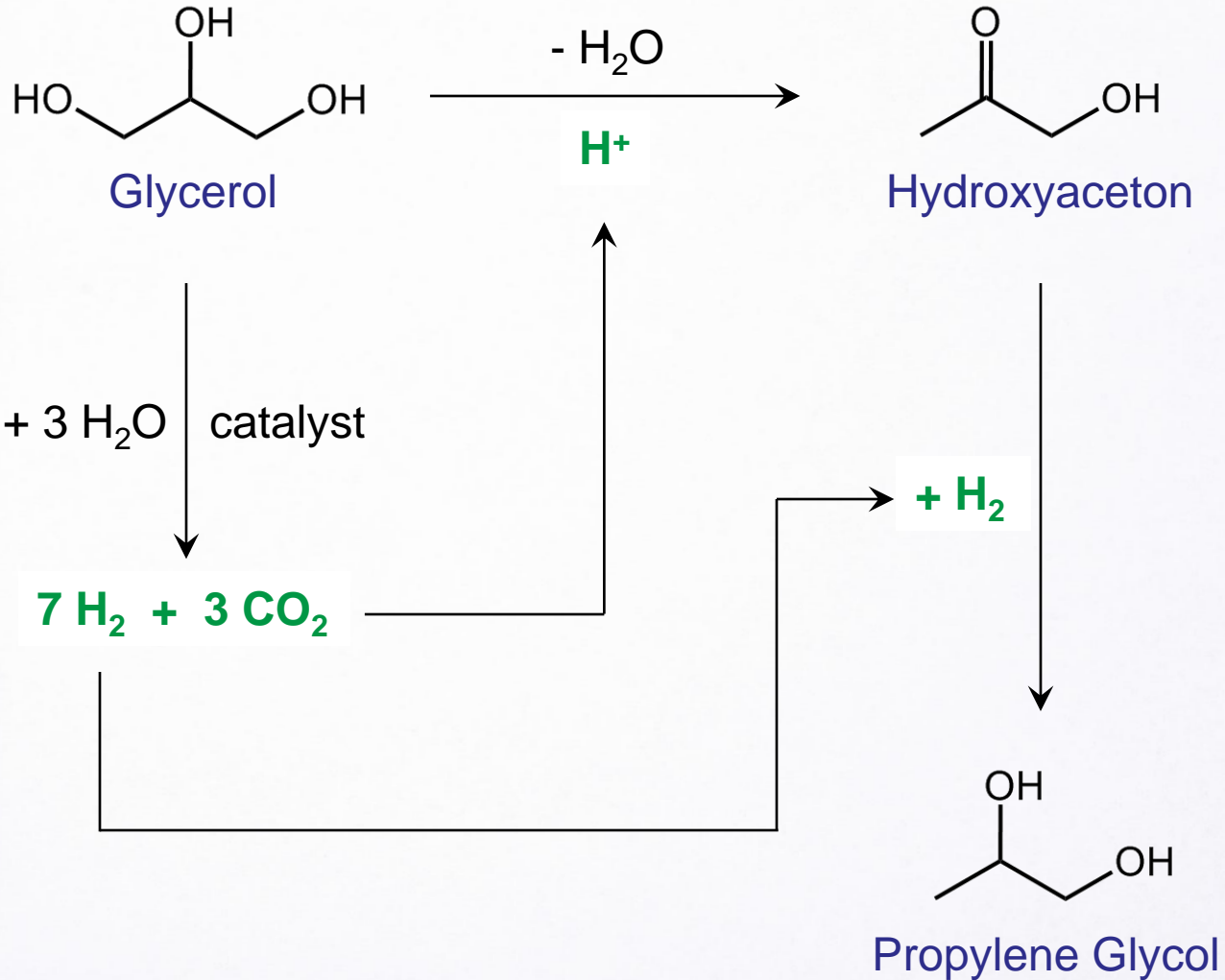


Industrial applications of propylene glycol

- Bioplastics
- Paints, lubricants, cosmetics
- Antifreeze products



Improved process with in situ production of biogenic hydrogen



Innovative technology meets criteria for green chemistry

1. Glycerol as renewable biomass
2. Water as solvent
3. Catalyst is insoluble
4. Recyclable catalyst
5. Sustainable process conditions
6. In situ production of hydrogen



Project objectives

Short term goals - Cash cow

- Commercialization of our clean process
 - Licensing
 - Process technology and equipment
 - Technical support
- Cooperation with biodiesel industry



Long term goals - Star

- Development of technology for hydrogen production from renewable biomass
- R&D funded with cash cow

(19) World Intellectual Property Organization
International Bureau



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3 July 2008 (03.07.2008)

PCT

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WO 2008/077205 A1

Catalytic Process for the production of oxygenated hydrocarbons

ChemComm

Catalytic glycerol conversion into 1,2-propanediol in absence of added hydrogen

