

POSCO Pledges Carbon Neutrality by 2050

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2021. 05. 27

The "With POSCO" logo is located in the bottom left corner. It features a stylized orange and blue "W" icon followed by the text "With POSCO" in a blue, sans-serif font.

I. Background



* IPCC, 2018: Global Warming of 1.5°C

UN IPCC Special Report* has emphasized actions to reach global carbon neutrality by 2050. As part of the efforts of UN IPCC, Korea has announced its 2050 carbon neutral goal.



TCFD (e.g., global investor firms) and customers have also pledged to move towards the goal of becoming carbon neutral by 2050, and called on to join the carbon neutrality initiatives.

POSCO Pledges Carbon Neutrality by 2050 after Board resolution ('20.12.11)

While fulfilling its responsibilities as a corporate citizen, the company is determined to enhance its competitiveness by shifting to a low-carbon production system and rebuilding its business portfolio.

2002~

Company-wide strategies to cope with climate change have been set up on an annual basis.

2006~

POSCO has implemented the **GHG management system**.

2010

POSCO announced its voluntary **2020 GHG reduction target**.

2010

Korea's first **2009 Carbon Report by POSCO** was published.

2011~14

POSCO successfully achieved the target proposed in the **Korea GHG & Energy Target Management Scheme**.

2013~

POSCO has implemented the **GHG-Energy management system**.

2015

Korean Emissions Trading Scheme has been implemented.

2020.12.11

POSCO announced its **2050 Carbon Neutrality Plan**.

11%

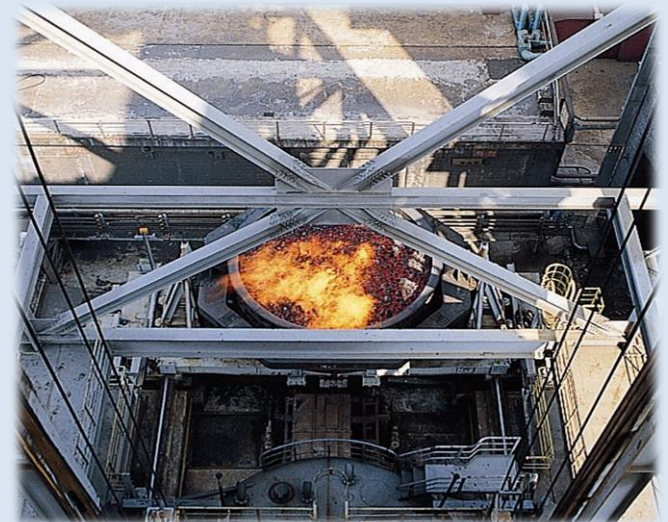
POSCO has placed 11% of total investments since the foundation for environment

\$827 million

invested in energy recovery equipment and process improvements

Ongoing R&D projects with the goal of reducing CO₂ include:

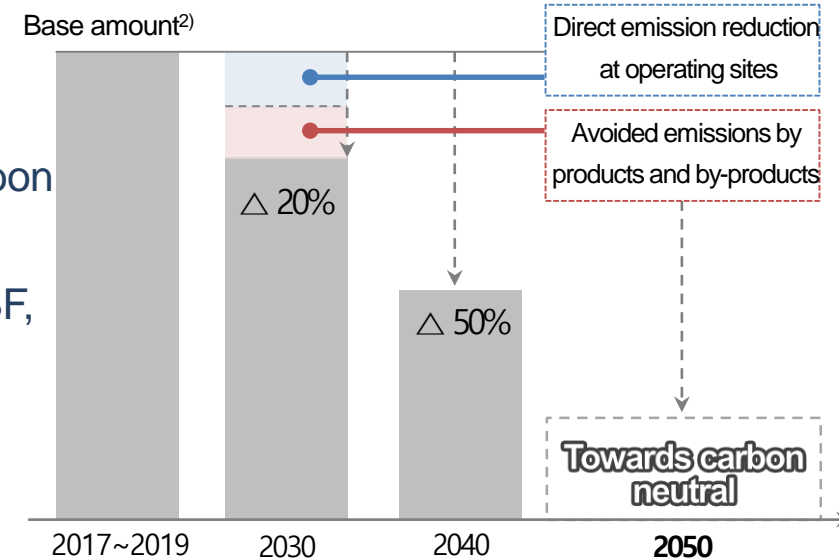
- Smart blast furnace & sintering to reduce reducing agents
- Optimization of coke ovens and CDQ operations
- Replacing a proportion of coal with hydrogen in the iron making
- Carbon captured from by-product gas, CO₂ reuse technology



Coke Dry Quenching (CDQ) facility in operation at Pohang steelworks. The CDQ recovers the heat from the hot coke which is converted into electricity. Last year, approx. 140,000 tCO₂ was reduced via the CDQ. CDQs have been installed in all coke ovens except for one which is to be revamped by 2023.

POSCO aims to achieve carbon neutrality by 2050 with the adoption of the hydrogen reduction process in iron and steel making. Interim reduction targets are set at 20% by 2030 and 50% by 2040.

- 2030 : Improvement of energy efficiency, usage of low carbon raw material alternatives (e.g., scrap, pellets, etc.)
- 2040 : Injection of natural gas and H₂-containing gas into BF, new EAF, CCR¹⁾ and etc.
- 2050 : Commercialization of HyREX + EAF using renewable energy source



The company will continuously work towards cutting GHG emissions through the supply of energy efficient steel products³⁾ and recycling of steel by-products⁴⁾.

1) Carbon capture and reuse

2) Baseline: average of CO₂ emissions from 2017 to 2019

3) Expanding the supply of high energy-efficiency steel such as high-strength steel, low core loss electrical steel, etc.

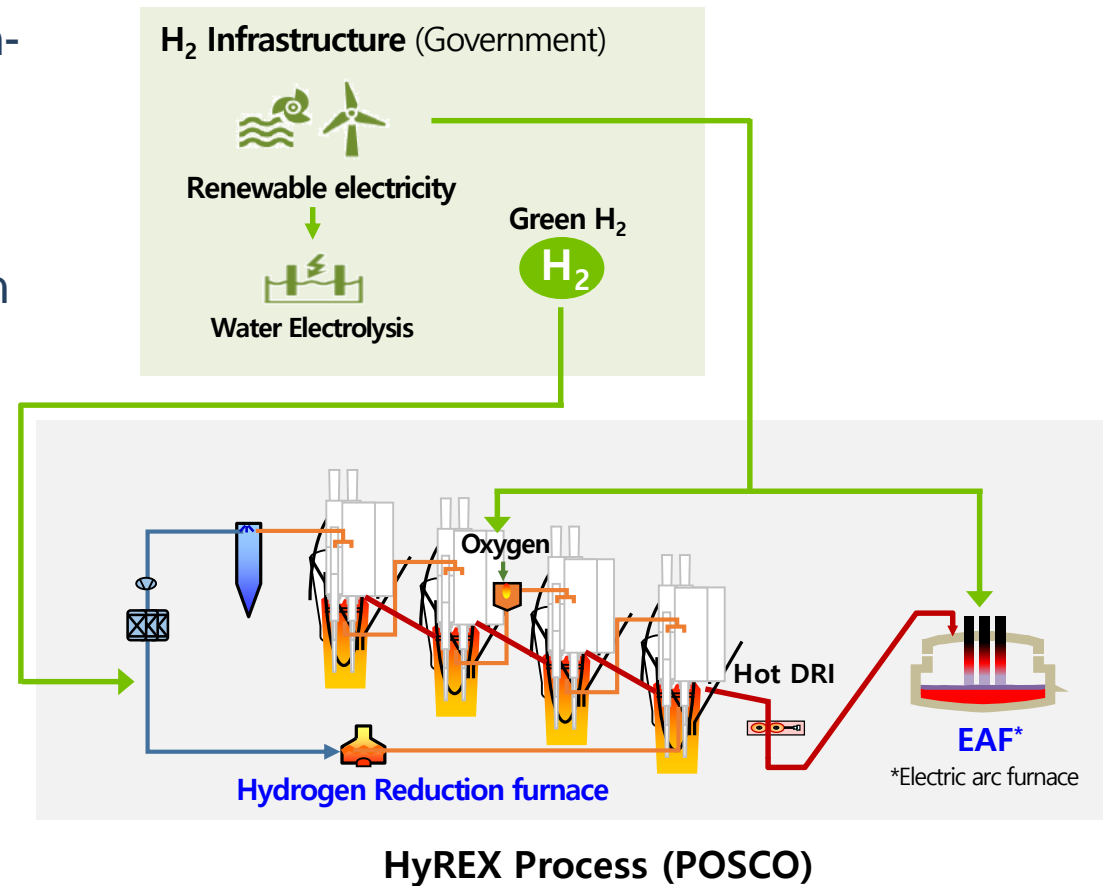
4) Eco-friendly use of steel slag such as slag cement, slag fertilizer, marine forest with Triton, etc.

FINEX, a coal & oxygen-based iron ore reduction process using fluidized bed reactors, is a key capability of POSCO that enables the development of the hydrogen-based iron-making process.

Based on such capabilities, the HyREX process has been designed to use green hydrogen and renewable electricity.

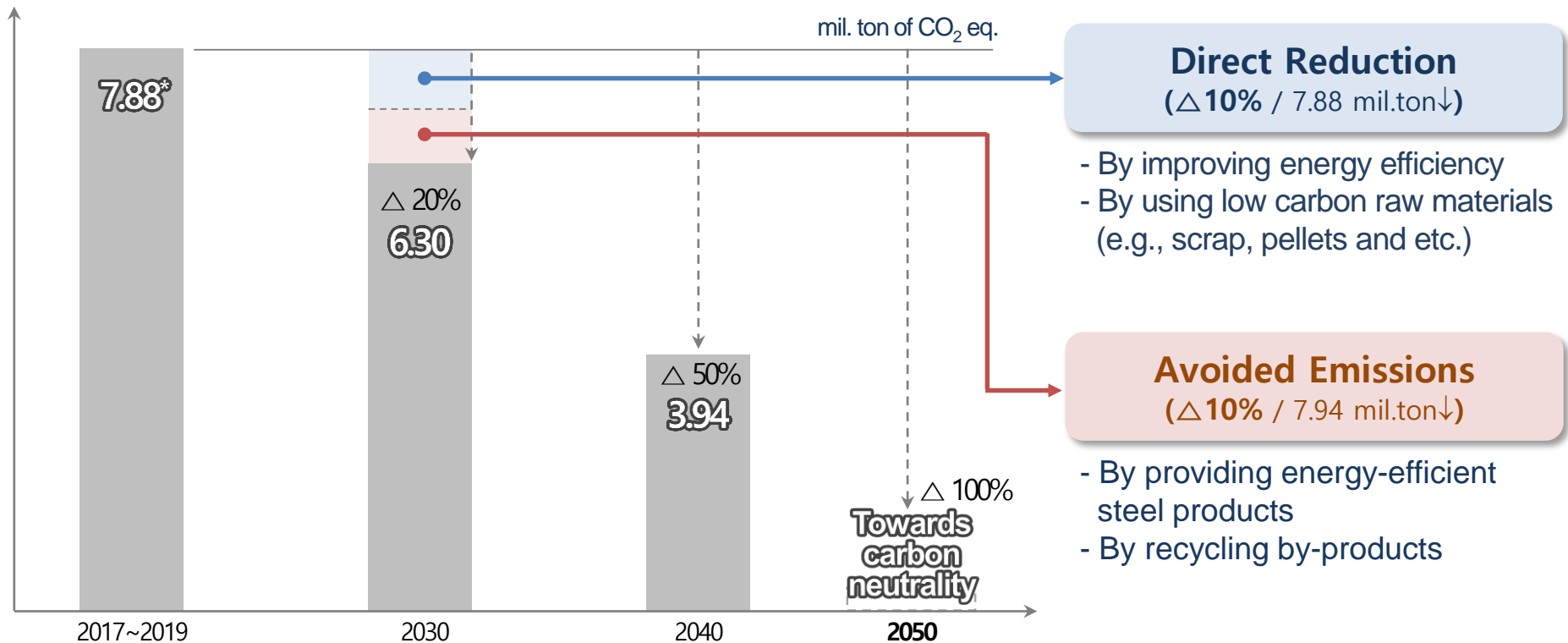
HyREX Roadmap

- ~2030 : pilot plant tests
- ~2040 : demo plants tests
- ~2050 : commercialization



III. Reduction Target by 2030

POSCO plans to reduce emissions by 20% by 2030. The target includes the reduction of direct emissions from production sites and avoided emissions that occur in our value chain, especially from the use of by-products. Performance in reducing emissions will be reviewed on an annual basis and the emission reduction plan will be updated every 10 years.



* Baseline: average of CO₂ emissions from 2017 to 2019

For Customers :

POSCO has constantly been disclosing carbon information (e.g., carbon footprint, certified green products, renewable energy consumption) to its customers.

The company obtained the EPD¹⁾ certification from the Ministry of Environment for 13 product groups²⁾ that have contributed to reducing product carbon footprint in 2019.

POSCO became Korea's first steelmaker to receive a "low-carbon product³⁾ certification" by the Ministry of Environment for its thick plates and hot-rolled products in 2019.

Scope	Cradle-to-gate assessment of steel products that includes stages from raw material mining, transport, manufacturing to packaging
Inventories	Inventories sourced from the mining and transport of raw materials are provided by the Korea LCI DB and the Ecoinvent DB, while inventories from manufacturing and packaging are listed via the POSCO carbon management system.
Software	Customized S/W for EPD (e.g., TOTAL, ez EPD)

The company will first provide REC (Renewable Energy Certificated) steel to RE100⁴⁾ members. Mid-to long-term plans on securing renewables are under review.

1) The Environmental Product Declaration (EPD) is one of the Type III Environmental Declaration programs which was introduced in 2001 by the Korean Ministry of Environment to accurately disclose the environmental impact of products to consumers.

2) The product groups include steel plates, wire rods, hot rolled steel, cold rolled steel, hot-dip galvanized steel, electrical galvanized steel, electrical steel, stainless steel, PosMAC, etc.

3) Low-carbon product certificate is given to products with a carbon footprint certificate, under the condition that the product's GHG emission is less than the average emission of products in the same category.

4) Renewable energy 100

For Investors :

Climate change has been the top agenda at POSCO's recent board meetings and will continue to be. In accordance with the TCFD guideline, the company studied new business opportunities based on the 1.5°C scenario and developed business strategies on three focus areas. Further details will be provided via an IR conference call.

For Supply Chain :

POSCO is to review investment in low-carbon materials, and build a low-carbon supply chain with global suppliers. In order to secure a stable supply of low-carbon materials, POSCO is reviewing opportunities to invest in the scrap business and long-term supply contracts.

Following the TCFD guideline, global investors such as BlackRock have urged companies to align their business portfolio with the 1.5°C scenario by identifying climate-related risks and seeking opportunities. POSCO has defined three focus areas—steel, rechargeable battery materials, hydrogen/LNG—and has set a goal to achieve carbon neutrality by 2050.

	Steel	EV battery materials	Hydrogen/LNG
Risk	<ul style="list-style-type: none"> ● Competitive markets focused on low carbon products ● Strengthened carbon regulations ● Increased electricity rate ● Increased exposure to natural disasters 	<ul style="list-style-type: none"> ● Early reduction of EV subsidies ● Decrease of EV demands with rise of electricity rate ● Delay in improving EV range to limit demand 	<ul style="list-style-type: none"> ● Monopoly power of KOGAS puts limits on business ● Price decline of crude oil ● Economics and safety issues
Opportunities	<ul style="list-style-type: none"> ● Improved cost competitiveness with breakthrough tech. ● Enhanced product competitiveness with energy-efficient steel 	<ul style="list-style-type: none"> ● Lower CO₂ emission than combustion engine vehicles ● EV market expansion 	<ul style="list-style-type: none"> ● Increase of LNG and hydrogen under the government's 9th basic plan for energy ● Biz expansion in linkage to current biz

Reduction Pathways	<ul style="list-style-type: none"> ❖ Intermediate reduction targets : 20% by 2030 and 50% by 2040 ❖ Sales increase of EV steel plate ❖ Build portfolio to focus on low carbon products 	<ul style="list-style-type: none"> ❖ Increase sales of high capacity cathodes and anodes ❖ Expansion of lithium business and launch of EV battery recycling biz ❖ Cooperation with global EV players and battery suppliers 	<ul style="list-style-type: none"> ❖ Expansion of LNG import terminal biz ❖ Supply of high manganese steel for LNG carriers ❖ Build infra for FCEVs charged with by-product hydrogen ❖ Re-evaluation of coal business at Group level
2050 Carbon Neutrality	<ul style="list-style-type: none"> ❖ Commercialization of HyREX based on nationwide H₂ supply and renewable energy infrastructure 	<ul style="list-style-type: none"> ❖ Next generation battery materials ❖ High-capacity ESS materials for factories and buildings 	<ul style="list-style-type: none"> ❖ Power supply from microgrids paired with renewable energy and LNG ❖ Mass production of green H₂ with water electrolysis

V. Dialogue with stakeholders

(10/10)

Technological breakthroughs are a key element in drastically reducing greenhouse gas emissions in the steelmaking process and for such advancements to be achieved, the respective roles of stakeholders (government included) and POSCO must be clearly defined for the parties to work in cooperation.

While steelmakers focus on technology development and commercialization, R&D and infrastructure will be supported by the government.

With greater customer demand for low-carbon products, co-development of low-carbon materials and a preferred supplier arrangement for procurement is a pre-requisite. Investors will rebuild investment portfolios with focus on the sustainability of steelmakers.

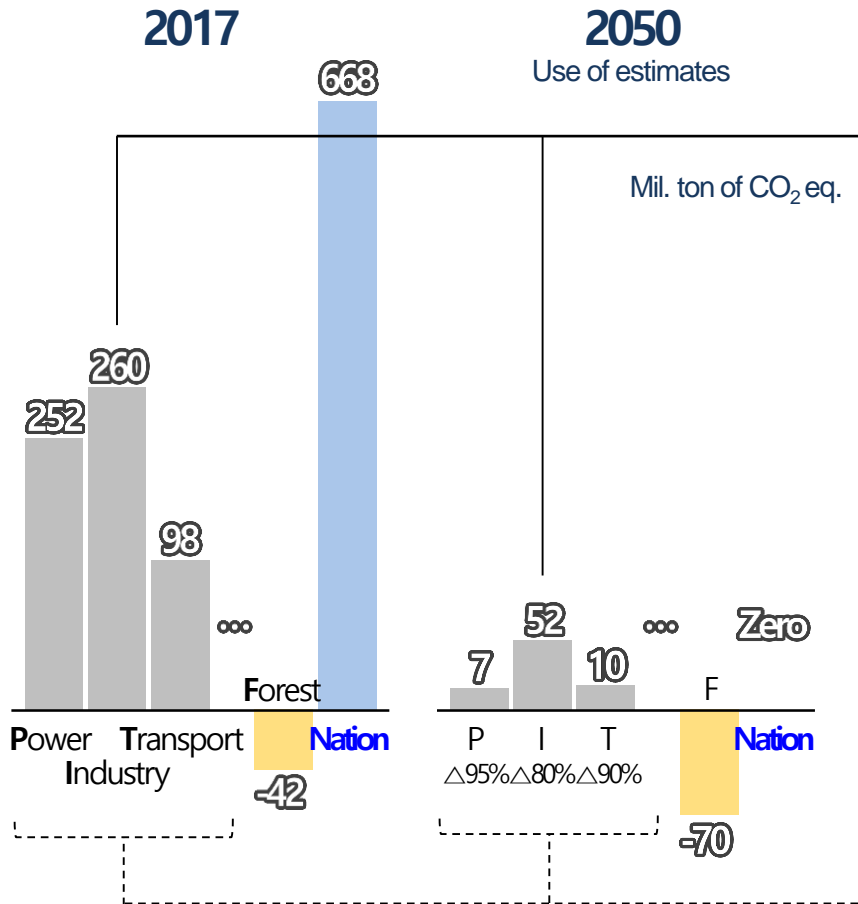
Cooperation with stakeholders to achieve carbon neutrality by 2050

- ① Countrywide infrastructure for the supply of green hydrogen and renewable energy
- ② Financial support for breakthrough technology development (e.g., hydrogen reduction iron and steelmaking process) and the shift towards a low-carbon (e.i., hydrogen-based) steelmaking process
- ③ Joint development of low-carbon products, procurement sourced from preferred low-carbon material suppliers
- ④ Including sustainable companies who have reported carbon emissions in the long-term investment portfolio

Appendix 1) Carbon Neutrality Plan of Government and POSCO

Government Target for 2050

POSCO Target for 2050



Direct reductions at operating sites are linked to government regulations (e.g., ETS)

Avoided emissions* are made by voluntary efforts, irrelevant to government regulations.

* The TCFD guideline recommends the disclosure of ① avoided emissions target, ② measures, key performance indicators for reduction pathways.

Appendix 2) Avoided emissions



GHG emissions impact of a product(good or service) relative to the situation where that product does not exist. Positive impacts are commonly referred to as '**avoided emissions**', as well as 'environmental load reduction potential', 'enabling effects', and '**contribution to societal reductions**'.

The Greenhouse Gas Protocol



WRI/WBCSD



Organizations should describe their key climate-related targets such as those related to GHG emissions, water usage, energy usage, etc. Other goals may include efficiency or financial goals, financial loss tolerances, '**avoided GHG emissions**' through the entire product life cycle, or net revenue goals for products and services designed for a lower carbon economy.

Ultra high strength steel

Ultra high strength steel in vehicles can reduce **0.60 tCO₂ eq.** per year by reducing the vehicle weight and improving fuel consumption.

연 도	ton thou.ton of CO ₂ eq.		
	2019	2025	2030
Ultra high strength steel sales	4,217	4,350	4,500
CO ₂ reduction	2,530	2,610	2,700