

# IDENTIFICATION OF ENVIRONMENTAL ISSUES ASSOCIATED WITH THE HYDROGEN SECTOR

## Context & Problematic:

Part of the *HyTrend* project, an initiative of the M.I.N.E.S. Carnot Institute

*Energy transition: Hydrogen, an alternative energy vector*

*Environment: Is hydrogen as green as it looks like?*

## Methodology:

State of the art of the *hydrogen sector*

*LCA: data analysis and comparisons*



## Less impacting:

From renewables

The least fossil raw material

Most efficient and cheapest:

From coal and natural gas

High potential from biomass

## Hydrogen state:

Gas better than liquid

Transport mean:

Pipeline less impacting than truck

Hydrogen on larger scale:

Emits as much as production

By 2100, in the world, GW should not exceed 2° C  
 By 2050, in Europe, climate neutral economy and emissions reduction of 130Mt CO<sub>2</sub>/year  
 By 2030, in France, 33% of the energy consumption would be from renewable sources

Objectives at different scales for energy transition

## Energy density of several fuels

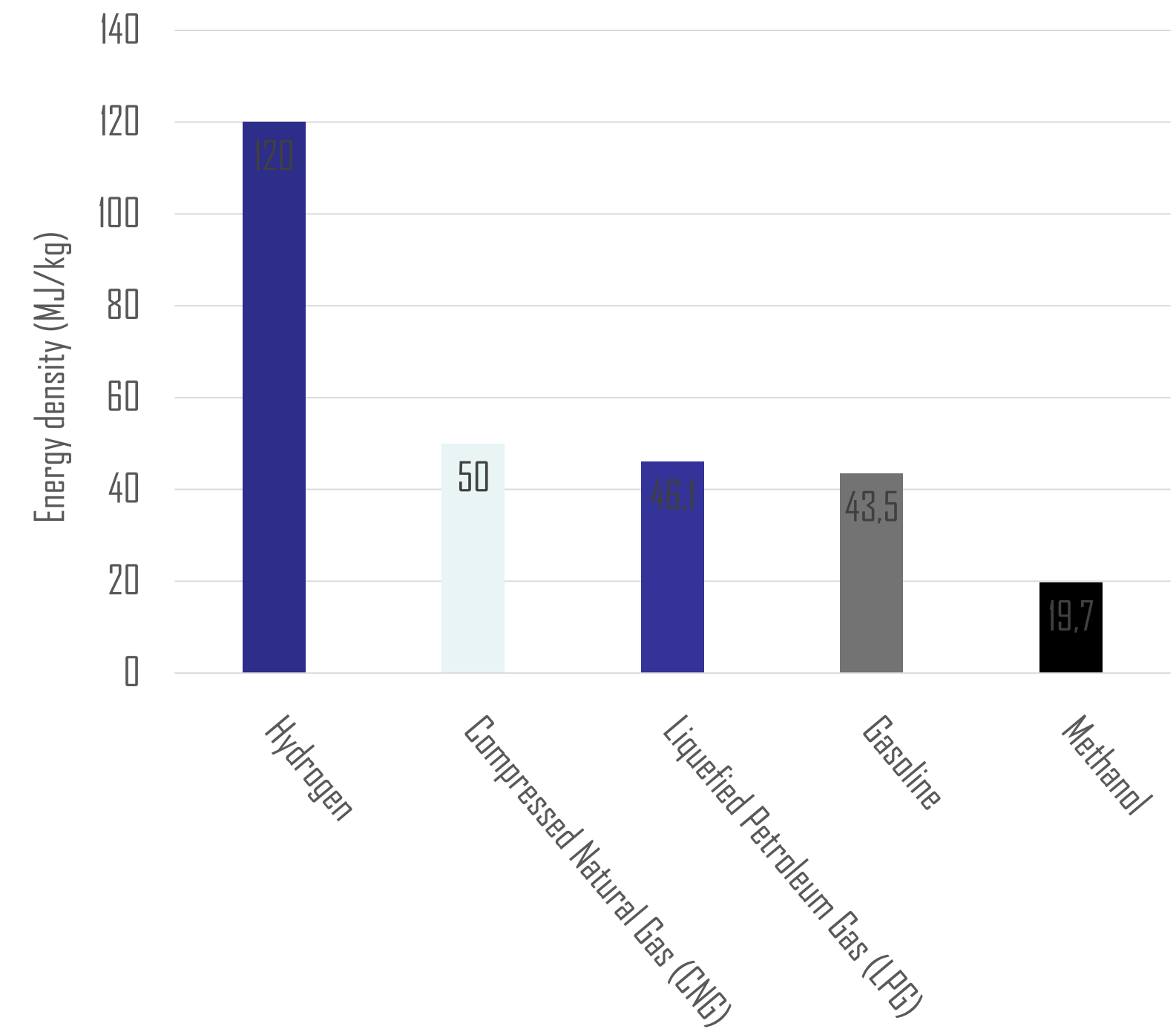
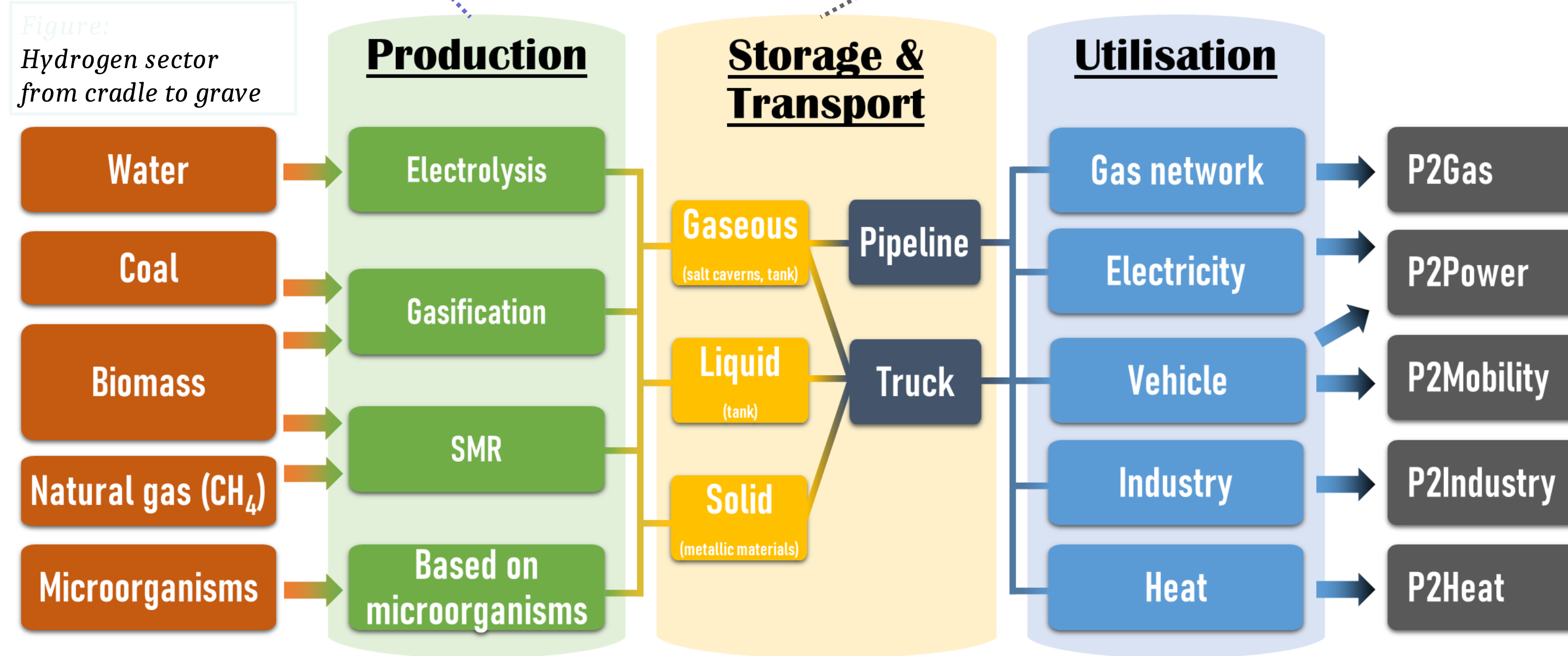
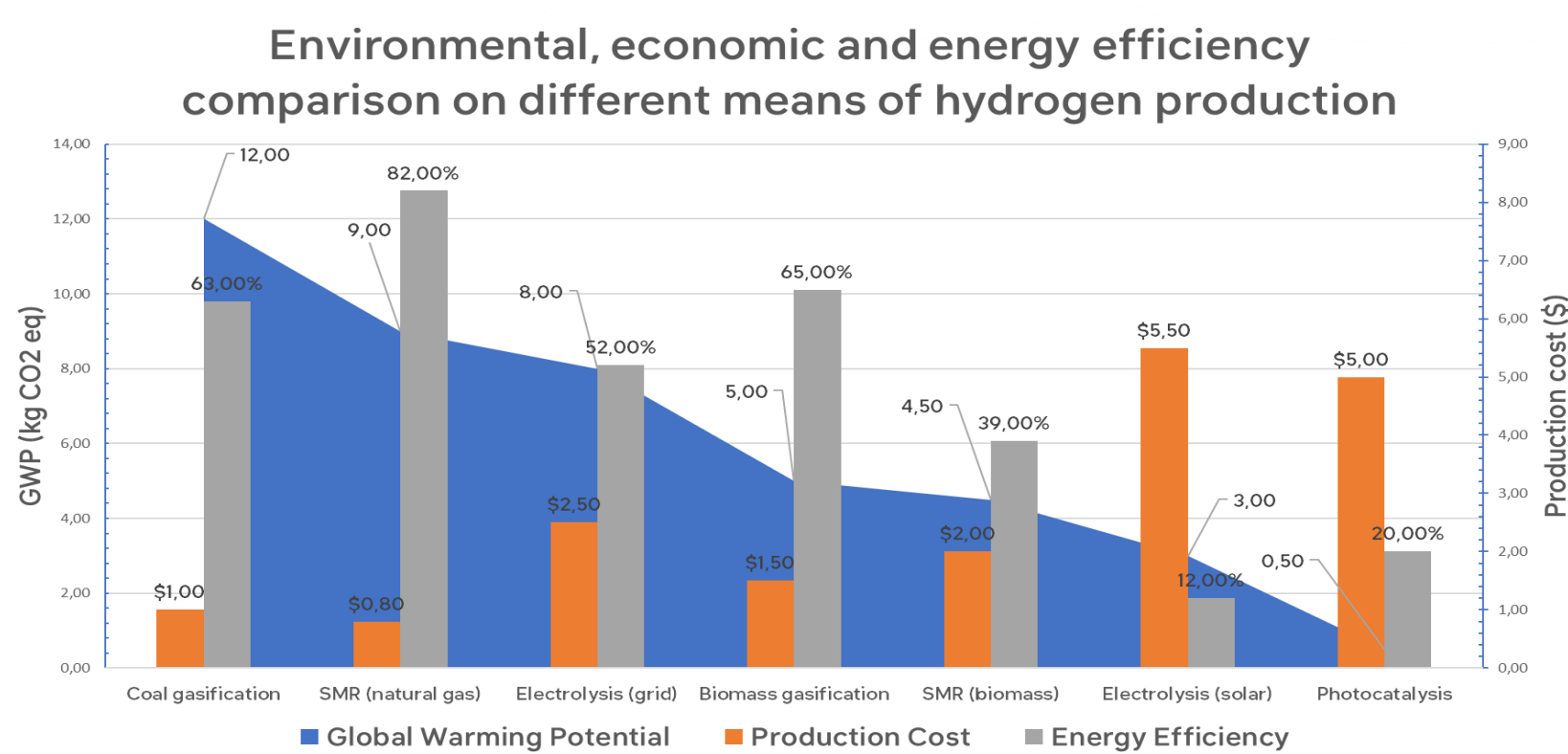
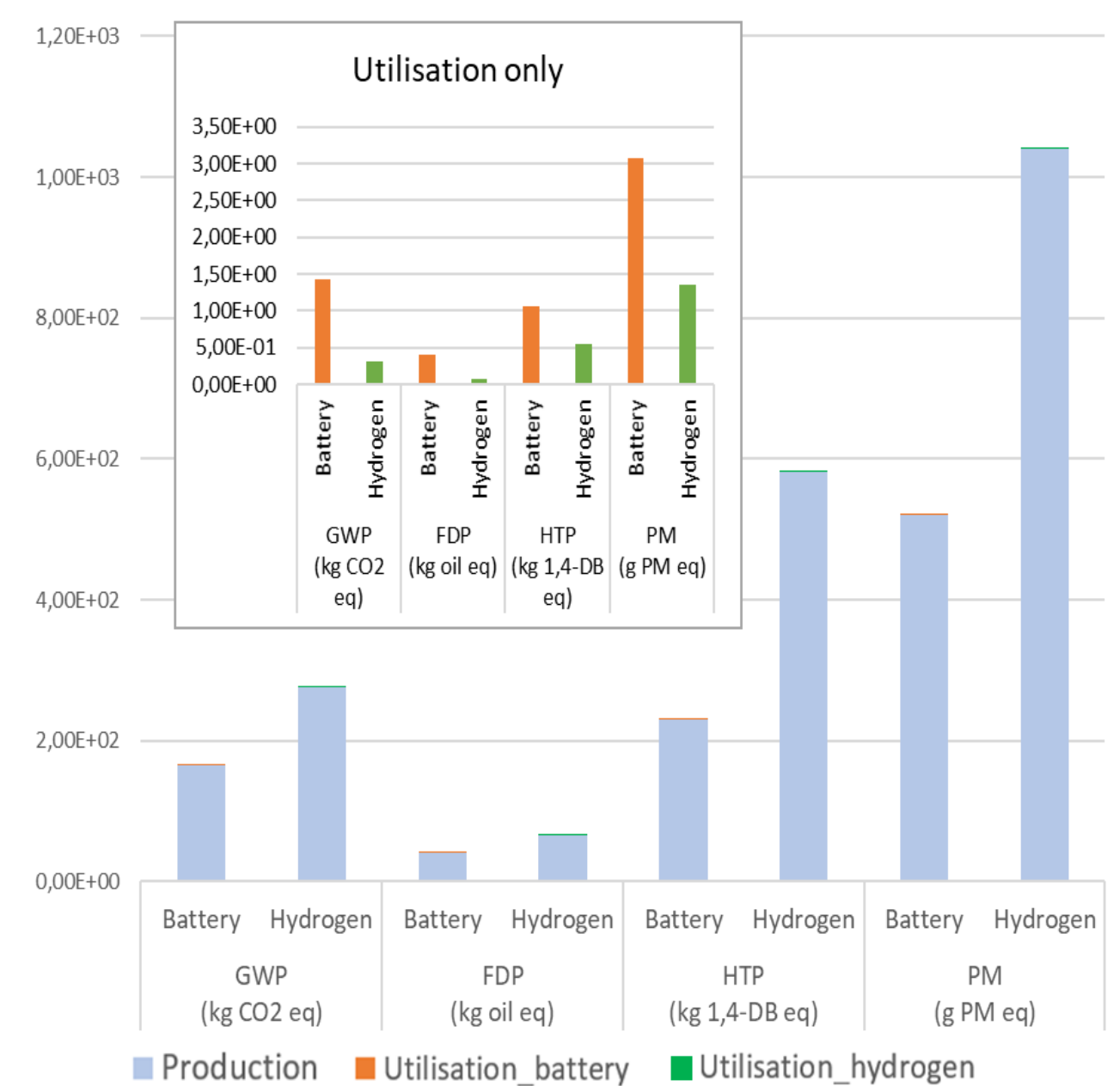


Figure: Hydrogen sector from cradle to grave



## Comparison between hydrogen and electric bicycles



## Gas network:

10% introduction of H<sub>2</sub> in CH<sub>4</sub> reduces impacts considerably

## Vehicle:

Use impacts negligible compared to vehicle production

Hydrogen less impacting than e-bikes and ICEV, more than e-cars

## Electricity:

Hydrogen impact low compared to conventional methods

## Conclusion:

- Hydrogen, a green potential, especially from biomass
- GW, particule emissions, acidification, human toxicity, water and fossils depletion are important to study
- Perspectives: measure impacts on the entire life cycle of hydrogen on several scenarios