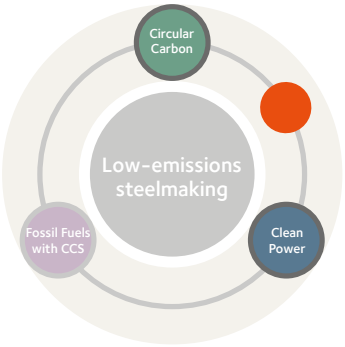
Waste CO_2 can be reformed into a synthetic gas suitable for reducing iron ore, giving it a second life. Our ultimate goal is to use clean power and waste plastics for low-emissions circular carbon steelmaking.



IGAR: reforming carbon to reduce iron ore

The IGAR[13] project aims to capture waste CO_2 from the blast furnace and convert it into a synthetic gas (syngas) that can be reinjected into the blast furnace in place of fossil fuels to reduce iron ore. Since the amount of coal and coke needed in steelmaking is reduced, this process helps to reduce CO_2 emissions.

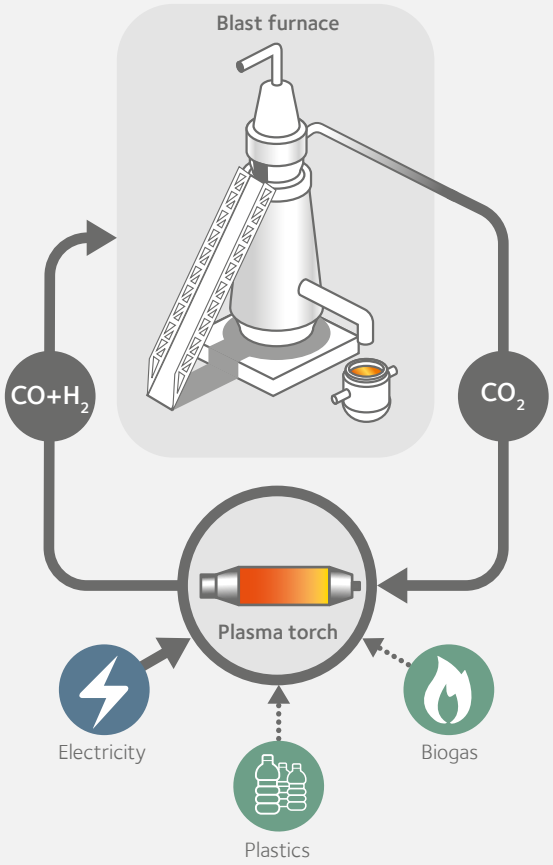
The syngas we need is made up of carbon monoxide (CO) and hydrogen (H_2). To form this, waste CO_2 is heated with natural gas (CH_4) to very high temperatures using a plasma torch – a process called dry reforming.

In future, we hope to use bio-gas or waste plastics in place of natural gas, furthering the use of circular carbon. And with the plasma torch running on clean power, the entire process enables substantial emissions reductions.

The IGAR project has seen a number of phases. Last year, to overcome the corrosive effects of the high-temperature syngas involved, our R&D labs in Maizières, France, developed both the specialist metals and refractories needed.

Today in Dunkirk, France, ArcelorMittal is running a €20 million project, supported by the French ADEME, to construct a plasma torch. To test-use the hot syngas created by the plasma torch, a pilot project is also running at the same plant.

Figure 7: IGAR process



13 Injection de Gaz Réformé