

# The Current status of Bio-Fuels in Korean

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# Attractiveness of Oil

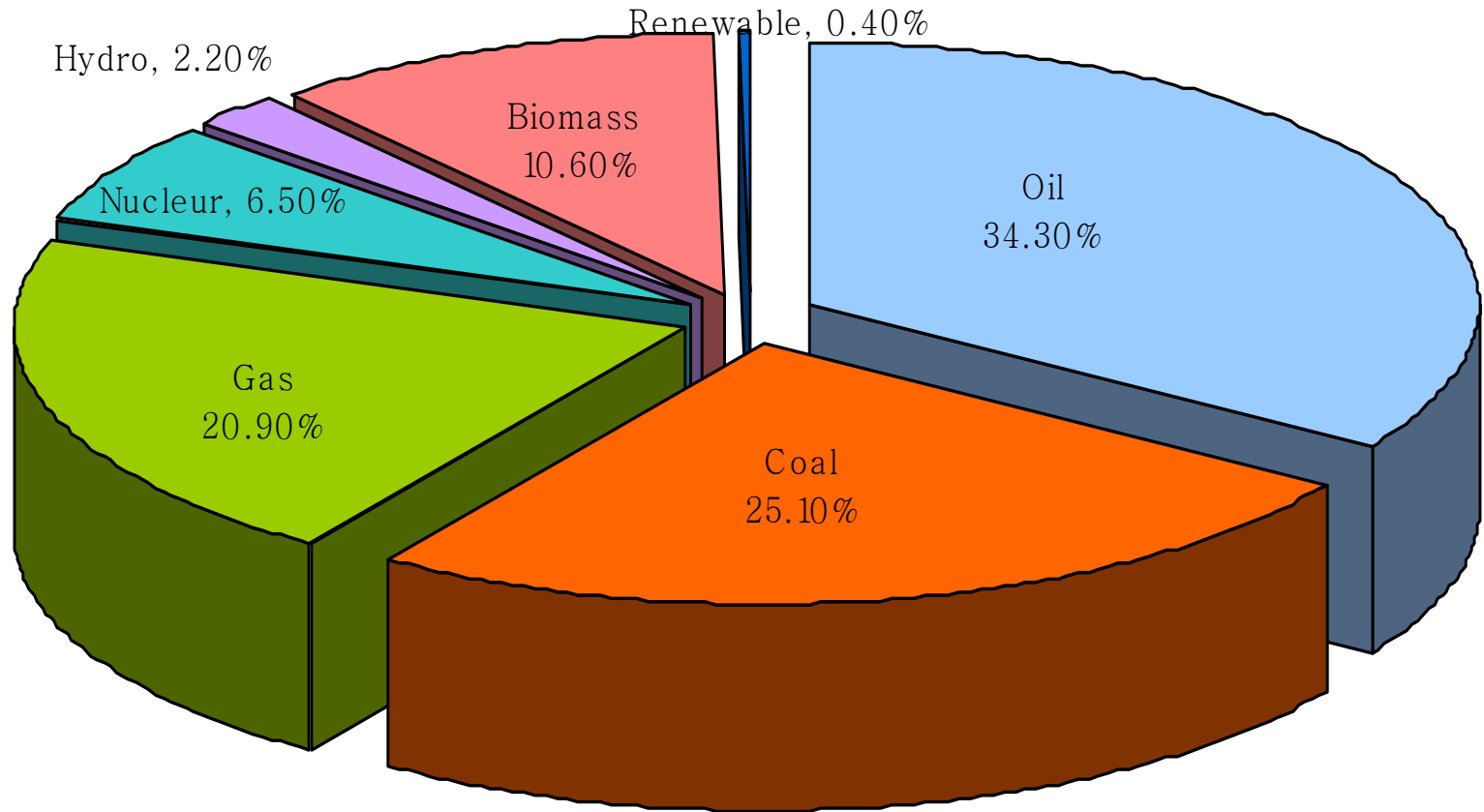
## Physically

- Easy to harvest
- Easy to store and transfer
- Easy to use

## Economically

- Oil is money.(그저 펌프로 수확하기만 하면 되는 준비된 천연자원)
- Low cost of harvest and low R&D investment
- Low transaction cost
- Among world top 5 enterprise=oil companies (Exxon Mobil, BP, Total, Shell, Chevron Texaco)

# 2004 Primary energy supply



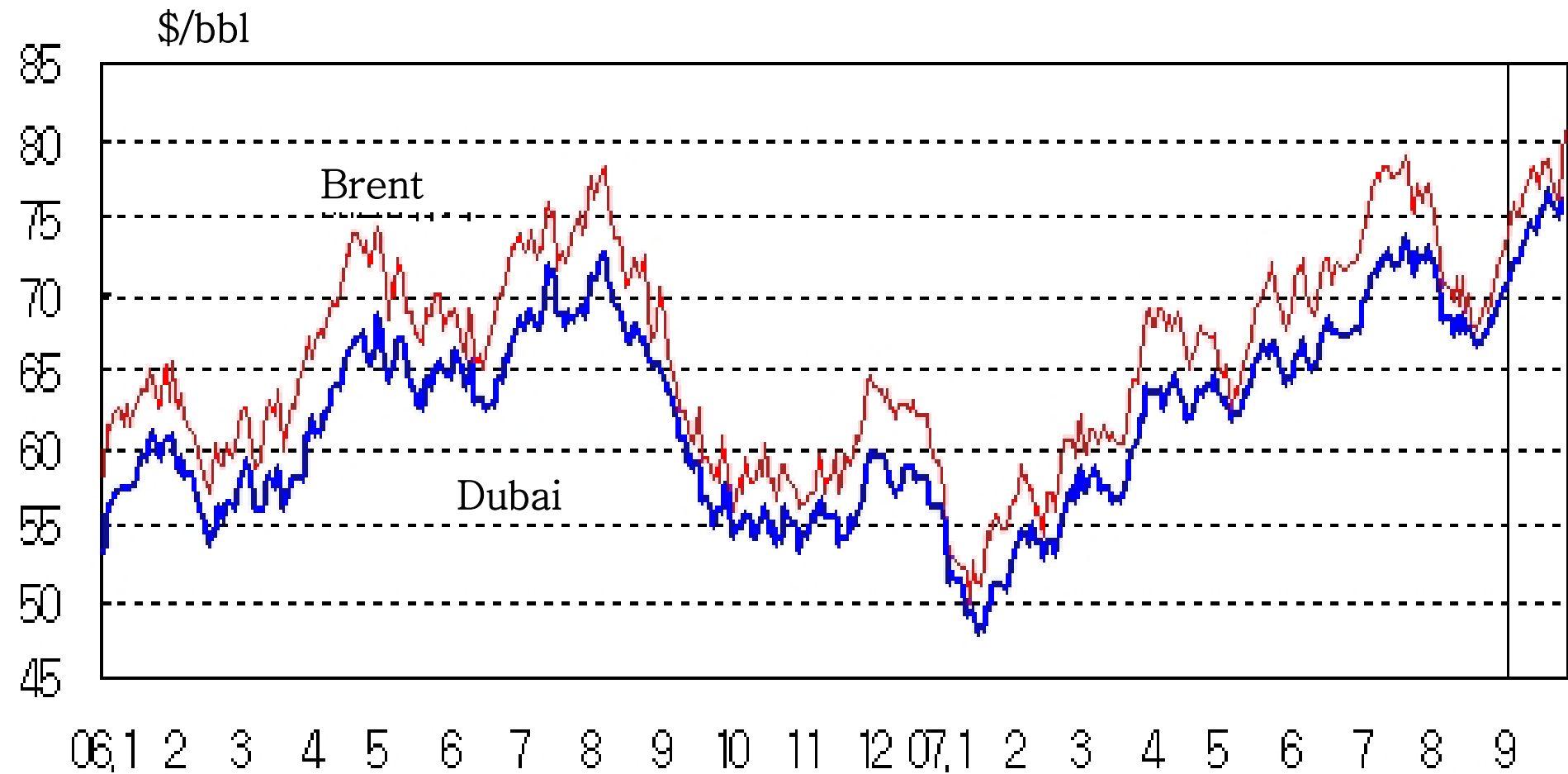
IEA, Database, 2007

# 2004 world oil import

Nation	Mt
U.S.	577
Japan	206
China	123
Korea	114
Germany	110
India	96
Italy	93
France	85
U.K.	63
Netherland	60
Rest	708
Total	2,235

IEA, Database, 2007

# Oil Price

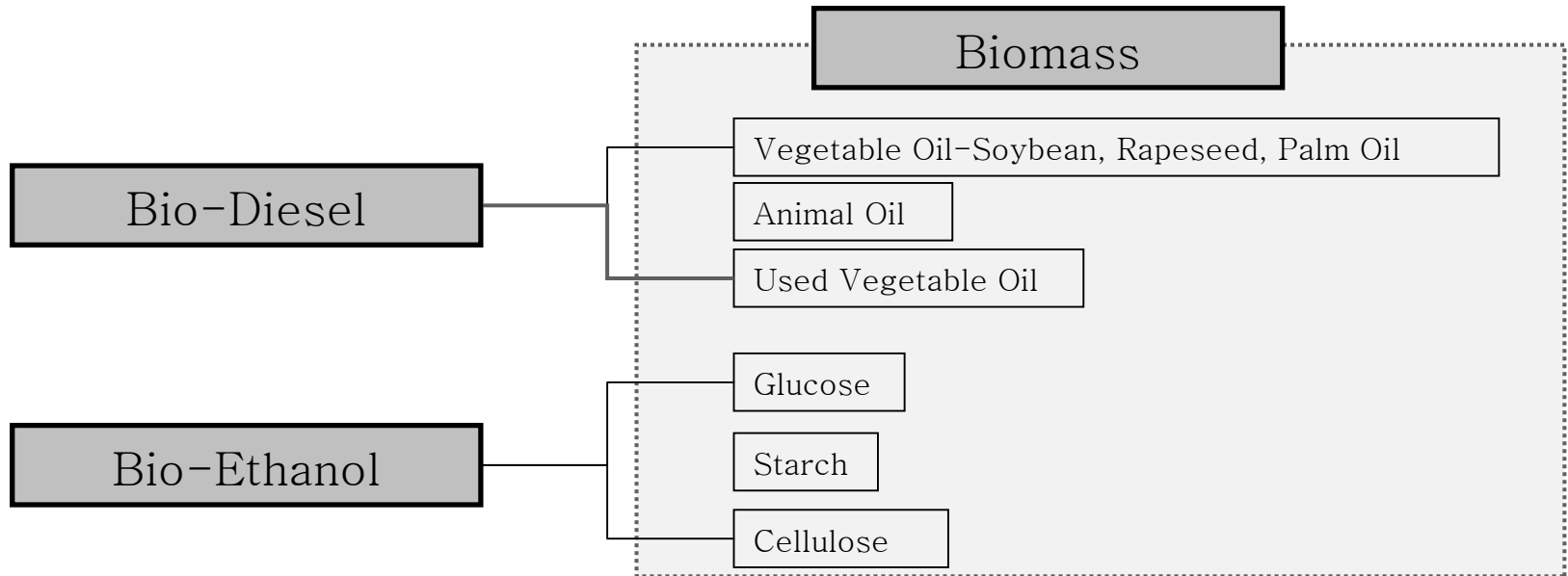


Bank of Korea 2007.10

# What is the biofuel?

## Definition

- Biofuel is liquid or gas transportation fuel derived from biomass in order to replace the petroleum oil (gasoline and diesel)
- Currently 90% of Biofuel is Bioethanol and 10% of that is Biodiesel
- Bioethanol: US, Brazil
- Biodiesel: EU

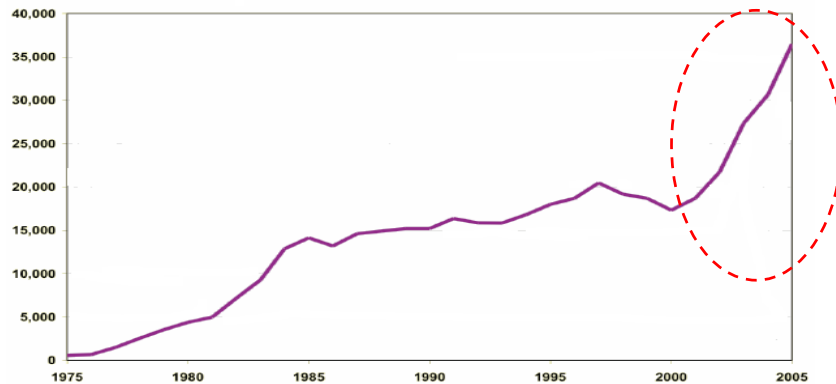


# High Oil Prices and Bio-fuels

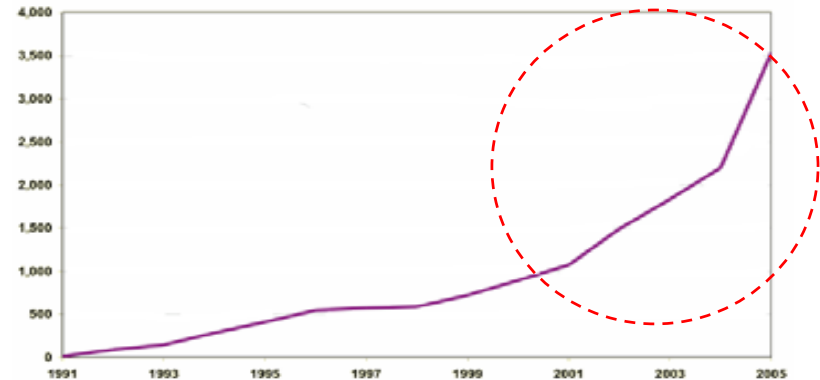
## Issue

- Since 2000 when stating high oil price, the production of biofuel has increased rapidly, especially in Brazil, USA, EU
- Japan, China, India also increase their production capacity

Global Biodiesel Production



Global Bioethanol Production



자료: Worldwatch Institute, *Bio-Fuel for Transportation*, 2006



# Why Korea Needs Biofuel?

## High Oil Prices & Energy Security

- less sensitive to the global oil price fluctuation
- less dependent on imported oil stock

## Reduction of Greenhouse Gases and Air Pollutants

- Preparing Post-Kyoto protocol(2013~)
- Environment Friendly Air Quality control-less Air Pollutants (PM, No<sub>x</sub>, CO, SO<sub>x</sub>)

## Agriculture and Industrial consideration

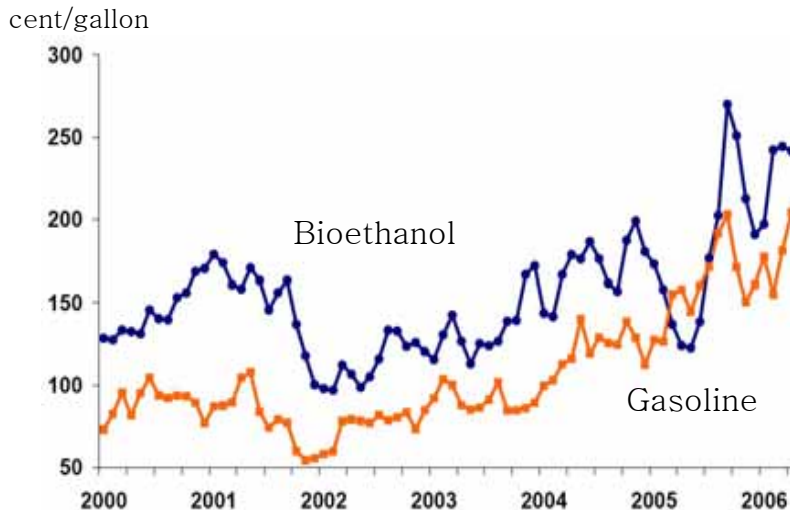
- After Fully Open market in agricultural products, Farmers need new agricultural cash-cow
- BT are new emerging items as a next Blue Ocean

# Social Benefits and Biofuels

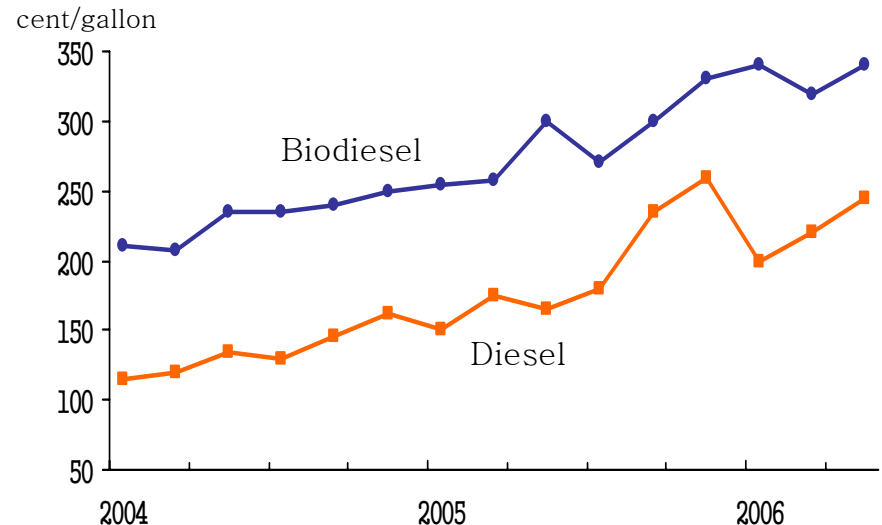
## Backgrounds

- The backgrounds of its rapid increase of Biofuels is 1) increasing energy security, 2) reduction of greenhouse gases & air pollutants and 3) increasing incomes of farming sector
- Considering these all social benefits, many countries is encouraging their Biofuel production even though its price is much higher than conventional gas prices

Gasoline price vs ethanol price

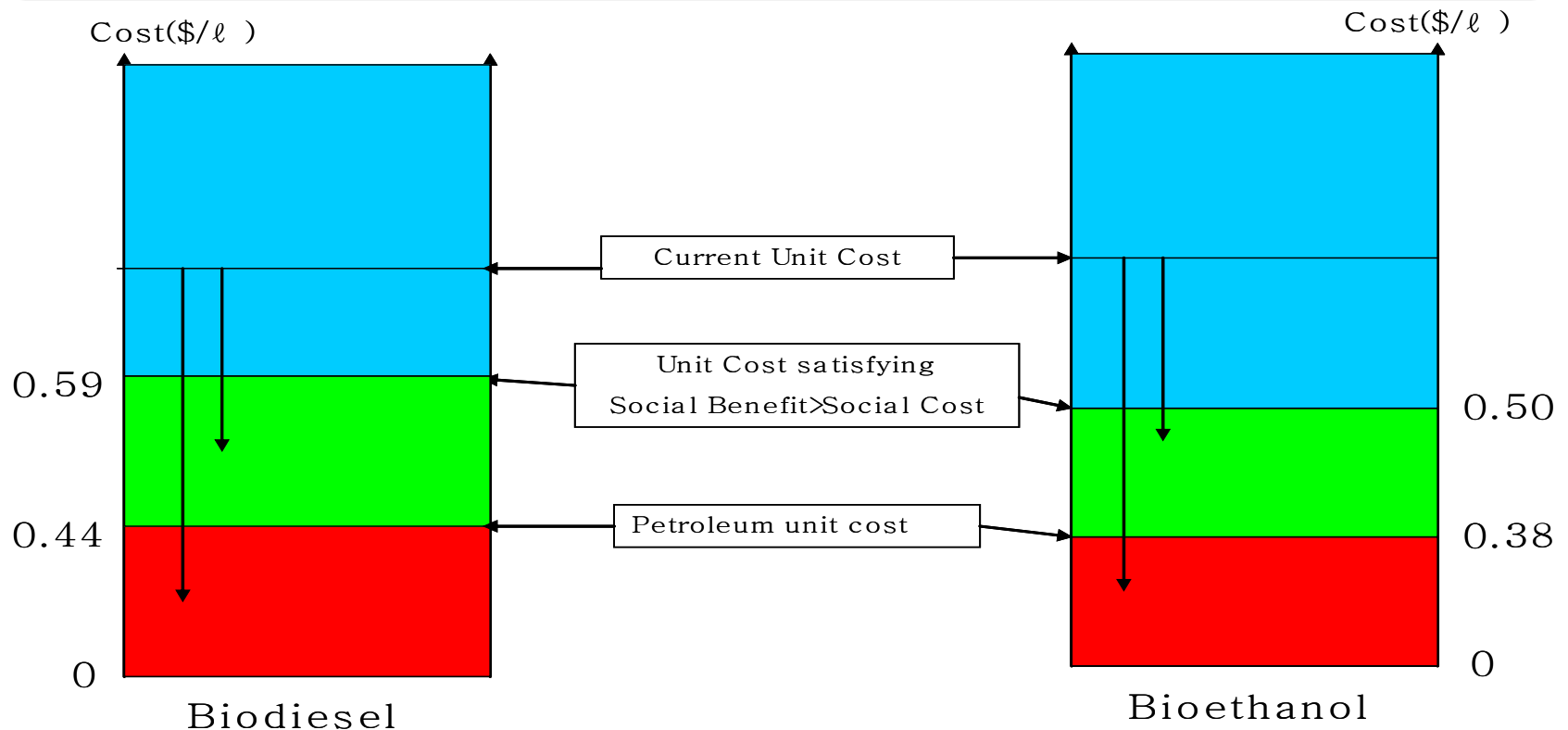


Diesel price vs Bio-diesel price

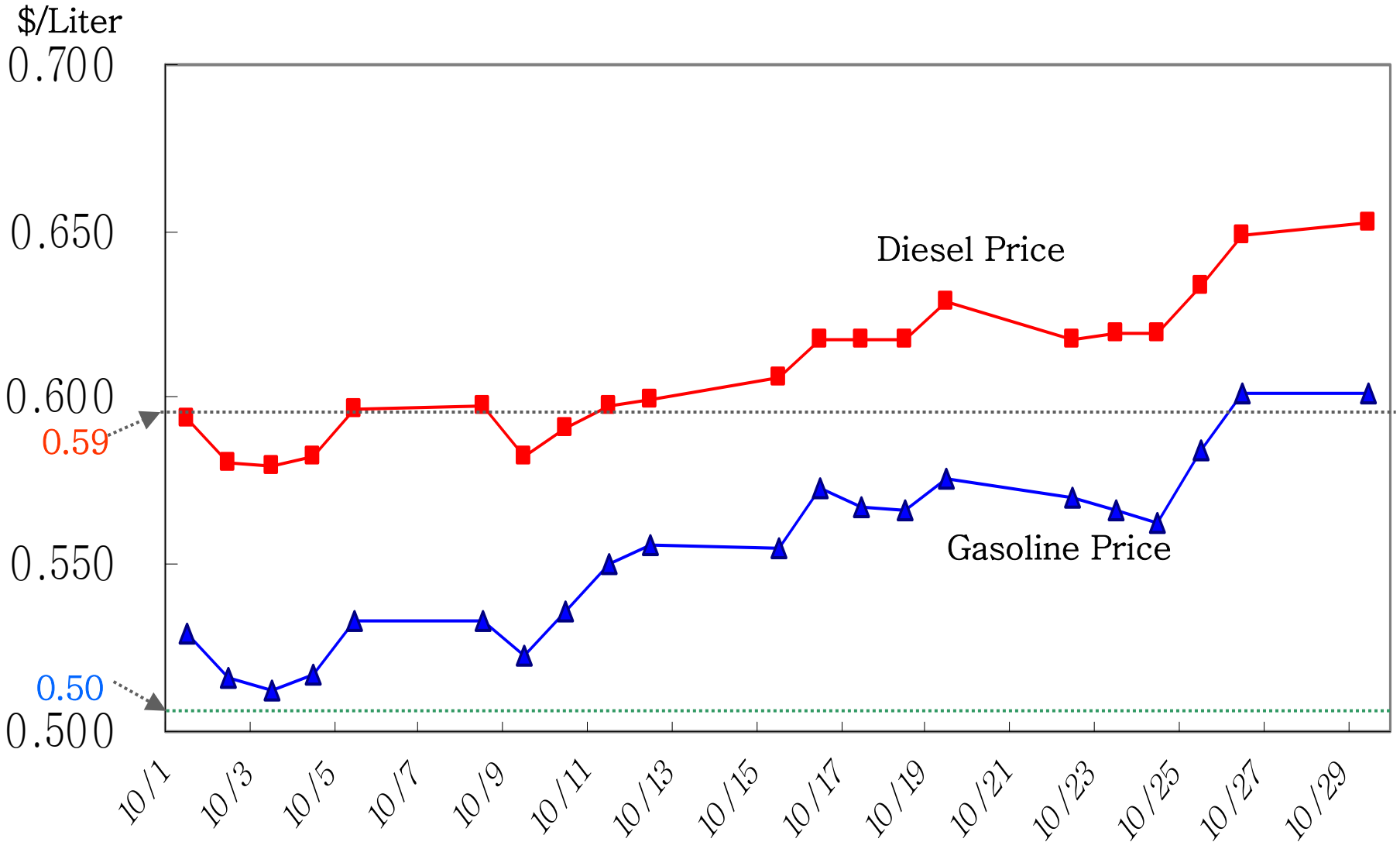


# Why should consider social benefits?

- In the individual level, the social benefits are usually not considered (public good characteristic)
- In government level, the biofuel can be accepted when social benefit is greater than social cost



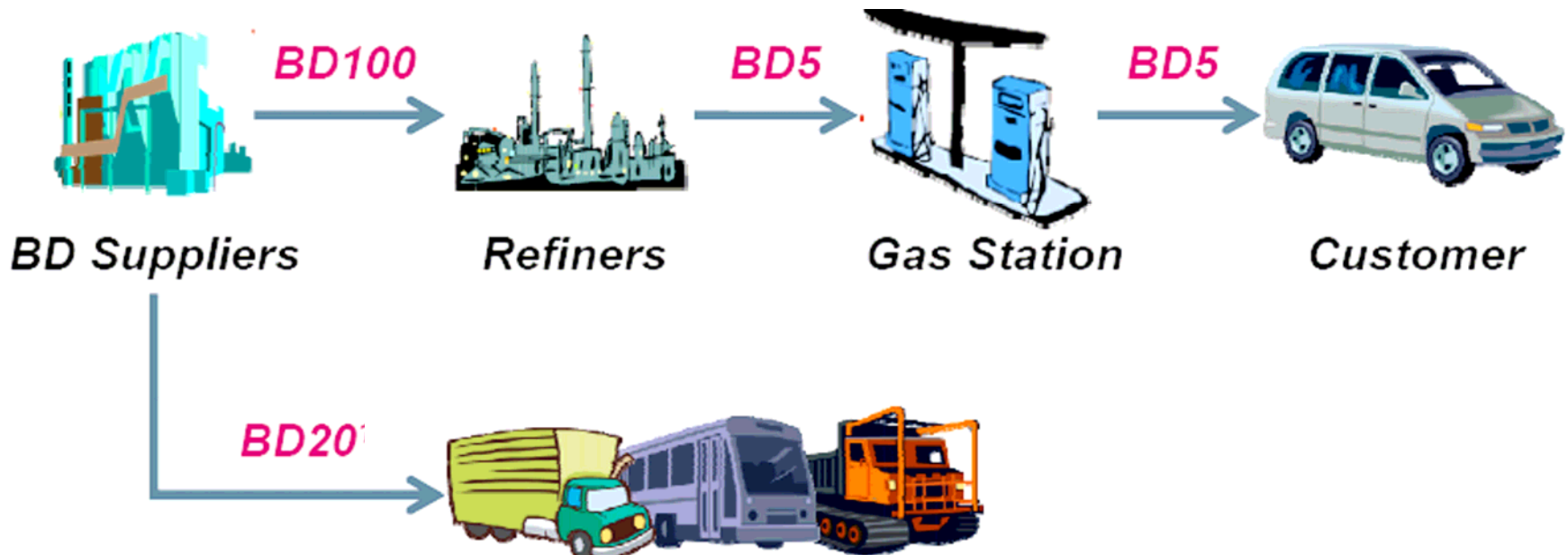
# High Oil Price and Market competitiveness



# Current Status of Korean Biofuel

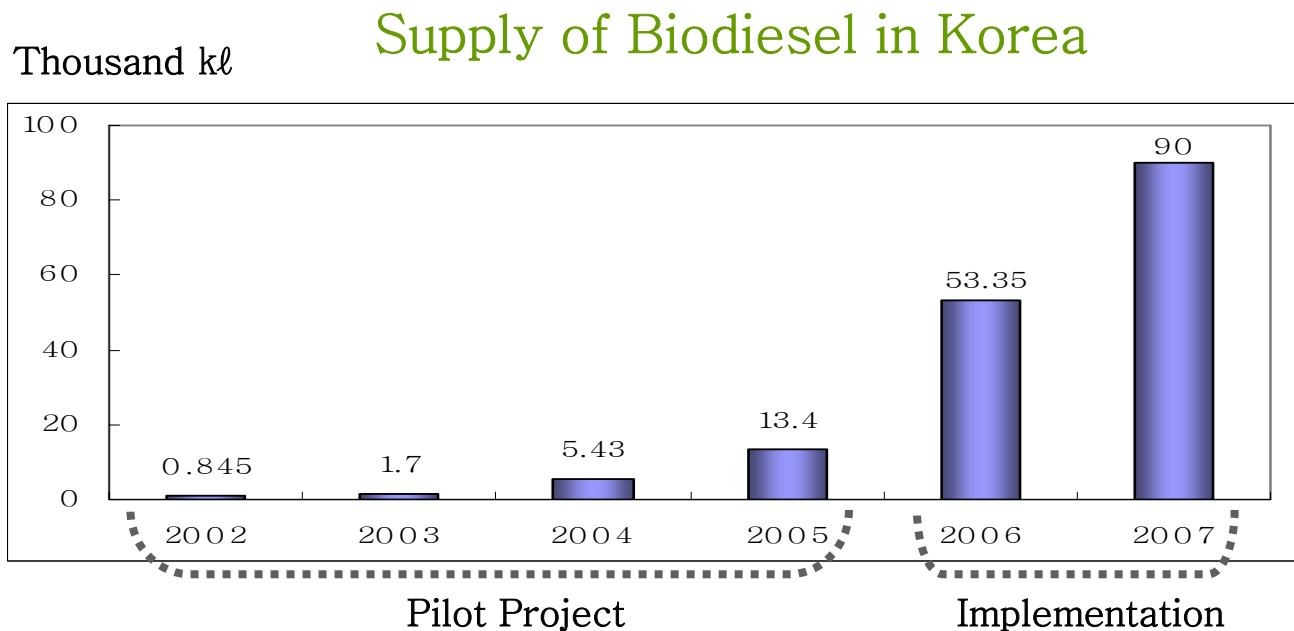
- During 2002~2006, a pilot project on implementation of Biodiesel in Korean Market  $\Rightarrow$  BD20(30,000 KL)
- During 2006.7~2008.6, BD0.5 being implemented in all gas stations in Korea (Voluntary Agreement b/w Korean government and oil companies)
- BD20 is only allowed in some places where self-maintenance is possible

## BD5 and BD20 Supply Chain



# Current Status of Korean Biofuel

- At present, 11 Bio-diesel refinery companies are registered and only licensed oil distributor are allowed to supply Bio-diesel in Korea
- In 2006, total production of biodiesel was 53.35 thousand kl and will be expanded to 90 thousand kl in 2007
- During 2008~2011, The Pilot project for Bioethanol will begin and test the technical feasibility and acceptability in Korean market



# Current Status of Korean Biofuel

- At present, 11 Bio-diesel refinery companies are registered and only licensed oil distributor are allowed to supply Bio-diesel in Korea

## Suppliers and Production Capacity of biodiesel in Korea

Suppliers	Capacity (kl/yr)	Source
Kaya Energy	100,000	Soybean, Waste Oil
B&D Energy	50,000	Soybean, Waste Oil
Econertech	33,000	Waste Oil
BASKO	27,300	Soybean, Waste Oil
BDK	20,000	Soybean, Waste Oil
Others	84,000	Soybean, Waste Oil, Palm
Total	314,300	

Source : Korea Biodiesel Association, 2007

# Obstacles in promoting Biodiesel in Korea

## High Cost

- Biodiesel production cost is 1.5 times higher than that of diesel fuel

### Average Cost Comparison

Biodiesel	Diesel
\$1.01/liter	\$0.62/liter

- AC of biodiesel using imported feedstock(soybean) is higher than using waste oil

### Average cost from different feedstock

	Soybean	Waste oil
Portion	77.3%	22.7%
AC	\$1.05/liter	\$0.89/liter



# Obstacles in promoting Biodiesel in Korea

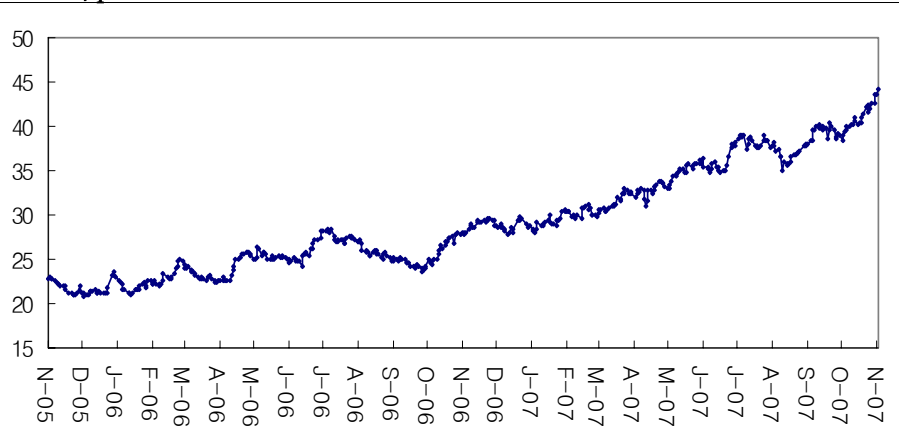
## Feedstock

- **Foreign Issue:** High dependence on imported feedstocks for Biodiesel
  - too sensitive to global supply and prices of feedstocks
    - Feedstock: imported soybean(77%), domestic used vegetable oil (23%)
    - Agflation: Price of feed stock (↑) → consumer price index (↑) : food, input price
    - Allocation issue between food and feed stock
- **Foreign Issue:** The limitation of secure supply of low priced feedstock from Southeast Asia
- **Domestic Issues:**
  - Without financial supports, the production of feedstock of Biodiesel is limited because of high wage rate and rent
  - The collecting cost is very high for waste oil

# Price trends of feed stocks

## Soybean Oil price

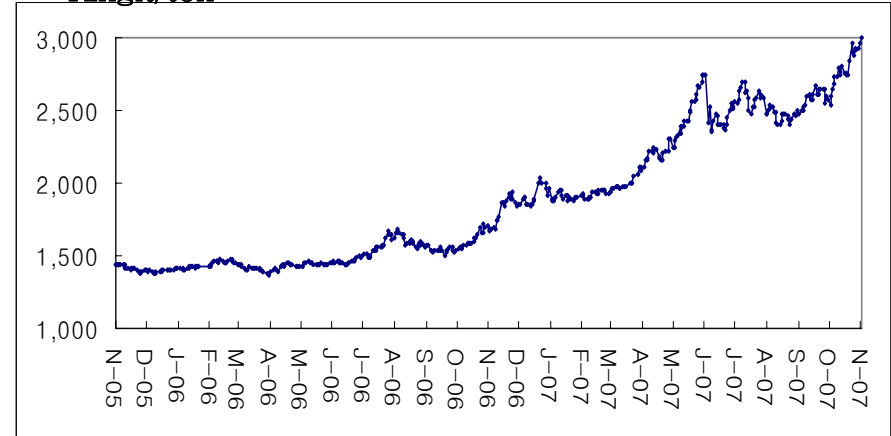
Euro/pound



CBOT(2005.11~2006.11)-시카고상품거래소

## Crude Palm Oil price

Ringit/ton



MDEX(2005.11~2006.11)-말레이시아 선물거래소

# Obstacles in promoting Biodiesel in Korea

## Implementation

- **Government:**
  - Weak purpose to enlarge domestic Biofuel market
  - Not sure of possibility of Biofuel industry
- **People:**
  - Low level of acknowledgment of Biofuel because of lack of public campaign
  - Less tax-incentive compared to current tax rate
- **Industry:**
  - Rush of small firms that expect public financing support
  - Less incentive to derive big oil companies to participate in Biodiesel market

# Obstacles in promoting Biodiesel in Korea

## Technical Issue

- **Biodiesel :**
  - the cold flow properties (tendency to thicken and in vehicles can plug fuel filters and lines, in colder temperatures) of biodiesel, particularly palm oil based biodiesel, are not as good as those of petroleum diesel.
- **Bioethanol:**
  - Unlike petrol, storage in normal tank can cause water separation
  - Blending, storage and distribution needs lots of money to build up infra-structure for safe supply of bio-ethanol

# The goal of Biodiesel in Korea

- By 2030, the portion of biofuel in gasoline and diesel consumption will be 20%
  - Provision of biodiesel will grow at 30% annually and the portion of biodiesel will be increased by 1.0% in 2008, 3.0% in 2012 of the total diesel consumption
  - Provision of bioethanol will begin at 2010 and grow at 17% annually

Year	2005	2010	2015	2020	2025	2030
Diesel	16,301	18,635	20,016	22,437	24,531	25,942
Biodiesel	8	373	1,001	2,244	3,680	5,188
%	0.05	2	5	10	15	20
Gasoline	7,512	7,818	8,945	9,001	9,158	9,403
Bioethanol	-	78	447	900	1,374	1,881
%	0	1	5	10	15	20

# The goal of Biodiesel in Korea

## Policy Issues

- The blending rate of BD5 will be extended gradually from 0.5% to 5%
  - Government will increase the blending rate annually at 0.5%
  - In 2012 it will 3% and will be increased 5% in 2016

The blending target

Year	'07	'08	'09	'10	'11	'12	'16
Blending rate (%)	0.5	1.0	1.5	2.0	2.5	3.0	5.0

- BD20 will increase
  - Obligation quota to Public sector, and Metropolitan area where the Air quality should be controlled
- Tax Incentive will increase
  - Considering the time when the Biodiesel has market competitiveness, the tax incentive will be endowed to the consumers
  - Tax incentive during 2008~2010 will surely implemented

# The goal of Biodiesel in Korea

## Technical Support

- The quality level will be adjusted up to Europe EN14214
  - **The car industry should follow the engine standard and refinery industry also should take an action to control the quality of Biodiesel**
- The National level of R&D center will be open and conduct projects which can increase productivity of feedstock and Efficiency of process of production and market competitiveness
- The monitoring center will be open and play a crucial role of checking up performance of car engine and security using the Biodiesel

# The goal of Biodiesel in Korea

## Feedstock Issues

- 'The pilot project for rapeseed of Biodiesel ('07 ~ '09)
  - Test the domestic production of feeds stocks for Biodiesel
    - Increase farm income and secure supply of domestic feedstock
  - Test the grant of money which can maintain current income level of farmers who want to switch to production of rapeseed (170million won /ha)
  - Test supply chain of rapeseed and productivity and market competitiveness
  - Test of reduction of greenhouse gas using LCA

The Production plan of feedstock during pilot project

Year	'07	'08	'09	'10
Area (Thousand ha)	1.5	1.5	1.5	-
Amount (Thousand kl)	-	2.4	2.4	2.4



# The goal of Biodiesel in Korea

## Feedstock Issues

- Survey on efficient policy tool which can increase the amount of the used vegetable oil
- Considering the import of foreign feedstock (Palm oil or zatropa oil) from Southeast Asia
  - **Diversification of feedstock**
  - **Test the technical safety with high level of mix of imported feedstock**

Thank you