

# *Alternative Transport Fuels in Korea*

*May, 2005*

**Korea Energy Management Corporation**  
**New & Renewable Energy Center**

# Why Alternative Transport Fuels in Korea

- ❖ **Energy consumption of transport sector amounts to 16.4% of total end use energy consumption(2004)**
  - Energy consumption of transport sector : 27,329 thousand TOE
  - Total end use energy consumption : 166,554 thousand TOE
- ❖ **Severe Air pollution over metropolitan area.**
  - The major portion (over 50%) of air pollutants are from diesel fuelled vehicles.
- ❖ **Concerns over global warming**
  - Korea is expected to follow Kyoto protocol from 2013

# Definition of Alternative Transport Fuel

## ❖ Category of NRE in NRE Promotion Act

- Solar thermal, Photovoltaic, **Biomass**, Wind, Hydro power, Geothermal, Marine, Waste Energy, **Fuel Cell**, **Hydrogen Energy**, Synthetic fuel from coal liquefaction/gasification

➔ **Biodiesel and Hydrogen for Fuel Cell is under R&D and Demo.**



# History of Biodiesel

- 2001 Nov.** Fleet tests started on pure biodiesel and biodiesel blending fuels
- 2002 May** MOCIE decided to start demonstration supply of BD20 at the designated areas (Seoul Metropolitan, Chonbuk Province)
- 2003 Oct.** Preparation on new Korean biodiesel standard started
- 2004 May** MOCIE extended the demonstration supply to 2005 May
- Present** Fleet tests and R&D on biodiesel production process are ongoing

# Biodiesel Standard and Fleet Tests

- ❖ For demonstration supply, the temporary standard was prepared in 2002 but automakers and oil companies are reluctant to accept it
- ❖ Stakeholders in the fuel market gathered to prepare Korean biodiesel fuel standard in October 2003
  - The draft was prepared in September 2004 and basically the standard was close to EN14214
- ❖ Fleet tests have been started to test the validity of biodiesel to commercialized vehicle since 2001
  - 1<sup>st</sup> test(2001~2003) : conventional diesel engine
  - 2<sup>nd</sup> test(2004~2006) : common rail diesel engine
- ❖ After the fleet tests, biodiesel consumption is expected to be activated

## Diesel and Biodiesel Prices

	Diesel			Biodiesel
	2004	2005	2006	2004~
Diesel untaxed*, \$/L	0.31	0.31	0.31	-
Total Tax, \$/L	0.34	0.41	0.51	-
Diesel fully taxed, \$/L	0.65	0.72	0.82	-
Biodiesel, min, \$/L				0.60
Biodiesel, max, \$/L				0.65

\* : based on \$ 30/bbl crude oil

# Production Capacity of Biodiesel

- ❖ Production Capacity : 107,500kl/year(2004)
- ❖ Actual Production Quantity : 6,750kl(2004)



← Largest Biodiesel Plant  
in Korea  
(100,000ton/year)

# Challenging Issues of Biodiesel

- ❖ **Security for the supply of raw material**
  - Biodiesel production is increasing rapidly
  - Only a few raw materials are currently used for biodiesel production
  - New raw materials should be desirable for stable supply
- ❖ **Evaluation of new biodiesel as a motor fuel**
  - Auto makers strongly concern about the quality of biodiesel



# History of Fuel Cell Vehicle

❖ 2000 KIST 5kW, Compressed H<sub>2</sub>



❖ 2000 HMC/KIST 10kW, Methanol



❖ 2000 Daewoo/KIER 10kW, Compressed H<sub>2</sub>



## ❖ 2002 HMC 75kW Fuel Cell Hybrid Vehicle

- System : Fuel Cell + Ni-MH Battery
- Fuel : Compressed Hydrogen



## ❖ 2004 HMC 80kW Fuel Cell Hybrid Vehicle

- System : Fuel Cell + Li-Polymer Battery
- Fuel : Compressed Hydrogen



## Ongoing R&D on Fuel Cell & H<sub>2</sub> for Vehicle

	Project
<b>Fuel Cell</b>	Develop 80kW PEMFC (2004~2009) Develop 200kW PEMFC for Bus (Plan to start 2005)
<b>Hydrogen</b>	Mass production of hydrogen from LNG(2001~2006) Membrane module for hydrogen separation (2003~2006) Construction & demonstration for Hydrogen station (2004~2009)

# Demonstration Project for Hydrogen Station

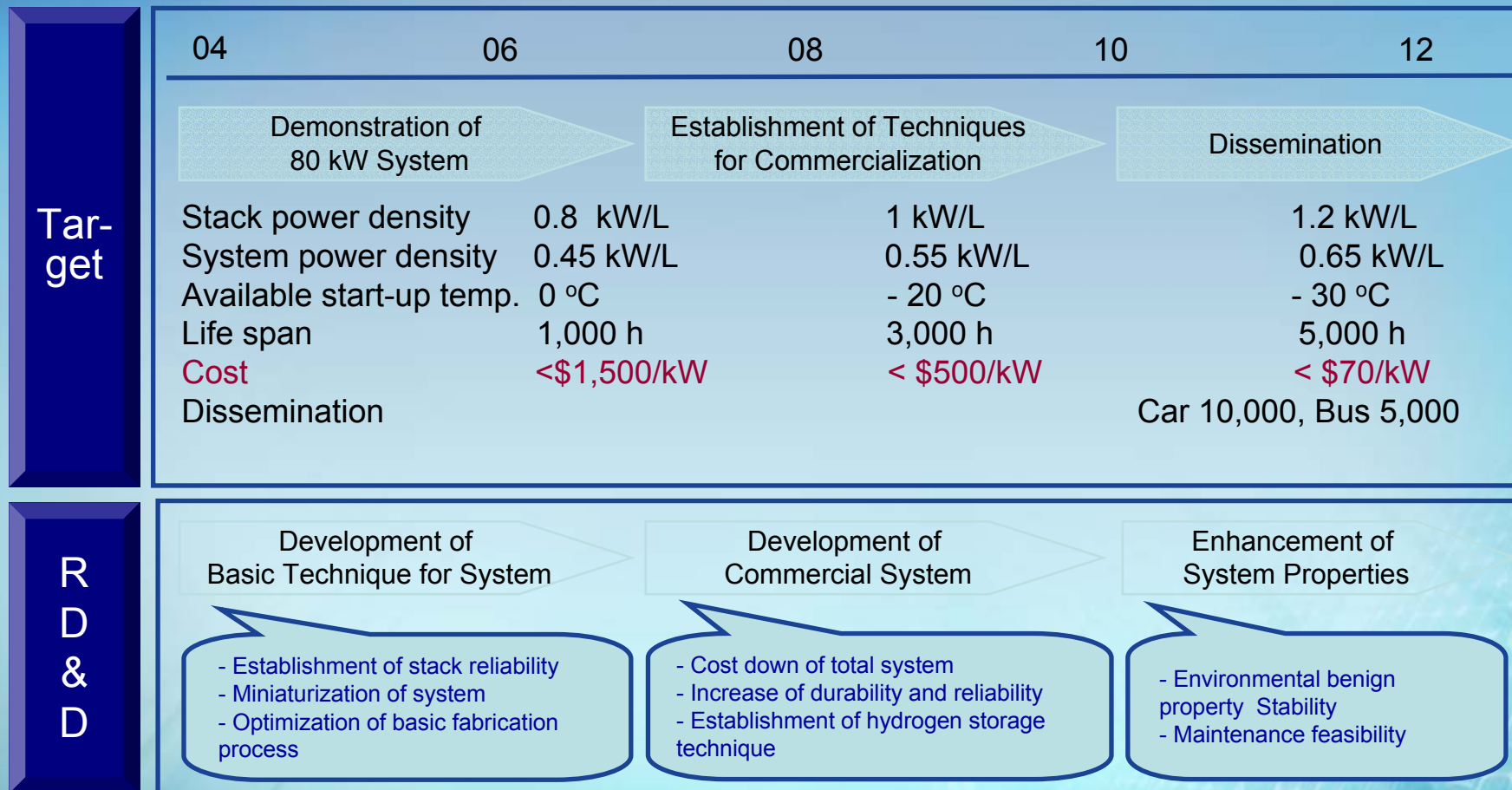
## Specifications

- Program: MOCIE NRE RD&D
- Period : 2004 ~ 2008 (4 years)
- Vehicle : more than 2 (HMC TUCSON)
- Capacity : 30 Nm<sup>3</sup>/hr
- Participants and Roles:
  - Korea Gas Corp.: Hydrogen Fueling Station
  - HMC: Vehicle Development

Demonstration Sites



# Action Plan for PEMFC for Vehicle



## President's Test-Driving (March 11, 2005)



**Thank You!**