AN OVERVIEW OF MANUFACTURING PROCESSES AND DECARBONIZATION MEASURES IN ALUMINIUM INDUSTRY IN INDIA

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INTRODUCTION

This study provides a comprehensive analysis of greenhouse gas (GHG) emissions from the Indian aluminium sector, evaluating the manufacturing processes and analysing the future emission trajectories under both business-as-usual (BAU) and low-carbon (LC) growth scenarios.

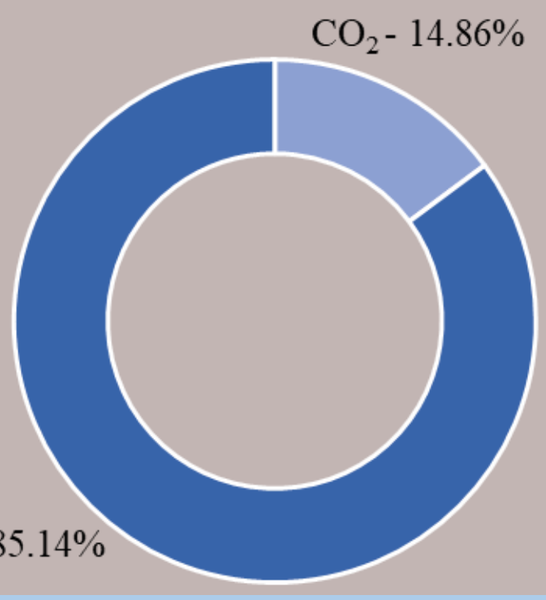
OBJECTIVES

- To analyse the manufacturing process and GHG emissions from the sector.
- To understand and suggest the decarbonisation measures in the aluminium manufacturing industry.

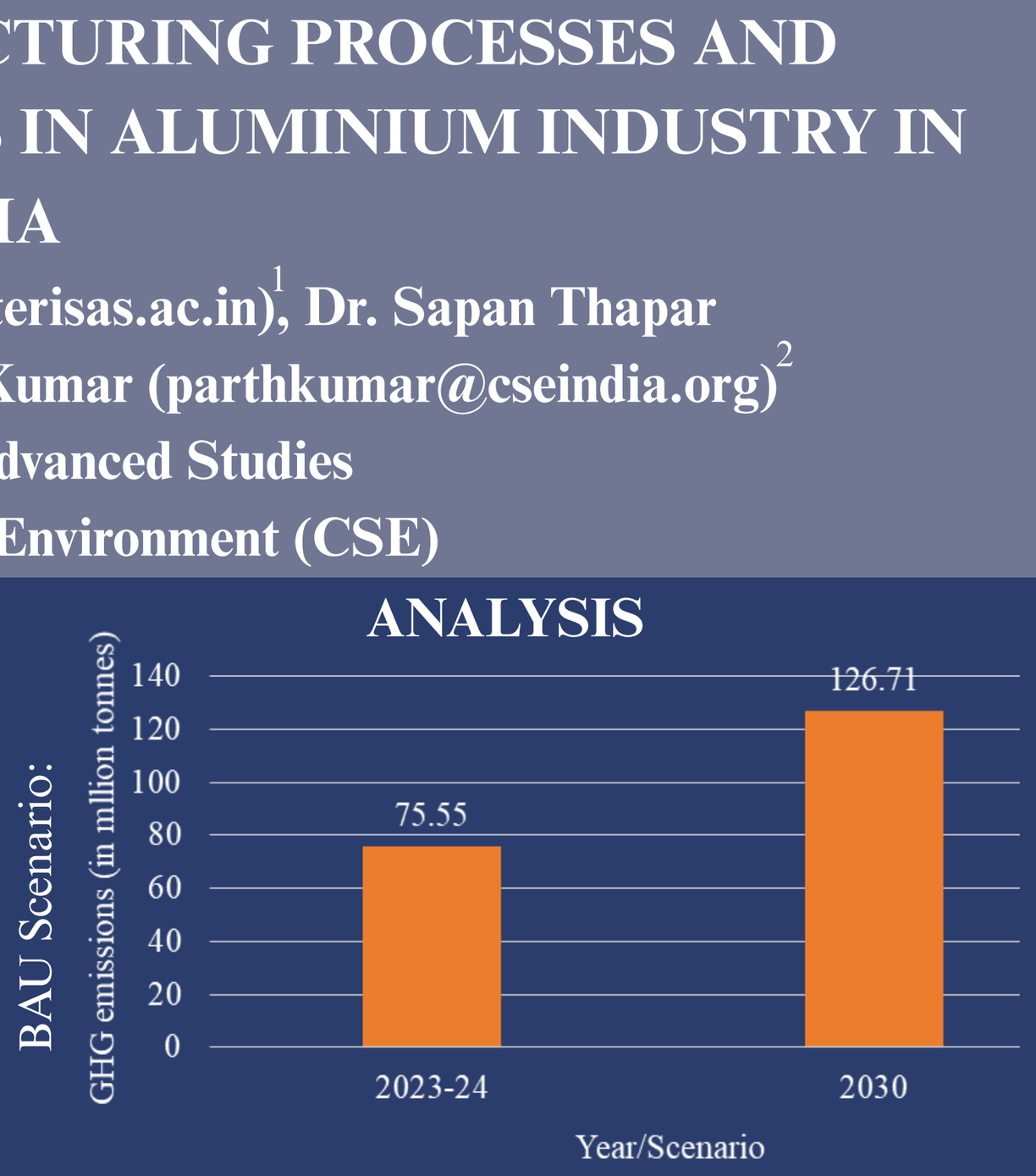
RESULTS

Emission Factor Bifurcation:

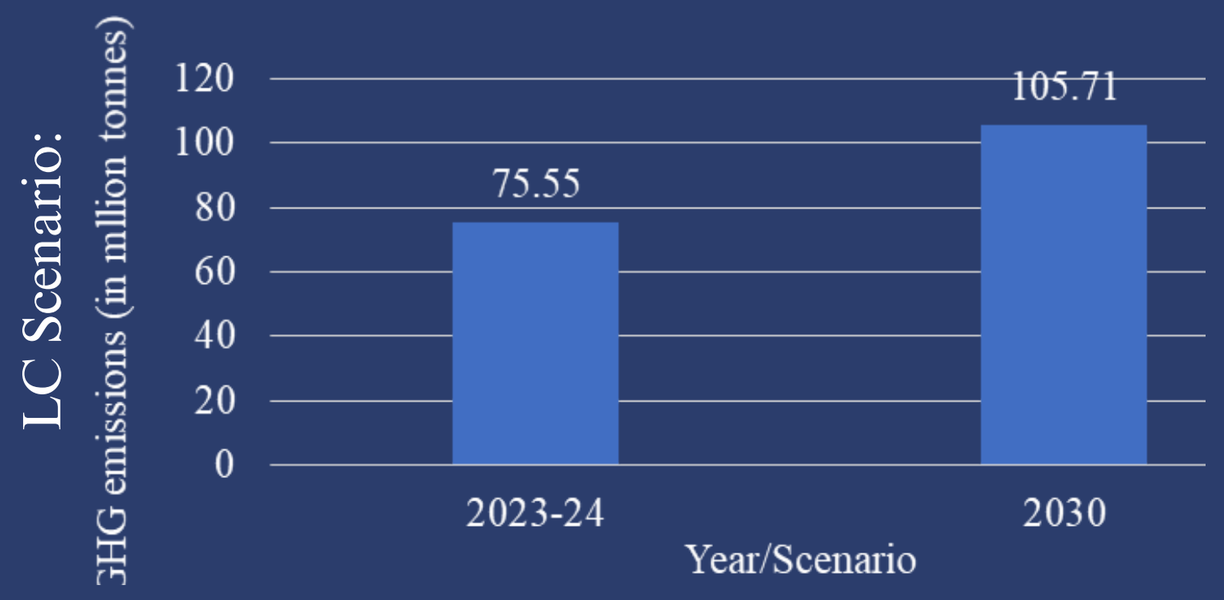
Perfluorocarbons (PFCs) are the major contributors in emissions from the industry. These gases which have higher Global Warming Potential (GWP) thus cause more harm over carbon dicxide.



ANALYSIS



The emissions are expected to increase 1.7 times as compared to 2023-24 in BAU scenario.

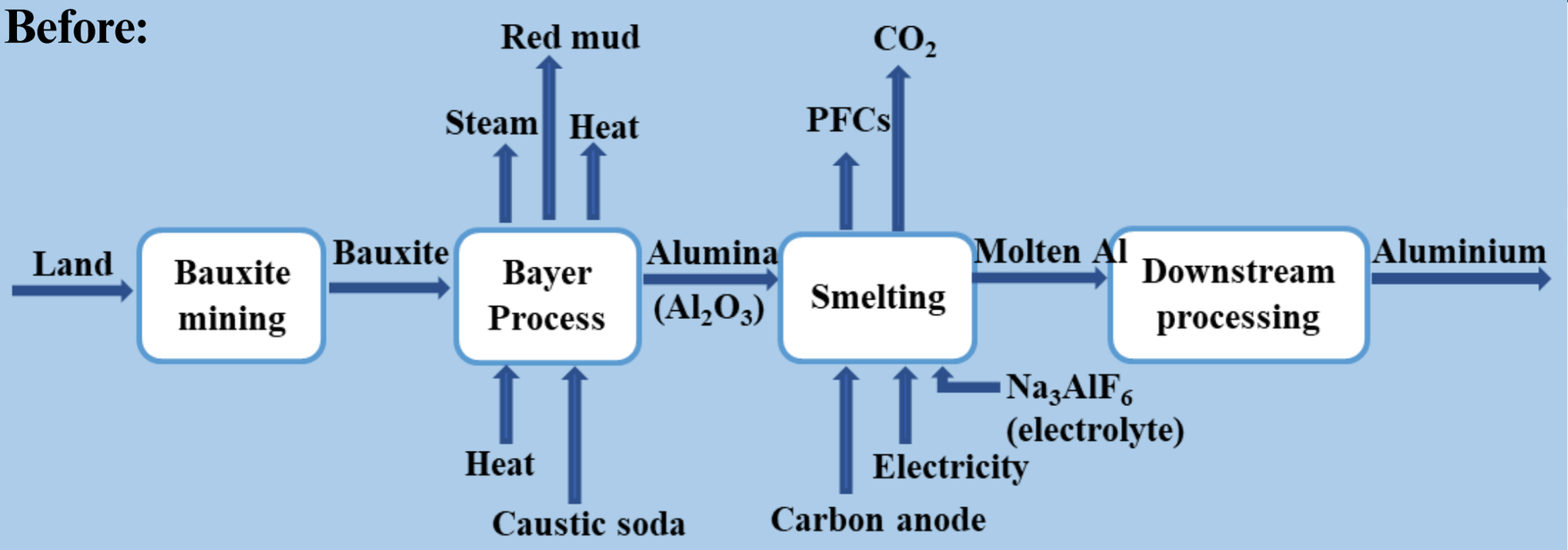


The emissions are expected to increase 1.4 times as compared to 2023-24 in LC scenario.

Mitigation strategies:

- The power sector can be decarbonized by integrating renewable energy (RE) to meet the demand.
- Inert anode technology during smelting process can reduce PFC emissions during electrolysis.
- Mechanical Vapor Recompression (MVR) technology during the refining process will meet the heat requirement thus reducing emissions in the Bayer process.

Before:



After: