



# BARRIERS AND DRIVERS TO THE IMPLEMENTATION OF GREEN HYDROGEN IN THE EUROPEAN STEEL INDUSTRY: A PESTLE Analysis

Author: Viktor Schultz-Zehden (S5319552)

## 01 Introduction

- Increasing need to decarbonize hard industries
- Hard industries such as the steel industry contributes significantly to climate change
- European steel industry accounts for 5% of all European CO2 emissions
- Of high priority to decarbonize this sector with cleaner energy carrier

## 02 Background

- European steel industry is characterised by large enterprises, significant market entry barriers and merger pressure
- Also low-profit margins and high fixed expenses are typical for this sector
- Steel sector can not be electrified fully, hence require green hydrogen as clean energy carrier for deep decarbonization
- Replacing fossil fuels with green hydrogen calls for systematic change among industrie members
- This is a challenge considering the aforementioned characteristics of the European steel sectors and its established processes.

## 03 Objective

- Disclosing barriers and drivers in the green hydrogen penetration by the European steel sector, according to PESTLE factors.
  - By doing so, understanding bottlenecks of this complex cross-sector transformation is facilitated and appropriate actions can be initiated.
- > RQ: What are the barriers and drivers regarding the uptake of green hydrogen within the European steel industry?

## 04 Methods

- Exploratory qualitative research strategy was used as a research design
- Herefore primary data was collected cross-sectionally from key stakeholders using semi-structured interviews

Interviewees	Position	Industry	Firms location
I1	Head of Department Efficiency of Ressources and R&D Coordination	Steel manufacturers research institute	Germany
I2	Process Engineer	Steel technology provider	Luxemburg
I3	Technical Research Manager	Research university	Italy
I4	Head of Large Systems Product Development	Electrolyzer producer	Germany
I5	Researcher Energy Transition	Research institute	Netherlands
I6	Business Line Manager Research Affairs	Engineering consultancy	Italy

## 05 Results

### Barriers:

- Green hydrogen costs (Economical)
- Availability of green hydrogen (Technological)
- Reskilling of employees (Social)
- High infrastructure investments (Economical)
- Overregulation (Political & Legal)

I5: “[...] It’s the cost of green hydrogen, they are still quite high. I mean, there’s barely any production yet.

I1: “[...] it is very difficult to achieve this ramp-up, I think it would be better if we set up simpler mechanisms, simpler regimes”

### Drivers:

- Business Case (Economical)
- Society’s legitimacy and Reputation (Social)
- Climate Change (Environmental)
- Mature technologies (Technology)

I1: “So, for the time being, I don’t see any technical problems on the whole. The technology is available, and we are currently investing and building a plant.”

## 06 Implications & Recommendations

- Need for a supportive policy framework
- Scaling of renewable energy capacities and green hydrogen production key
- Supplying steel sector with green hydrogen displays a business opportunities for the private sector
- Unbureaucratic financial support for steel producers essential to compensate their cost disadvantage linked to green hydrogen steelmaking