

# Korea's Efforts to Reduce Climate Change & Methane Emissions



Ministry of Environment  
Republic of Korea

# Overview of Presentation

Korea's Efforts on Climate Change

Korea's Joining Methane to Market Partnership

Methane Emissions in Korea

Methane Reductions in Korea

Future Direction in Methane Reduction in Korea

# I

## Domestic Policies on Climate Change

### ● **Inter-Ministerial Committee on Climate Change**

- Formation : 1998
- Chair : Prime Minister (Ministers from relevant Ministries)
- Preparation and implementation of the Comprehensive Governmental Climate Change Policy (1<sup>st</sup> : '99-'01, 2<sup>nd</sup> : '02-'04, 3<sup>rd</sup> : '05-'07)

### ● **3<sup>rd</sup> Inter-ministerial Governmental Climate Change Policy**

- (1) Foundation of Institutional Framework for Climate Change Convention  
(Negotiation for the Convention, R&D, Public awareness & education, Institutional framework for the Kyoto Mechanism)
  - (2) Reduction of Greenhouse Gas Emissions by Sector  
(Energy, Construction, Transportation, Environment, Agriculture, Forestry)
  - (3) Foundation of Institutional Framework for Climate Change  
(Climate Change Monitoring, Impact Assessment on ecosystem & health)
- Total Estimated Budget : \$21.2 billion for 90 projects ('05-'07)

## II

# Global Cooperation on Climate Change

## Cooperation on Climate Change

Name of the project	Partner Country	Cooperation	Future Plan
Integrated Environment Strategy	USA (EPA)	Joint cooperation on analysis of benefits from greenhouse gas emission reductions	Co-benefit analysis of greenhouse gas emission reductions
International Partnership On Hydrogen Economy	USA	Cooperation on technology development to set up hydrogen economy	Joint cooperation on technology development
Asia Pacific Workshop On climate and Energy	USA, Japan, Australia	Discussion on cooperation to cope with climate change and energy related issues in the Asia-Pacific region	Review of setting up a mechanism for facilitating exchange of information and cooperation on climate Change

### III

## Korea's Joining the Methane to Market Partnership

### ● **Application History**

- Consultation with the Partnership member countries on Korea's joining the Partnership at the COP10 to UNFCCC (Dec. '04)
- Consulting with & Sending the application letter to the Administrative Support Group in EPA (Jan. '05)
- Acceptance of Korea's application for the Partnership by the SC members (May, '05)
- Submission of the Terms of Reference signed by the Vice-Environment Minister (June, '05)
- Designation and notification of the Korea's National Authorities for 3 technical Sub-Committees (July, '05)

### ● **DNA in Korea**

Landfill : Director of the Daily Waste Management Division, MoE

Coal Mine : Deputy Director of the Coal Industry Division, MoCIE

Gas and Oil system : Director of the Gas Industry Division, MoCIE



# IV

## Methane Emissions in Korea (the Overall status)

### • The Overall Methane Emissions('01)

(Unit : CH4 thousand tons)

Emission Source	Amount	Emission Source	Amount
1. Energy	263	3. Agriculture	487
Fuel Combustion	43	4. Waste	465
Fugitive Emission	220		
2. Industrial Process	20	Total	1,236

### • Methane Emission Trend (since '90)

- Annually Decrease by 4.5%

- Decrease rates by sector

Waste : -7.7, Agriculture : -1.0, Energy : -3.4 Industrial process : +12.7

- \* Strict enforcement of waste management policies and practices resulted in reduction of waste production

- \* Expanding in installation of petrochemical facilities increased CH4 emissions in industrial process

# V

## Methane Emissions by Sector

### ● **Waste sector (including Landfill sector)**

- Major CH<sub>4</sub> emission source : waste landfill sites, Sewage water & industrial waste water
- Waste production : declined since mid-1990's due to strict enforcement of waste management policies
- Sewage water : increase annually by 2.0% (14,000m<sup>3</sup>/day in '90 → 17,111m<sup>3</sup>/day in '00)
- Waste water : increase annually by 2.1% (3,446m<sup>3</sup>/day in '90 → 4,068m<sup>3</sup>/day in '00)

### ● **Coal Mine**

- No specific data on CH<sub>4</sub> emissions
  - CH<sub>4</sub> emissions : presumed to decrease due to dwindling of coal industry
- \* Scale of the coal mine industry shrank to 1/6 since '89 because of the government's coal mine rationalization(closing up coal mines & reduction in coal production)

# V

## Methane Emissions by Sector (continued)

### ● Natural Gas and oil system

- 98% of the domestically consumed natural gas : imported from the oil field overseas (Korea has only one oil field in the East Sea)
- Methane Emissions : Presumed very negligible

### ● Agriculture Sector

- Decrease in the total Rice field areas : 1.233million ha('90) → 1.083million ha ('01)
- Methane emissions : Decrease by 1.5% annually (2,349,000TC in '90 → 1,980,000 TC in '01)

### ● Livestock Sector

- Total number of livestock raised : Decrease in the late '90's
- CH<sub>4</sub> emissions by enteric fermentation : slight increase by 0.2 % annually (704,000TC in '90 → 722,000 TC in '01)



# VI

## Methane Emission Reductions in Korea (Landfill)

### ● Landfill Sector

#### Landfill Sites in Korea

- Total Number of landfill sites : 1,408 sites
  - Closed-up sites : 1,170, · Sites in operation : 238
- Most of landfill sites are of very small scale
  - 976 closed-up sites : the waste filling capacity  $\leq 10,000\text{m}^3$
  - 98 sites in operation : the waste filling capacity  $\leq 10,000\text{ m}^3$

#### Landfill Gas Utilization

- 15 landfill sites are operating electricity generating facilities or gas supplying facilities to utilize CH<sub>4</sub>
  - 12 sites operates CH<sub>4</sub> using electricity generators(capacity : 1-6.5MW)
  - 4 sites operates gas CH<sub>4</sub> supplying facilities

## VI

## Methane Emission Reductions in Korea (Landfill)

Landfill CH<sub>4</sub> Utilization

Location	Facility	Capacity	Location	Facility	Capacity
Metropolitan area	E (3)	6.5MW, 3.38MW, 50MW	Goosan	E	1MW
Seoul (Nanji)	G	90,000m <sup>3</sup> /day	Pohang	E	2MW
Busan	E	6MW	Sung-am	G	60,000m <sup>3</sup> /day
Daegoo	E & G	1.5MW, 165,000m <sup>3</sup> /day	Masan	E	1.5MW
Daejeon	E	3MW	Jeju	E	1MW
Gwangju	E	2MW	Yeo-su	E	1MW
Wonju	G	7,600m <sup>3</sup> /day	Soon-cheon	E	1MW
Cheongju	E	1MW			

E : electricity generating facility, G : gas supplying facility

## VII

# Methane Emission Reductions in Korea (Coal Mine)

### ● Coal Mine Sector

#### Setting up & Implementation of a Long-term Plan on Coal Industry

- Promotion of the coal industry rationalization
- Setting up a framework for a long-term coal production optimization
- Voluntary closure or reduction of coal production in inefficient coal mines
- Strengthening coal mine safety system & invigorating coal mine hazard prevention activities

\* This plan is prepared in accordance of the Coal Industry Act

### ● Gas & Oil Sector

CH<sub>4</sub> reduction activities are not so active because most of gas and oil are imported from oil fields overseas

## ● **Agriculture Sector**

### CH<sub>4</sub> Reduction in Rice Fields

- Changing rice cultivation patterns, irrigation management, plant breeding (applying direct planting on easily drying rice paddies, intermittent irrigation)
- Developing & disseminating a comprehensive model package for CH<sub>4</sub> reduction in rice farming
  - CH<sub>4</sub> reducing farming & rice cultivation techniques, steady farmers education, encouraging public understanding & awareness
- Target : Decrease emissions to 90% of emissions in '90 by '00

## ● **Livestock Sector**

### Improving Enteric Fermentation in Ruminants

- Improving livestock breed, encouraging to raise optimal No. of livestock (prevention of over-breeding)
- Expanding supply of high quality livestock feed(financing installation of high quality feed production facilities and equipments, setting up exemplary complexes)

## • Livestock Sector

### Improving Livestock Waste Treatment

- Currently, most of massive livestock farms operate livestock waste treatment facilities
- Promoting livestock wastes utilization
  - During '02-'04, \$160million was spent on improving livestock waste treating facilities & their operation, transforming wastes to liquefied fertilizers
  - Developing and dissemination of livestock waste treating models



## • Landfill Sector

### Expanding CH<sub>4</sub> Utilization from Landfill Sites

- Estimation of annual benefits to operate a 50MW electricity generator
  - Reduction of 540,000 TC of CO<sub>2</sub> & CH<sub>4</sub>
  - Electricity generation & other concomitant benefits worth of \$20 million
  - Removing mal-odor and air pollution around the landfill sites
- If CH<sub>4</sub> utilization is admitted as a CDM project, it is projected that benefits worth up to \$6 million will occur
  - Korea can transfer CH<sub>4</sub> utilization technologies from landfill sites to other countries in the form of CDM projects (Unilateral CDM)

## ● Agriculture & Livestock Sector

### Concentrating on Livestock Waste Treatment

- Taking into consideration the current situation in Korea, improving livestock waste treatment is the priority area where Korea can harvest the greatest benefits in the short term.
- \* Promoting eco-friendly livestock waste treatment will result in the most tangible outcomes in methane reduction under the Partnership in Korea