

Green Tomorrow begins with POSCO

- POSCO's Carbon Neutral Strategy -

Dr. SeDon Choo

Head of Technical Research Laboratories

December 5, 2023



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POSCO 2050 Carbon Neutrality Declaration (11th Dec. 2020)

World - Government

123 countries declare 2050 carbon neutrality, accelerate 2030 carbon emission reduction

✔ **Governments**(123 countries), including Korea, EU and the US, declared 2050 carbon neutrality in accordance with UN IPCC* 1.5°C recommendation

* Intergovernmental Panel on Climate Change

✔ **Emphasis on corporate participation and role in carbon neutrality such as COP26****

** Conference Of the Parties 26

✔ **Korea, raised the 2030 reduction target** (Nov. 2021)

- Compared to 2018, $\Delta 26.3\% \rightarrow \Delta 40.0\%$

Investor - Customer

Investors and customers directly request to produce and supply low-carbon steel products

✔ **TCFD***, establishment of long-term reduction target and demand for implementation plan according to 1.5°C scenario

* Taskforce on Climate-related Financial Disclosures

✔ **BlackRock**, one of the boards recognizes climate change risks and emphasizes reflection in management strategies

✔ **Customers urged us to reduce CO₂ much rapidly**
: 12 → 39 Companies

Climate change became a key dimension of ESG considerations for businesses.

POSCO believe that “a company must grow in harmony with society to be sustainable”.

POSCO's Carbon Neutral Strategy

✓ History of establishing and rolling of POSCO carbon neutral strategy

☑ 2021 Roadmap Establishment toward Carbon Neutrality

- Scenario planning for facility improvement and transition to achieve 2030 NDC and carbon neutrality by 2050

☑ 2022 Rolling

- Detailed measures to achieve 2030 NDC
- Production system of low carbon steel up to 10Mt/yr
- Two track route for carbon neutral
 - ① HyREX, hydrogen steelmaking
 - ② EAF with scrap and DRI produced overseas

☑ 2023 Rolling

- **Targeting 2035 carbon emission reduction to 30%**
Strengthening bridge technologies & Commercialization of HyREX
- **2050 carbon neutrality with CCUS**



POSCO Group CEO Jeong-Woo Choi announced challenging carbon emission reduction target during keynote speech

[Global Steel Dynamics Forum, 27th June 2023]

POSCO's Carbon Neutral Roadmap



Building Infrastructure for Carbon Neutrality

- ☑ Raw materials supply for low carbon steel production
- ☑ Economical electrical energy supply
- ☑ Massive hydrogen supply with low price
- ☑ Leverage of POSCO's own eco-friendly brand in marketing

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BF-based Low-carbon Technology

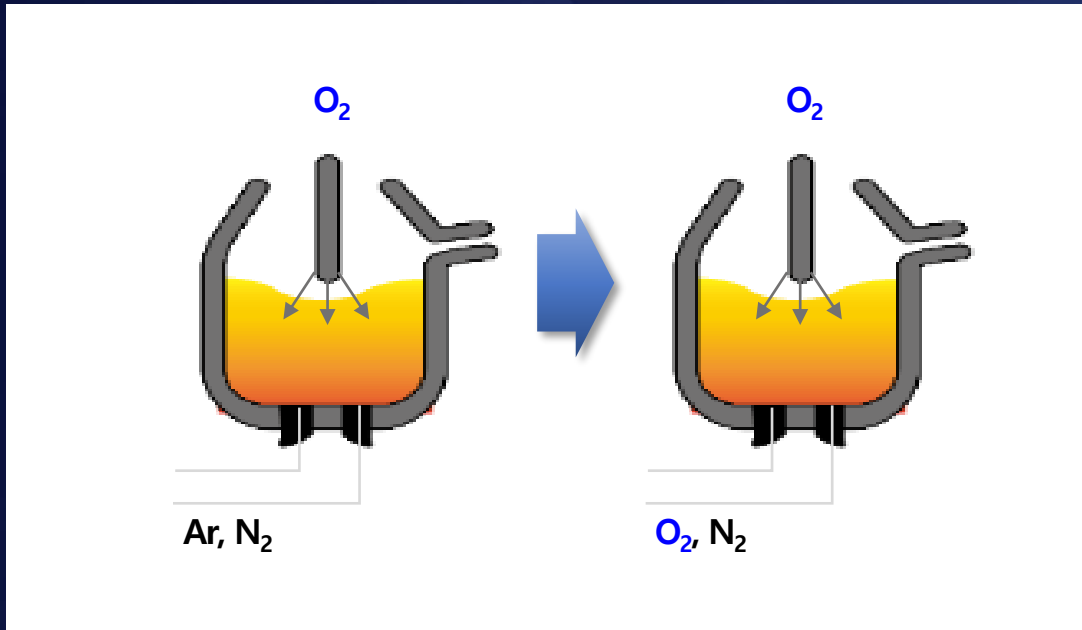
✓ Bridge technology is required to reduce CO₂ emission with existing BF-based steelmaking process



Basic Oxygen Furnace

☑ 'Oxygen Top & Bottom Blowing Converter' can secure additional heat sources and increase scrap usage

Top and Bottom Blowing Converter



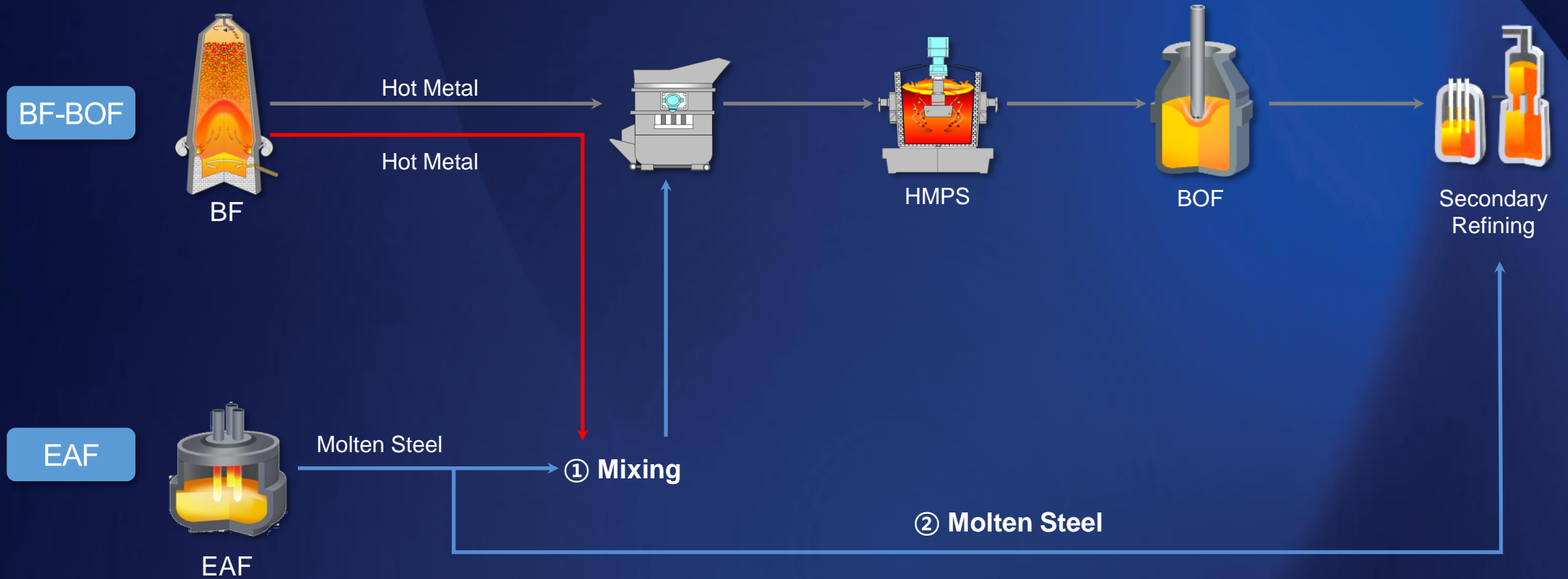
	Top blowing converter	Top and bottom blowing converter
Oxygen blowing location	Top	Top, Bottom
Post combustion ratio(%)	5~10	25~30

* [Primary combustion] $[C] + \frac{1}{2} O_2 \rightarrow CO : + 2,200 \text{ kcal/kg_C}$
 [Post combustion] $CO + \frac{1}{2} O_2 \rightarrow CO_2 : + 5,630 \text{ kcal/kg_C}$

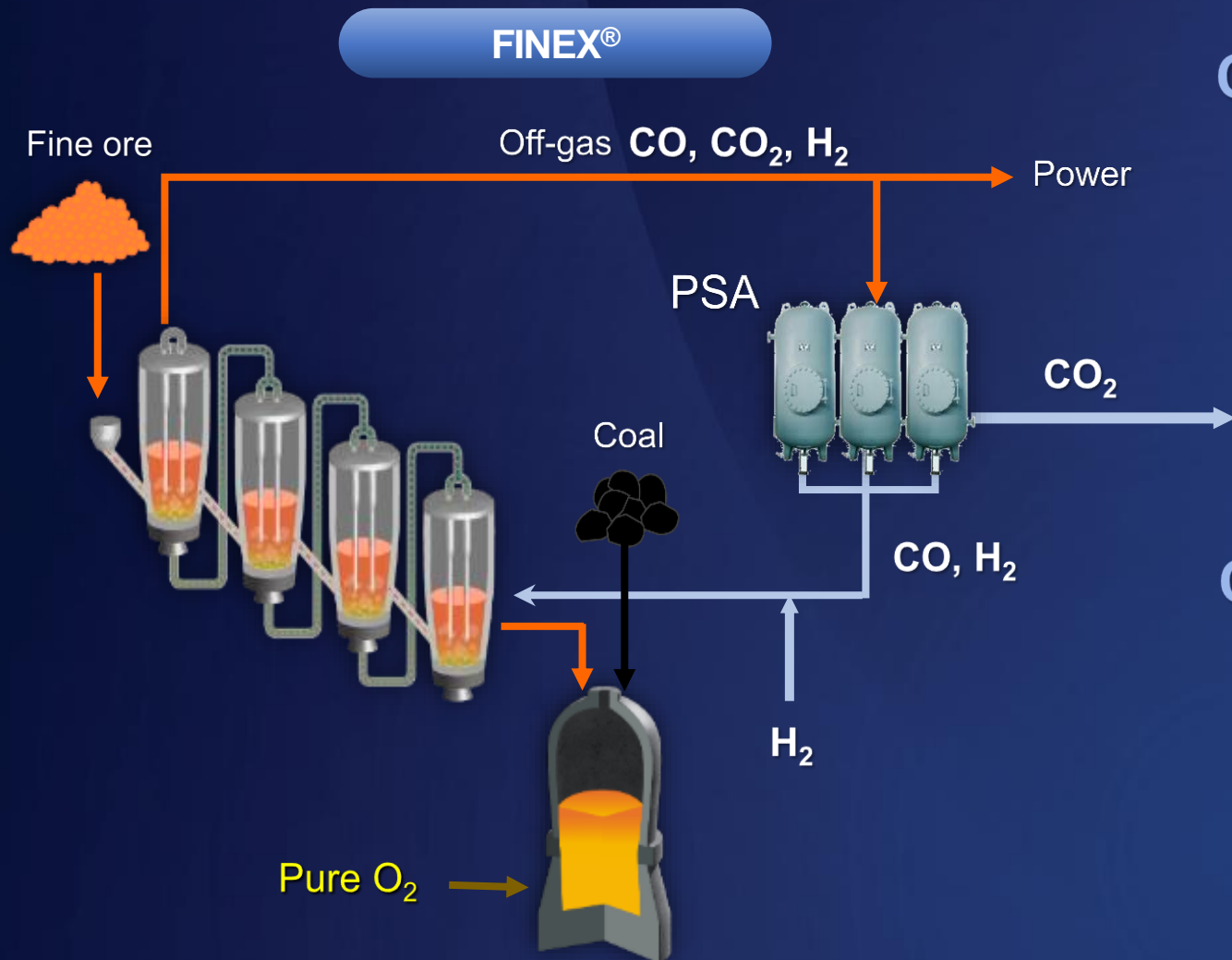
[Comparison between Top Blowing Converter and Top & Bottom Blowing Converter]

Low-carbon Steel Production using Electric Arc Furnace

☑ EAF Steelmaking Process: Mixing with Hot Metal(①) or Transferring directly to Secondary Refining(②)



CCUS (Carbon Capture Utilization & Storage)



CCU

Cryogenic



Liquefied carbonic acid



$\text{CO}_2 + \text{H}_2$ Chemical



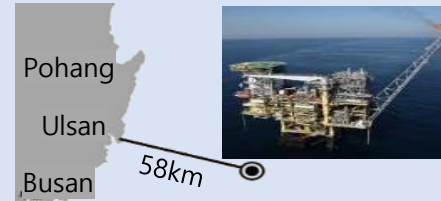
Recycled in Coke oven



Reused in BOF

CCS

Domestic CCS

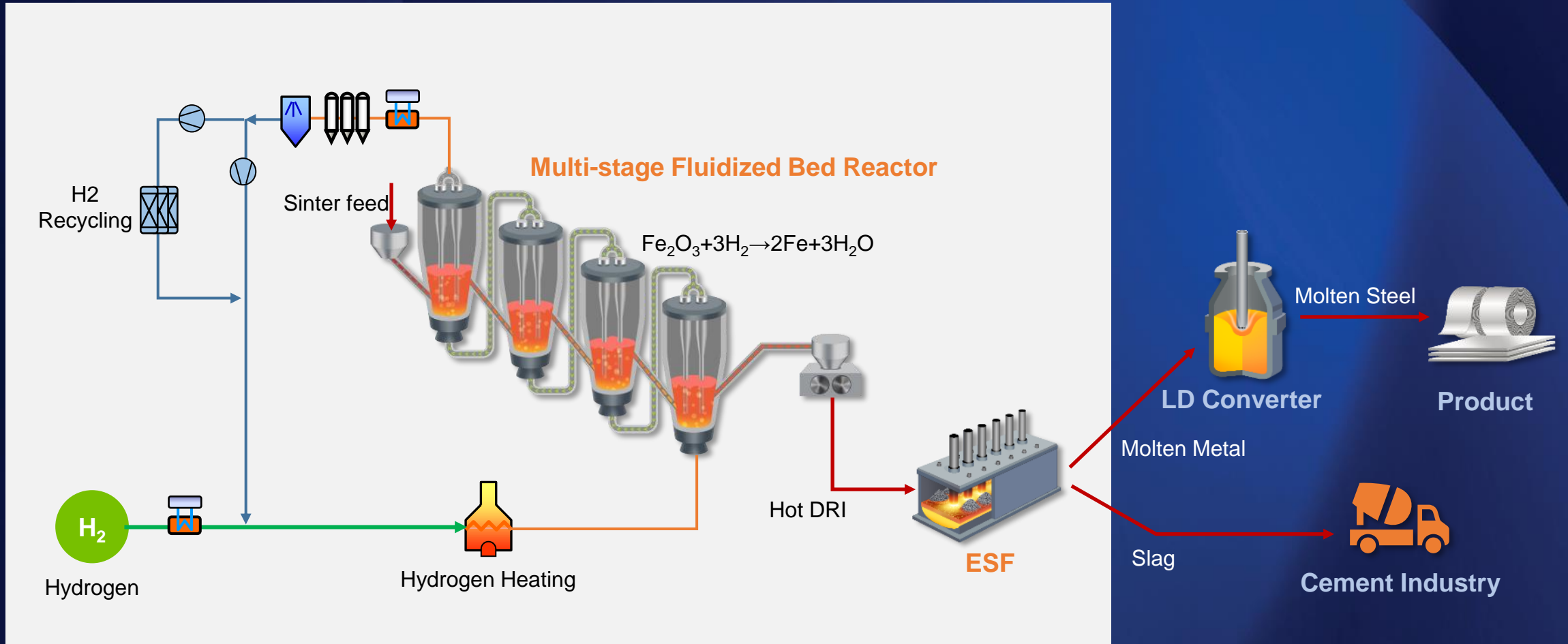


Overseas CCS



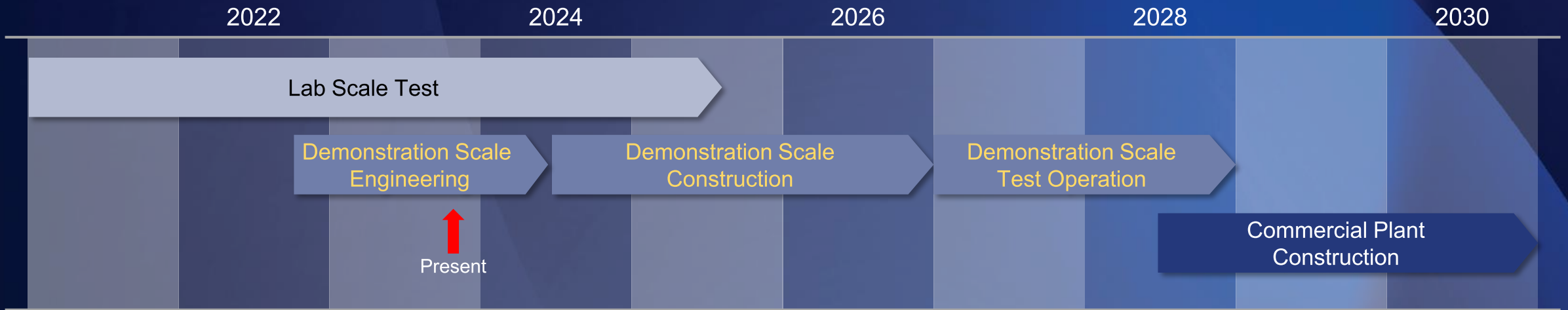
HyREX Process using 100% Hydrogen

* HyREX: Hydrogen Reduction



Roadmap of HyREX Development

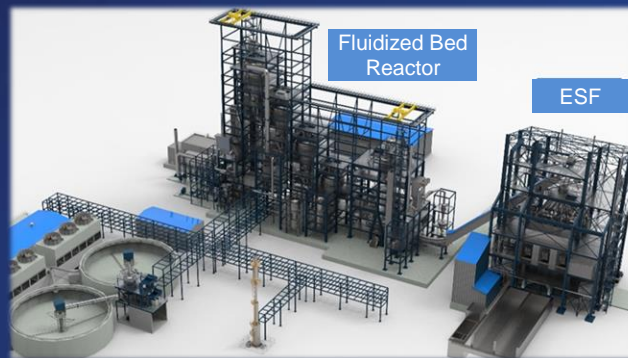
Demonstration by 2030, hereafter Stepwise Replacement of BF with HyREX



Fluidized Bed Reactor
50 kg/batch



Electric Smelting Furnace
1.0 t/hr
(Test will start in 2024)

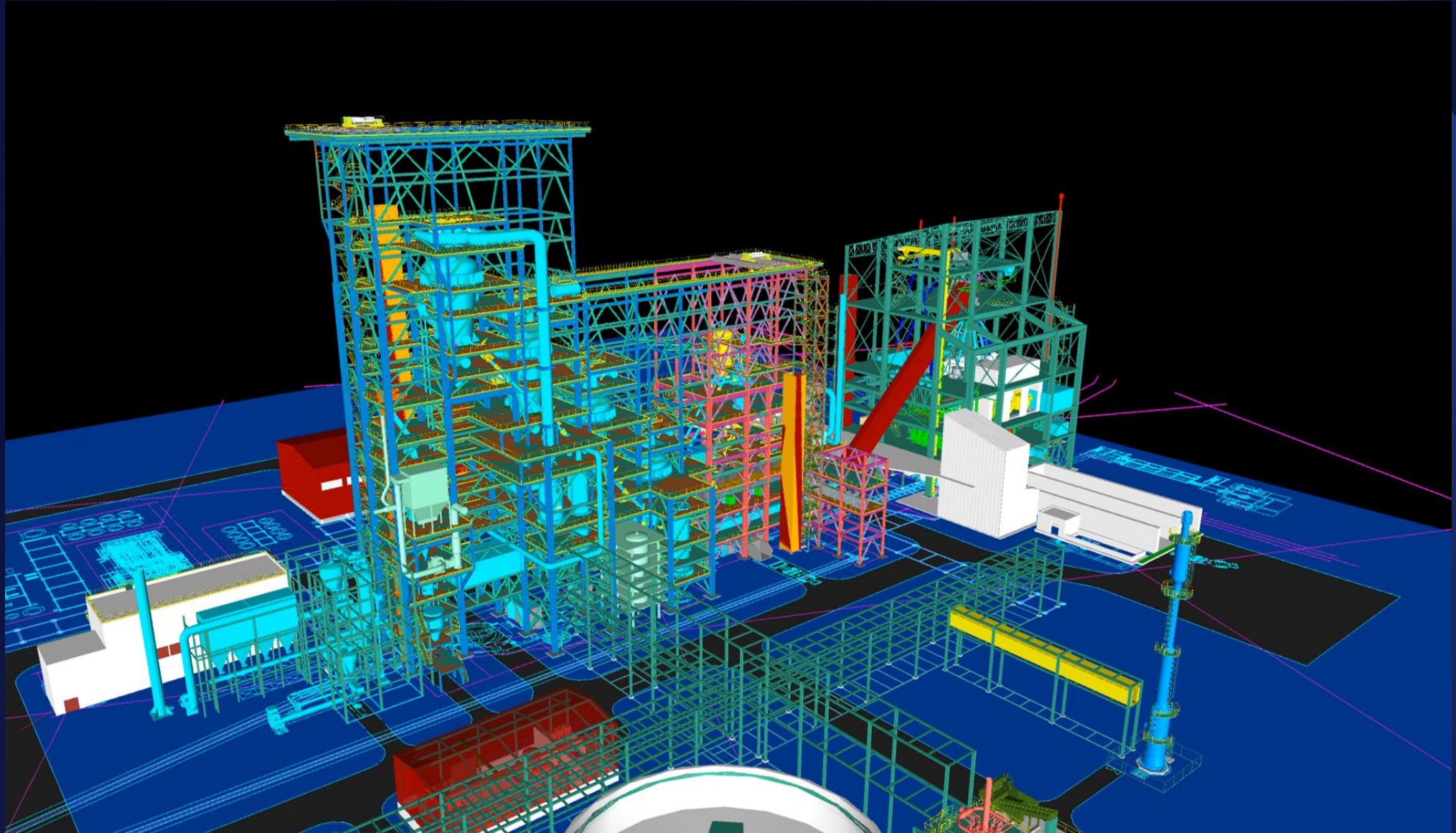


Demonstration Plant
0.3 Mt/y
(Engineering in progress)

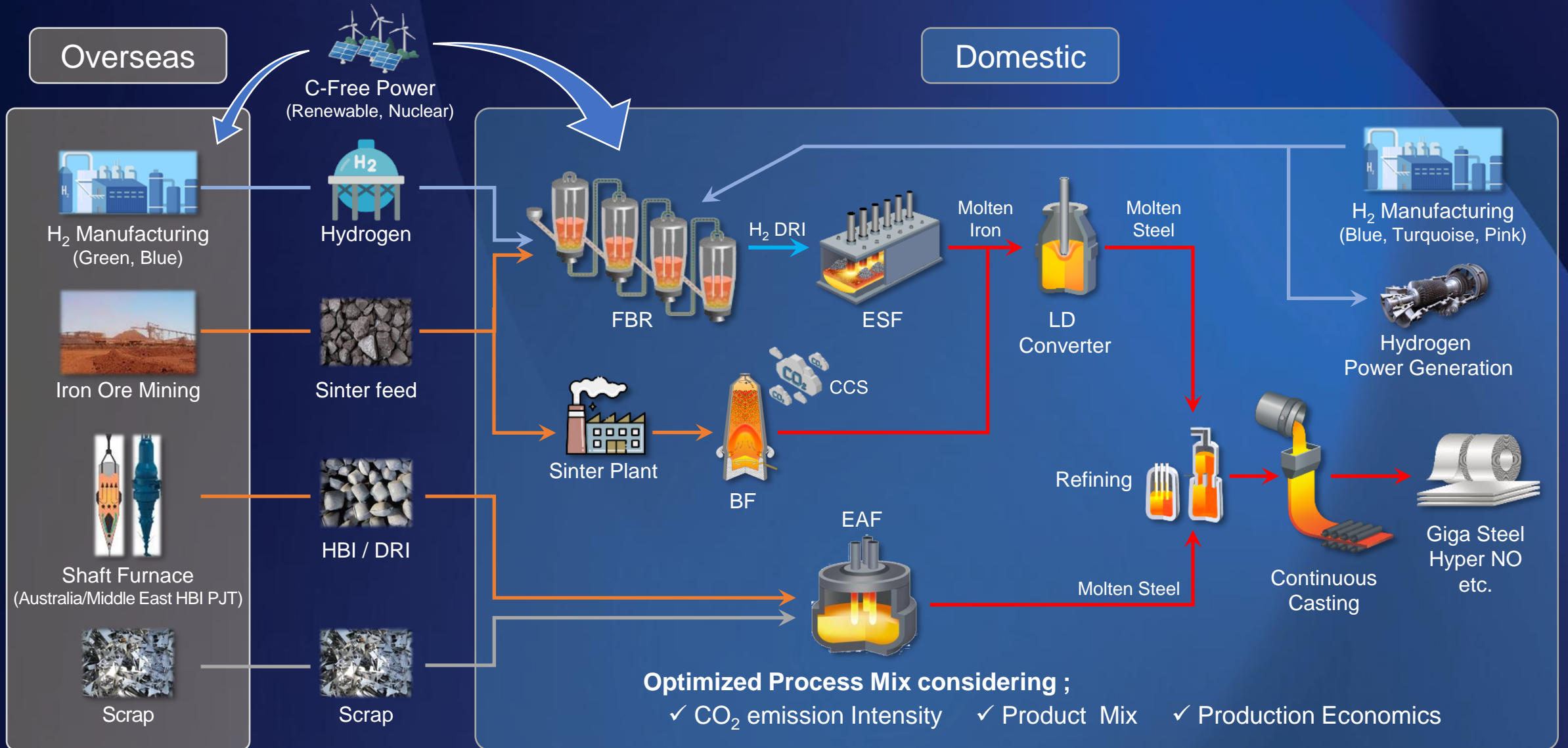


Commercial Plant
1.0 Mt/y
(Transition of FINEX to HyREX)

HyREX Demo Plant Engineering



Future of POSCO Steelworks



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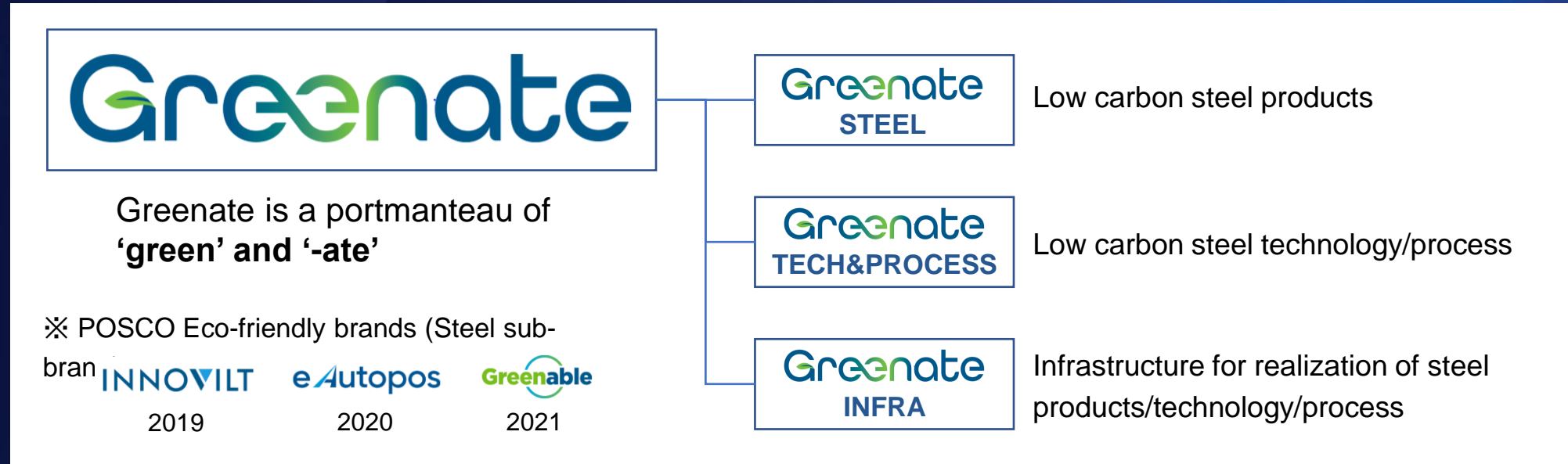
03 Eco-friendly Products

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Launching Eco-friendly and High-performance Brand

☑ Carbon Neutral Master Brand, 『Greenate』 (Nov. 2022)

☑ Represents POSCO's strategic direction, efforts and achievements



☑ Launching a mass-balanced carbon reduction brand, 『Green Certified Steel』 (Jun. 2023)

**Greenate
Certified Steel**

☑ The most widely used international standard and verification came from DNV UK, one of the world's top three certification bodies

☑ POSCO was recognized for cutting certain amount of CO₂ emissions from January to August last year by raising the use of pellets in its blast furnaces and scrap metal in its converters.

Response to Customer's Low-carbon Demand

✓ Low-carbon requirements of major customers

- ☑ IT industry : all STS products with 100% renewable energy ('23), and increased scrap usage ratio
- ☑ Automobile industry : Produced with 100% renewable energy GI products ('30)
- ☑ Energy industry : 50% reduction in CO₂ emissions ('32), carbon neutrality ('40)

✓ Operation of production system that meets customer needs (~'30)

	2022	2030
I Increased scrap usage ratio (%)	-	30
II Reduction of carbon unit (tCO₂/t-s)	2.0	1.5
III RE100 product production (GWh)	0.1	848



- * Hot Metal Ratio
- HMR* and carbon unit reduction
 - Two new electric arc furnaces (~'30)
Stepwise increase of EAF (~'50)
 - Investment in renewable energy and REC** purchase
- ** Renewable Energy Certificate

[~2050] Green steel production will be achieved via expansion of investment in renewable energy, and 7 million tons of hydrogen will be secured through domestic/overseas production and purchase

POSCO will continue to respond actively to meet market needs for eco-friendly product

Eco-friendly Industries utilizing Steel as a Core Material

7 Major Industries and Representative Products



Automobile

Drive Motor NO,
Battery Case, Giga Steel



Offshore Wind Power

Structure
(Tower, Substructure)



Solar Energy

High Corrosion-Resistance Steel Sheet
(PosMAC)



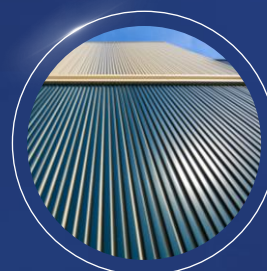
Hydrogen

High Pressure Vessel Piping



LNG

High Mn Steel
for LNG Storage Tank



Construction

Structural Steel



Home Appliance

Graphitic Steel (PosGRAM)

POSCO's Eco-friendly Brands and Sales Target



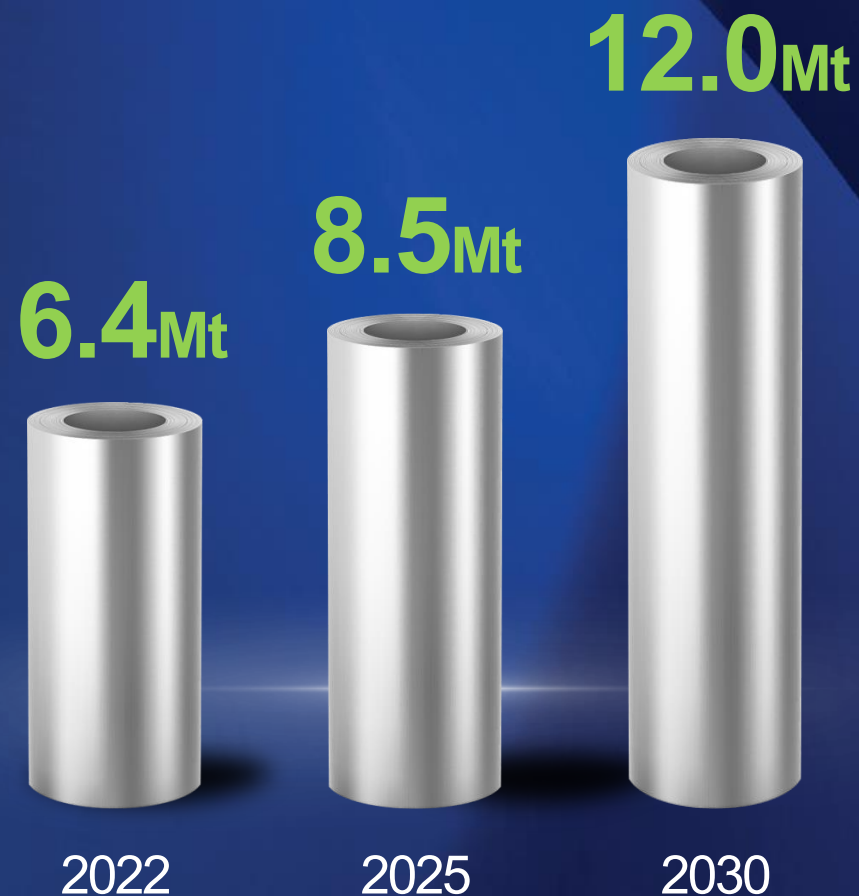
Steel for Eco-friendly Vehicle



Eco-friendly Steel Building Materials



Steel for Eco-friendly Energy



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Transformation Into a Sustainable & Competitive Carbon-Neutrality

1

Establish and redeem business and technological strategies to keep commitment to carbon neutrality by 2050. And recently announced a goal of increasing the pace of CO₂ emission reduction.

30% reduction by 2035, 50% reduction by 2040, and carbon neutrality by 2050

2

Introduce low carbon BF-BOF and EAF, and develop hydrogen base steelmaking, HyREX. Simultaneously build supply chain of iron carriers and infrastructure of hydrogen and energy.

Response to customers' low carbon demand, POSCO moves to supply 10Mt steel of 30% lower carbon intensity by 2030.

3

Launch of carbon neutral master brand, Greenate™ to represent the strategic direction, efforts and achievements, and will supply high grade steel to the environmentally friendly Industry utilizing steel as a core material

POSCO is operating the eco-friendly product brands such as INNOVILT®, eAutopos®, and Greenable®. POSCO aims to increase the eco-friendly product sales from 6.4Mt to 12Mt by 2030.

Thank you for your kind attention

