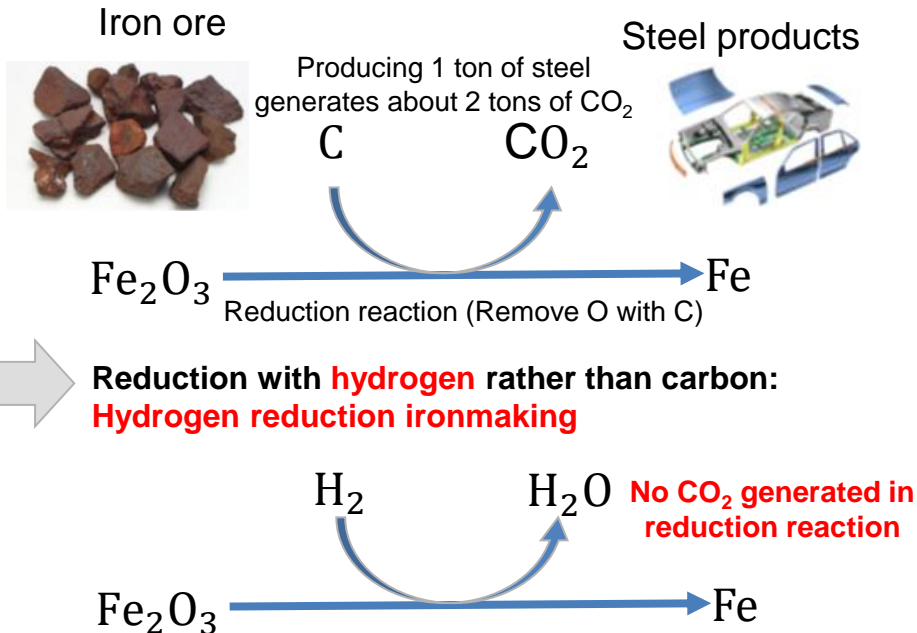


# Hydrogen Utilization in Iron and Steelmaking Processes (Amount covered by the government: Up to 193.5 billion yen)

- The Japanese iron and steel industry supplies the world's highest-grade steels (ultra-high tensile strength steel, electromagnetic steel, etc.), and **has the potential to gain markets that are growing due to decarbonization**, such as electric vehicles and offshore wind.
- The "green steel" market is expected to account for half of the global market in 2050, and even Japan's **high-grade steel might not be able to enter the market unless it is "green."**
- **Technology** for producing "green steel" (**including hydrogen reduction**) **has yet to be established**, and **investment to research and development of the decarbonization process is also risky**.
- In order to lead the global decarbonization market with high-grade steels, **the public and private sectors need to work together on research and development to decarbonize the iron and steelmaking process** while maintaining the same quality as before.

## Image of hydrogen reduction ironmaking



## Technical challenges

### <Development of hydrogen reduction technology using blast furnaces>

- The blast furnace method is highly energy efficient, and can manufacture high-quality steel. Japan's iron and steel industry has a technological advantage.
- Aim to decarbonize blast furnaces by developing **technology for reducing iron ore with hydrogen**, and **for using the generated CO<sub>2</sub> as a reducing agent, etc.**

Note: Using the test blast furnace, test the technology for reducing the CO<sub>2</sub> emissions from the iron and steelmaking process by more than 50%

### <Development of direct hydrogen reduction technology that reduces iron ore with hydrogen only>

- The direct reduction method will decarbonization without the need for CCU and other peripheral technologies by replacing all the reduction gases with hydrogen.
- Aim to manufacture high-quality steel in a direct hydrogen reduction furnace by developing **technology for directly reducing iron ore with hydrogen**, and **for removing impurities using electric arc furnaces**.