

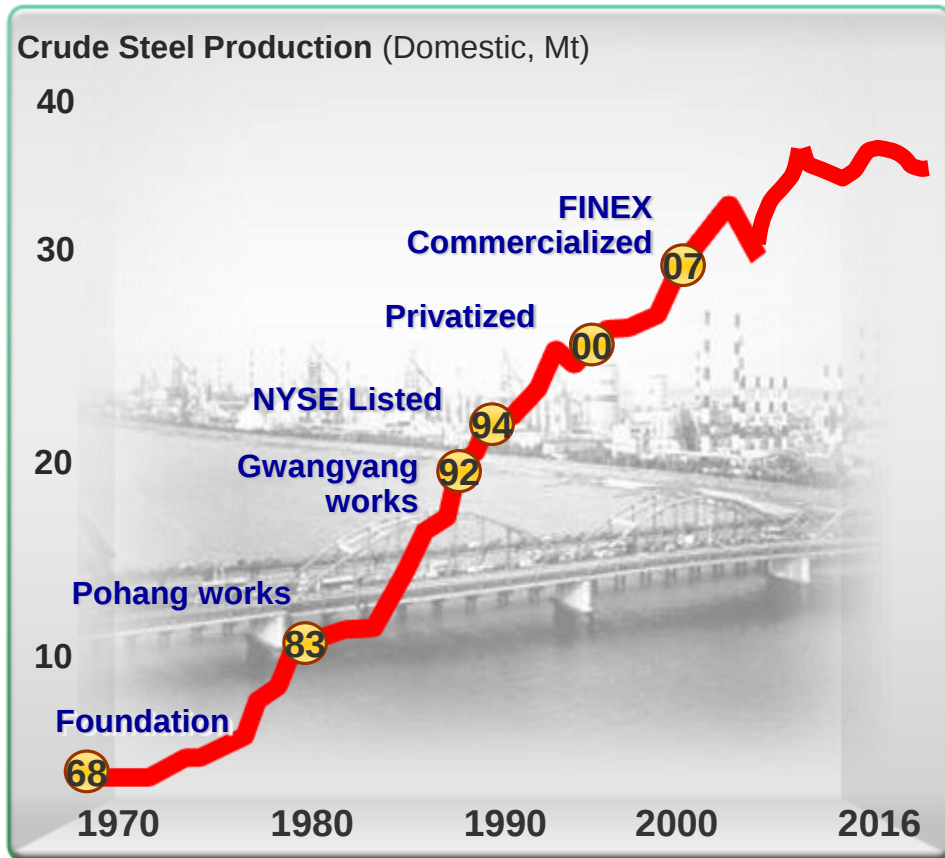
GHG Reduction Activities of POSCO

- I. Overview of POSCO**
- II. Reduction Target for Korea and Steel Industry**
- III. Reduciton Activities of POSCO**
- IV. Summary**

2017. 11. 20

I. Overview of POSCO

- POSCO, the history of Korean steel industry built from literally "NOTHING"



About 2016

- **Steel Production** : Top 5th (37.5 Mt)
- **Product** : Hot & Cold Coil, Stainless steel
- **Employees** : 17 thousand persons

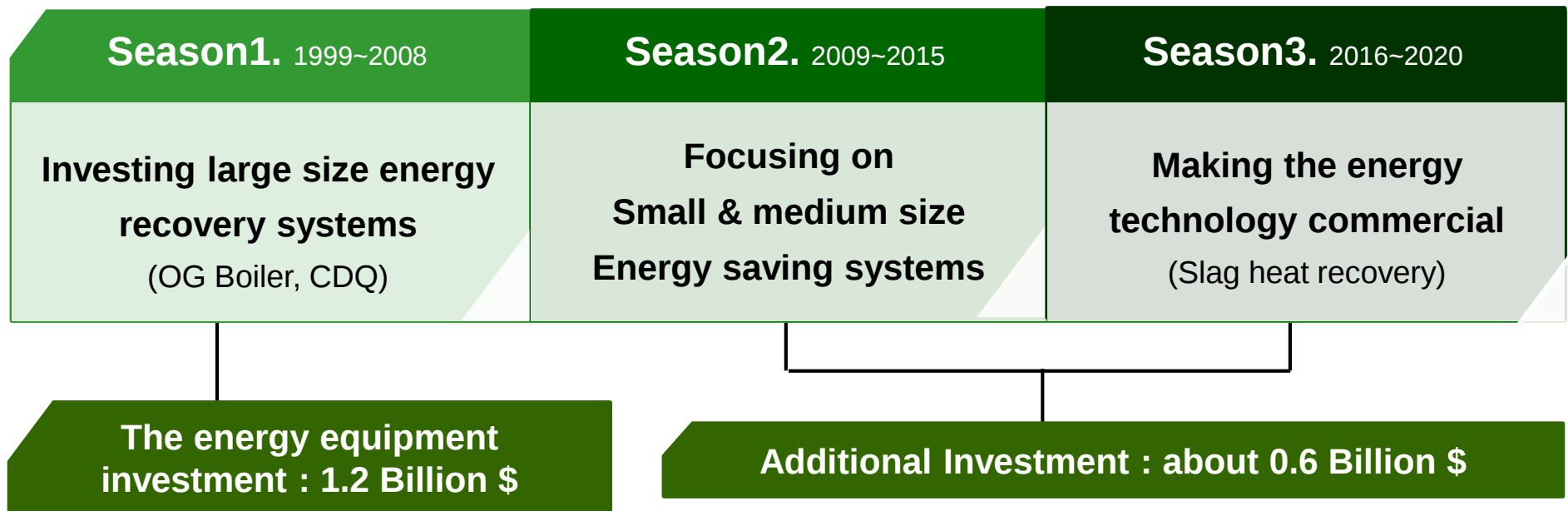
Evaluations

- **Global top 100 company** by DAVOS
- **Best company for 12 yrs** by Dow Jones
- **Best company in steelmakers** by *WSD

*WSD : World steel dynamics

I. Overview of POSCO

- POSCO, the biggest energy consumer and GHG emitter in Korea
- Long term policy to reduce energy consumption and GHG emission



II. Reduction Target of Korea and Steel Industry

■ Reduction target by 2030

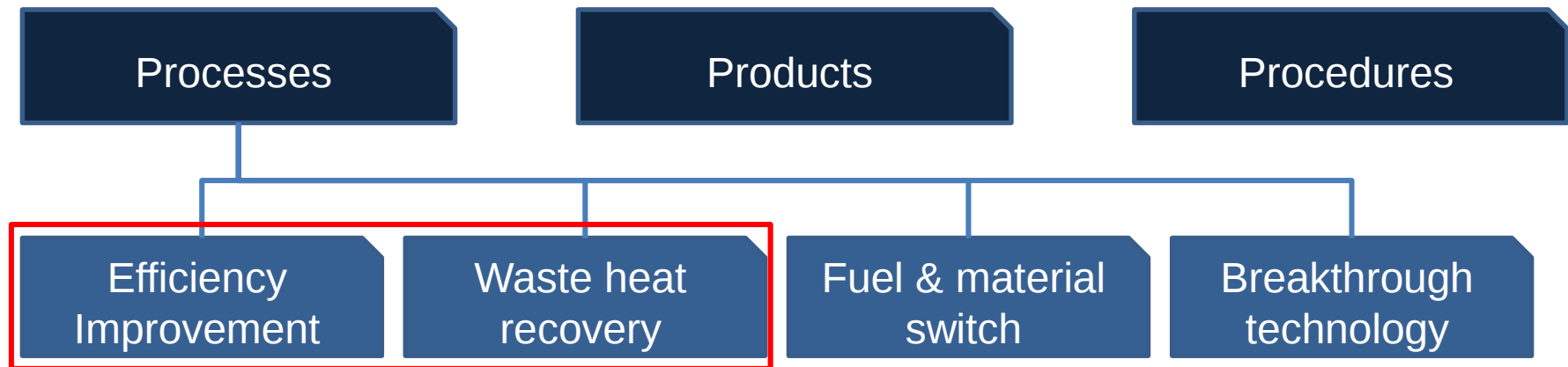
- Nation: reducing GHG emissions 37% below BAU level
- Steel industry: reducing emissions 11.1% below BAU level
 - Reduction amount is about 17 MtCO₂

■ The key abatement options identified in the steel industry are mainly related to heat recovery and efficiency improvement

Abatement options in steel industry
Energy efficiency improvement
Fuel switch (heavy oil to LNG)
Operational efficiency improvement (e.g. FEMS*)
Waste heat recovery
Waste plastic injection
Breakthrough technologies (e.g. hydrogen reduction)
Steel industry adjustment and upgrade

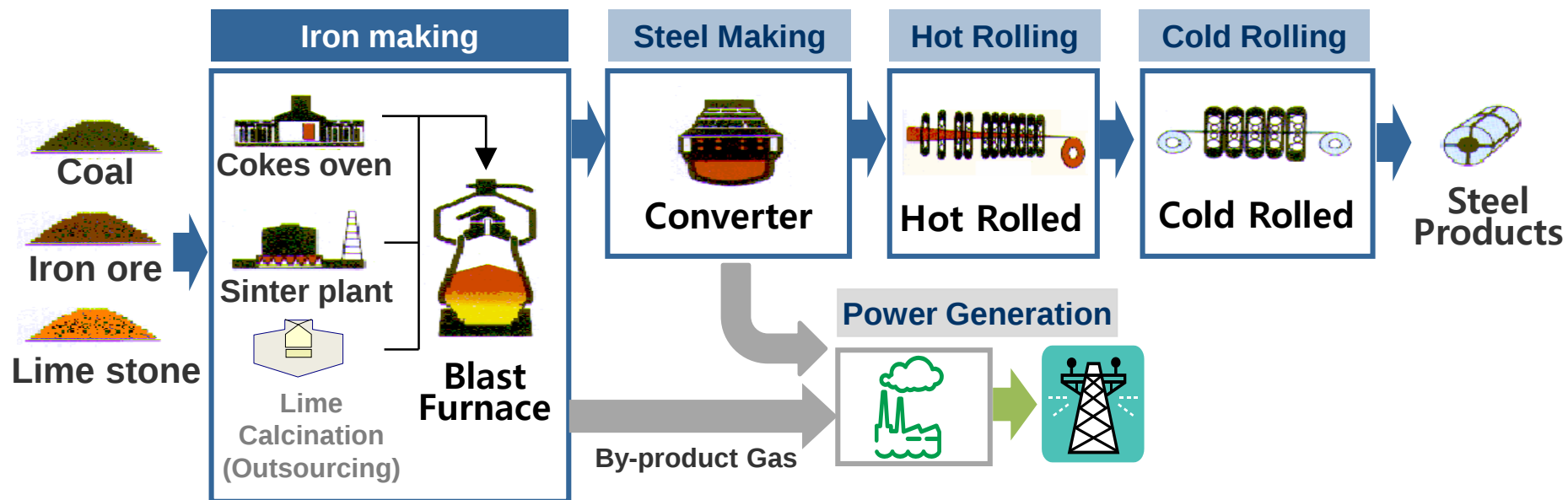
III. Reduction Activities of POSCO

- **Voluntary GHG reduction target for 2020 had been declared in 2010**
 - 9% reduction of CO₂ intensity compared to average CO₂ intensity for base period('07~'09)
 - Target CO₂ intensity is 2.00 tCO₂/tS and the intensity of base period is 2.20 tCO₂/tS
- **The reduction target for 2020 is expecting to achieve in 2017**
- **Reduction activities for GHG reduction target**



III. Reduction Activities of POSCO

■ Energy & heat recovery facilities in iron and steel making porcesses



Process	Iron Making			Steel making (Converter)	Rolling Furnace	Power Plant
	Blast Furnace	Cokes Oven	Sinter Plant			
Recovery Facility	TRT	CDQ	Cooler Boiler	OG Boiler	Recuperator	Heat Exchanger

III. Reduction Activities of POSCO

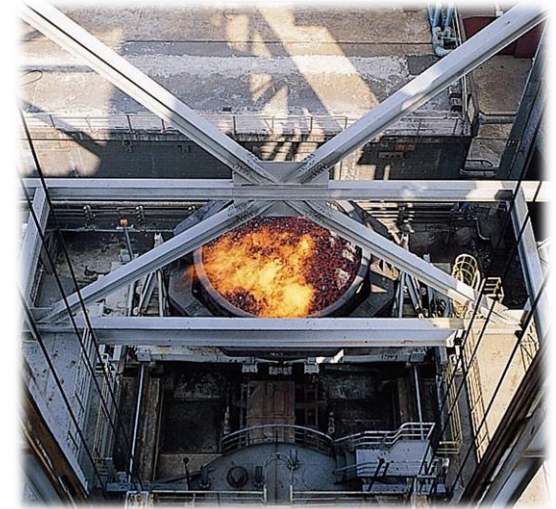
■ Efficiency Improvement

○ Performance Restoration of Energy Recovery Facilities

- Target facilities: CDQs, TRTs, and waste heat boilers
- TRT generation expansion by improving BFG valve control, wear resistance coating, and shorten repairing times in 2016

○ Minimization of waste gas release to atmosphere

- Considerable waste gas was releasing into atmosphere due to the extension of factories and repairing of power plant using waste gas
- Waste gas release was minimized by reconstruction and optimization of pipeline network
- Result in the reduction of 160 ktonCO₂/y



III. Reduction Activities of POSCO

○ Improvement of Combustion Efficiency of Heating Furnaces

- Organized official team in 2012 and implementing the annual improvement projects
- Diagnosed the whole facilities of 19 heating furnaces in 2015
- Enhanced combustion efficiency by controlling the temperature of heating furnaces, raising air temperature for combustion, and reinforcing the materials of heat exchangers in 2016

○ Enhancement of power generation efficiency

- Efficiency for power generation was increased from 37% to 45% by introducing combined cycle power plant for waste gas
- Result in the increasement of 180 GWh/y and reduction of 80 ktCO₂/y.



III. Reduction Activities of POSCO

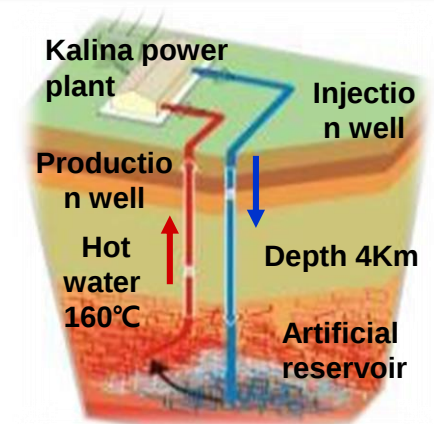
■ Heat recovery

○ Evaporative cooling system

- Skid beam cooling system is substituted to evaporative cooling system in hot rolled process
- Resulted in annually increasement of 300 kt steam, 80 GWh electricity and finally reduction of 38 ktCO₂

○ Low to mid-temperature waste heat power generation

- Developing the Kalina system using lower temperature heat
- features;: lower temperature with higher efficiency compared to existing organic ranking cycle
- 600 KW standard module was installed in the sintering plant and developed through performance optimization and long-term operational test.
- applied to Geothermal Power Generation Project in Pohang



III. Summary

- POSCO have made efforts to reduce energy consumption since 1990's.
- To accelerate the GHG reduction, POSCO built the voluntary reduction target for 2020 in 2010. The voluntary target is expecting to achieve in 2017 due to the various reduction activities including efficiency improvement and heat recovery.
- POSCO plans to build the new internal reduction target and roadmap to cope with the national reduction roadmap for 2030. However, it will be more tough to achieve the new reduction target because almost reduction potential has been exhausted.
- Therefore, POSCO is making lots of efforts to develop innovative technologies and measures.