International Mitigation Program of Korea

Cooperation with participating countries
The Korea Energy Agency is a public entity under the Ministry of Trade, Industry and Energy, aiming to reduce GHG emissions and improve quality of life by promoting rational energy use and dissemination of new and renewable energy.

**Main Role**

**01** Improve energy efficiency

**02** Disseminate new and renewable energy

**03** Respond to climate change

**04** Energy welfare

**Budget** 1.44 billion dollars (1.987 trillion KRW)

**Founded** July 4, 1980 (Article 45, *Energy Use Rationalization Act*)

**Type** Quasi-governmental organization
Climate Change

Pictures on Climate Change

World of Change

Flood in Gangnam, Seoul (2022)

Forecast on farmland of Apple in Korea
(Rural Development Administration)

https://earthobservatory.nasa.gov/world-of-change
# Paris Agreement & NDC

## UNFCCC

<table>
<thead>
<tr>
<th>Kyoto Protocol</th>
<th>Paris Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Period:</strong> 2008-2012</td>
<td><strong>Post Kyoto:</strong> 2021~</td>
</tr>
<tr>
<td><strong>2nd Period:</strong> 2013-2020</td>
<td></td>
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<tr>
<td><strong>GHG Emission Reduction</strong></td>
<td><strong>Goal</strong></td>
</tr>
<tr>
<td><strong>Mainly GHG Emission Reduction</strong></td>
<td><strong>Scope</strong></td>
</tr>
<tr>
<td><strong>Developed countries (Annex I)</strong></td>
<td><strong>Countries Subject to</strong></td>
</tr>
<tr>
<td><strong>Top-Down Emission, Reduction Target</strong></td>
<td><strong>Targeting Methods</strong></td>
</tr>
<tr>
<td><strong>No comment</strong></td>
<td><strong>Targeting Principle</strong></td>
</tr>
<tr>
<td><strong>Punitive</strong></td>
<td></td>
</tr>
<tr>
<td>(Deducts 1.3 times of non-achievements in next period's allocation)</td>
<td><strong>Penalties</strong></td>
</tr>
<tr>
<td><strong>Expiry period</strong></td>
<td><strong>Implantation Period</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Every country</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Bottom-Up, Nationally determined</strong></td>
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<tr>
<td></td>
<td><strong>Successive NDC will represent progression beyond the current NDC</strong></td>
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<tr>
<td></td>
<td><strong>Non-punitive</strong></td>
</tr>
<tr>
<td></td>
<td><strong>No expiry (5 Year cycle)</strong></td>
</tr>
</tbody>
</table>
Paris Agreement & NDC

Goal (Article 2)

- Mitigation
- Adaptation
- Finance

General Responsibility (Article 3), Ambitious effort, progression over time

NDC: Nationally Determined Contribution

- Mitigation (Article 4)
- Adaptation (Article 7)
- Finance (Article 9)
- Tech. Transfer (Article 10)
- Capacity Building (Article 11)
- Trans-parency (Article 13)

Global StockTake (Article 14): Assess the collective progress towards achieving the purpose of this Agreement and its long-term goals every 5 years

<table>
<thead>
<tr>
<th>Unit (Year, %, MtCO2eq)</th>
<th>Korea</th>
<th>Vietnam</th>
<th>Indonesia</th>
<th>Thailand</th>
<th>Philippines</th>
<th>Bangladesh</th>
<th>Uzbekistan</th>
<th>UAE</th>
<th>Mongolia</th>
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</thead>
<tbody>
<tr>
<td><strong>Recent Emission</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(MtCO2eq)</td>
<td>2020</td>
<td>656.2</td>
<td>458.1</td>
<td>1,475.8</td>
<td>451.4</td>
<td>227.5</td>
<td>224.4</td>
<td>184.2</td>
<td>249.9</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Base Year</td>
<td>2018</td>
<td>BAU</td>
<td>BAU</td>
<td>BAU</td>
<td>BAU (Cumulative)</td>
<td>BAU</td>
<td>2010</td>
<td>2019</td>
<td>BAU</td>
</tr>
<tr>
<td>Emission in Base Year</td>
<td></td>
<td>727.6</td>
<td>927.9</td>
<td>2,869.0</td>
<td>3,340.3</td>
<td>409.4</td>
<td>187.1</td>
<td>225</td>
<td>74.3</td>
</tr>
<tr>
<td>(BAU Year)</td>
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<tr>
<td><strong>Target</strong></td>
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<td></td>
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<tr>
<td>Year</td>
<td>2030</td>
<td>2030</td>
<td>2030</td>
<td>2030</td>
<td>2030-2030</td>
<td>2030</td>
<td>2030</td>
<td>2030</td>
<td>2030</td>
</tr>
<tr>
<td>Emission in Target Year</td>
<td></td>
<td>436.6</td>
<td>524.4</td>
<td>1,629.6</td>
<td>333.0</td>
<td>835.1</td>
<td>319.9</td>
<td>-</td>
<td>182</td>
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<tr>
<td><strong>Mitigation</strong></td>
<td></td>
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<tr>
<td>(Target Emission Reduction)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conditional</td>
<td>-</td>
<td>27.70%</td>
<td>11.31%</td>
<td>10.00%</td>
<td>2.71%</td>
<td>15.12%</td>
<td>-</td>
<td>-</td>
<td>4.50%</td>
</tr>
<tr>
<td>Unconditional</td>
<td>40.00%</td>
<td>15.80%</td>
<td>31.89%</td>
<td>30.60%</td>
<td>72.29%</td>
<td>6.73%</td>
<td>35.00%</td>
<td>19.00%</td>
<td>22.70%</td>
</tr>
<tr>
<td>Maximum</td>
<td>40.00%</td>
<td>4350%</td>
<td>43.20%</td>
<td>40.00%</td>
<td>75.00%</td>
<td>21.85%</td>
<td>35.00%</td>
<td>19.00%</td>
<td>2720-4490%</td>
</tr>
<tr>
<td>Net-Zero</td>
<td>2050</td>
<td>2050</td>
<td>2060</td>
<td>2065</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2050</td>
<td>-</td>
</tr>
</tbody>
</table>

* An optional component on forestry was included that would push total GHG emissions reduction to 44.9% by 2030
* The Republic of Korea plans to use voluntary cooperation under Article 6 of the Paris Agreement as a supplementary measure to achieve its NDC(5.15%, 37.5 MtCO2eq)
International Mitigation Program

International cooperation program that Korean government promotes GHG emission reduction activities under the A6 of Paris Agreement using the government budget for implementation of emission reduction projects, achieving NDC goals and sustainable development of host countries.

A 6.2 Cooperative Approach (led by countries)

Design & Finance Activities

Start GHG ER Activities

Corresponding Adjustment

Transfer ITMO

A 6.4 Mechanism (led by UNFCCC)

Implementing NDC of Participating Countries and Sustainable Development of Host countries

* Corresponding Adjustment: Preventing participating countries from using the same ITMO for NDC (Double-Counting)

** ITMO: Internationally Transferred Mitigation Output

Overseas
Efforts on achieving NDC goals with international cooperation using Article 6 of Paris Agreement and continuous negotiation

Korea
Voluntary cooperation under Article 6 of the Paris Agreement to achieve its NDC (37.5 MtCO₂-eq by 2030)
International Mitigation Program of Korea

1. Implementation of the Program
   - Technology, capital investment
   - ITMO for NDC
   - ROK: Korean companies
   - Stakeholders: Host Country

2. Going to NET-ZERO with socio-economic benefit
   - Achieve NDC
   - ROK + HOST Country
   - Contribute to National NDC (37 MtCO₂-eq)
   - Conditional Emission Reduction Target

- Mutual understanding
- The opportunity of business with technology transfer and investment
- Contribution to sustainable development of host country
- Job creation and Local Community Development
- Improvement on low carbon, clean and healthy Environment
- Improvement on 17 SDGs applicable
# International Mitigation Program of Korea

## Traditional (As-Is)
- **Framework First**
- **Only Government Officials in the beginning**
- **Time Consuming**
- **Application error inevitable**
- **Follower in A6 market**

## Bilateral Agreement
Contains the philosophy for the cooperation including scope, important hierarchy, finance and etc.

## Innovative (To-Be)
- **Activities-Framework at the same time**
- **Government Officials and Participants together from the beginning**
- **Shorten Time**
- **Application error minimized**
- **Leader in A6 market**

## 6.2 Framework
Define the hierarchy on decision making, role and authorities, qualification, standard, procedures and others

## Working Group
Prepare standard, procedure, methodologies, forms including other documents with supporting joint committee

## Operationalization of the Scheme
Activity participants apply to the scheme, third party entity validates and verifies the activities, committee registers the activities and issues the ITMO

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We need “learning by doing” and minimize error would happen through demonstration projects
03 Practical Case of Activities

Zero / Low Carbon Brick

Carbon Intensive

Labor Intensive
Manufacture

Poor Quality

Zero / Low Carbon

Mechanized
Manufacture

Good / Uniform
Quality
Waste Heat Recovery in Industry

03 Practical Case of Activities

Waste Heat Recovery Generation (Existing Case in Korea)

01 WHRG Project
- Construction Period: 26 months
- Generation Capacity: 30MWH/H
  (Annual Generation 150,000MWH/H ~ 25% of Total Electricity Usage)

02 Major Facilities
- Steam Turbine & Generator: 1 set
- Boiler 5EA (AQC3EA, P/H:2EA), Water Disposal & Cooling Tower, etc.
03 Practical Case of Activities

HFC Recovery

Large GWP GHG emission without Recovery

Recall contaminated or less pure HFCs in the RAC (Refrigeration and air conditioning) field, or recover HFCs that are dumped into the atmosphere during maintenance.

Refining and recovering

Baseline Emission
\[ \text{Baseline Emission} = \{(M1) \times (M2) \times (M3)\} \times \text{sharecondi} \]
\[ Q_{\text{ECV}} = M1 + M2 + M3 \]

PE = Fossilfuel \( (EC_{\text{F}}) \) + Electric \( (Q_{\text{ECV}}) \)

99.0% ≤ Purity < 99.5%

For foaming agents and other raw materials

99.5%↑ Able to recharge cylinder

Use of regenerative refrigerants for various purpose

99.5%↑ Able to recharge cylinder

HFCs

Disposable cylinder

HFCs

HFCs

HFCs
03 Practical Case of Activities

Power to X by Renewable Energy

- Renewable Energy
- Water Electrolysis
- Storage & Transportation
- Hydrogen Vehicle
- Fuel Cell
- Hydrogen Turbine

- Energy Storage System
- Charge Controller
- Floating, Rooftop, Agriculture PV
- Wind, Hydro Power
- Peak Load Shaving
- Meter
- Lower Carbon Grid
- Charging Station
- E-mobility
- Green Hydrogen
03 Practical Case of Activities

Fuel Switch - Biomass

Not limited to GHG emission reduction, considering various aspects

- GENERATION OF EMPLOYMENT, INCOME AND PRODUCTIVE CHAINS
  - Agricultural growth
  - New bio industry
  - More investments in territories
  - New value chains

- SUSTAINABILITY AND CLIMATE CHANGE
  - Less waste and residues
  - Eco-intensive practices
  - More environmental efficiency
  - Replacement of fossil fuels

- FOOD SECURITY
  - More production
  - Less losses
  - Improve safety and quality
  - More food in MKT

- COMPETITIVENESS OF AGRICULTURE AND RURAL AREAS
  - More production
  - Less losses
  - Waste valorization
  - Value addition
Program for mitigation activity by KEA

Government budget will be given to Korean companies but Korean Companies will cooperate various stakeholders of host countries

**ODA**
- Advise and support on policy making, regulation implementation. Capacity building in energy audit, GHG MRV, Demonstrative pilot project, and etc.

**Feasibility**
- Sustainable development, legal/economical/technical possibility in pre-feasibility study, Estimation of GHG ER, standardized baseline, technical specification, environment assessment in feasibility study
- Government provide loan as much as 50% of EPC cost with almost zero interest to Korean companies overseas project, and Korean companies returns back as a credit.
- Rasing Fund to promote the financial techniques and skills for overseas ER project with carbon pricing

**Investment**

**GHG ER Fund**

Share the knowledge and practices for Better Activities in virtuous circle
BP: E-mobility in Cambodia

ODA in 2018

- Pilot PV in Off Grid region
- Survey in feasibility on PV farm business
- e-Mobility concept recognition

ODA in 2019

- Pilot on PV charging e-Mobility
- Feasibility on e-Mobility business
- Design e-Mobility ODA to Indonesia with the experience

e-Mobility Project concept

Demonstration Pilot in 2020 (Next Slide)
BP: E-mobility in Cambodia

Cost share on KEA’s Demonstration Pilot

Government Budget + Private fund ⇒ Business model

Zero-Carbon Tour Model (POPLE Tour)

Ceremony

POPLE Station (Zero-Carbon culture complex)

Rooftop PV

BIPV

Charging Station

Training Room

Café Area

POPLE Scooter

Rewards Point

CO₂ Reduction Credit

CO₂ Credit
BP: E-mobility in Cambodia

Project Concept (Tentative)

- Investment 15m USD
- Re-Investment
- Profit Sharing

- e-Mobility
- Photovoltaics (Solar)
- Battery
- Charging Station

- Investment (4.5m USD)
- GHGs Credit Sharing
- DOE (Designated Operational Entity)
- Reporting

- Republic of Korea
- Bilateral Agreement
- Support Assistance
- Host Country

The expected amount of GHGs reduction (if implemented as planned)
- 2025~2034: 811,970 tCO2 eq.
- 2035~2044: 7,848,006 tCO2 eq.

Methodology of GHGs Reduction Project
- CDM, AMS-III.C Emission reductions by electric and hybrid vehicles (V16.0)

Block-chain based MRV
- Project information and monitoring stored and maintained in block chain system
Technical support and cooperation to improve energy efficiency in Uzbekistan
Implementing pilot project by reviewing the feasibility on installation and operation of pellet manufacturing with not a woody plant in a sustainable way

<table>
<thead>
<tr>
<th>Program</th>
<th>Project Title</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODA</td>
<td>Energy policy consulting support project for Uzbekistan</td>
<td>Energy policy consulting and ODA/NDC project concept development</td>
</tr>
<tr>
<td>Demonstration Pilot</td>
<td>Pellet business using agricultural waste from Uzbekistan</td>
<td>Analysis of waste-to-energy concept, specific technology and amount of GHG ER, sustainable development and etc.</td>
</tr>
<tr>
<td>International mitigation program</td>
<td>GHG emission reduction project for brick factory through fuel switch to pellet using agricultural waste in Uzbekistan</td>
<td>Securing ITMO through implementation of climate technology for GHG ER and monitoring of project in accordance with carbon crediting mechanism</td>
</tr>
</tbody>
</table>
Emission Reduction: A Change in energy Sector

Emission Reduction
“A Change”

- Sustainable Development
- Environmental Integrity
- WIN-WIN Strategy
- International Cooperation
Thank you

Seok-Jai Choi
stones3@energy.or.kr
+82-10-7963-3130