

# **Low-carbon transition in the steel industry: A comparative study of Iran and Sweden**

***By:***

***Soma Rahmani***

*PhD candidate, Mazandaran University, Iran, [Srahmani@umz.ac.ir](mailto:Srahmani@umz.ac.ir)*

***Mohsen Alizadeh Sani***

*Assistant professor, Mazandaran University, Iran, [Alizadehsani@umz.ac.ir](mailto:Alizadehsani@umz.ac.ir)*

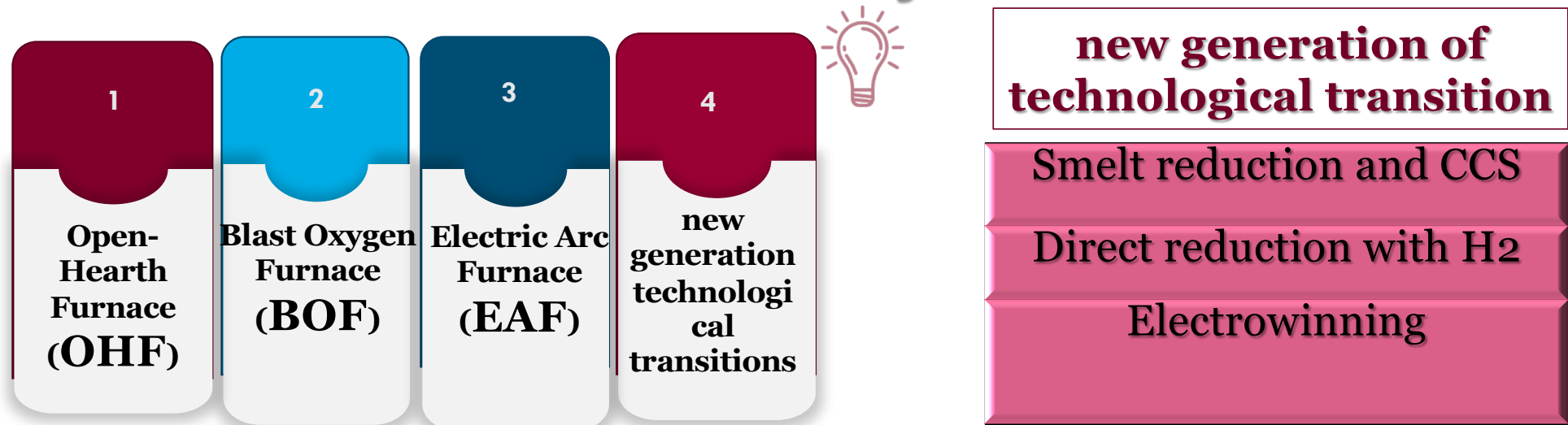
# Introduction

## ❖ Technological catch up



❖ **Research Questions:** How developing countries in transition era catching up? Where are the Iran's and Sweden's steel industry placed in the transition process, and what factors have an impact on their success or failure?

# Changes in industrial leadership in the world steel industry



# Research Method

## ❖ The research method is multiple case study

❖ An analytical method in the multiple case study framework is Multiple-Level Perspective (MLP)

❖ The case studies focus on the situation of sustainability transition, and hydrogen direct reduction technology in particular, in Iran and Sweden.

Primary data	Secondary data
semi-structured interviews in both Iran's and Sweden's steel industry (2018- 2019)	Academic papers, documents from companies, governmental documents, reports, and statistics of some agencies.

# Sustainability Transitions- the definition

**-Question:** how these transitions to a new system take place and analyse?

**- Answer:** MLP can be applied as an analytical tool

**MLP: niches** (local innovations), **socio-technical regimes** (established actors, technology, practices, and rules in the system and in fact) and a **socio-technical landscape**.

# Findings

## Driver factors in Sweden's steel industry based on MLP analysis

### **Socio-technical landscape:**

#### Severe pressure

Global overcapacities, some practices, energy costs, policies at the national and international stage (**ETS, Paris agreement, Vision 2011, Climate policies Sweden's Riksdag in 2017**) and cultural changes

### **Socio-technical regime:**

*Government support for Research and Development (R&D)*

*Policymaking model of government*

*Well established collaboration among actors*

*Public awareness*

### **Niche-innovation:**

**action plans** (**steel industry** + the Stockholm Environmental Institute (**SEI**)) in 2015-2016 ,Cooperation of Swedish companies **LKAB, SSAB, and Vattenfall**

# Findings

## Barrier factors in Iran's steel industry based on MLP analysis

### **Socio-technical landscape:**

-No severe pressure.

unsuccessful national plan for the protection of the environment, and the national strategy for sustainable development by NCSD (1992).

*Formulating not applicable policies in Fifth and Sixth Five-year Development Plans*

### **Socio-technical regime:**

*Low R&D allocation*

*Market control by fossil fuel systems*

*Government financial support restrictions*

*Lack of proper cooperation among the actors*

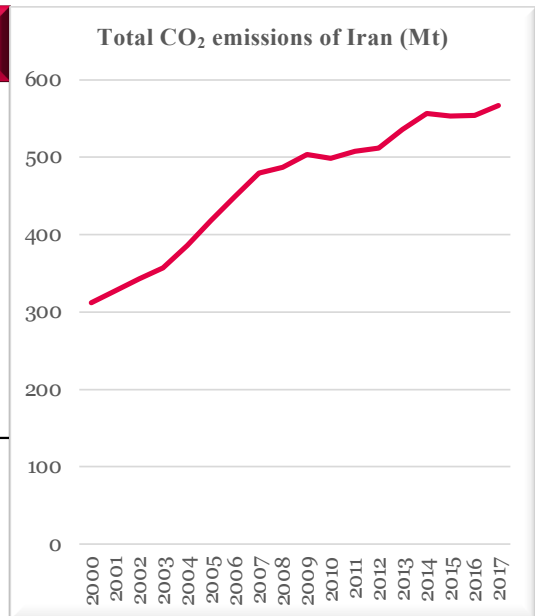
*Lack of proper executive policies related to the transition in steel*

*Lack of public awareness*

*International limitations*

### **Niche-innovation:**

No existence



Total CO<sub>2</sub>  
emissions, Islamic  
Republic of Iran  
2000-2017 (IEA  
data services)

# Discussions

**Swedish steel industry:** Hydrogen- Direct Reduction (H-DR) technology pilot phase (Sustainable path)

**limitations** :Major investment, natural gas needed for a short time in the H-DR process

**Iran:** resistances, preventing the industry from being sustainable

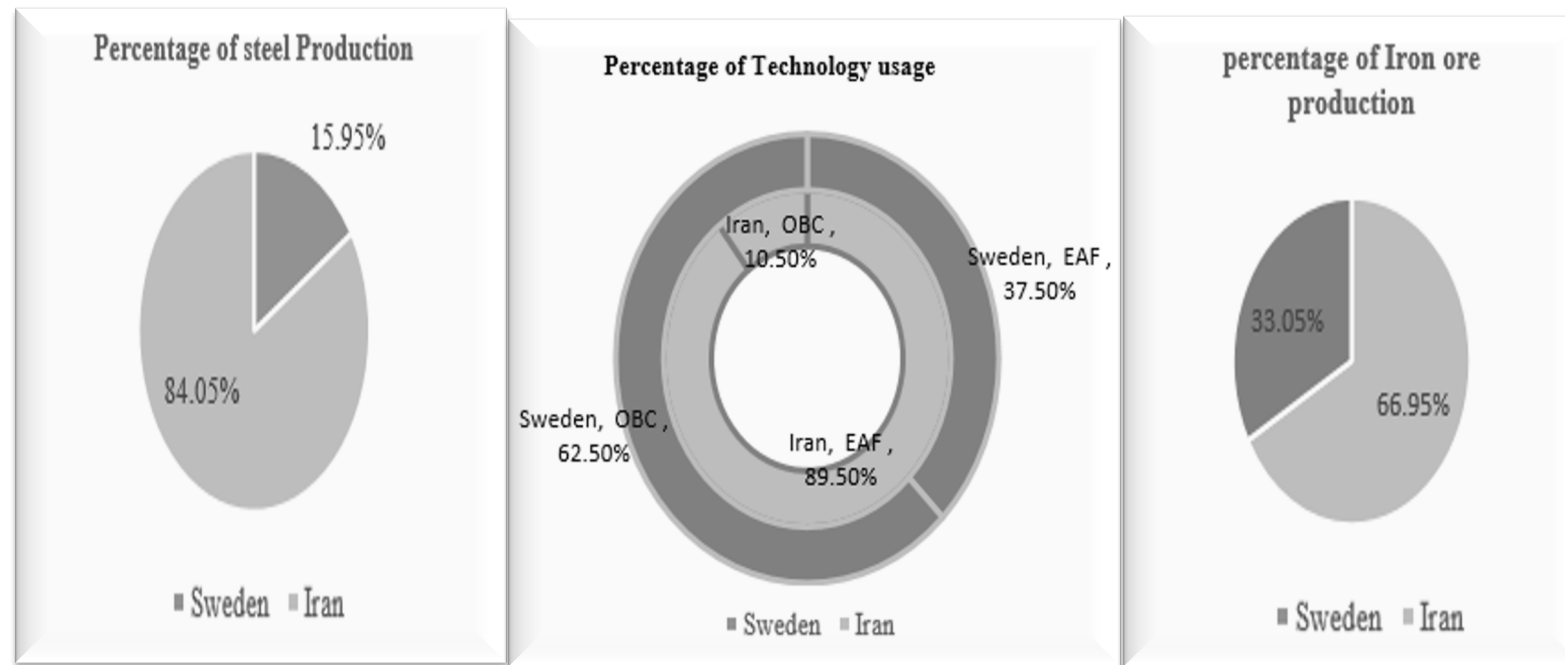
**Potential of Iran:** generation of solar power has been developed in recent years, it has rich sources of natural gas, its infrastructures and skilled people, improvement of the Midrex process (PRED)

**Main point:** How these countries collaborate to compensate for their limitations for decarbonisation?

**prerequisites** to remove or decrease Iran's barriers.



# Status quo of Iran's and Sweden's steel industry



*Steel production (2018), technology usage, iron ore production (2017) of Iran's and Sweden's steel industry (World steel association)*

# ***Thank you***

## **Contact**

Soma Rahmani

Email: [Srahmani@umz.ac.ir](mailto:Srahmani@umz.ac.ir)

Linkedin: <https://www.linkedin.com/in/soma-rahmani-830148145>