



Low Temperature Iron Ore Agglomeration Process for Australian Iron Ores

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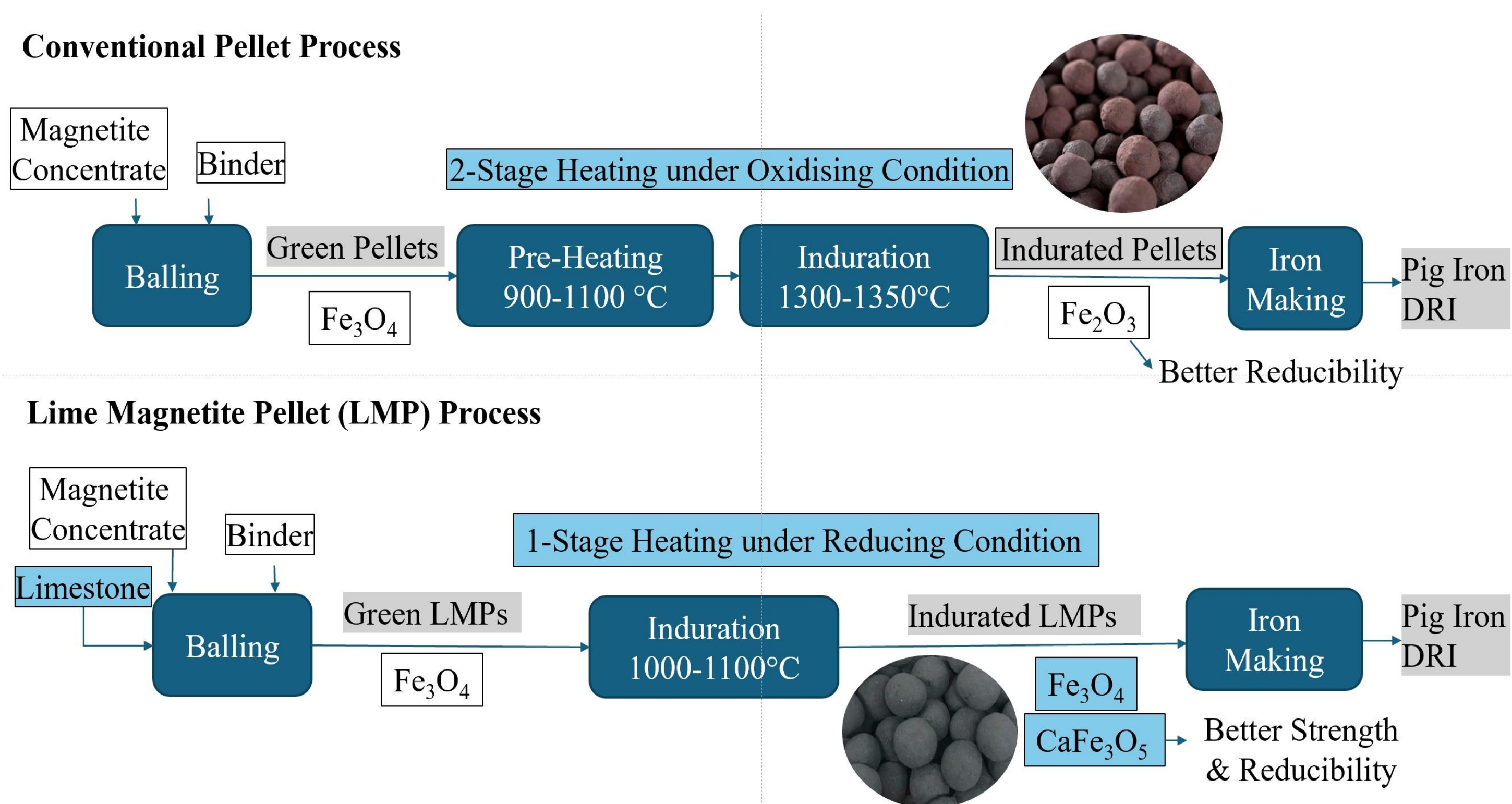
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Introduction

Ongoing decarbonisation initiatives in the steelmaking industry necessitate high-grade ironmaking feedstocks, which will heavily influence Australia's iron ore export market if low-grade ore is not upgraded. The proposed project aims at producing premium quality ironmaking agglomerates by utilising Australia's largely underutilised magnetite ore reserves as well as low-grade goethite-rich hematite ores, thereby reducing Australia's scope-3 emissions from the iron ore industry. The novel approach in this project is referred to as the Lime Magnetite Pellet (LMP) process. By replacing conventional agglomerates like sinters and pellets with LMPs, the carbon footprint of traditional blast furnace (BF) ironmaking can be reduced by up to 18%.

LMP Technology

The LMP process is a lower temperature iron ore agglomeration method designed to operate at about 300°C lower temperatures than existing iron ore pelletising processes, while maintaining the required physical and metallurgical agglomerate properties. The novelty of the LMP process is characterised by the lower temperature and partially reducing induration conditions that eliminates the oxidation of Fe_3O_4 to Fe_2O_3 and instead favours the formation of a calcio-magnetite ($CaFe_3O_5$) bonding phase that is highly reducible and physically strong.

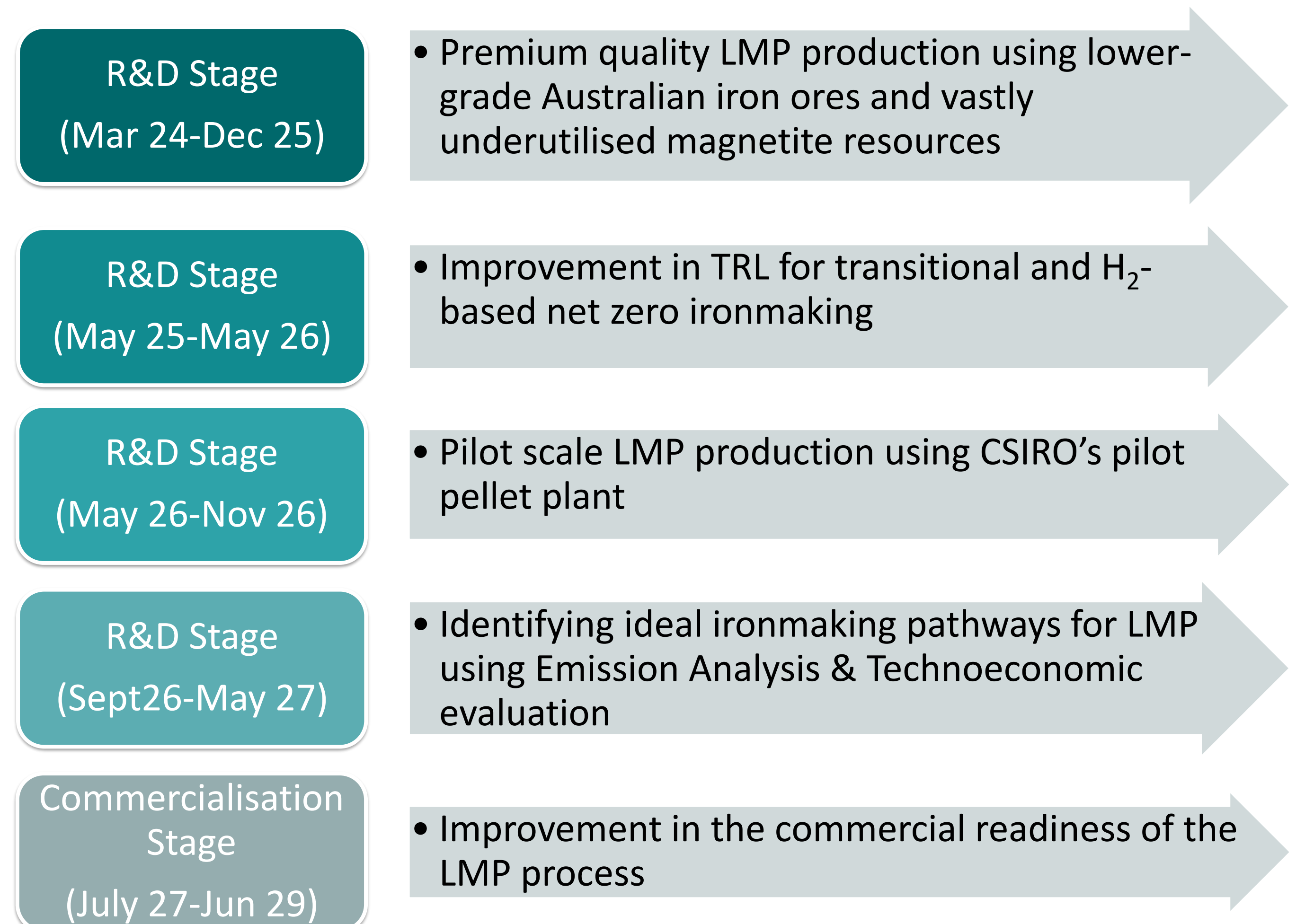


Project Overview

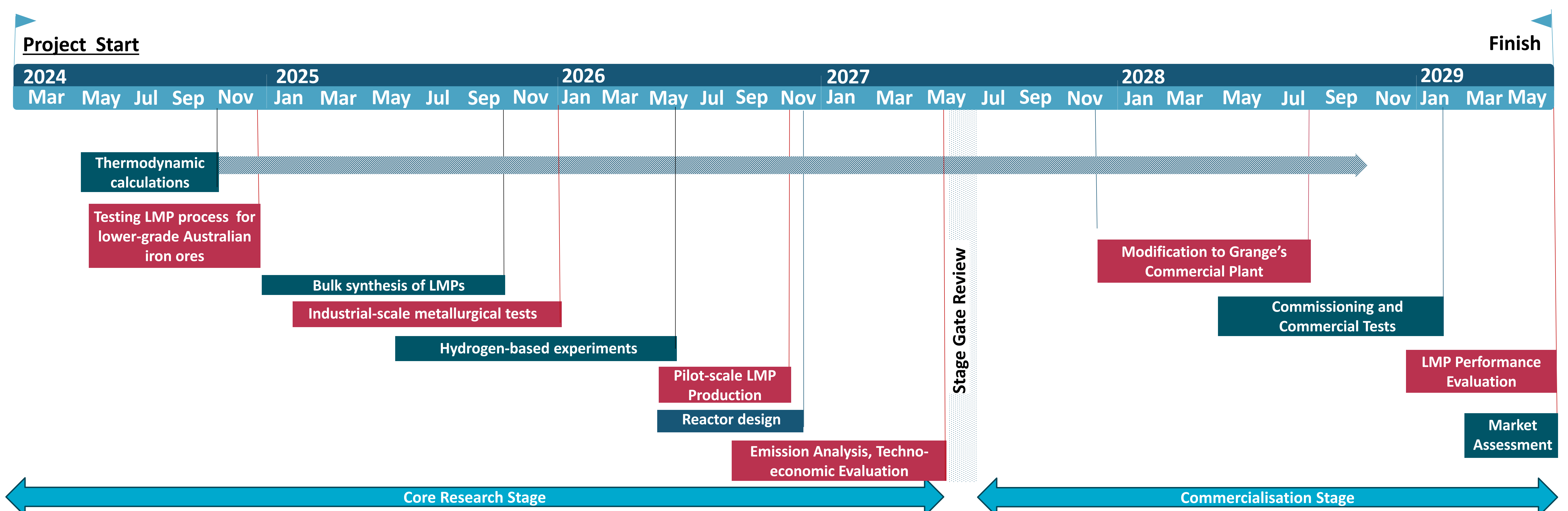
The LMP technology was conceived in 2016, and since then, three years of core research has been conducted at a laboratory-scale to validate the concept. After successful validation, the technology was upscaled for batch synthesis and industrial-scale metallurgical testing. The results of the testing indicated that LMPs have comparable or even superior metallurgical properties compared to traditional iron ore agglomerates (i.e. sinter or pellets).

So far, the LMP concept has been demonstrated using magnetite concentrates for blast furnace ironmaking operations. Building on this foundation, the ARENA-funded project aims to develop and progress the LMP technology for other lower-grade hematite-goethite Australian iron ores. Results will be used to assess the suitability of LMP's for both transitional and future Net-Zero ironmaking applications.

Key potential outcomes of the project are mentioned below.



Project Timeline



Acknowledgements and Disclaimer

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