DECARBONISATION OF THE STEEL INDUSTRY: A CASE STUDY

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With industry accounting for nearly a third of global greenhouses gases, industry will need to act to move towards becoming carbon neutral to achieve the IPPC target of limiting global warming to 1.5°C above pre-industrial levels. The steel industry accounts for a large portion of these greenhouse gas emissions and plays a key role in achieving the maximum temperature rise target.

Focusing on the energy intensive steel industry, in 2021 the worldwide steel production was 1,950 million Tons of steel, and accounted for approximately 8% of the global CO2 emissions. With demand for steel growing and a 50 years plants life there is an incentive to reduce emissions. McDermott have identified opportunities to decarbonize steel plants to ensure this industry sector can meet their decarbonisation goals.

We start by looking at a case study focusing on steel produced on a Blast Furnace Steel Mill, which account for 70% of the global steel production. Additionally it is the most emission intensive steel production route and therefore provides a greater share of greenhouse gas emissions within the sector. Two options have been identified to reduce carbon emissions:

1. Switch to gas-based Direct Reduced Iron – Electric Arc Furnace (DRI-EAF) steel making
2. Apply Carbon Capture, Utilization and Storage on the Blast Furnace Steel Mill

Focusing on carbon capture and utilization McDermott have considered the emissions within the plant and have systematically identified technologies, processes and techniques to reduce these emissions and create additional revenue by chemical and/or hydrogen production. A strong focus has been on maximizing the potential use of any available resources and/or energy.

McDermott show through this case study the opportunities for carbon capture and utilisation to reduce emissions:

- Capturing CO2 from blast furnace production gases for sequestration
- Utilizing by-product gases from the blast furnaces to produce hydrogen to be used within the facility

McDermott show that carbon capture and utilization at the site provided the potential to reduce CO2 emissions by 5 million mt/year, leading to a 40% reduction in CO2 emissions by 2030 at this specific steel mill.