The Status of Renewable Energy for Road Transport in Korea

Dr. JAE-KON KIM

Green Technology R&D Center,
Korea Institute of Petroleum Management(K-Petro)

Presentation Outline

Ⅰ The Status of Energy Policy in Korea

Ⅱ The Status of Bioenergy Dissemination in Korea

Ⅲ Prospect of Transport Bioenergy in Korea

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1-1 Energy Situation in Korea

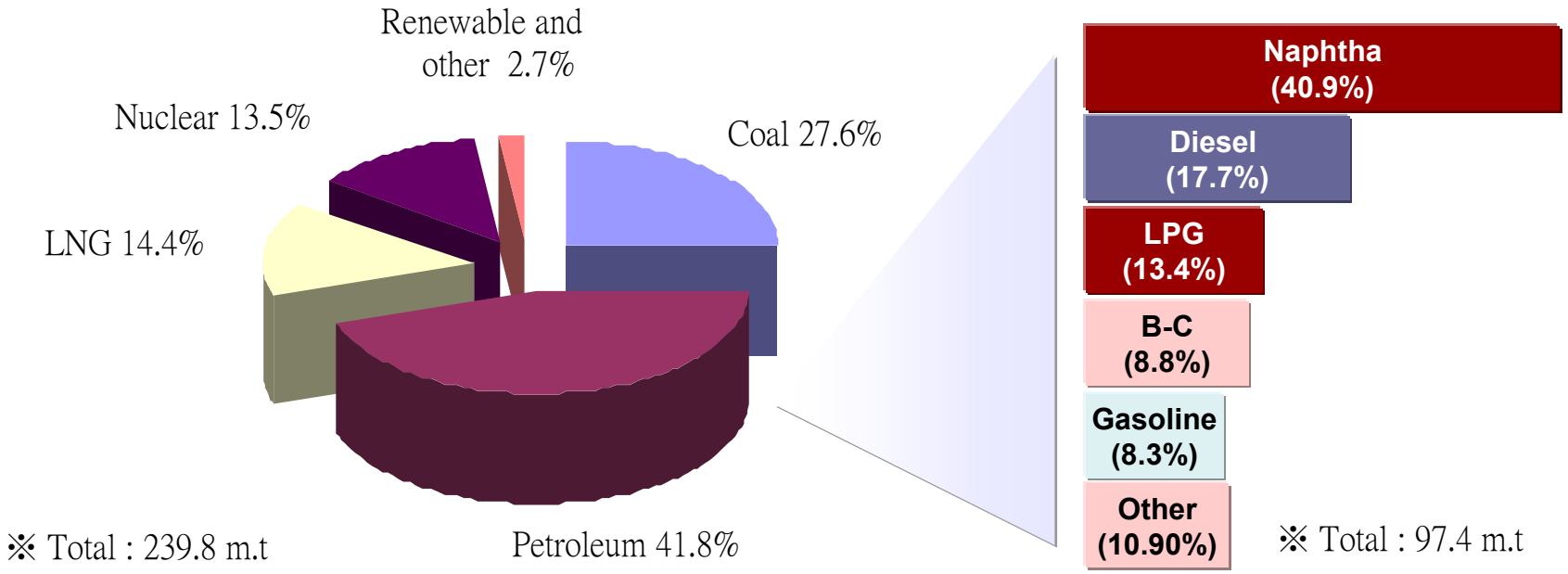
Energy Situation

Energy Consumer	11th biggest consumer in the world, conuming 240 Mtoe in 2008, with reliance on importing overseas sources reaching 96.4%
Petroleum Importer	5th biggest in the world, importing 141.5 billion US dollars worth in 2008, accounting for 33% of all imports.
CO_2 emission	5th biggest in the world, emitting 550 million tonnes in 2007.

1-2 The Status of Energy Consumption

Primary Energy Consumption(2008)

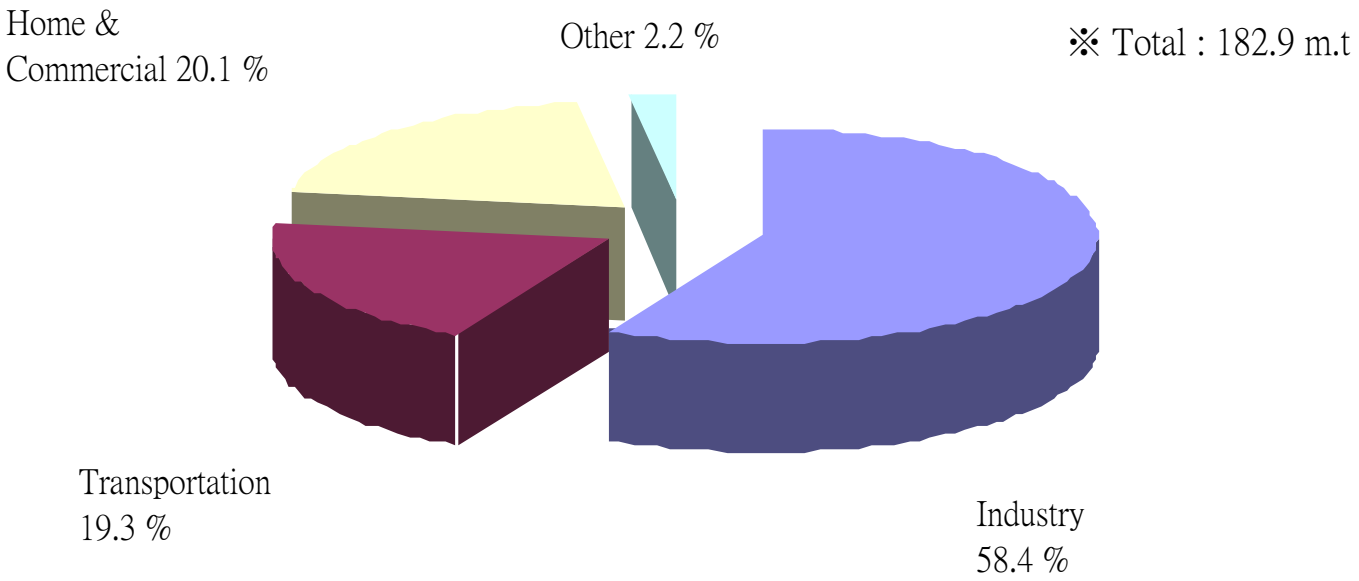
- **Fossil fuel occupy about 80% of total energy consumption**
- **Petroleum(41.8%) > Coal(27.6%) > Nuclear(13.5%)**



1-3 The status of Energy Consumption

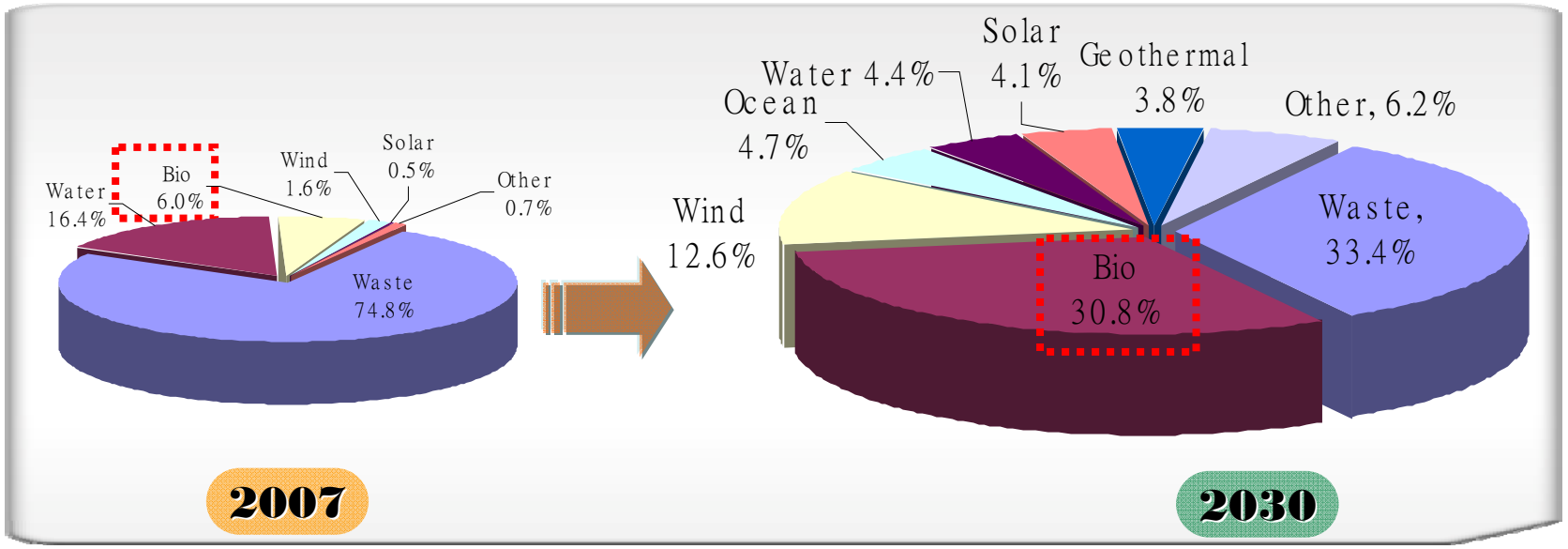
Energy Consumption by Sector(2009)

- Energy consumption of Industry occupy above half of all
- Industry(58.4%) > Home(20.1%) > Transportation(19.3%)



1-4 Energy Policy (National Energy Roadmap in 2008)

Target for Renewable Energy



- **Increase dissemination ratio of renewable energy in 2030, compared to Japan, USA level**

  * Prospect for renewable energy dissemination ratio in 2030
  (EU 20% / Japan 11% / USA 9%)

- **Especially expand dissemination ratio of bioenergy , from 6.0% in 2007 to 30.8% in 2030**

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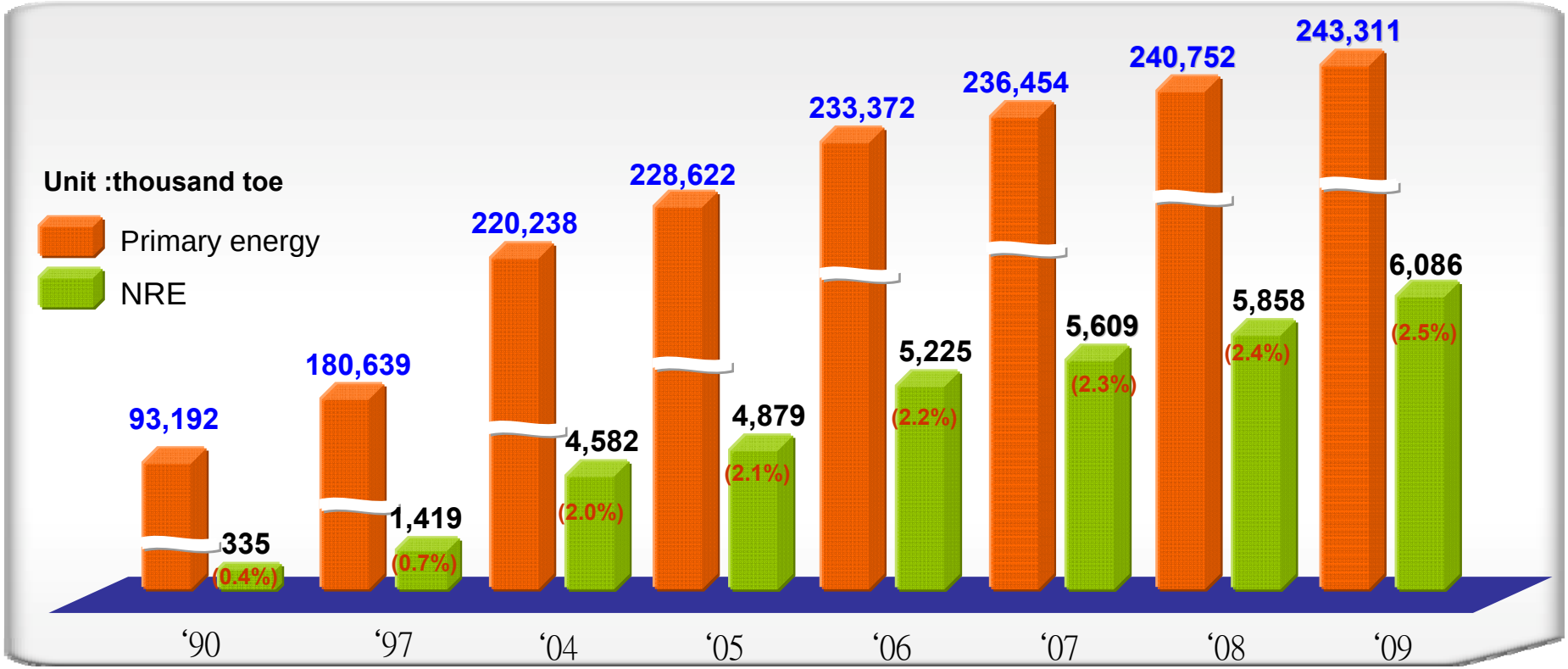
1-5 The status of Energy Consumption

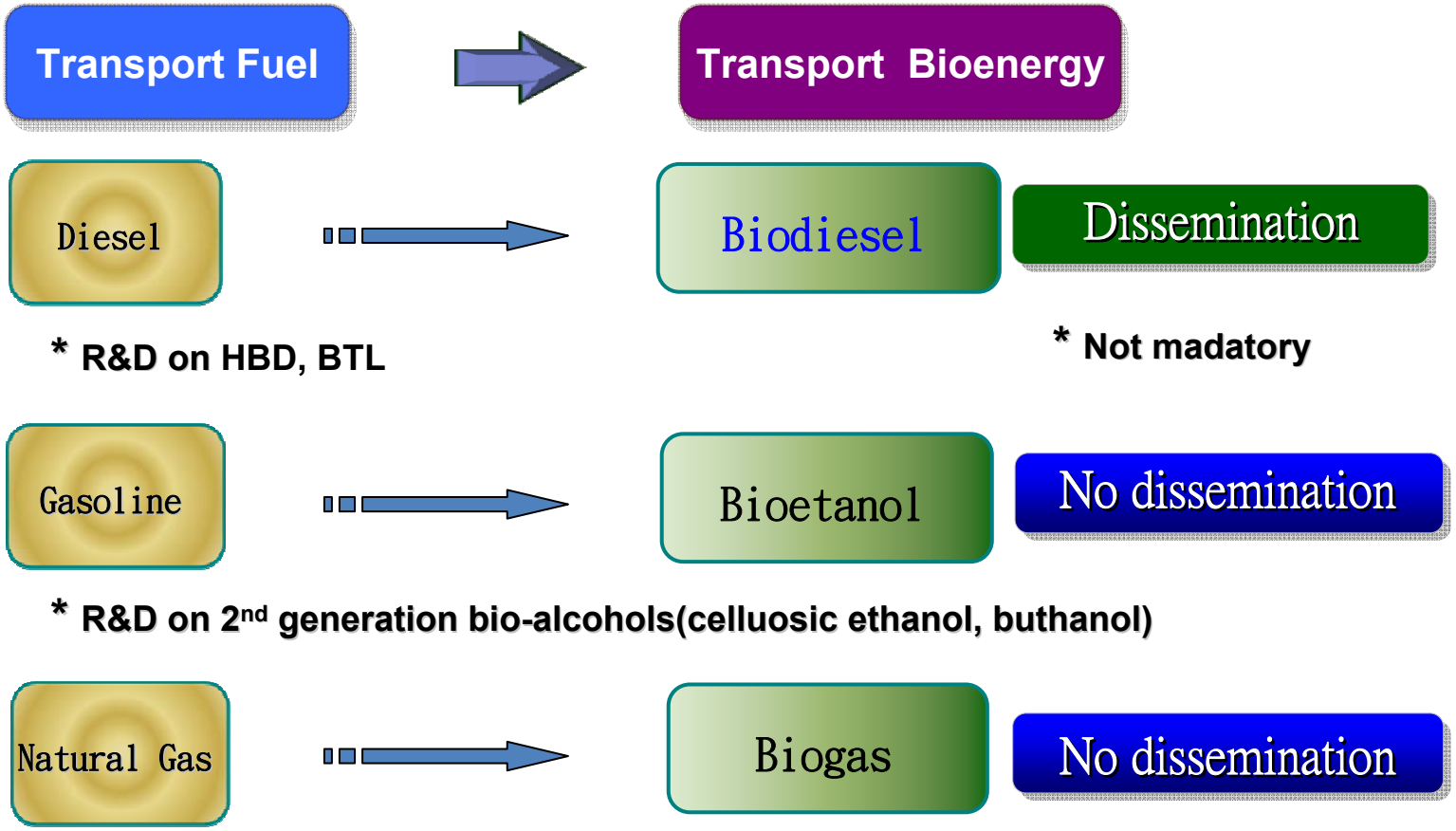
Status of New & Renewable Energy(NRE) Consumption

- As of the end of 2009, NRE supply total 6,086 thousand toe, which comprise 2.5% percent of total primary energy consumption 243,311 thousand toe.



1-7 Status of Bioenergy for Road Transport

Bioenergy for Road Transport(2010)



2-1 Status of Bioenergy Dissemination

Status of Biodiesel

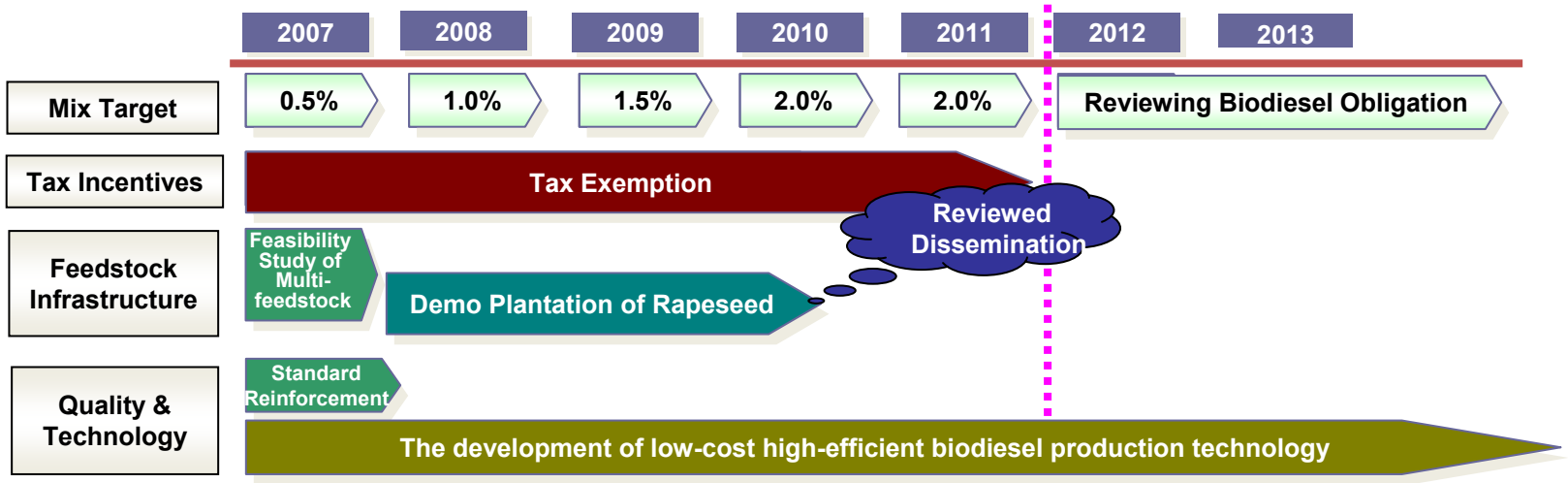
Progress of Biodiesel Dissemination

- In May, 2002, Biodiesel demonstration project started
- In March, 2006, refiners voluntarily agreed with MKE to Supply Biodiesel more than 90,000 kL annually
- In June, 2006, Biodiesel was commercialized and disseminated nationally with blend ratio 0.5%
- In September, 2007, “The Long Term Dissemination plan for biodiesel” confirmed

2-2 Status of Bioenergy Dissemination

The Long Term Dissemination plan for Biodiesel ('07.9, '10.12)

- Blend ratio of biodiesel for B5 increased by 0.5% each year from 2007 to 2010.
- B20 is limited on the vehicles enabling to repair in their own facilities due to the technical problems
- Recently, this Plan including blend ratio and tax reviewed in 2010 and will be Keep current blend ratio(2.0%) and tax exemption by 2011



2-3 Status of Bioenergy Dissemination

Supply System of Biodiesel in Korea

- B5 is subject to diesel fuel specification, and supplied by refiners
- B20 is used by bus and truck company on their own accord, and supplied by biodiesel suppliers

Biodiesel Suppliers
(15 companies in 2010)

* Capacity : About 1,044,000kL/yr

B100 →

Refiners
(4 refiners)

B5 →

Gas Station

B5 →

Customer

[1] 10% during winter season(11/1~3/31)

B20 [1]

Bus, truck and construction equipment operators who are equipped with 'certified storage tank' and 'self-repair shop'

2-4 Status of Bioenegy Dissemination

Status of Biodiesel Dissemination

B5

- **The biodiesel(B100) for blending B5 was totally distributed at 637,000 kL since 2006.**

Unit : kL

	2006.7 ~ 2007.12	2007	2008	2009
B100	46,000	108,000	195,000	288,000
Blend Ratio(%)	0.5	0.5	1	1.5

B20

- **The biodiesel(B100) for blending B20 was totally distributed at 822 kL since 2006.**

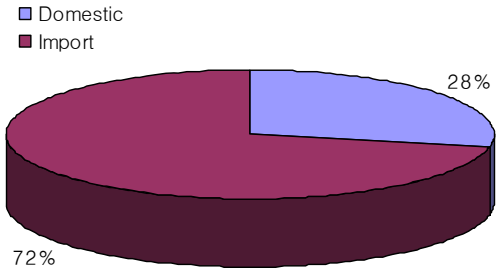
Unit :kL

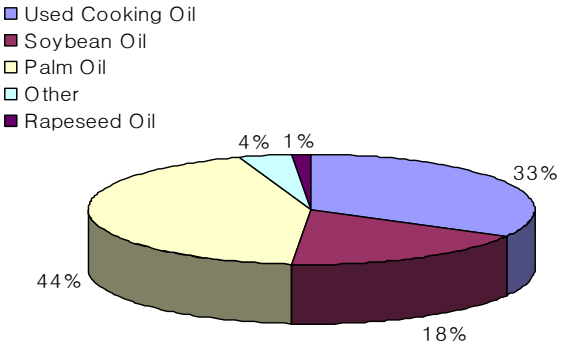
	2006.7 ~ 2007.12	2007	2008	2009
B100	20	187	304	311
Blend Ratio(%)	20 (Winter 10)			

2-5 Status of Bioenergy Dissemination

Production Capacity and feedstock of Biodiesel in Korea

- **Currently, there are 15 biodiesel producers which have combined production capacity of 1,044,000 kL/yr**
- **The primary feedstock of biodiesel are palm oil(44%), used cooking oil(33%), soybean oil(18%).**





2-6 Status of Bioenergy Dissemination

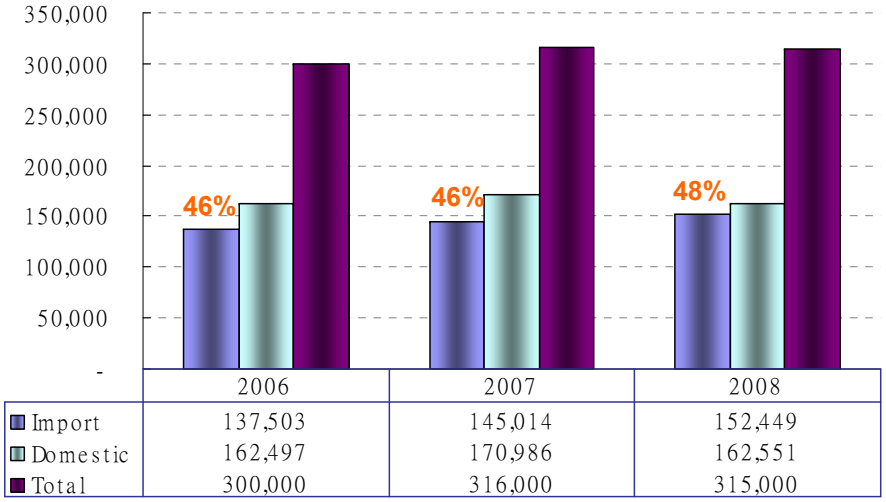
Production and Consumption of Bioethanol in Korea

Production

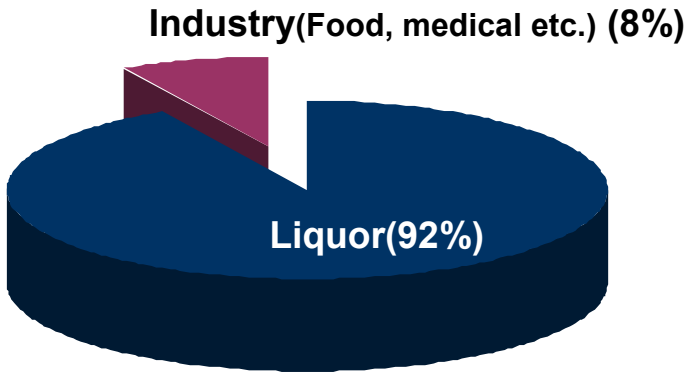
- Bioethanol for beverages is produced by 10 domestic companies
  - Import : 48%, Domestic Production : 52%

Consumption

- Annual production of Bioethanol
  → 300,000 ~ 316,000 kL
- In case supply with E3 in whole country, bioethanol is needed about 300,000 kL



	2006	2007	2008
Import	137,503	145,014	152,449
Domestic	162,497	170,986	162,551
Total	300,000	316,000	315,000



2-7 Status of Bioenergy Dissemination

Status of Bioethanol

Establishment of Bioethanol Infrastucture

- **In 2005, Feasibility study for the Implementation of bioethanol as fuels in Korea was carried out by KIER**

  ⇒ The study suggest necessity of actual assessment study on domestic infra

- **In 2006, actual assessment study on bioethanol blends fuel to introduce in Korea was carried out by K-Petro**

  ⇒ No special problem for management of Bio-ethanol blended fuels (E3 and E5) in 4 gas stations during demonstration (10 months)

Project Outline

- Demonstration project to establish the distribution infra for Bio-ethanol blended fuels was conducted for two years (August 2006 – July 2008).

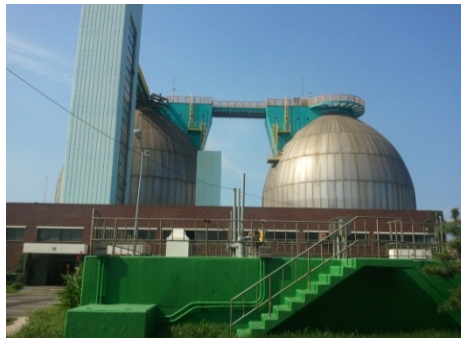
- Bio-ethanol blended fuels(E3 and E5) was demonstrated in 4 gas stations.

K Petro

2-8 Status of Bioenegy Dissemination

Development of Biogas for Road Transport in Korea

- **During the research for the utilization of biogas as road transport, various recent governmental initiative and plan were found.**
  - ⇒ **Biogas has high potential bioenergy in Korea**
  - ⇒ **Upgrading and highly concentrated fuel technology(CBG, LBG)**
  - ⇒ **Biomethane from biogas can be used as for natural gas vehicle(NGV) in Korea**



<Biogas Plant>

<Biomethane gas station>

2-9 Status of Bioenegy Dissemination

Circumstance for Bioenergy in Korea

Economics

- Bioenergy is more expensive than fossil fuel and prospect for economics is uncertain
  - * Bio-diesel/diesel price(before tax) : ('07) 1.55 → ('08) 1.66 → ('09) 1.92
  - * Bio-ethanol/gasoline price(before tax) : ('07) 1.29 → ('08) 1.55 → ('09) 1.67

Fiscal Burden

- If bioenergy's economics is not recovered, fiscal burden will grow heavier

Energy independence

- Most feedstock for biodiesel production is imported (about 72% in 2009)
- Domestic production of feedstock for bioethanol is difficult because of high land prices and labor costs

3-1 Prospect of Transport Bioenergy in Korea

- Bioenergy for road transport are getting more important in Korea because of the environment pollution and the global warming problems.
- Implementation of biodiesel is quite successful in Korea.
- Stable supply of feedstock is a major concern and Plantation of biodiesel crop is a promising option.

3-2 Prospect of Transport Bioenergy in Korea

- Transport bioethanol is getting more important in Korea due to high oil price & Kyoto protocol.
- Establishment infrastructure of bioethanol is more expensive to commercialize, compared with that of biodiesel in Korea.
- Bioethanol commercialization will be carefully determined under consideration bioethanol economic in Korea.
- Biogas for road transport is developing to establish infrastructure for upgrading and plans technologies.
- Finally, Korea government will be carefully reviewed sustainability criteria and RFS in road transport sector of bioenergy to Introduce in Korea

Low Carbon Green Growth

These are the new driving forces for our economy

Thank you for your attention !

감사합니다

Korea Energy Management Corporation

New and Renewable Energy Center