

# JFE Steel Corp.'s Development of Process for Achieving Carbon Neutrality

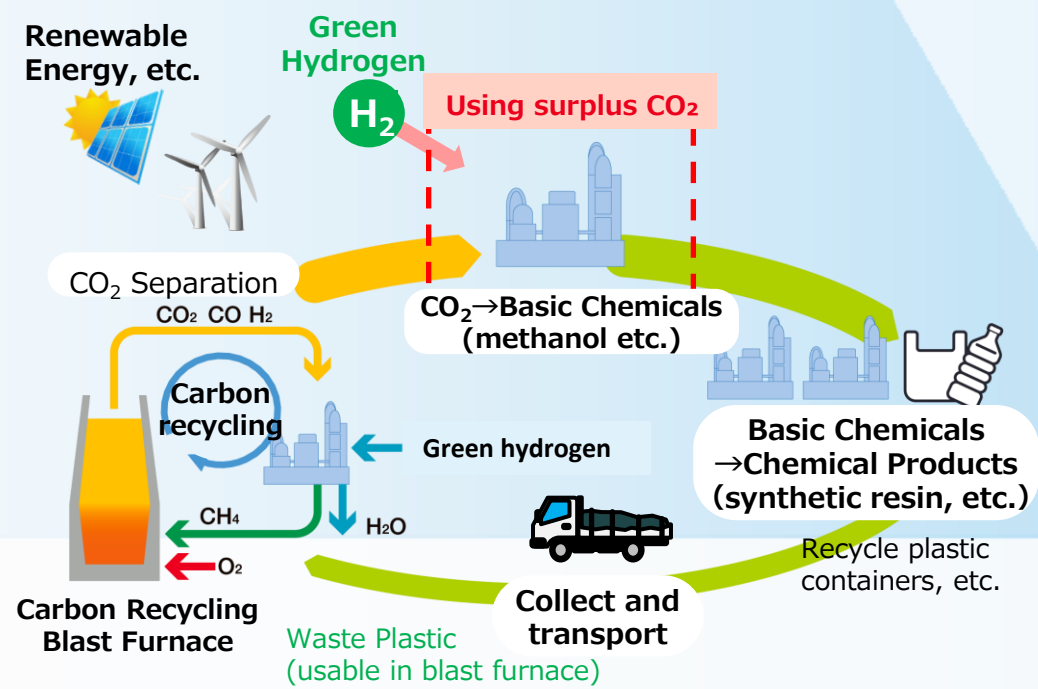
The combination of Carbon Recycling Blast Furnace and CCU

## Concept of Carbon Neutrality

JFE Steel plans to achieve carbon neutrality by using carbon recycling blast furnaces and CCU technology.

First, CO<sub>2</sub> generated in blast furnaces is recycled in carbon recycling blast furnaces. In addition, CO<sub>2</sub> is separated from the blast furnace gas and converted into basic chemicals (such as methanol) for recycling as raw materials for chemical products.

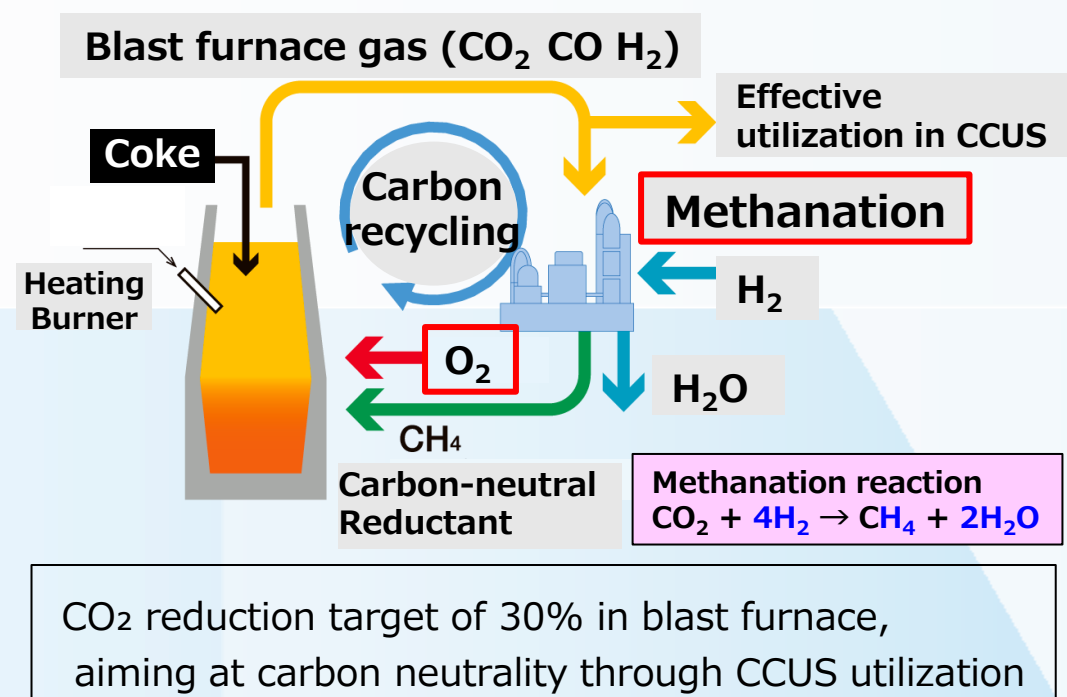
After using this chemical product, waste plastics can be reused as raw materials for the ironmaking process. We believe that we can contribute to realize carbon neutrality throughout society through such a cycle.



## Carbon Recycling Blast Furnace

Carbon Recycling Blast Furnace is a innovative technology that drastically reduces CO<sub>2</sub> emissions from steelworks by recycling CO<sub>2</sub> generated during the reduction process of iron ore.

In the Carbon Recycling Blast Furnace, CO<sub>2</sub> emitted from the blast furnace is reacted with green hydrogen in the methanation plant and carbon neutral methane is synthesized. The carbon neutral methane is reused as a reducing agent in the blast furnace. Carbon Recycling Blast Furnaces can be further improved by combining oxygen blast furnace technology. Our goal is to reduce CO<sub>2</sub> emissions from blast furnaces by 30%.



CO<sub>2</sub> reduction target of 30% in blast furnace, aiming at carbon neutrality through CCUS utilization

## Methanol Production from CO<sub>2</sub>

One of the challenges for CCU by methanol production ( $CO_2 + 3H_2 \rightarrow CH_3OH + H_2O$ ) is a low yield due to byproduct H<sub>2</sub>O, which decomposes methanol.

To increase the yield, JFE Steel has been developing a novel reactor in collaboration with RITE\*. In our reactor, catalysts are combined with zeolite membranes which selectively remove H<sub>2</sub>O. This structure enables simultaneous H<sub>2</sub>O removal during methanol production, and higher production yield.

\* Research Institute of Innovative Technology for the Earth

