

## Introduction

### Net-Zero GHG Emissions Target and Industry Sector

- India aims to achieve net-zero emissions by 2070 which Requires structural changes in industrial production due to rising demand in goods and services to achieve such ambitious target.
- Industry sector is the **second largest contributor** (22%) to national greenhouse gas (GHG) emissions, contributing 14% and 8% from fuel combustion, and industrial processes and product use respectively, in 2016 (MoEFCC, 2021).

The industry sector consumes **23% of India's coal**, 17% of the total oil and 48% of the total gas consumption (Paltsev et al., 2022).

### Complexities and challenges with industry sector

- Unavailability of process substitution
- Limited cost effective options
- low Energy efficiency and standard mandates
- Heterogeneous characteristics & industry type
- Inefficient technology and process that leads to pollution load

## Methodology

- Includes the stakeholder inputs in defining the constraints for the scenarios that are further fed into the soft-coupled top-down and bottom-up models.

- Stakeholder consultation involved semi-structured open-ended entailed questions

- 22 Sectors** in the model including **six manufacturing sector**
- The macroeconomic framing derives from 2-sector KLEM model (Gupta & Dhar, 2022).
- The model is calibrated on the recent data on supply-use table for the year 2015 (MoSPI, 2020).
- The original matrix is treated along with the energy balance and prices to construct the **hybrid matrix** (Gupta, 2021).

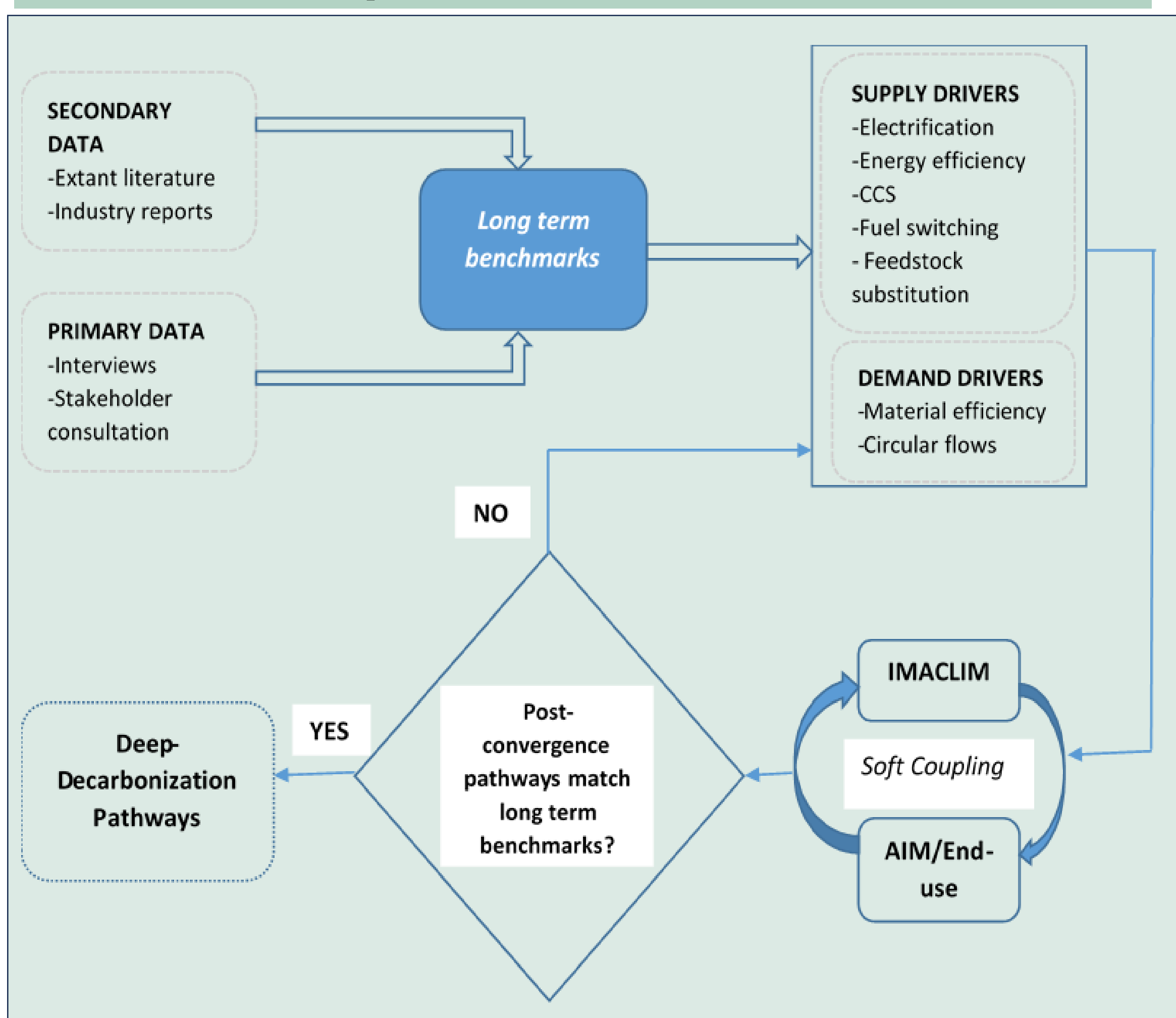


Figure 1. Research framework

## Scenario storylines

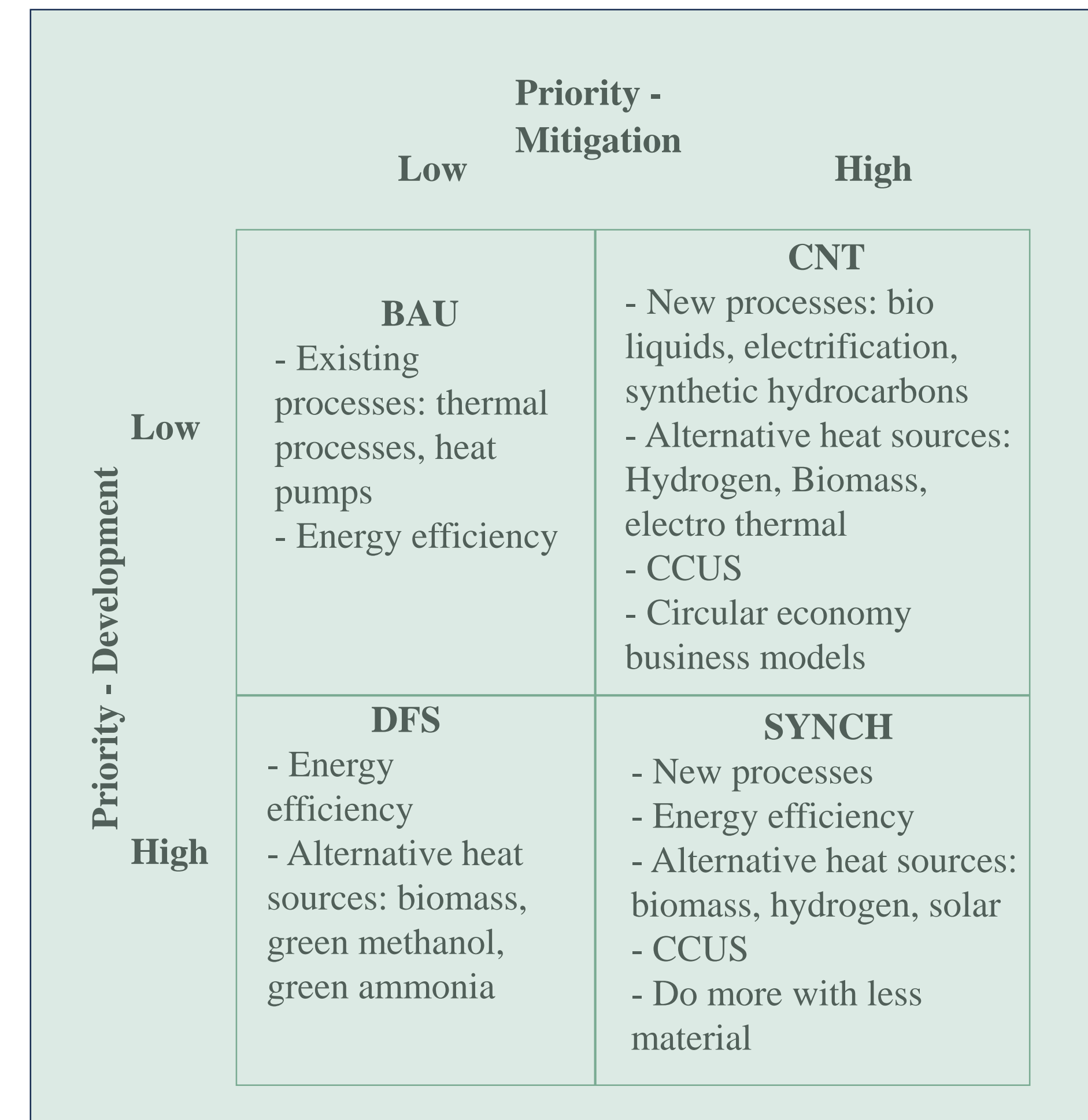
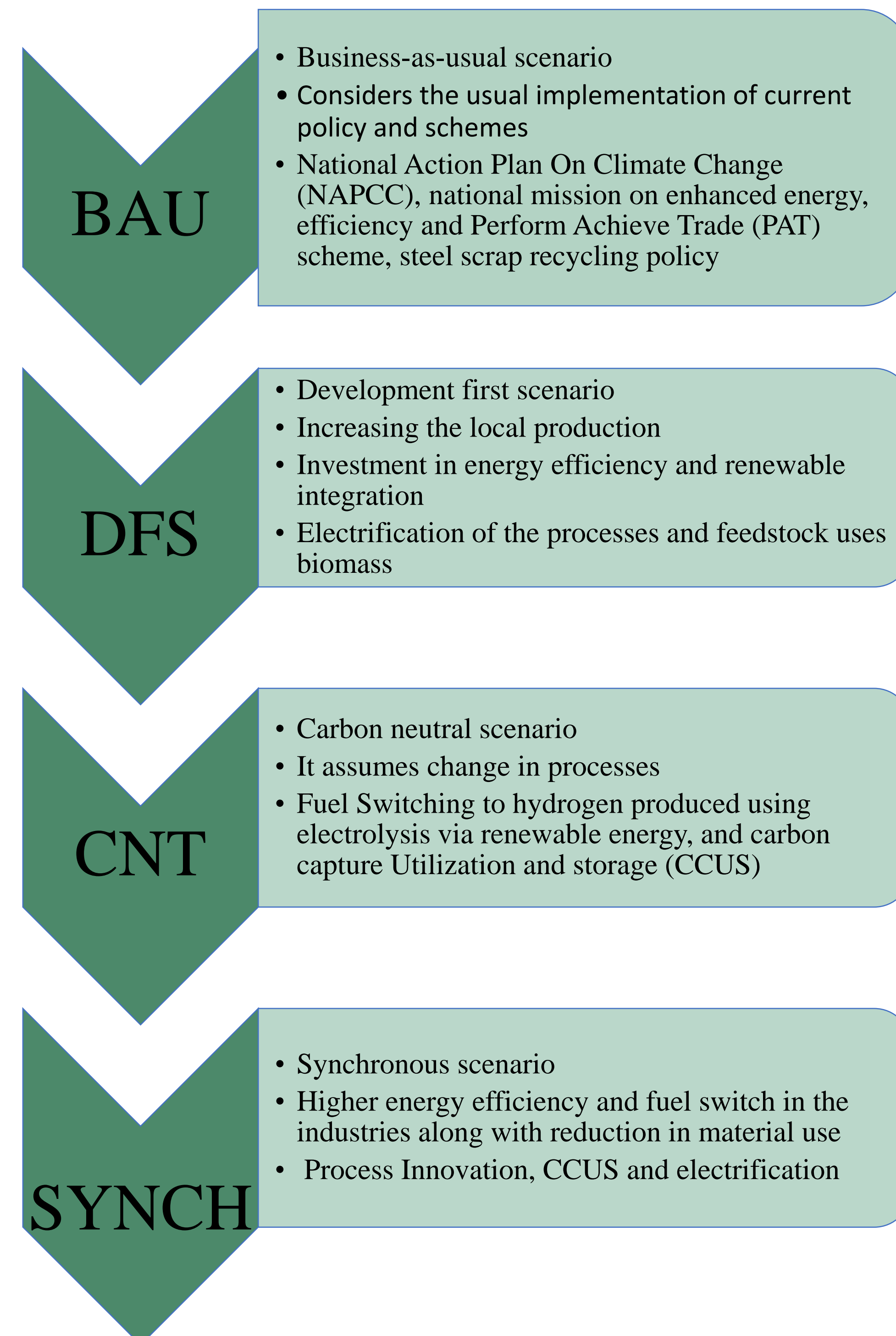
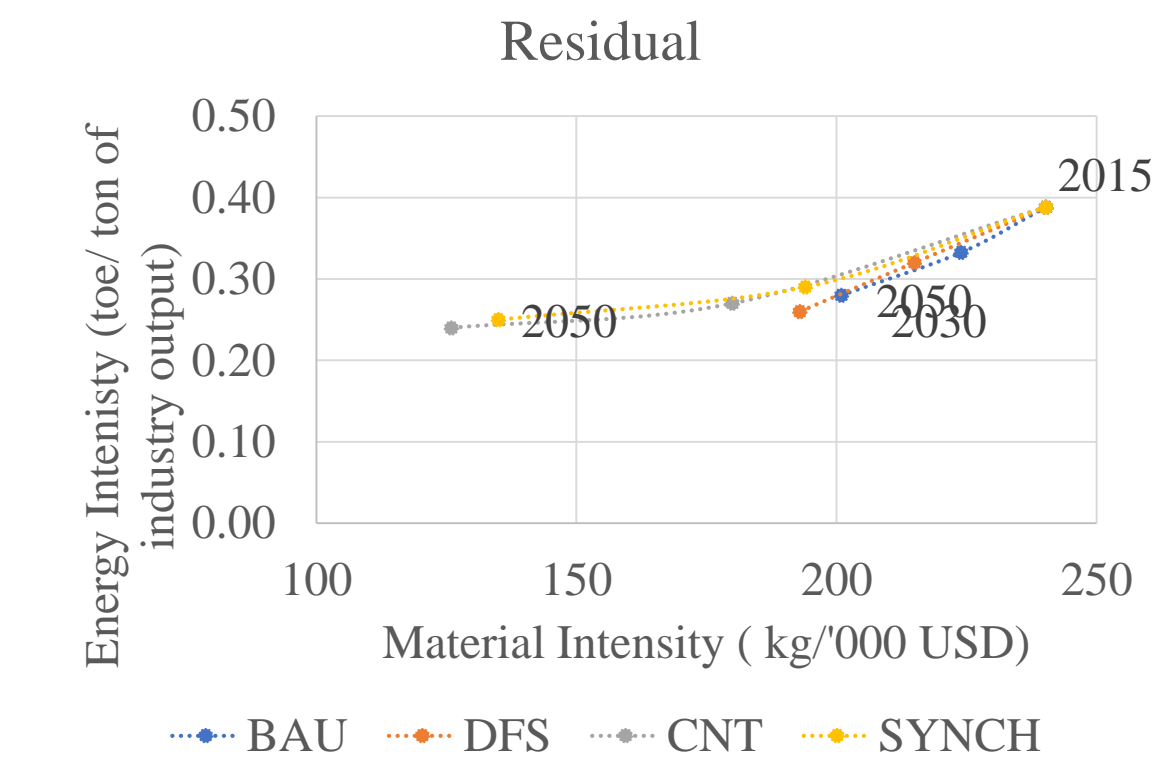
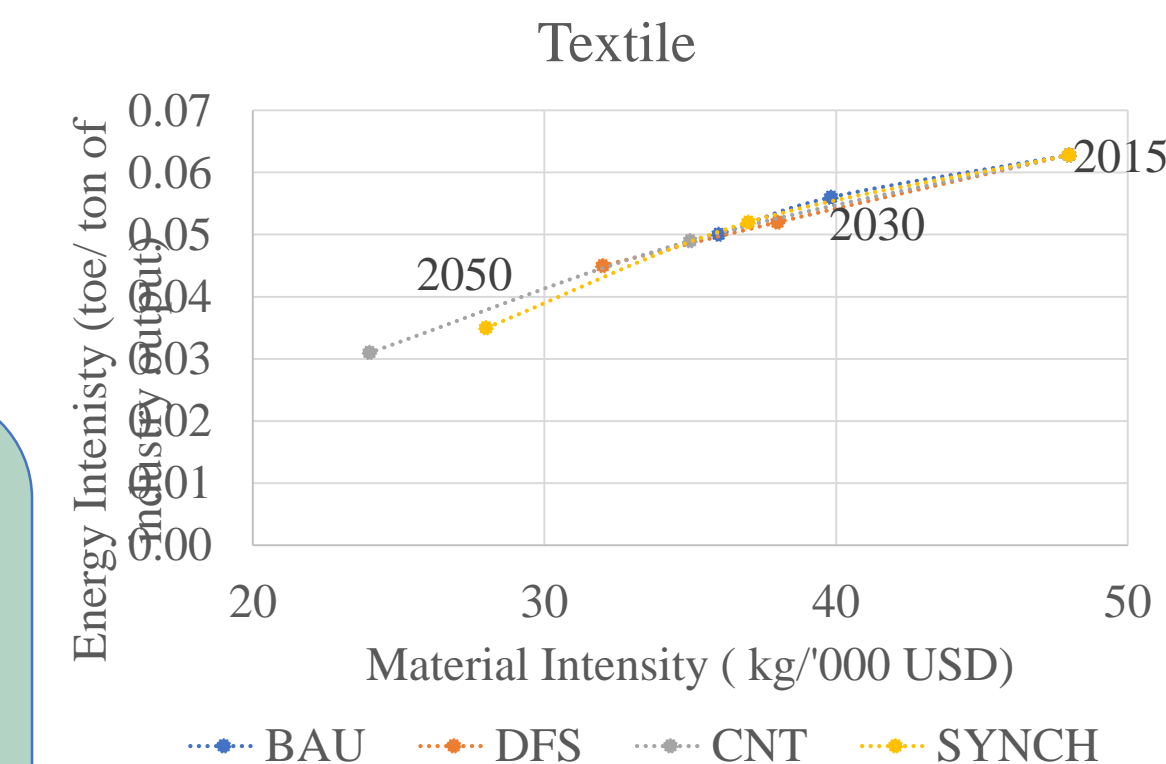
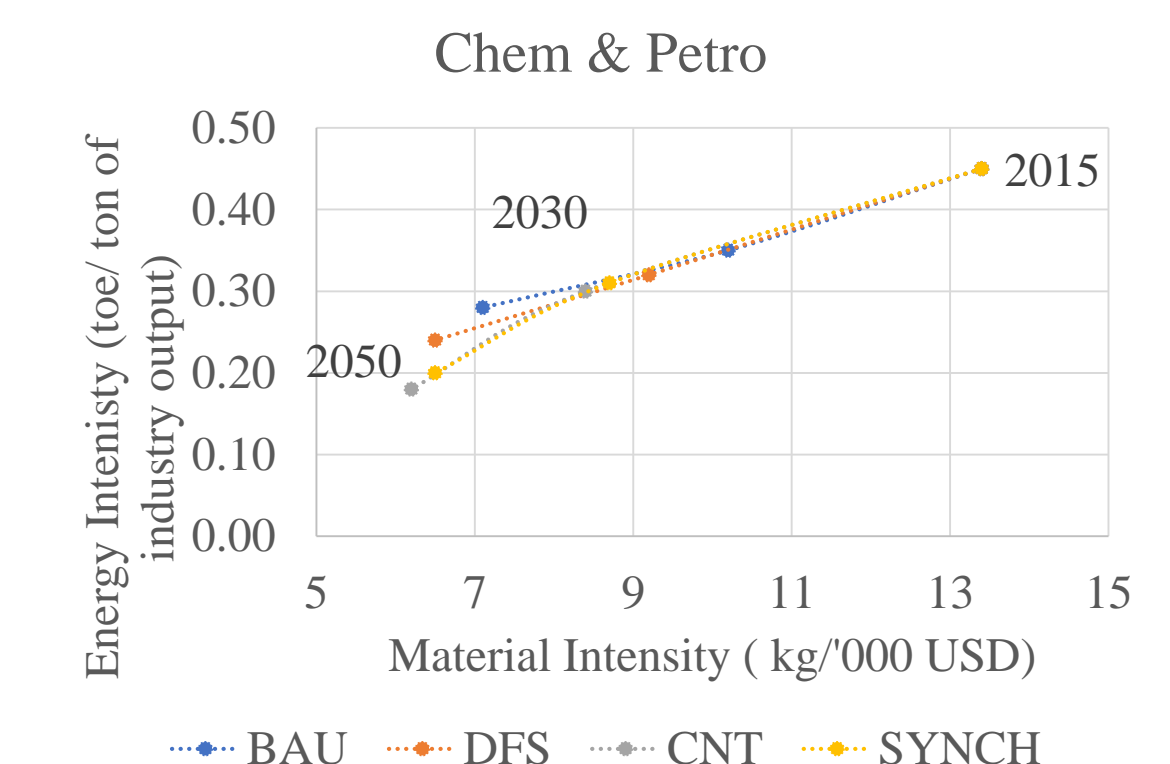
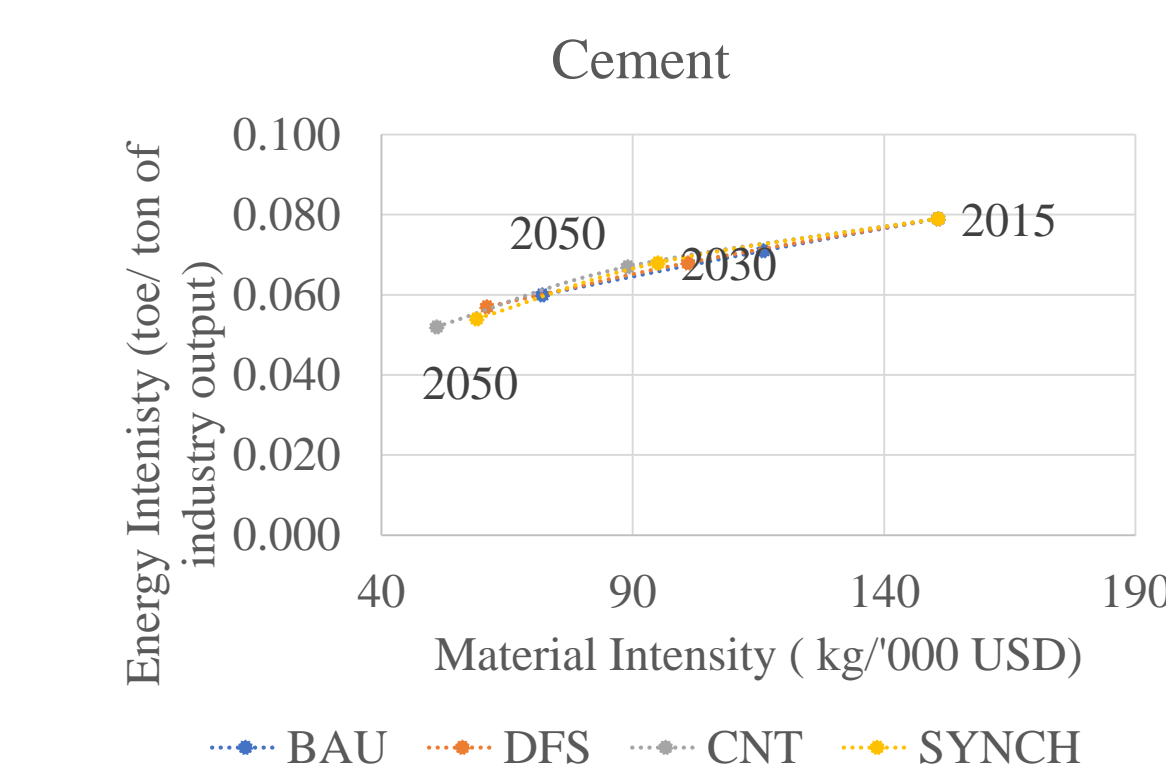
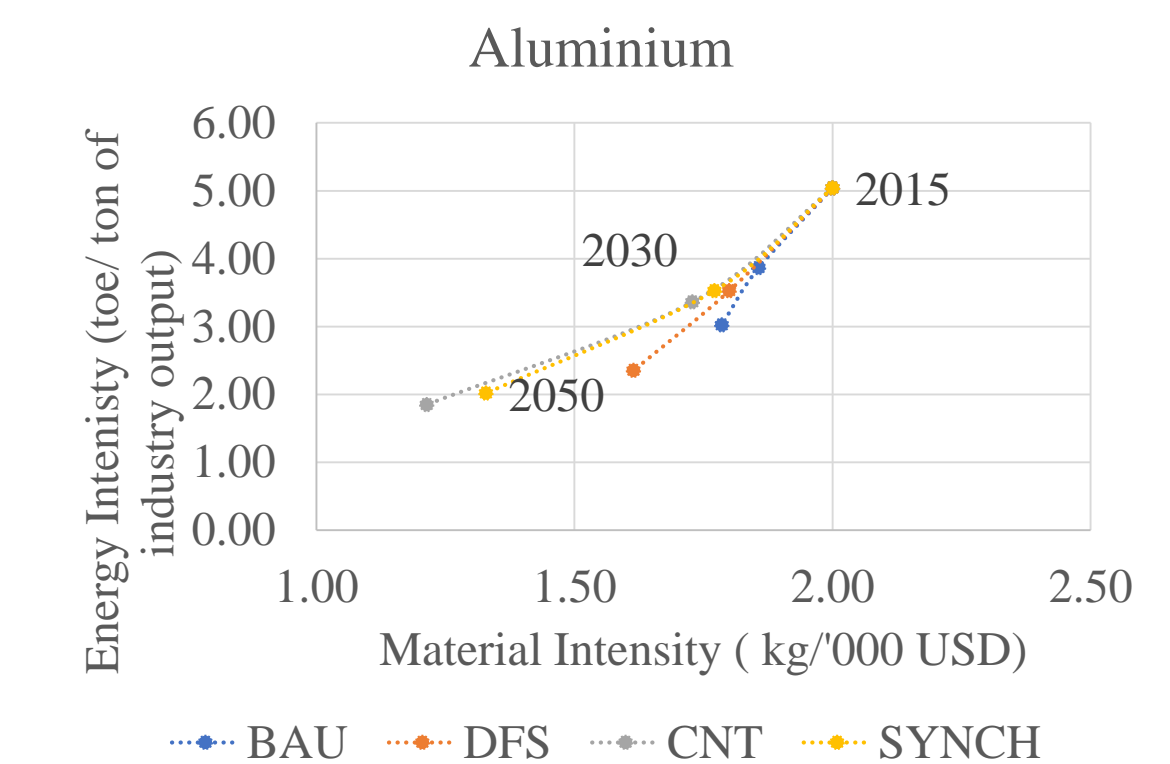
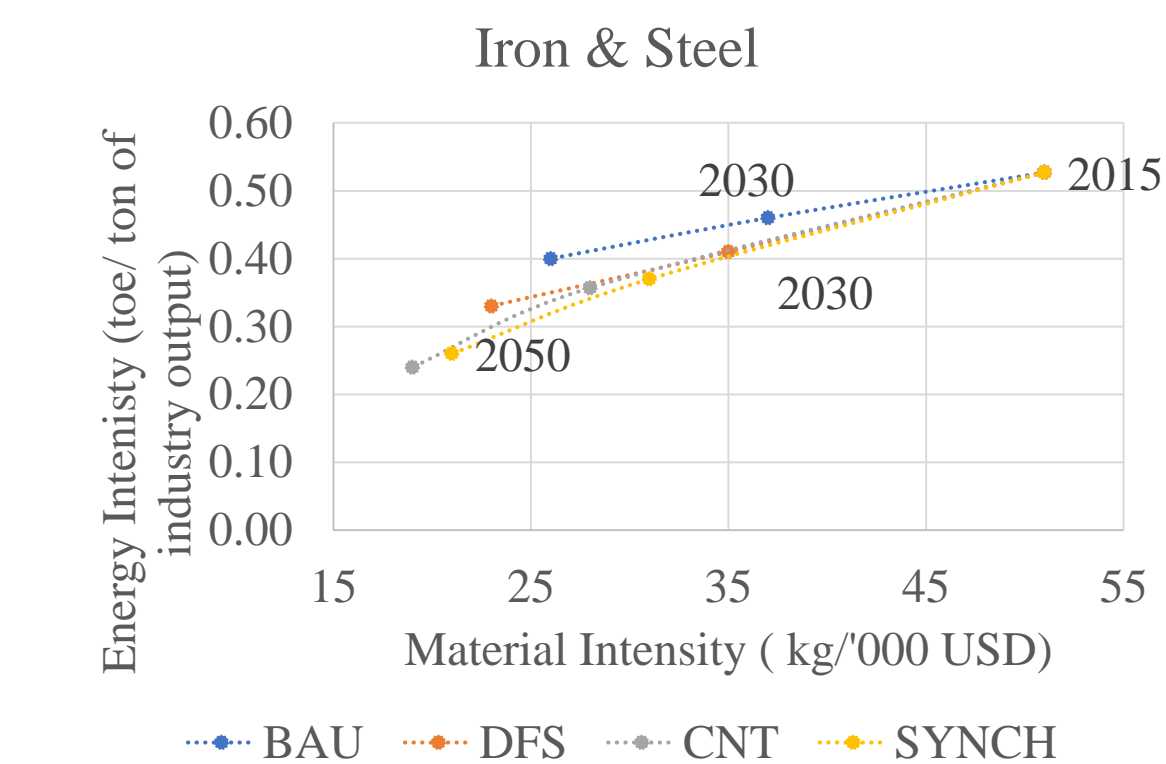


Figure 2. Scenario framework

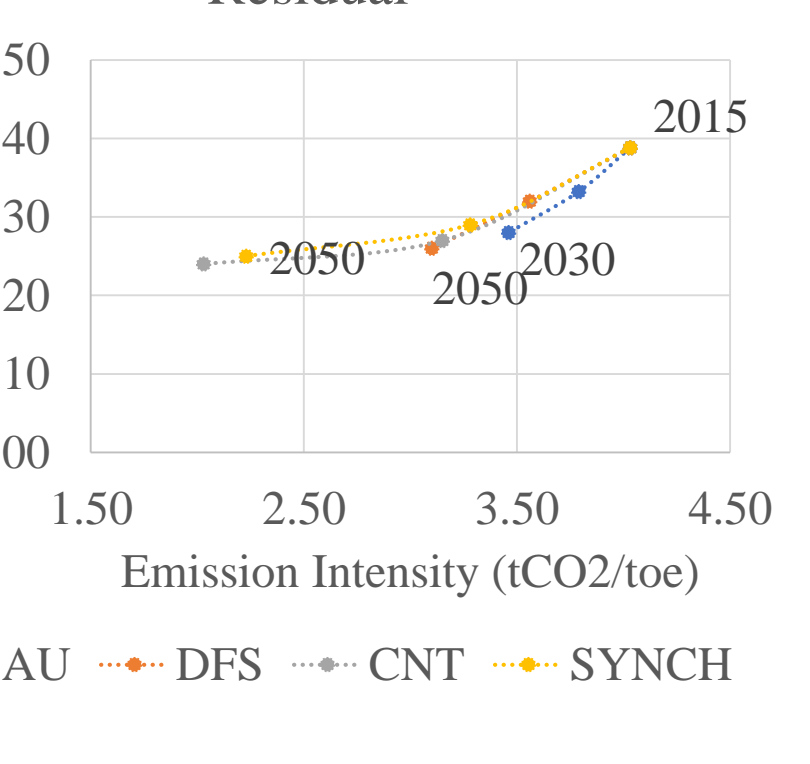
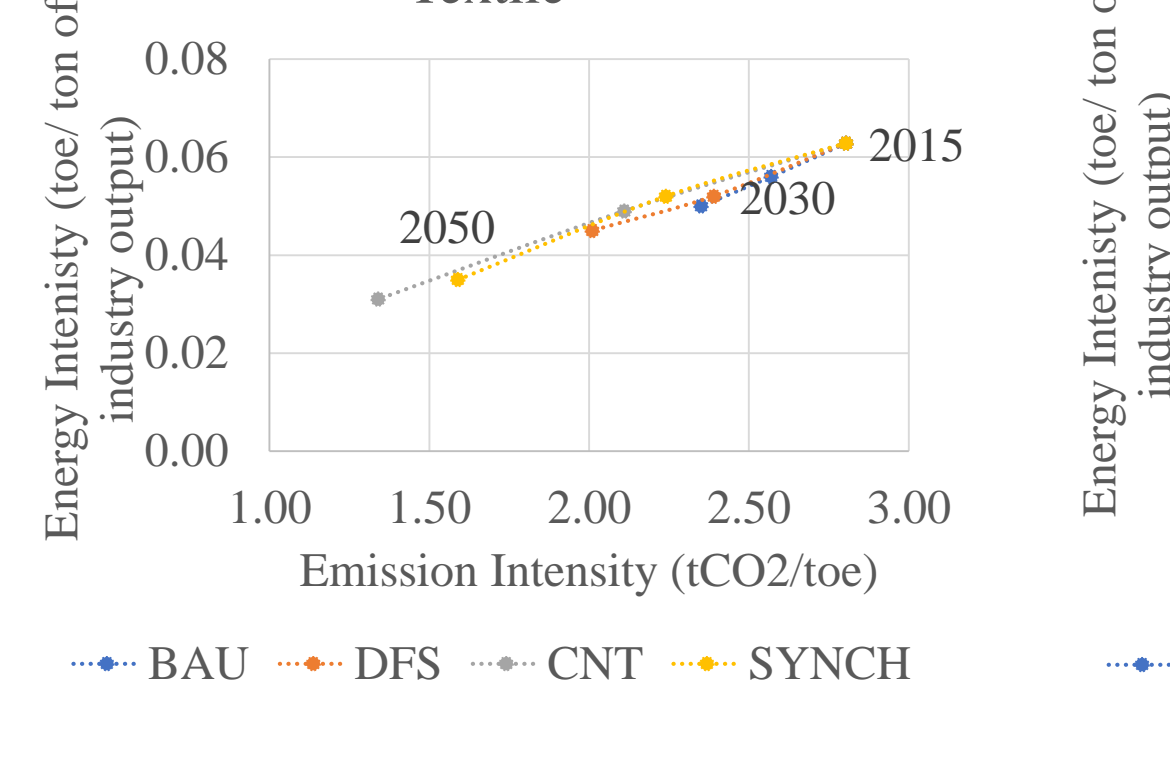
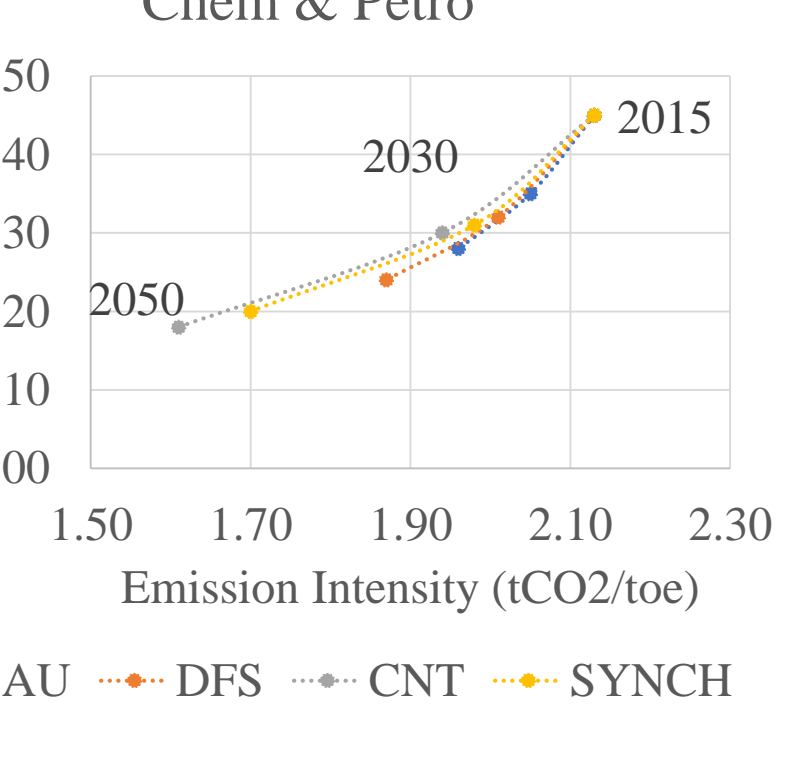
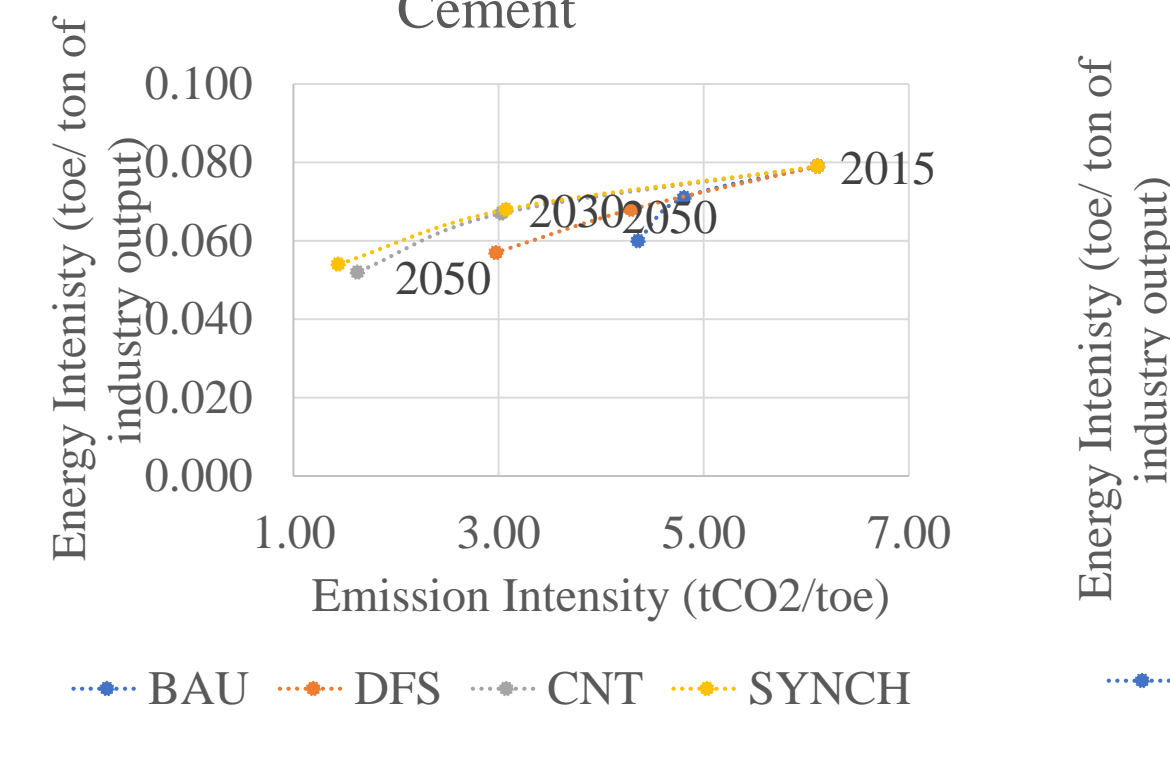
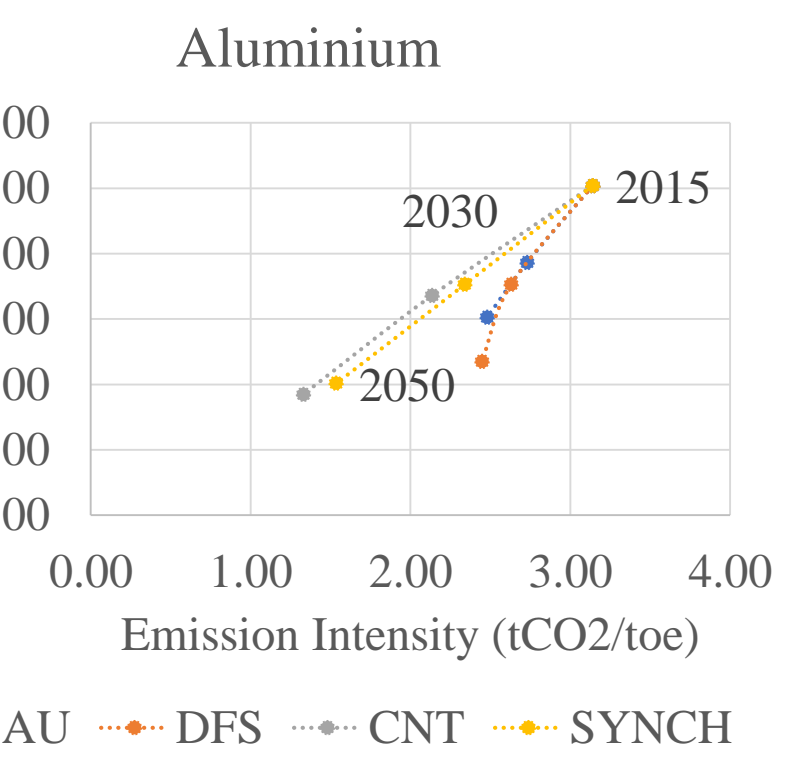
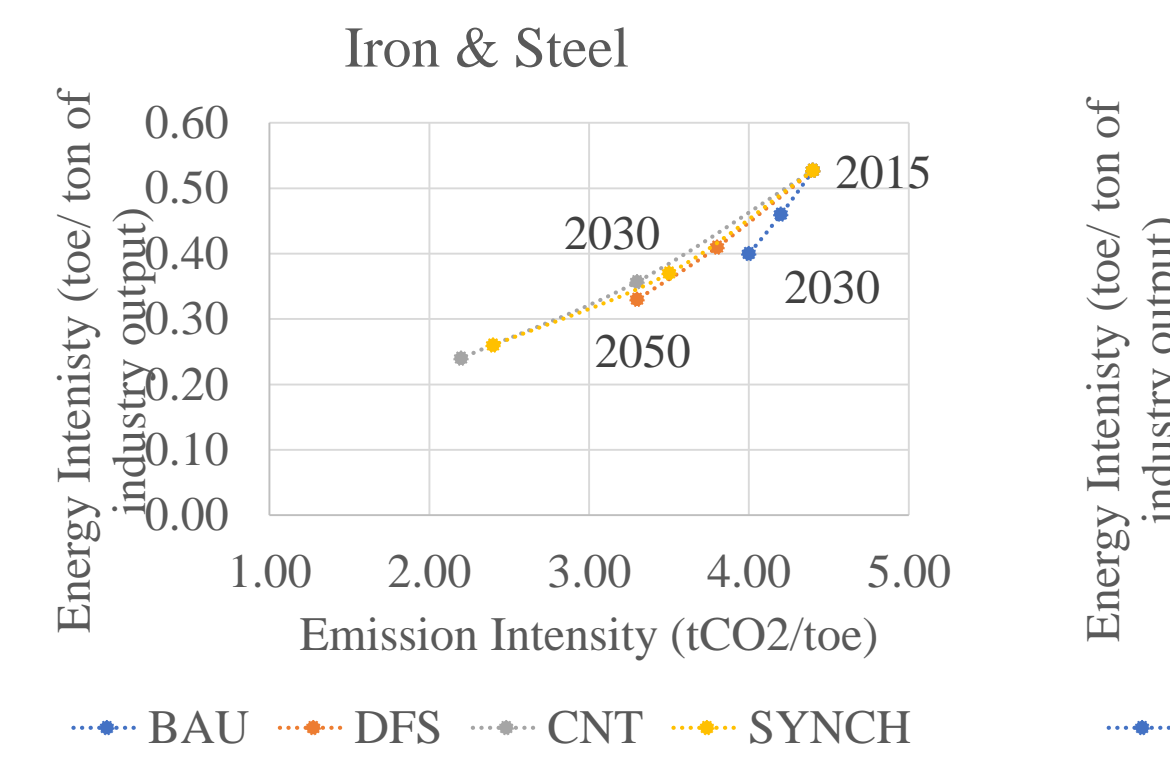


## Energy intensity vs material intensity



## Results

### Energy intensity vs emission intensity



## Macroeconomic results

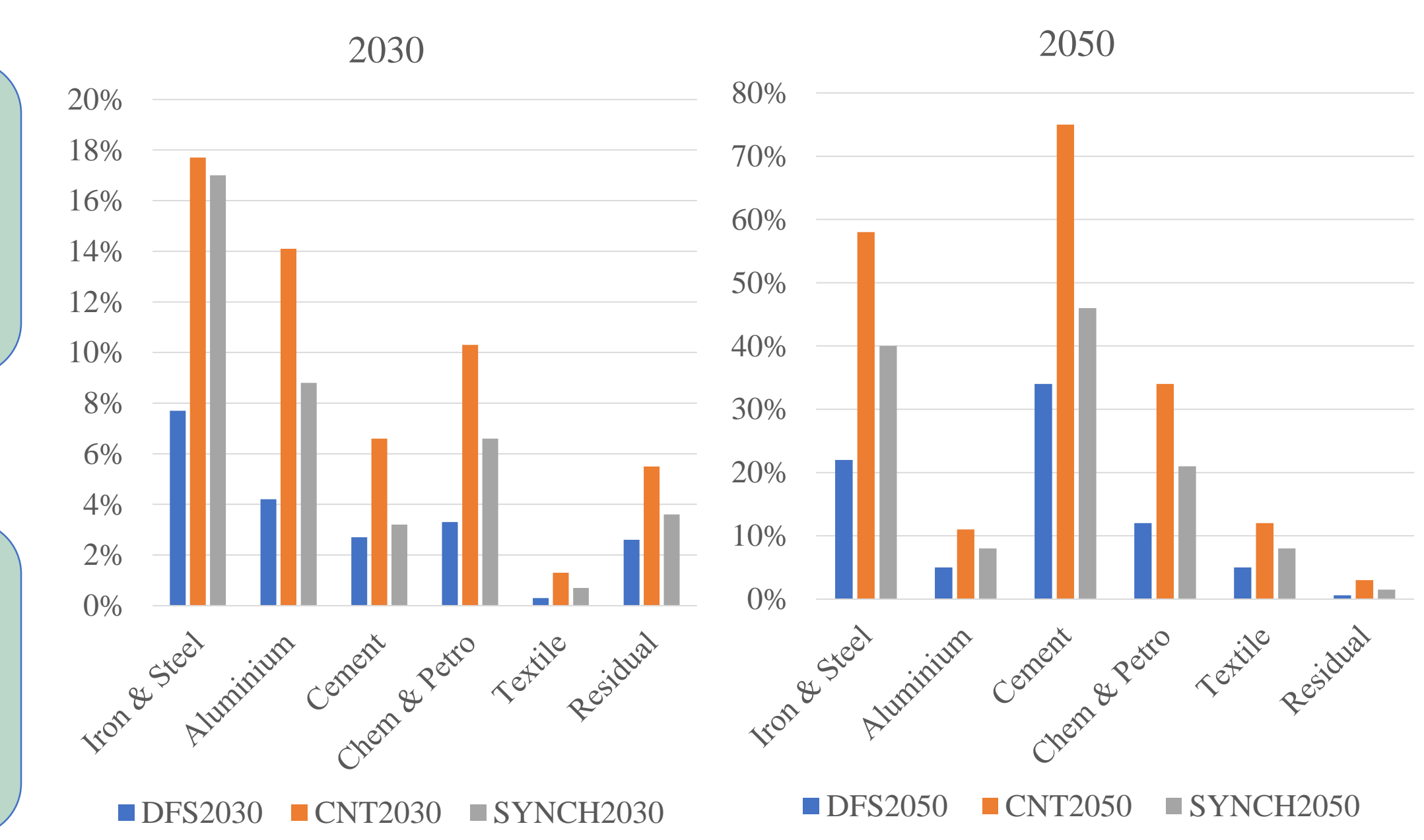


Figure 3. Change in investment requirement for DFS, CNT, SYNCH scenarios for horizon year 2030 and 2050 compared to BAU2030 and BAU2050

## Conclusion

- Short term & short to medium term priorities**
  - Energy efficiency
  - Production side decarbonization
- Responsible production**
  - Material efficiency
  - Includes responsible production measurement and reporting standards
- Informed standards**
  - Information & guidelines
  - Emission trading scheme and mandatory Business Responsibility and Sustainability Reporting framework.

## References

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