The 7th Implementation–Liaison Committee Meeting
Oxford, United Kingdom

# Member State

# Korea

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# Energy Status of Korea

## High dependency on energy imports

- Imports about 97% of the energy used
- More than 80% of oil from the Middle East

< Energy Imports >

( unit : % )

| Classification | ’80 | ’90 | ’00 | ’02 | ’05 |
|---|---|---|---|---|---|
| Overseas Energy Dependency | 73.5 | 87.9 | 97.2 | 97.1 | 96.8 |
| Oil in total energy | 61.1 | 53.8 | 52.0 | 49.1 | 44.3 |
| Import from the Middle East of total oil | 98.8 | 73.7 | 76.9 | 73.3 | 81.8 |

# Status of NRE

## 5% of total energy consumption by 2011

- Ratio on NRE/Total Energy Consumption is 2.13%(2005)
- Waste & Hydro power accounted for the most

| Resource | Capacity | Amount (1000toe) | % |
|---|---|---|---|
| Waste | Waste gas incinerators(6,317t/d), Municipal waste incinerators(11,310t/d), etc | 3,705.5 | 75.9 |
| Hydro | 1,584 MW | 918.5 | 18.8 |
| Bio | LFG(30MW, 16kNm$^3$/h), Bio-diesel(191Mt/y), etc | 181.3 | 3.7 |
| Solar Thermal | 1,337,443 m$^2$ | 34.7 | 0.7 |
| Wind | 98.7 MW | 32.5 | 0.7 |
| PV | 13.5MW | 3.6 | 0.1 |

# NRE Development Policy of Korea

## R&D and Deployment programs

- **R&D**

  -Maximization of R&D investment effect by Priority selection and concentration (Hydrogen- Fuel Cell, PV, and Wind Power)

- **Deployment programs**

  -General subsides program for deployment of NRE facilities (Ex. 100,000 photovoltaic roof programs)

  -Loan programs for customers of NRE system

  -Feed-in Tariff for NRE electricity generation

*Organizing of "Project Group" (Wind, PV and Hydrogen&Fuel Cell)*

# Vision of Hydrogen / Fuel Cell

**<National Plan for the Hydrogen Economy (2040)>**

- ◆ Hydrogen energy portion in final energy : 15%
- ◆ GDP portion of fuel cell industry : 5%

**◆Vision : Creation of New Hydrogen · Fuel Cell industry**

- 60% of Hydrogen produced from renewables
- Replacement of 54% of automobile fuel by energy
- Replacement of 22% of Power plant by fuel cell generation
- Replacement of 23% of residential power by fuel cell generation

**R&D** | **Demonstration** | **Deployment**

# R&D Budget Allocation

## Intensive investment on H &FC R&D

- R&D budget on H & FC has increased sharply in the last 3 years
- Budget on Hydrogen occupies 39%, Transportation FC 31%, Stationary FC 23% respectively

* 1$ = 1,000WON

| | 2004 | | 2005 | | 2006 | |
|---|---|---|---|---|---|---|
| | Projects | Budget (M$) | Projects | Budget (M$) | Projects | Budget (M$) |
| Hydrogen | 29 | 14.3 | 27 | 15.5 | 31 | 18.9 |
| Stationary FC | 13 | 8.8 | 13 | 6.4 | 9 | 11.4 |
| Transportation FC | 1 | 3.3 | 2 | 6.9 | 4 | 15.3 |
| Portable FC | 3 | 2.4 | 4 | 5.0 | 3 | 3.6 |
| Total | **46** | **28.8** | **46** | **33.8** | **47** | **49.2** |

# Monitoring Projects

## Background

- **Fuel Cell Monitoring Project for Transportation**
  - Cost Down & Feasibility Test of PEMFC Vehicles before Full Scale Deployment
  - Promotion of FC Core-parts Manufacturing Companies
- **Fuel Cell Monitoring Project for Residential Power Generation(RPG)**
  - Evaluation of FC efficiency
  - Penetration of FC Market
  - Collaboration of Public Companies and Energy suppliers

# Monitoring Project for Transportation

## Project Objectives

- Demonstration of 30 FCV (80kW), 4 FC BUS (200kW) by 2009
- Build 4 hydrogen station (H production capacity: more than 30Nm3/hr )

## Overview

- Budget : US$ 48 M
- Period : 3 Years from August, 2006
- Participants : HMC, NGV, KIST, SK, GS-caltex, KOGAS

# Monitoring Project for Transportation

## ■ Project Areas

- **FCV Actual Road Test**

  - Vehicles performance, operation status, stack durability, parts replacement record, safety-related data, fuel efficiency, etc.

- **Ensuring the operation data of Hydrogen filling stations**

  - Hydrogen production, degree of hydrogen purity, parts replacement record, safety-related data, hydrogen price, etc.

- **Research on FCV/ Fuel cell station interface**

  - Frequency of filling, Safety, Convenience

- **Publicity and Education**

- **Carrying out Environmental and Economic evaluations of hydrogen and fuel cells vehicles**

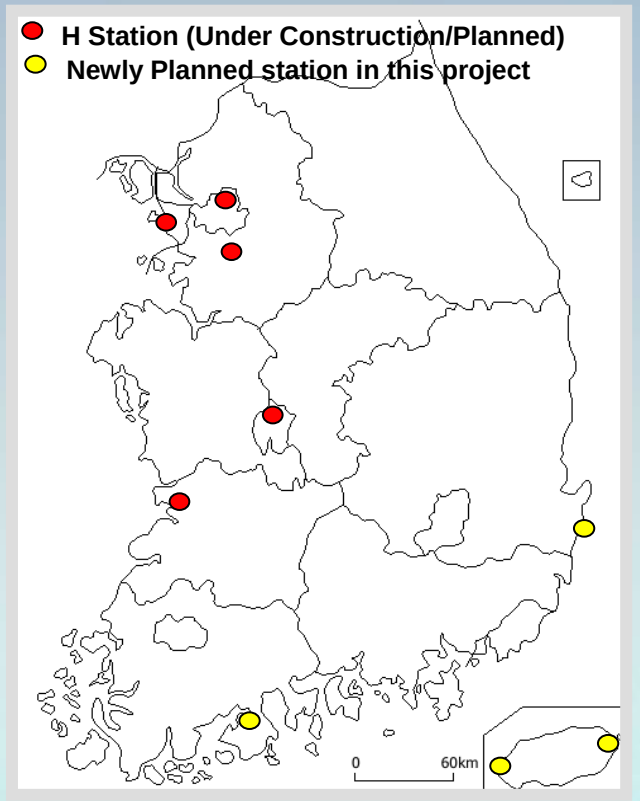
# Plan for demonstration site

## A. Seoul Metropolitan


- **LNG Reforming**
- **Naphtha Reformig**

## B. Southern Region


- **Truck-in/Pipe line**




## C. Central Region

- **LPG Reforming**

## D. Jeju


- **Electrolysis**
  Wind Farm

# Monitoring Project for RPG

## ■ Project Objectives

- Build the Fuel cell systems fit for Climate of Korea and Induce cost down through demonstration of the large production system
  - 40unit(1st year) → 70unit(2nd year) → 100unit(3rd year)

## ■ Overview

- Budget : US$ 41 M
- Period : 3 Years from July, 2006
- Participants :
  KOGAS, GS-FC, FC-Power, KIER,
  10 City Gas Suppliers

KOGAS · FuelCellPower · GS 퓨얼셀 · 한국에너지기술연구원 KOREA INSTITUTE OF ENERGY RESEARCH · 해양도시가스 · KyungDong City Gas · JUNGBU CITYGAS · 대한도시가스주식회사 DAEHAN CITY GAS CO., LTD. · 대구도시가스 DAEGU CITY GAS · yesco happiness energy · Samchully · KYUNGNAM ENERGY CO., LTD. · (주)충남도시가스

# Monitoring Project for RPG

## ■ Project Areas

- Evaluation RPG system in Actual conditions
  - Generation and heat efficiency of fuel cells
  - Reduction amounts of carbon dioxide, nitrogen oxide, sulfur oxide
  - Generation time
  - Troubleshooting methods
- Providing the information needed for the development of domestic fuel cells and hydrogen research.
- Establishing the residential fuel cell system available to all the regions and climate in Korea.
- Safety standards, data collection for adjusting regulations

# National Program for H & FC Education

## ■ Education Program

- Core-Technology Research Center
- Specialized Graduate Schools
- Best Lab

## ■ Workshop on H & FC Education

- October 2006, Chonbuk Nat'l Univ.
- Workshop theme

  - Education Program for Specialized Graduate School of Hydrogen & Fuel Cells
  - Education and Training Program for industries

# 8th IPHE ILC Meeting in Korea

# Thank you