

An aerial photograph of a road and a dense forest. A large blue arrow graphic, composed of many thin lines, points from the forest towards the right side of the image. The text 'POSCO's Carbon Neutral Strategy' is overlaid on the blue arrow.

POSCO's Carbon Neutral Strategy

 With POSCO

posco

Leading Provider of Future Materials

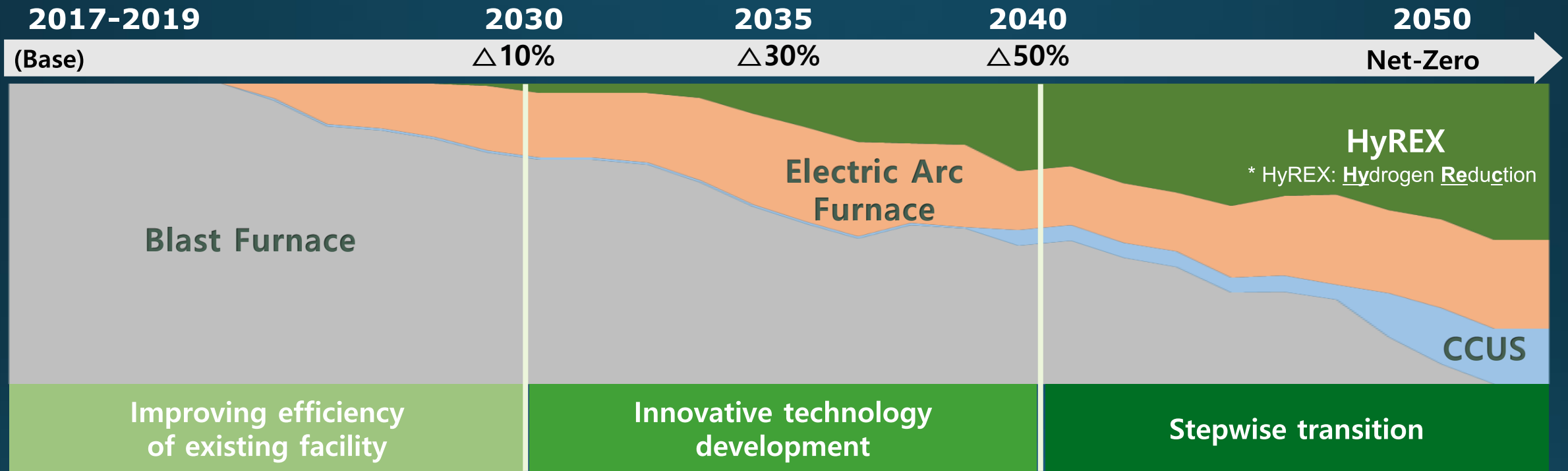
the world's No.1 steelmaker in competitiveness

(2023, 13th consecutive year, World Steel Dynamics)



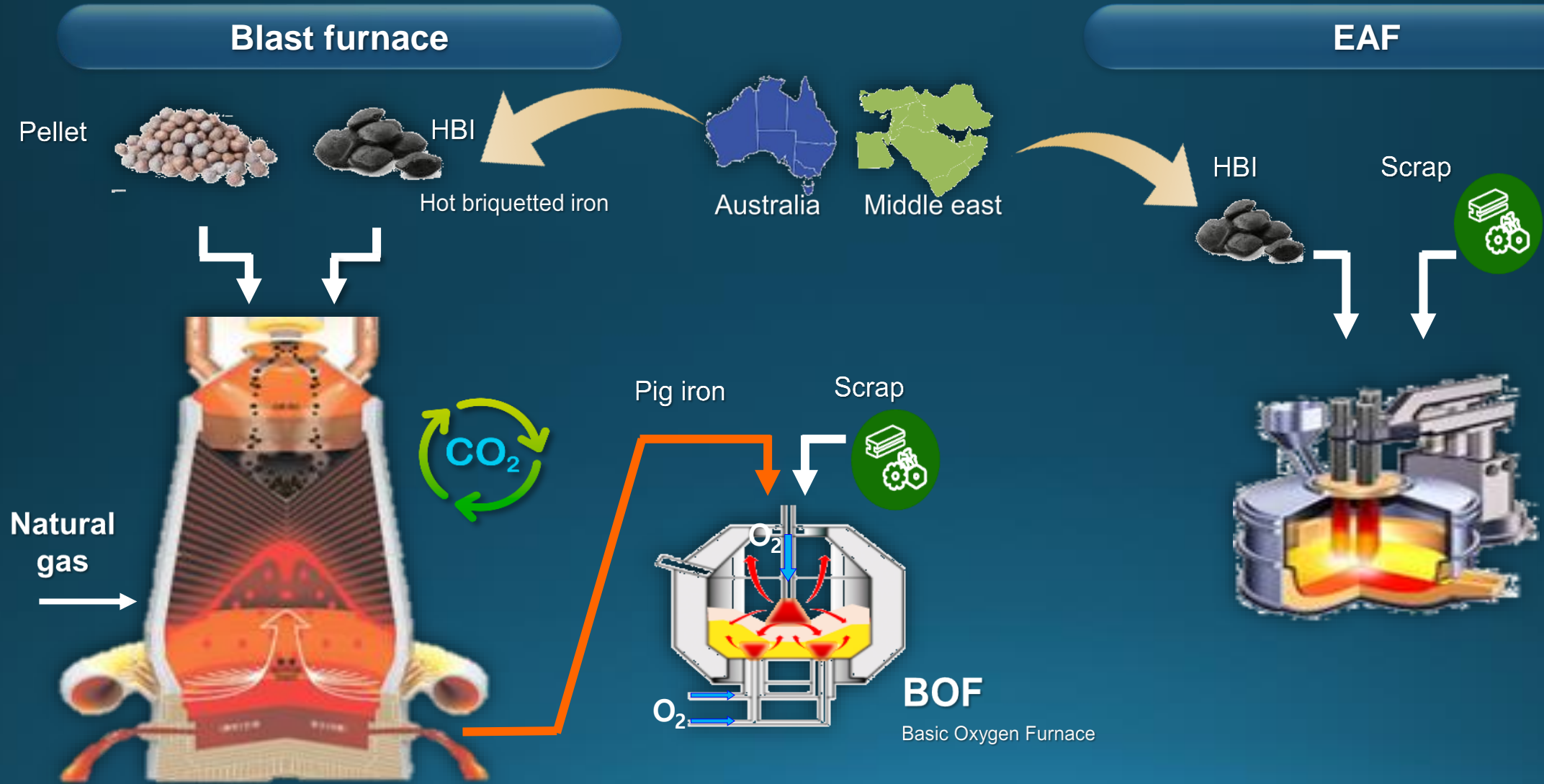
POSCO's Carbon Neutral Roadmap

POSCO established the target of CO₂ reduction 100% by 2050



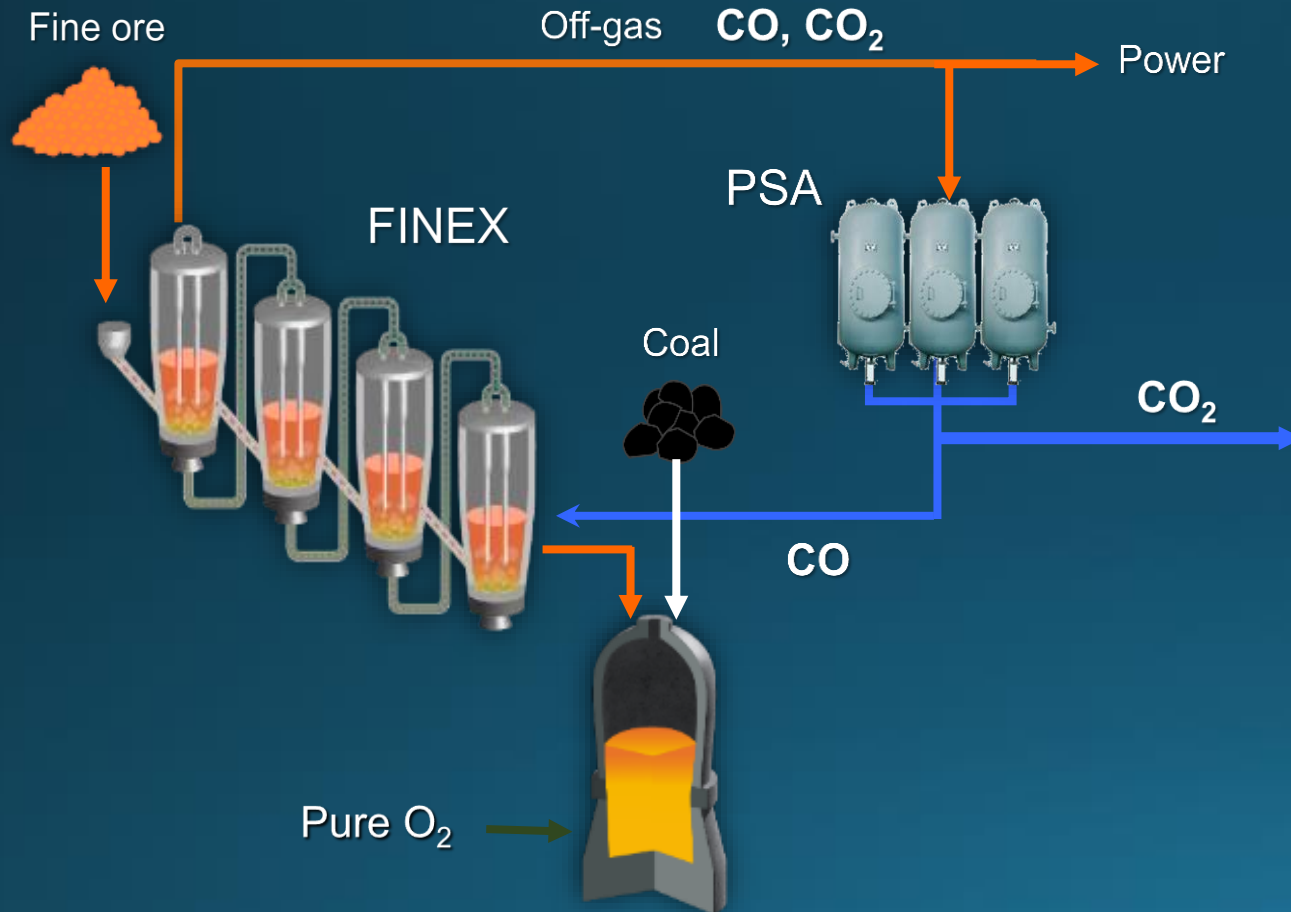
- By 2030, Improving existing facility and Starting to operating Electric Arc Furnace
- By 2040, Expanding electric arc furnace and Starting to operating HyREX
- By 2050, The remaining blast furnaces stepwise converted to HyREX and CCUS

Bridge technology #1



Bridge technology #2

CCUS: Carbon capture, utilization & storage



CCU

Cryogenic



Liquefied carbonic acid



CO₂+H₂ Chemical



Recycled in Coke oven



Reused in BOF

CCS

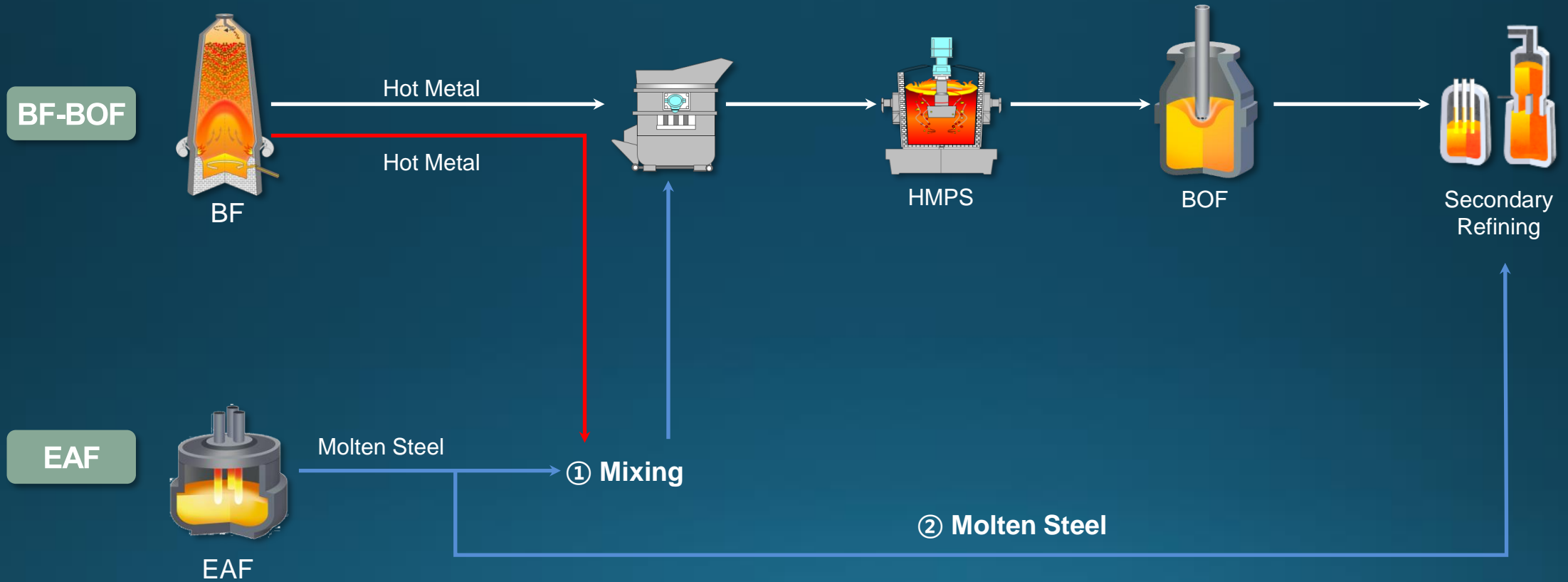
Domestic CCS



Oversea CCS

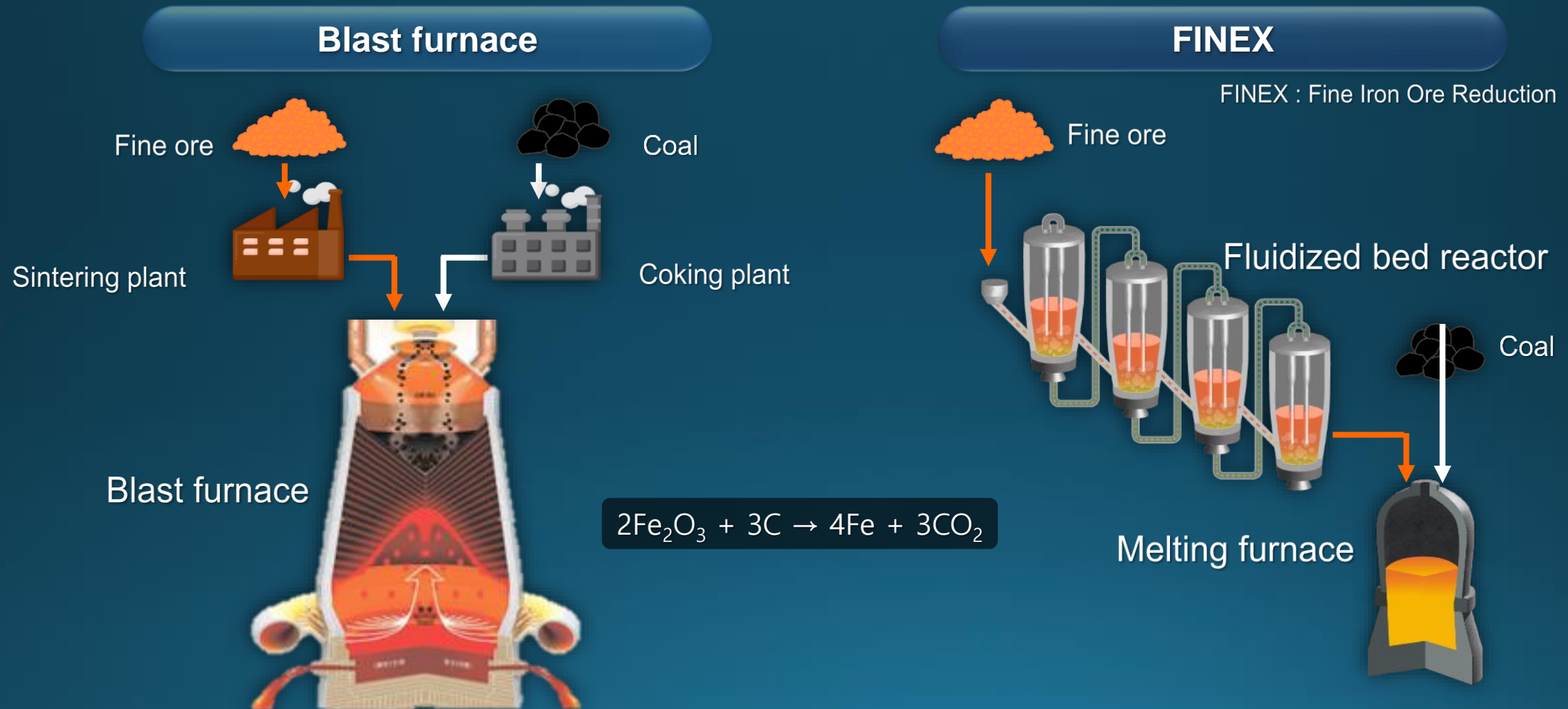
Low-carbon Steel Production using Electric Arc Furnace

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



FINEX, eco-friendly steelmaking process

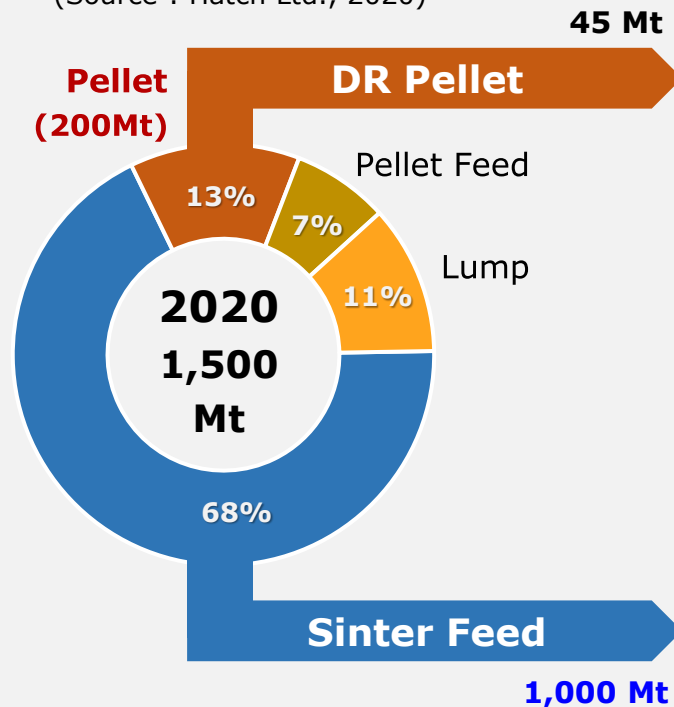
Developed by POSCO in 2003, eliminates sintering and coking processes



Hydrogen-based Steelmaking Routes

Seaborne Iron Ore

(Source : Hatch Ltd., 2020)



Based on DR Shaft

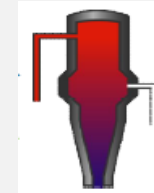
DR Pellet



DRI

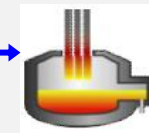
Natural Gas

Electric Power



Hydrogen

DRI



Molten Steel

EAF

Based on Fluidized Bed Reactor

Sinter Feed



DRI

Coal Gas



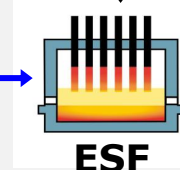
Hot Metal

Electric Power



Hydrogen

DRI

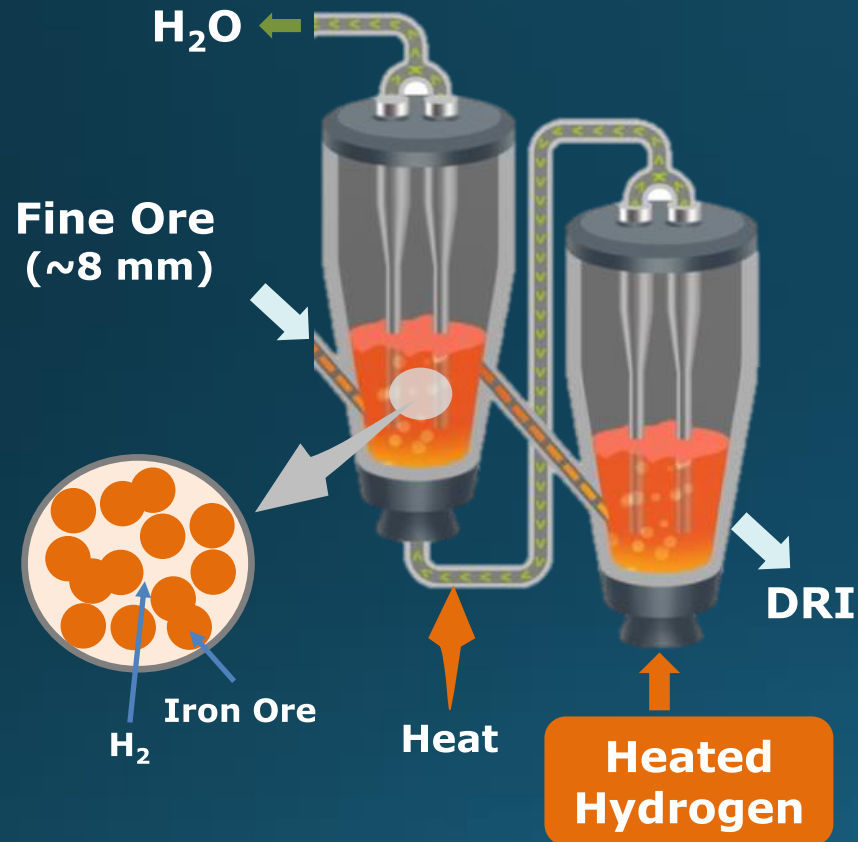


Hot Metal

ESF

POSCO selected the combination of FBR and ESF to use an abundant sinter feed directly

Why Fluidized Bed?



Advantages of Fluidized Bed Reactor

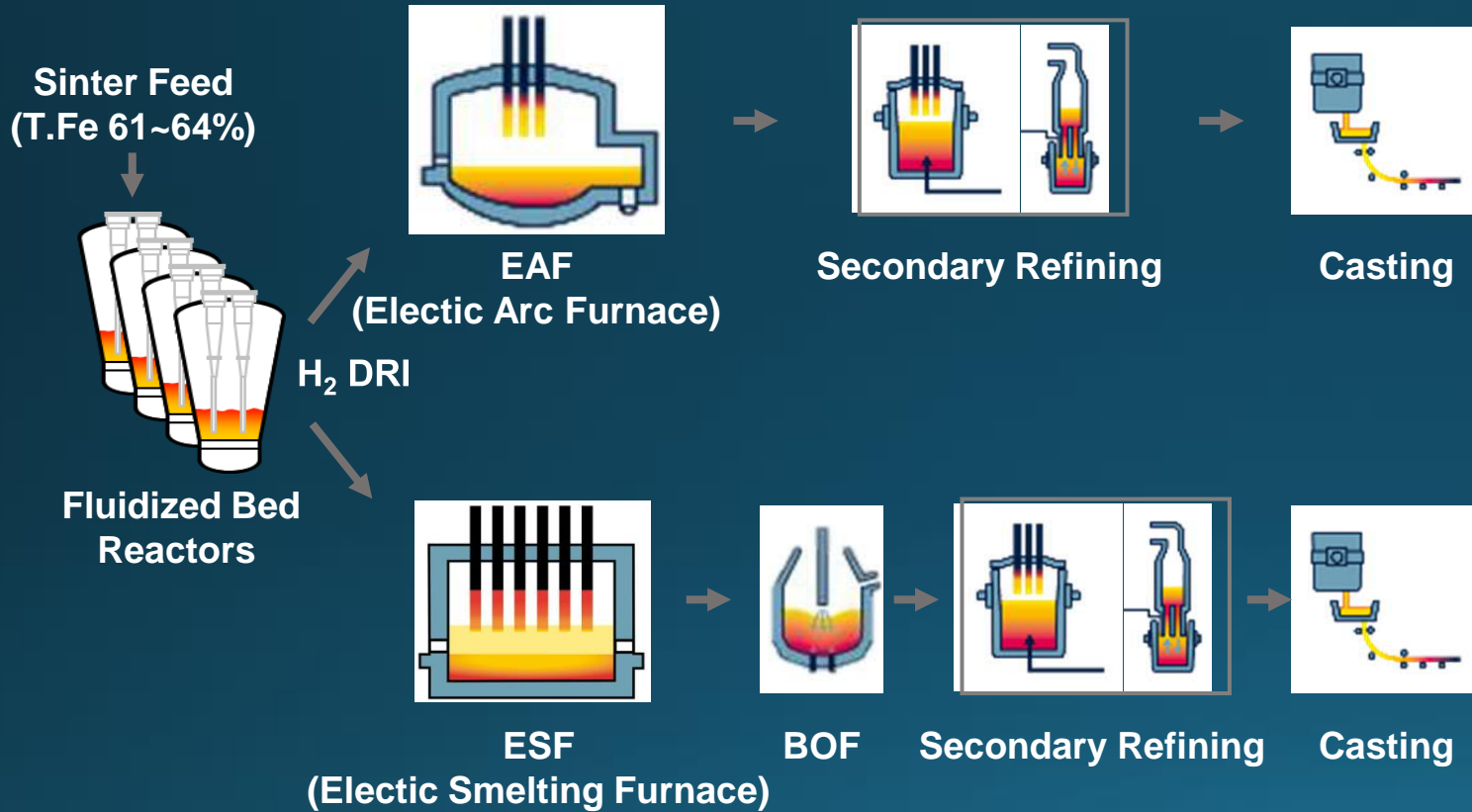
- ✓ Direct use of fine iron ore
- ✓ Uniformity in reduction
- ✓ Easy thermal compensation



- ✓ Considerable know-how by long-term operation and maintenance in FINEX®

※ Commercial operation of two FINEX plants :
1.5Mt plant since 2007 and 2.0Mt plant since 2014

Why ESF?



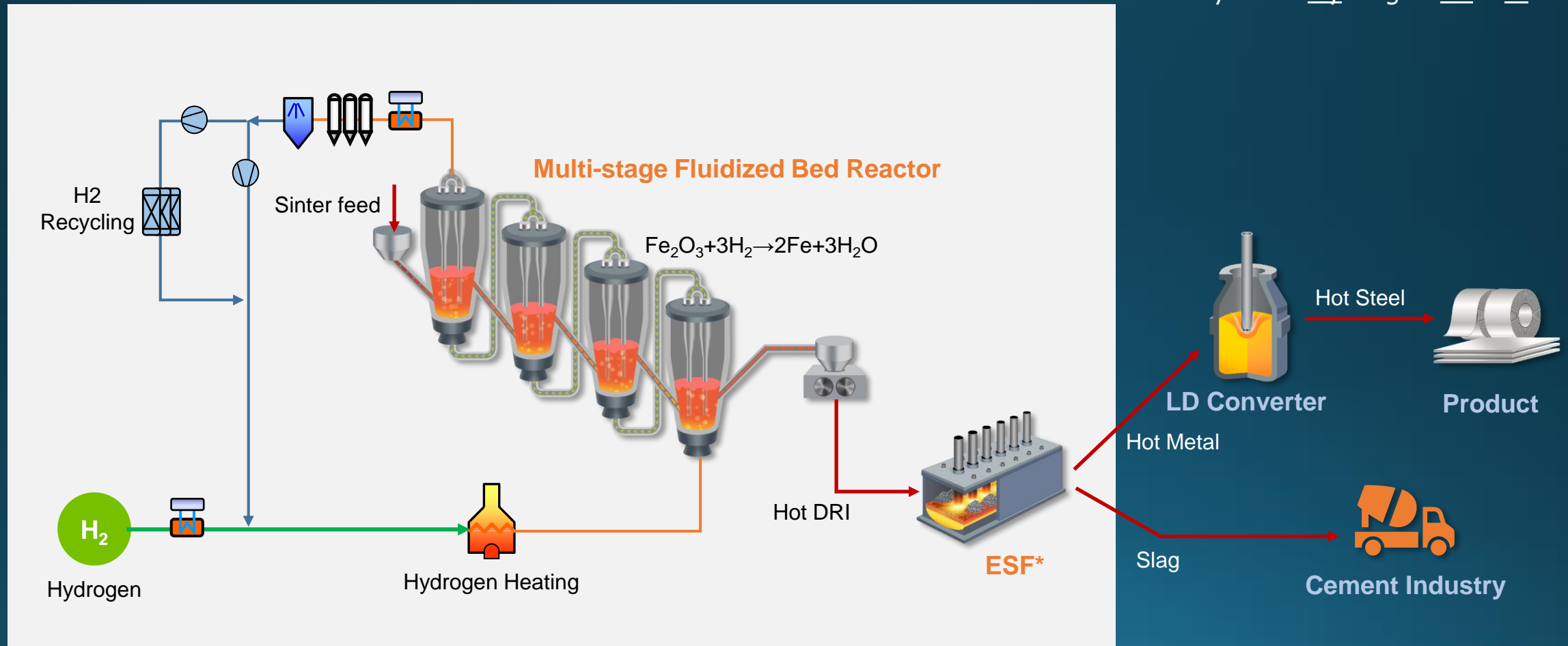
- ✓ Yield: Low
- ✓ Slag Amount: High
- ✓ Slag Recycling: Only Minor Application
- ✓ Steel Quality : Limited

- ✓ Yield: High
- ✓ Slag Amount: Low
- ✓ Slag Recycling: to Cement Industry
- ✓ Steel Quality : Unlimited

HyREX Process using 100% Hydrogen

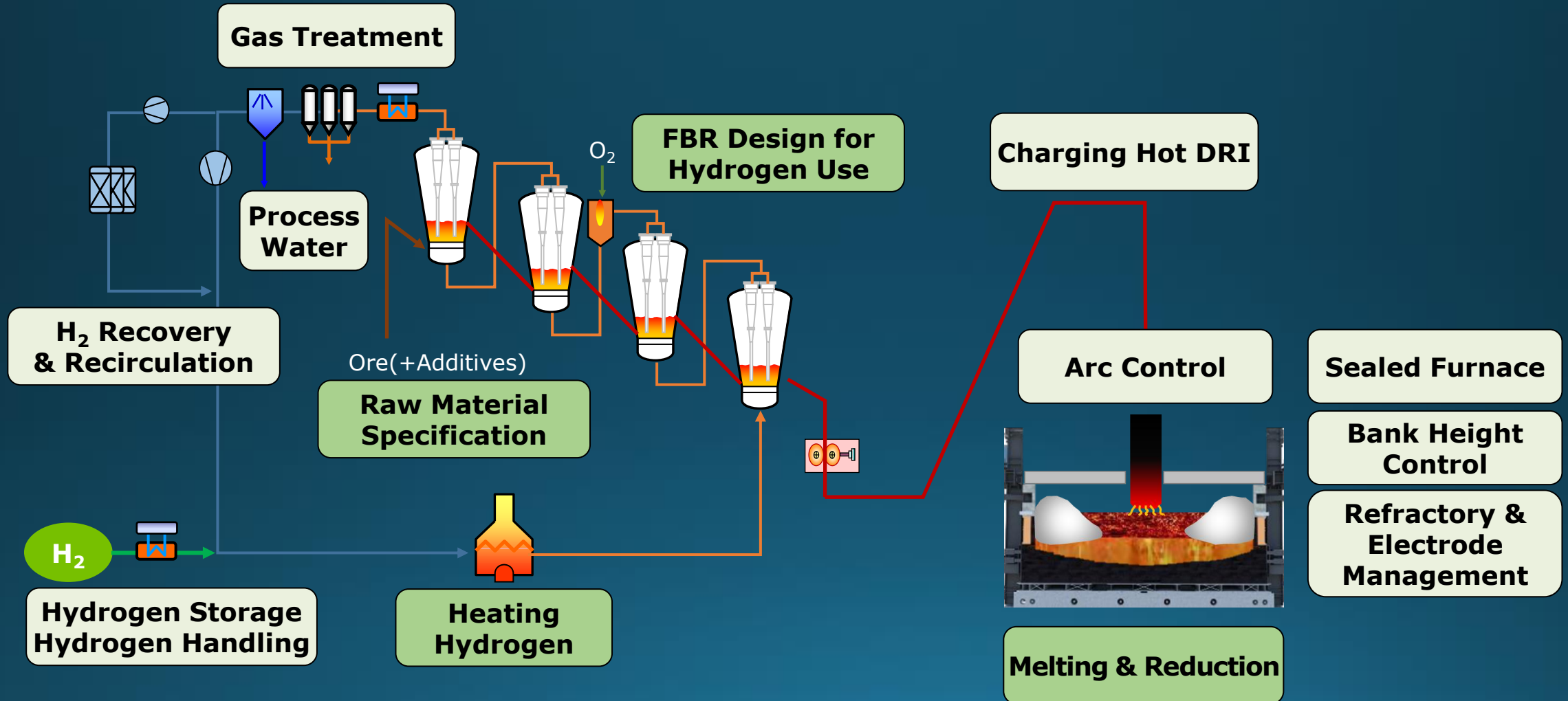
HyREX : Combination of fluidized bed reactors and electric smelting furnace

* HyREX : Hydrogen Reduction



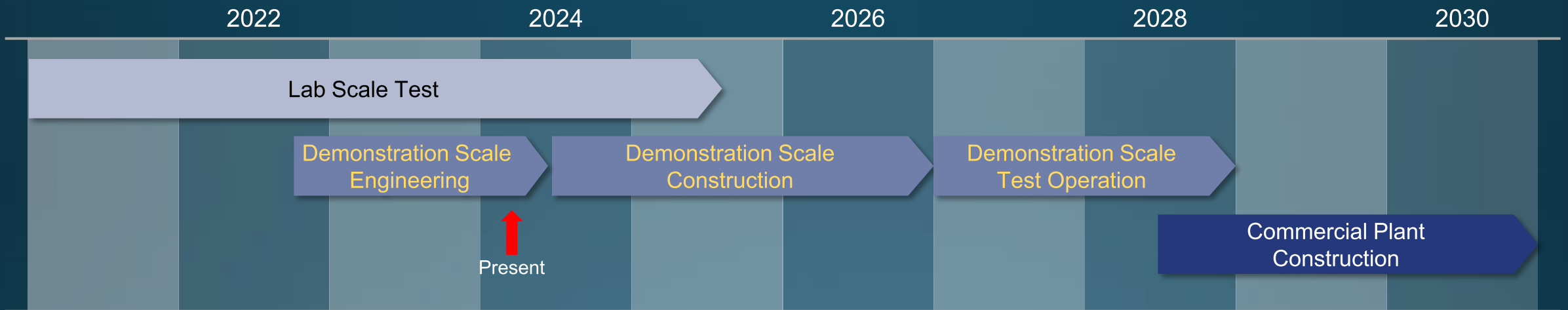
*Electric Smelting Furnace

Key Technical Challenges for HyREX



Roadmap of HyREX Development

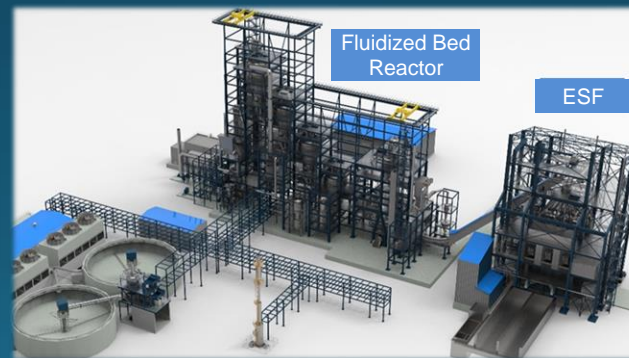
Demonstration by 2030, hereafter Stepwise Replacement of BF with HyREX



Fluidized Bed Reactor
50 kg/batch



Electric Smelting Furnace
1.0 t/hr

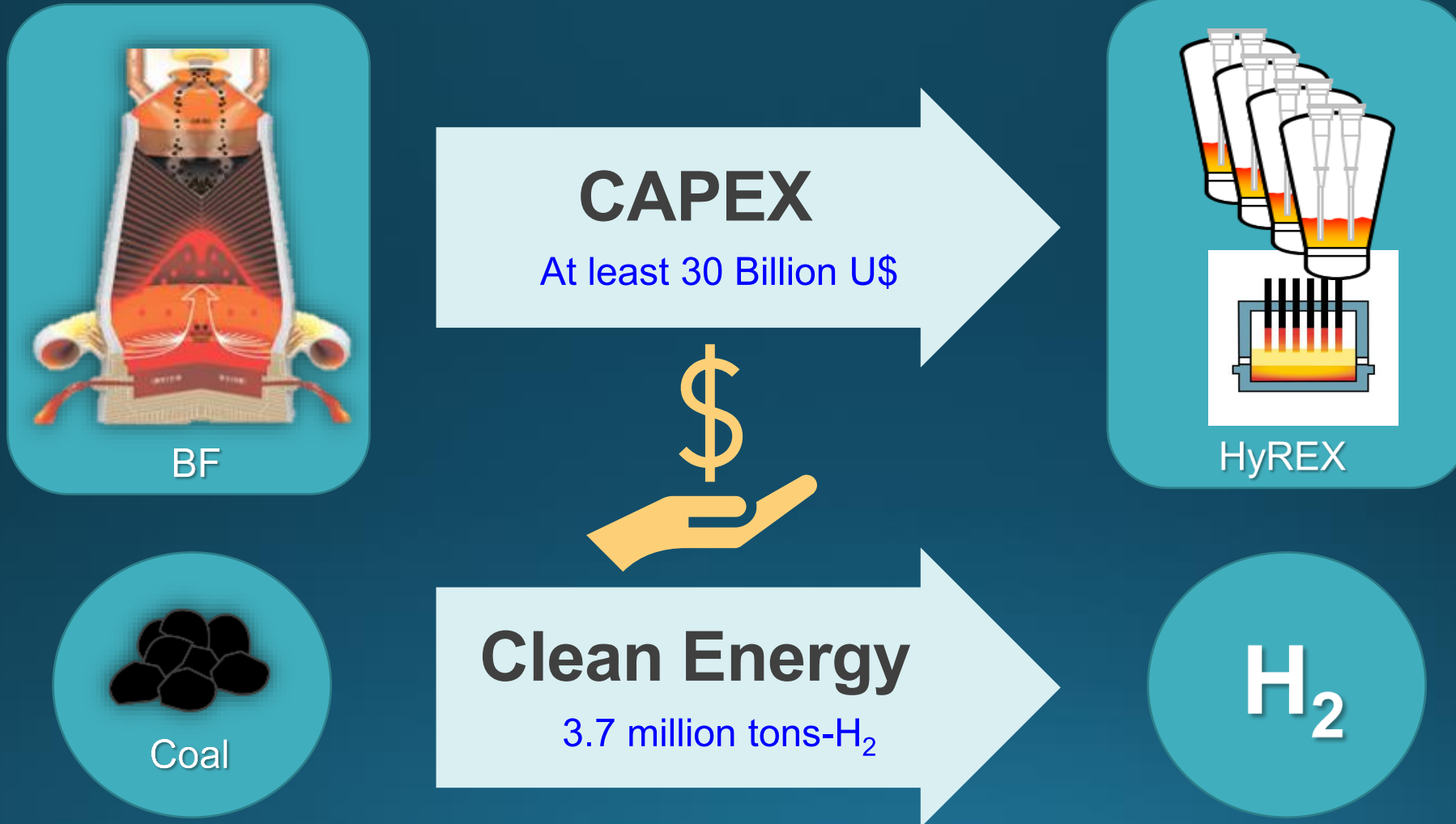


Demonstration Plant
0.3 Mt/y
(Engineering in progress)



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

Intensive Government Support Needed



* Numbers are based on the estimation for Posco by 2050. Subject to change due to various factors.

To transform a sustainable & competitive carbon-neutrality

1

POSCO will do the best to realize '2050 Carbon Neutrality'
- Achieve NDC, Actively respond to customer demands and investors

2

POSCO will take 'Technology Leadership through HyREX'
- Produce low cost, high quality green steel by hydrogen reduction

3

POSCO will continue 'Cooperation with various stakeholders'
- Collaboration with Government, Community, Academia, and Global partners

Τησική υου



Pohang Youngil bay 『SPACE WALK』