

## South Korea's Way of Fighting Climate Change with Green Energy

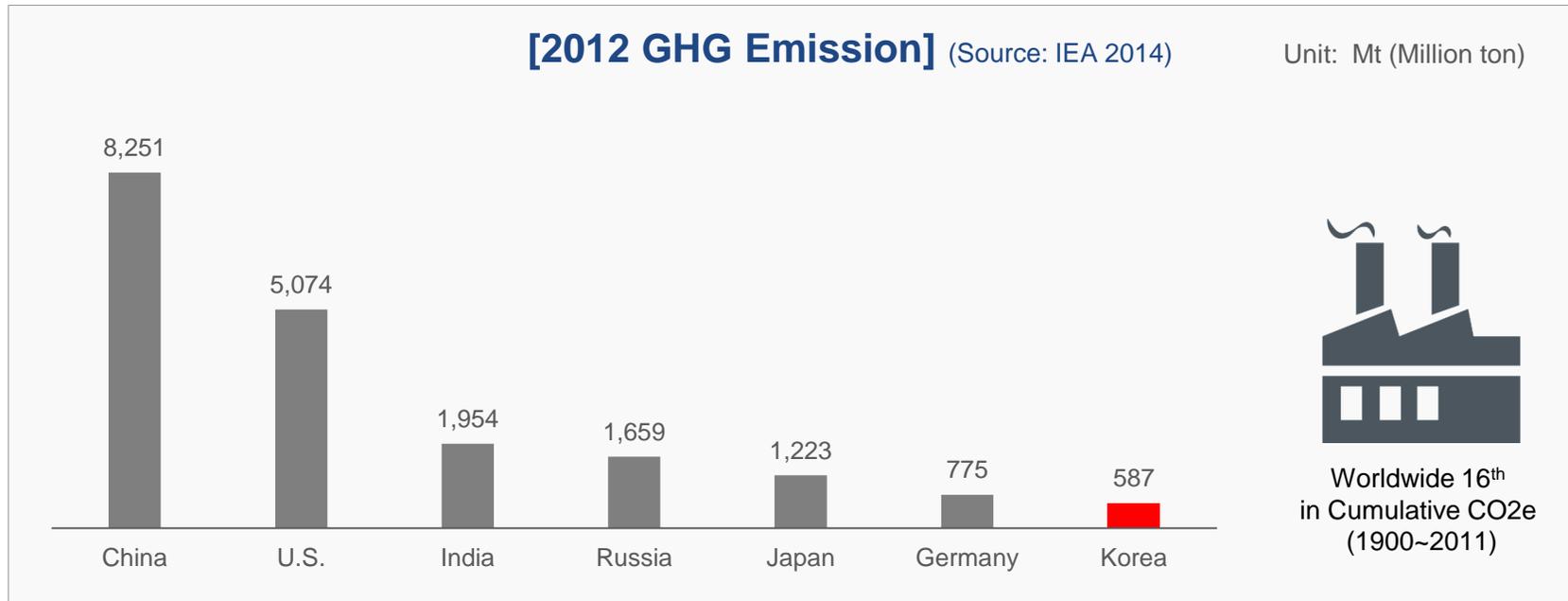
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# I. South Korea's Climate Change Policy

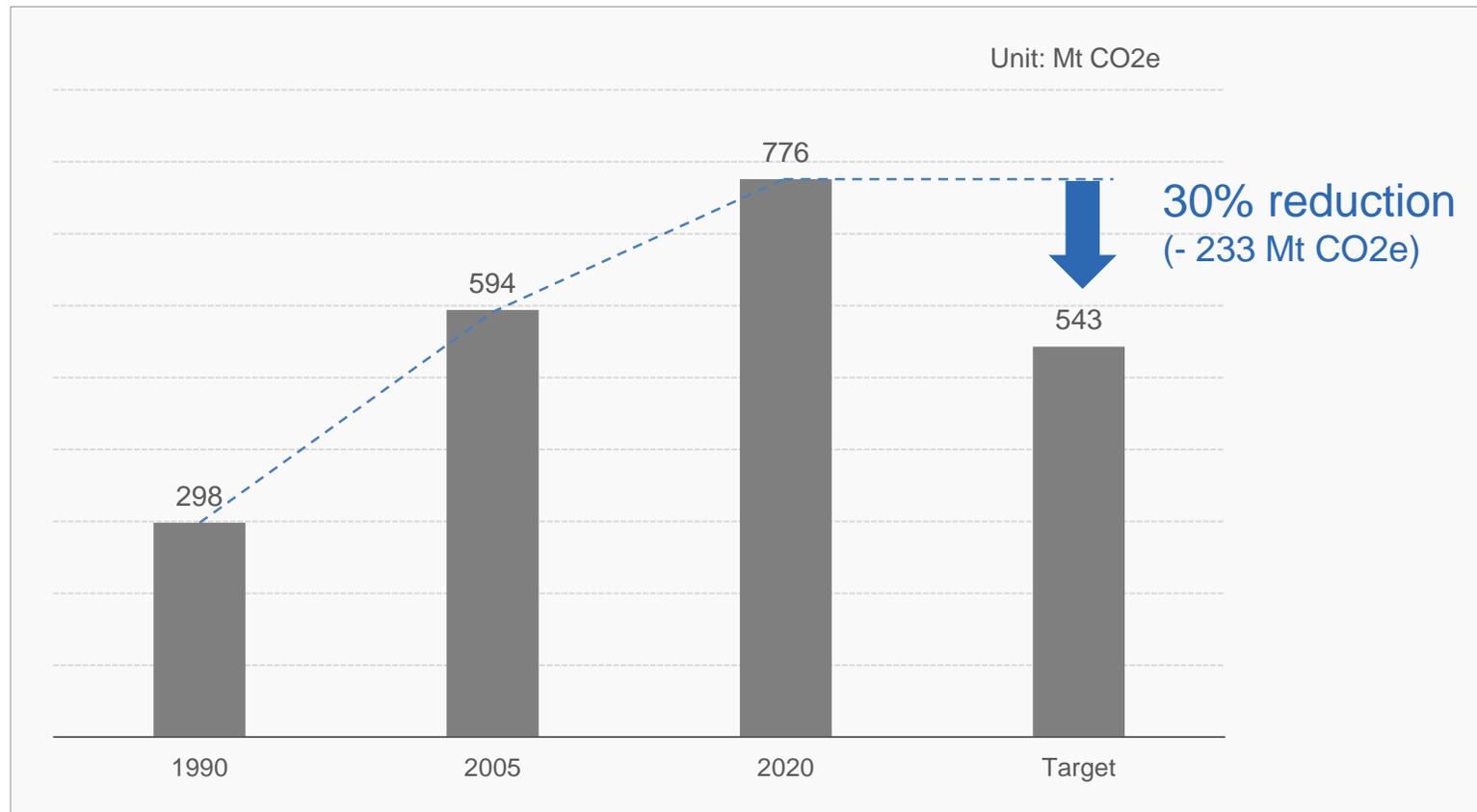
# 1. South Korea's Worldwide Position in GHG Emissions



- Economic Size: 12<sup>th</sup> in GDP and 6<sup>th</sup> in Volume of Exports (2016)
- Hosting relevant international organization secretariats: Global Green Growth Institute (2010), Green Climate Fund (2012)
- Producing leaders of relevant international organizations: Secretary General of the UN (United Nations), Chairman of the IPCC (Intergovernmental Panel on Climate Change)

## 2. Self-initiated Establishment of a 30% Reduction Target Against the 2020 BAU Emissions

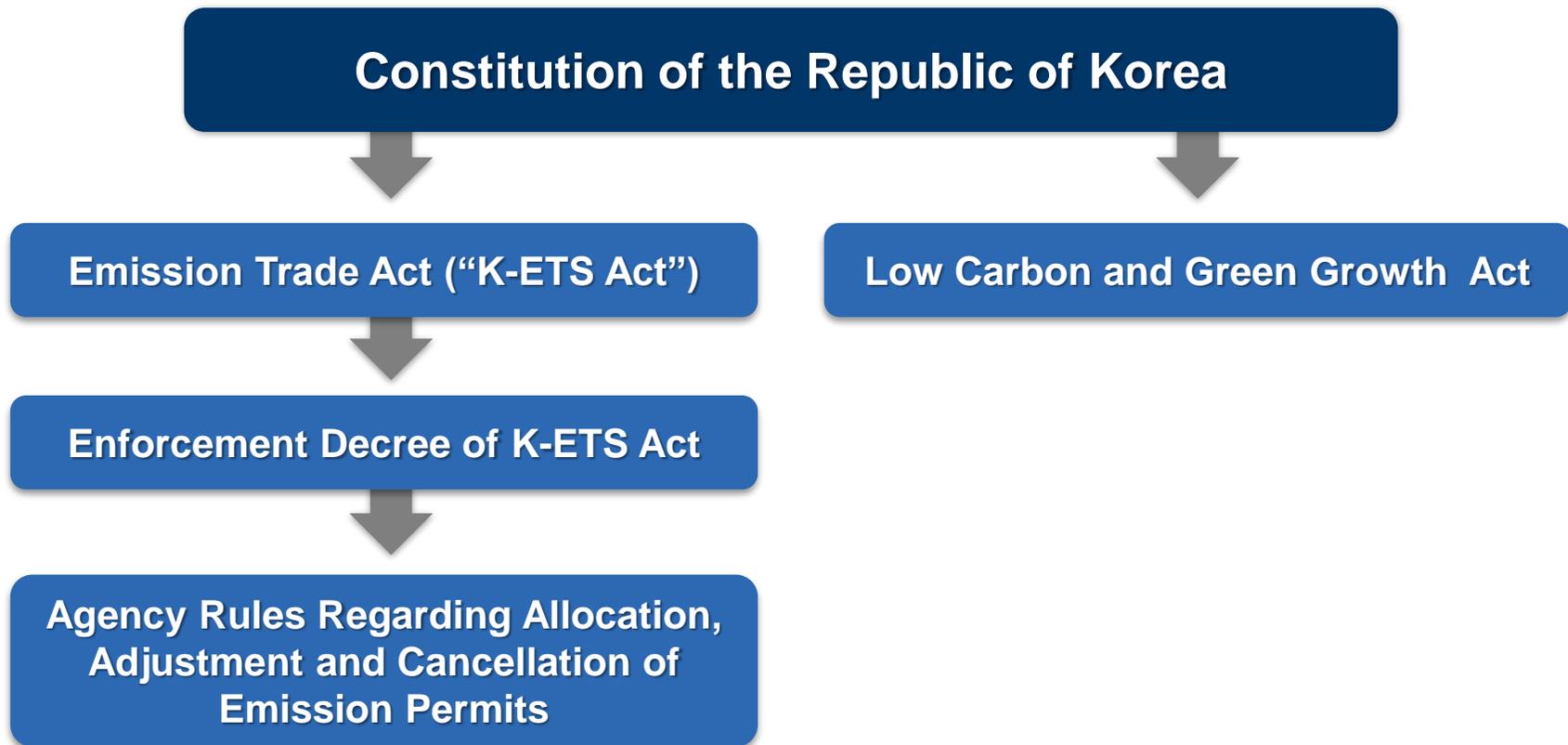
- Under the Kyoto Protocol Framework, with COP 15, the Korean Government established an initiative targeting “30% reduction against the 2020 BAU (Business As Usual) emissions” (November 2009)



### 3. The Adoption of Diverse Policies for GHG Emissions Reduction

- In order to accomplish the 2030 reduction target, South Korea is actively enforcing diverse policies for GHG emissions reduction: (i) TMS, (ii) K-ETS and (iii) Green energy policies.
- **The Target Management System for GHG and Energy (“TMS”) (2011~)**
  - A conventional ‘command and control regulation’ under the Low Carbon and Green Growth Act.
  - The system has been introduced to establish MRV (Monitoring, Reporting, and Verification) prior to the introduction of Korean ETS.
- **Emission Trading Scheme (“K-ETS”) Under the Emission Trade Act (2015~)**
  - Among the countries with no duty to reduce emissions under Kyoto Protocol Framework, South Korea was the first country to operate a national level emission trade market, starting in 2015.
  - **Coverage:** Business entities with an annual average GHG emissions of 125,000 tons or more, or business entities that have a place of business with an annual average GHG emissions of 25,000 tons or more have participated (in 2014, emission permits have been allocated to 525 business entities in 23 sectors).

## 4. Korean ETS – (1) Relevant Laws and Rules



## 4. Korean ETS – (2) Covered Entity and Allocation

### Coverage & Sectors (§8)

- 67% of South Korea’s national emissions
- 23 sub-sectors (including steel, cement, petro-chemistry, refinery, power, buildings, etc)
- 525 liable entities in Phase I

### Phases & Allocation (§12)



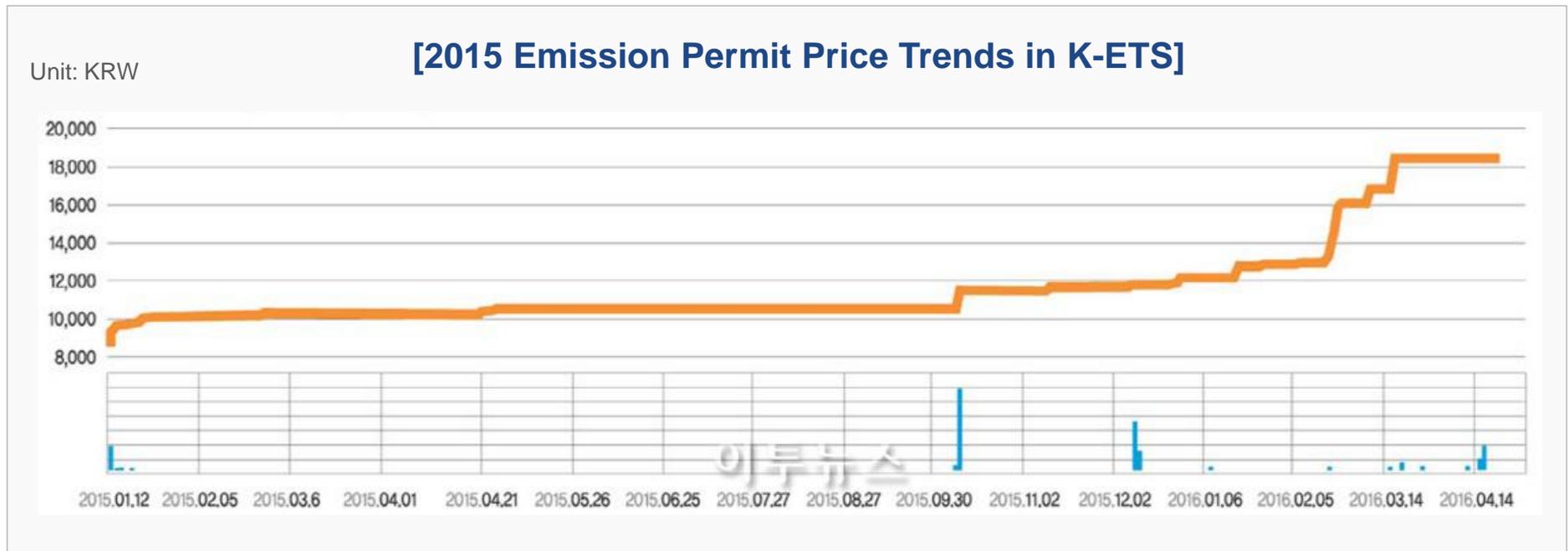
### Enforcement (§33)

- Korean Allowance Unit (“KAU”): 543 Mt\* in 2015 / 1,690 Mt in 1<sup>st</sup> Phase  
\* Mt: Million ton
- Penalty not exceeding 3 times the average market price of allowances of the given compliance year or KRW 10,000/t CO<sub>2</sub>e (approx. \$ 9)

## 4. Korean ETS – (3) Assessment of Enforcement

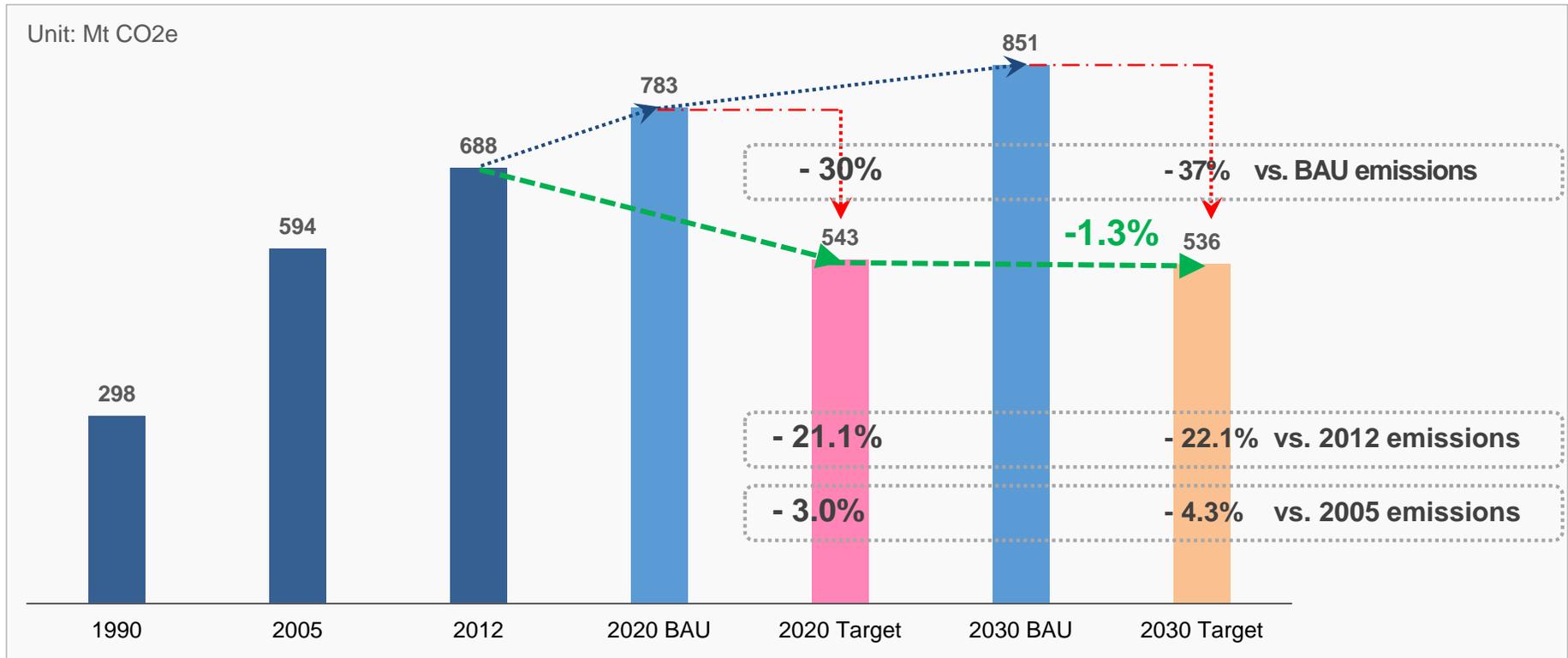
### • 2015 - 2017 enforcement results

- **Volume of Transactions** (Jan. 2015 ~ Mar. 2017): an emission amount of approx. 21.22 Mt has been traded
- **Emission Permit Price**: approx. KRW 10,000 (≒ \$ 9) in 2015; reached approx. KRW 26,500 (≒ \$ 23) in Feb. 2017, but recently maintaining approx. KRW 21,000 (≒ \$ 19)



## II. South Korea's Countermeasures to Achieve Reduction Target

# 1. South Korea's Announcement of Its NDC



- In light of the new climate change framework, South Korea announced in June 2015 that it would reduce GHG emissions by 37% against 2030 BAU emissions.
  - (i) Domestic Reductions (Reduction Within South Korea): 219 Mt CO<sub>2</sub>e (25.7% of the 37%, only the reduction activities carried out in South Korea are available) ⇒ Expected 2030 domestic GHG emissions: 632 Mt CO<sub>2</sub>e [89 Mt increase from expected 2020 domestic GHG emissions target (543 Mt)]
  - (ii) International Offsets (Reduction Outside of South Korea): 96 Mt CO<sub>2</sub>e (11.3% of the 37%, the purchase of international emission permits and the reduction activities carried out abroad are available)

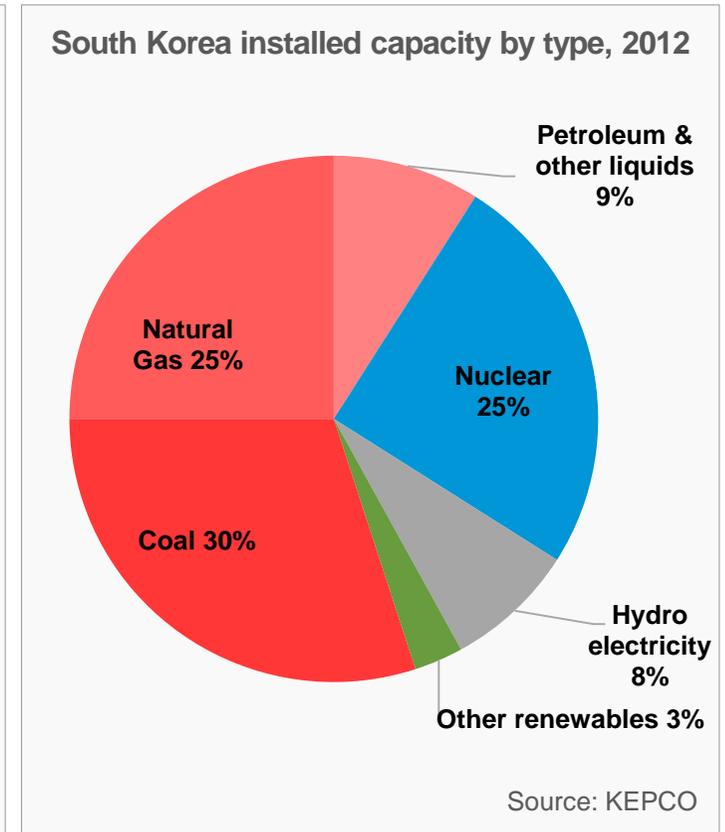
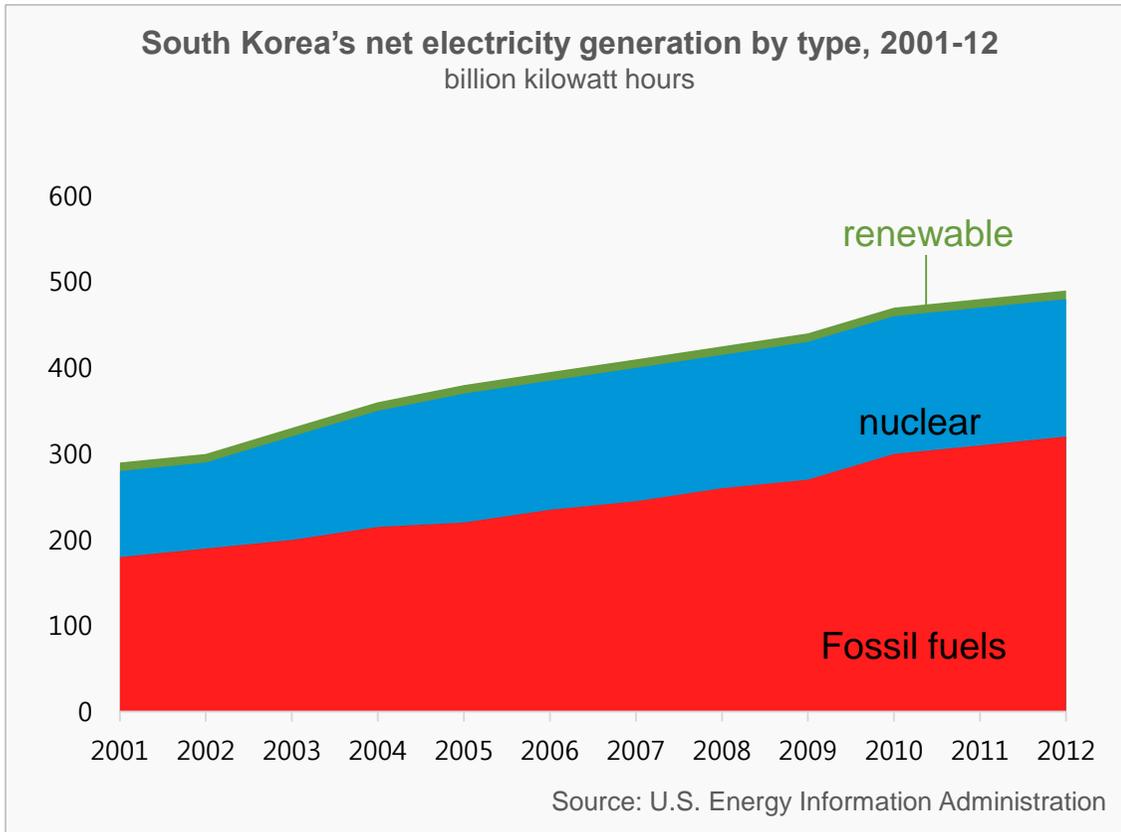
## 2. Countermeasures to Achieve Reduction Target Under the New Climate Change Framework

[South Korea Major GHG Emitters (2014)] (Source: GHG Inventory and Research Center)

Rank	Company	Sector	Emissions (CO2e)
1	POSCO	Steel	75,788,901
2	Korea South Eastern Power	Power Generation	56,504,496
3	Korea East West Power	Power Generation	38,383,445
4	Korea Midland Power	Power Generation	37,503,486
5	Korea Southern Power	Power Generation	36,079,816
6	Korea Western Power	Power Generation	34,720,751
7	Hyundai Steel	Steel	18,802,293
8	Hyundai Green Power	Power Generation	12,164,959
9	Posco Energy	Power Generation	12,006,785
10	Ssangyong Cement	Cement	11,721,698
11	GS Caltex	Oil Refinery	8,525,204
12	SK Energy	Oil Refinery	7,736,031
13	LG Display	Semiconductor, Display	7,536,745
14	S-Oil	Oil Refinery	7,433,460
15	LG Chem	Petrochem	7,063,768
16	Dongyang Cement	Cement	6,855,924
17	Samsung Electronics	Semiconductor, Display	6,775,019

Power sector emissions account for approx. 35% of total GHG emissions, among which 77% is from coal power generation.

## 2. Countermeasures to Achieve Reduction Target Under the New Climate Change Framework (continued)



- It is more difficult for South Korea to achieve the 2030 reduction target.
  - We need to understand power industry and policy to address climate change issues in South Korea.
  - Energy mix of South Korea is inconsistent with global market trends in many ways. For example, the portion of fossil fuel will increase continuously and the portion of new/renewable energy has been very low for a long time.

## 2. Countermeasures to Achieve Reduction Target Under the New Climate Change Framework (continued)

- In order to accomplish the 2030 reduction target, thus, South Korea needs to adopt and enforce strong and effective policies, including:
  - 1) The need for an improved K-ETS
    - Need for improvement on the K-ETS
    - Proposed alternatives: (i) stimulating the K-ETS market by allowing third parties' early market participation, and (ii) measures to limit excessive governmental interference on the K-ETS market.
  - 2) The need for introduction of a new policy for GHG emissions reduction
    - There are strong arguments for the need of additional policies in order to accomplish the 2030 reduction target.
    - In this context, South Korea will aggressively push ahead with renewable energy policy that contributes to reducing GHG emissions.

# III. South Korea's Green Energy Policy

# 1. Korea's Green Energy Policy– Framework



Source: <http://www.energynewbiz.or.kr/main>

# 1. Korea's Green Energy Policy– Framework

<b>Industry Area</b>	<ul style="list-style-type: none"><li>▪ <b>Element</b> – automobile (Electric/Hydro), renewable energy, ESS, smart meter, IoT, energy efficiency</li><li>▪ <b>System</b> – green energy town, energy-independent island, smart grid, smart city</li></ul>	 
<b>Policy Target</b>	<ul style="list-style-type: none"><li>▪ Aggressive and fundamental energy reforms</li><li>▪ Technology development and creating early market</li><li>▪ Intensive support for green energy industry to expand market</li></ul>	
<b>Required Actions</b>	<ul style="list-style-type: none"><li>▪ Remove entry barrier, support for new energy projects</li><li>▪ Expanding renewable energy</li></ul>	

## 2. Korea's Green Energy Policy– History & Accomplishments

### Key Items

Item	Regulation-Easing and Supporting Measures	Market Expansion
<b>Solar Energy</b> 	<ul style="list-style-type: none"> <li>Grant REC to solar energy for self-consumption (May 2016)</li> </ul>	<ul style="list-style-type: none"> <li>The world's most efficient module released (Company L, 19.5%)</li> <li>Ranked 7th in new capacity installation (1GW, 2015)</li> </ul>
<b>Energy Storage System</b> 	<ul style="list-style-type: none"> <li>Permit sales of ESS-stored power to KPX (Apr 2016)</li> </ul>	<ul style="list-style-type: none"> <li>Achieved the world's fastest charging-discharging speed (Company D)</li> <li>Largest ESS investment globally (KEPCO, KRW 600 billion)</li> </ul>
<b>Energy Prosumer</b> 	<ul style="list-style-type: none"> <li>Permit inter-prosumer electricity trade (Feb 2016)</li> </ul>	<ul style="list-style-type: none"> <li>Expanded inter-prosumer trades</li> </ul>
<b>Electric Vehicle</b> 	<ul style="list-style-type: none"> <li>Subsidize electric vehicle purchase (2013-)</li> <li>Mandate public entities to purchase electric vehicles (2015)</li> </ul>	<ul style="list-style-type: none"> <li>Exported 20,000+ electric vehicles (Mar 2016.)</li> </ul>

## 2. Korea's Green Energy Policy– History & Accomplishments

### Energy Integration System

Item	Regulation-Easing and Supporting Measures	Market Expansion
<b>Green Energy Town</b>	<ul style="list-style-type: none"> <li>• Trial projects in three towns including Hongcheon (May 2014.)</li> </ul>	<ul style="list-style-type: none"> <li>• Working on selection on 19 towns (targeting 2017)</li> </ul>
<b>Zero-Energy Building</b> 	<ul style="list-style-type: none"> <li>• Recommend zero-energy building construction to public entities (2015)</li> <li>• Lay grounds for certification system (Jan 2016)</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration complex created in Nowon-gu, Seoul</li> <li>• Trial projects implemented per height of building</li> </ul>
<b>Energy Independence</b>	<ul style="list-style-type: none"> <li>• Permit private renewable energy generation in archipelagic regions (Apr 2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration complex created in Gashido and Gapado Islands</li> <li>• SPC established for Uleungdo for energy independence (Sep 2015)</li> </ul>

## 2. Korea's Green Energy Policy– History & Accomplishments

Substantial progress, but more investment needed to establish infrastructure

**Private  
Companies**

**Investment in new energy projects neither aggressive nor sufficient**

*“Hydro or electric... automotive companies are at crossroads”  
(Chosun Daily, Sep 2016)*

**Public  
Entities**

**Putting less priority to green energy projects than conventional sectors, leading to sluggish investment**

**Electric  
Vehicles**

**Systematic and infrastructural supports need improvement**

*“To nurture electric vehicles, the key lies in infrastructure development”  
(Economy Chosun, Sep 2016)*

### 3. Korea's Green Energy Policy – Future Pathways

#### (1) Renewable energy: Promote KRW 30 billion investment by raising mandatory RPS ratio

- **Goal: Develop renewable energy into key industry driver**
  - Replace 26 coal power plants (500MW per each plant) with renewable energy by 2020

<b>Deregulation</b>	<ul style="list-style-type: none"><li>• Unconditionally permit connection to power network to small-sized solar or wind power plants</li><li>• Expand solar power offset schemes for large buildings</li></ul>
<b>Support</b>	<ul style="list-style-type: none"><li>• Promote KRW 8.5 billion investment by raising mandatory RPS rate</li><li>• Promote solar/wind power projects to replace 5 coal power plants (total 2.3GW)</li><li>• Unconditionally permit trading of extra solar power generated for self-consumption</li></ul>
<b>Overseas Expansion</b>	<ul style="list-style-type: none"><li>• Develop Renewable energy project to address electricity shortfall in emerging economies<ul style="list-style-type: none"><li>✓ Solar power project in Min Kin Town, Myanmar (USD 3.35 million)</li><li>✓ Solar power and ESS projects in Fiji (USD 10 million)</li></ul></li></ul>

### 3. Korea's Green Energy Policy – Future Pathways

**(2) ESS: Price discounts for 10 years; Permit ESS trading to promote investment of KRW 40 billion**

- Provide extensive support to both ESS-producing companies and ESS-consuming companies

<b>Deregulation</b>	<ul style="list-style-type: none"><li>• Permit sale of ESS-stored electricity to general consumers</li></ul>
<b>Support</b>	<ul style="list-style-type: none"><li>• Discount period will be extended for Peak-Saving ESS Energy Plans</li><li>• ESS at solar power plants will be given additional RECs</li><li>• Expand ESS distribution to government and public entities</li><li>• Expand renewable + ESS schemes in archipelagic regions.</li></ul>
<b>Overseas Expansion</b>	<ul style="list-style-type: none"><li>• Provide solutions for power shortage combined with renewable energy for emerging nations</li></ul> <p>- Export: USD 870 mil. (2017) ➡ USD 3.2 bil (2020)</p>

### 3. Korea's Green Energy Policy – Future Pathways

#### (3) Distribute smart meters to the entire electricity user base by 2022 ☞ KRW 2 trillion investment

- Combine smart meters with IoT to maximize applicability and efficiency

<b>Distribution</b>	<ul style="list-style-type: none"><li>• Implement AMI-based smart grids nationwide<ul style="list-style-type: none"><li>✓ 20%(2016) ☞ 100%(2022, target)</li></ul></li><li>• Distribute to 100% of electricity users by 2022 (investing KRW 2 trillion)</li></ul>
<b>Support</b>	<ul style="list-style-type: none"><li>• Expand time-based price schemes in line with AMI distribution</li><li>• Promote release and use of electricity consumption information</li><li>• Develop systems for wired/wireless communications, security, and encryption</li></ul>
<b>Overseas Expansion</b>	<ul style="list-style-type: none"><li>• Expand into emerging economies<ul style="list-style-type: none"><li>✓ Uzbekistan: AMI distribution projects to prevent electricity theft (2015~)</li><li>✓ AMI projects in Hormuz, Iran (Aug~Dec 2016)</li></ul></li></ul>

### 3. Korea's Green Energy Policy – Future Pathways

#### (4) Electric/Hydro Vehicles

	Vehicle	Charging Station	Incentive	Distribution/Export
Electric Vehicles	Developing vehicles with double driving range (2020)	<p>Construct more charging stations to address inconvenience</p> <p>Provide nationwide discount for charging (50% for base price)</p>	<p>Provide incentives to purchase</p> <ul style="list-style-type: none"> <li>- Higher subsidies, exempting purchase tax</li> </ul> <p>Provide incentives to drive</p>	<p>Local Distribution 6,000 units (2015)</p> <p>☞ Targeting 260,000 units by 2020</p> <p>Export 12,000 units (2015)</p> <p>☞ Targeting 214,000 units by 2020</p>
Hydro Automobiles	Expand downtown bus pilot projects to cover taxis and other public transportation	<p>Utilize hydrogen by-product</p> <p>Ease construction regulation</p>	<ul style="list-style-type: none"> <li>- Lower toll fees</li> <li>- Discount for public parking</li> </ul>	

## 4. New President's Energy Policies

- “South Korea’s freshly inaugurated President Moon Jae-in is expected to push forward renewable energy policies to tackle concerns over pollution...”
- “Moon is likely to scale down coal and nuclear power dependency as pledged during his campaign. His camp had said the government would no longer build nuclear reactors and thermal power plants.”
- “Moon said he would aim to raise the proportion of electricity generated from renewable energy from 1.1 percent to 20 percent by 2030 -- nearly double the target of 11.7 percent proposed by the previous government.”
- “Moon had also pledged to boost new registrations of electric cars as a measure to reduce air pollution, while aiming to ban diesel vehicle registrations by 2030.”



Source: <http://www.koreaherald.com/view.php?ud=20170510000794>



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# Thank you

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