

The Asian Oil Problem: Imbalance of Supply and Demand

Yoshiki Ogawa
General Manager
the 2nd Research Department
The Institute of Energy Economics, Japan

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Contents of Presentation

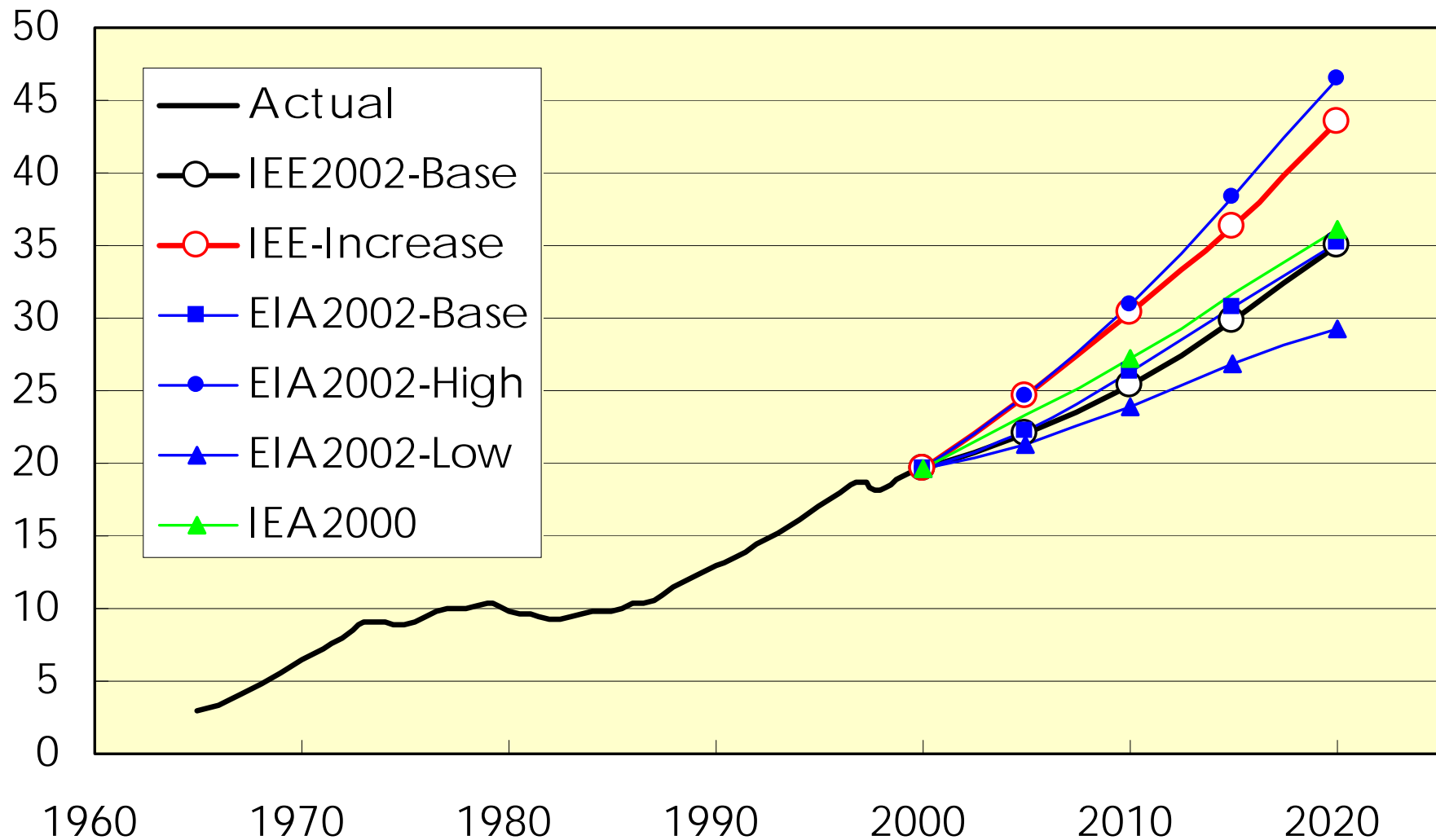
- Oil Supply-Demand in Asia and High Quality Requirement to Oil Products
- Asian Oil Premium and Marker Problem
- Minimization of Crude Price Fluctuation
- Integrated Energy Industry and Flexibility

Specific Characteristics of Asian Economy and Energy

- Rapid recovery from Asian economic crisis
- Long-term steady growth of economy 3-4%
- Growth center in the world
- Steady increase of energy demand, especially of oil demand centering in the transport sector
- Increasing volume dependency on imported oil from middle east
- Countermeasures required to local environment problems such as air pollution

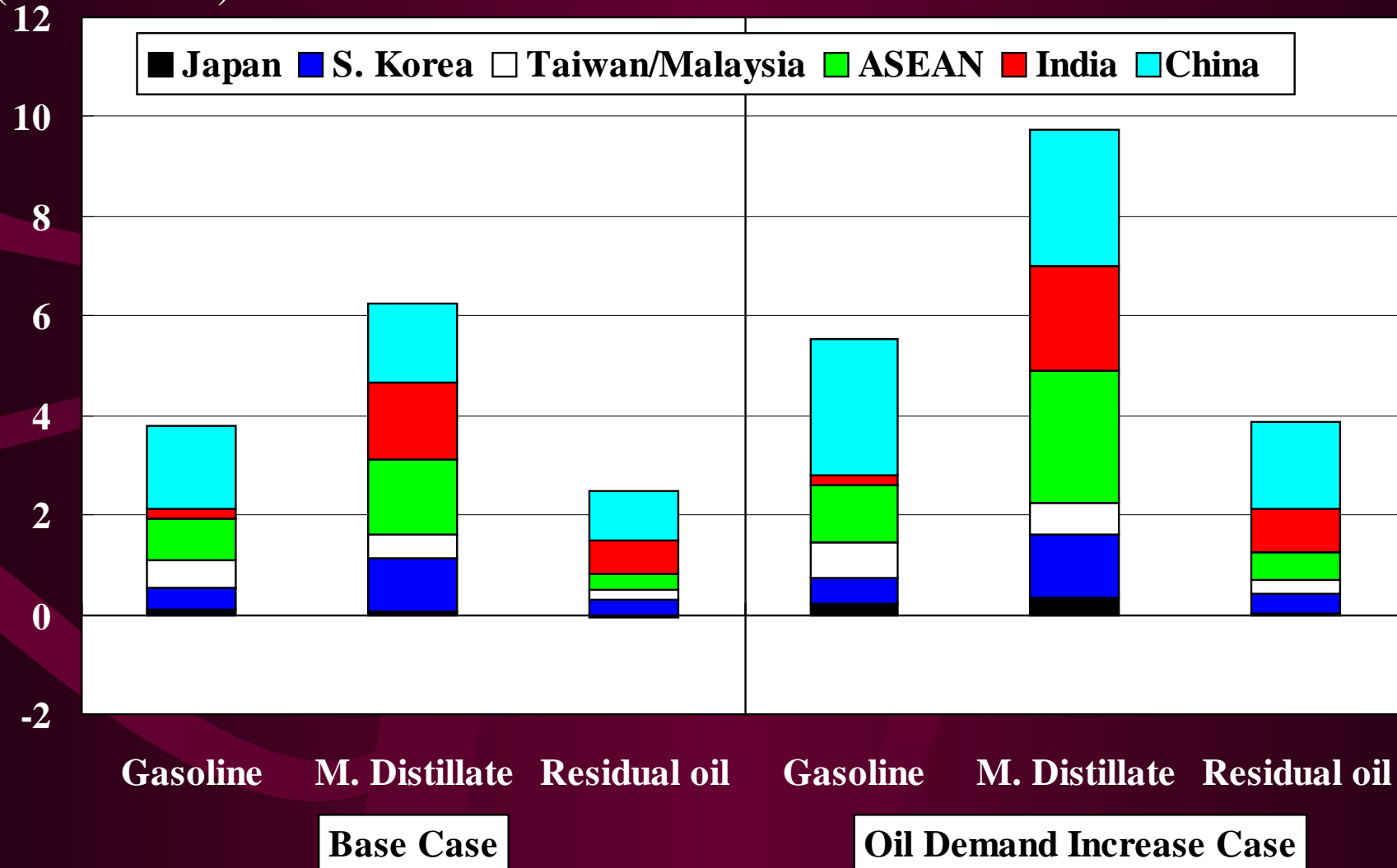
Prospects for Oil Demand in Asia up to 2020

(1 mil. B/D)

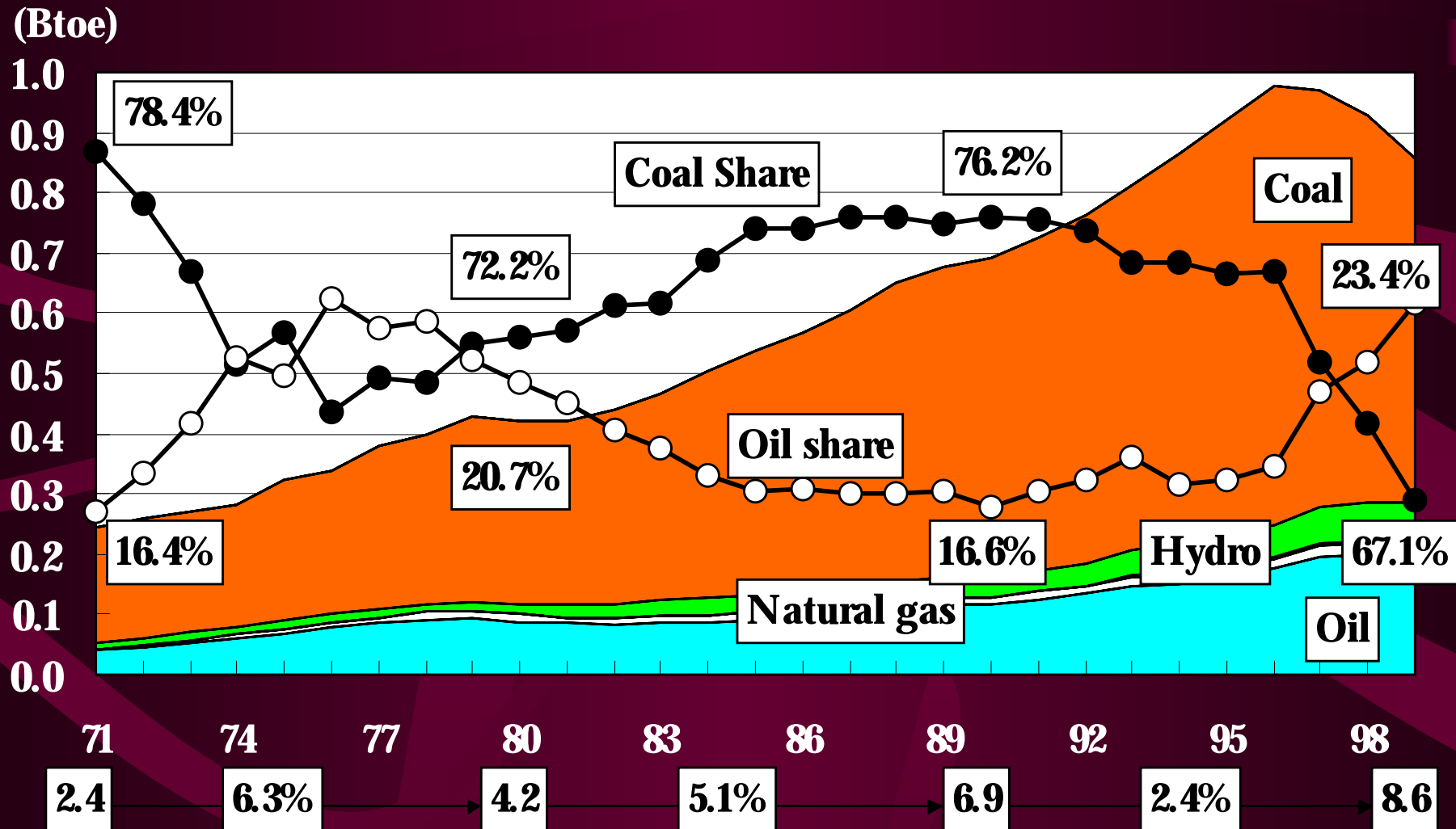


Increasing Demand by Oil Product From 1996 Through 2020

(1 million B/D)

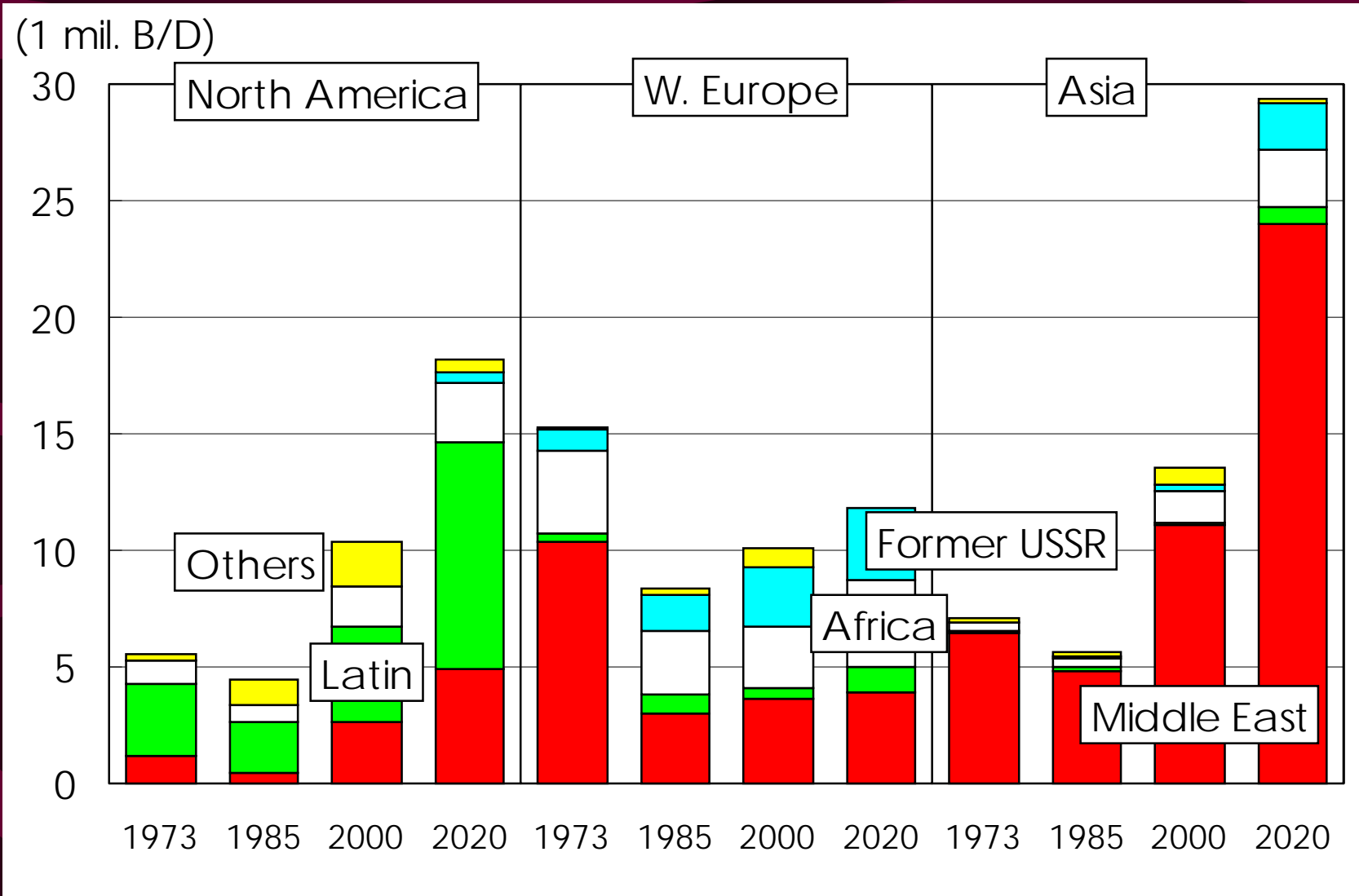


Recent Rapid Decrease in Coal Consumption in China



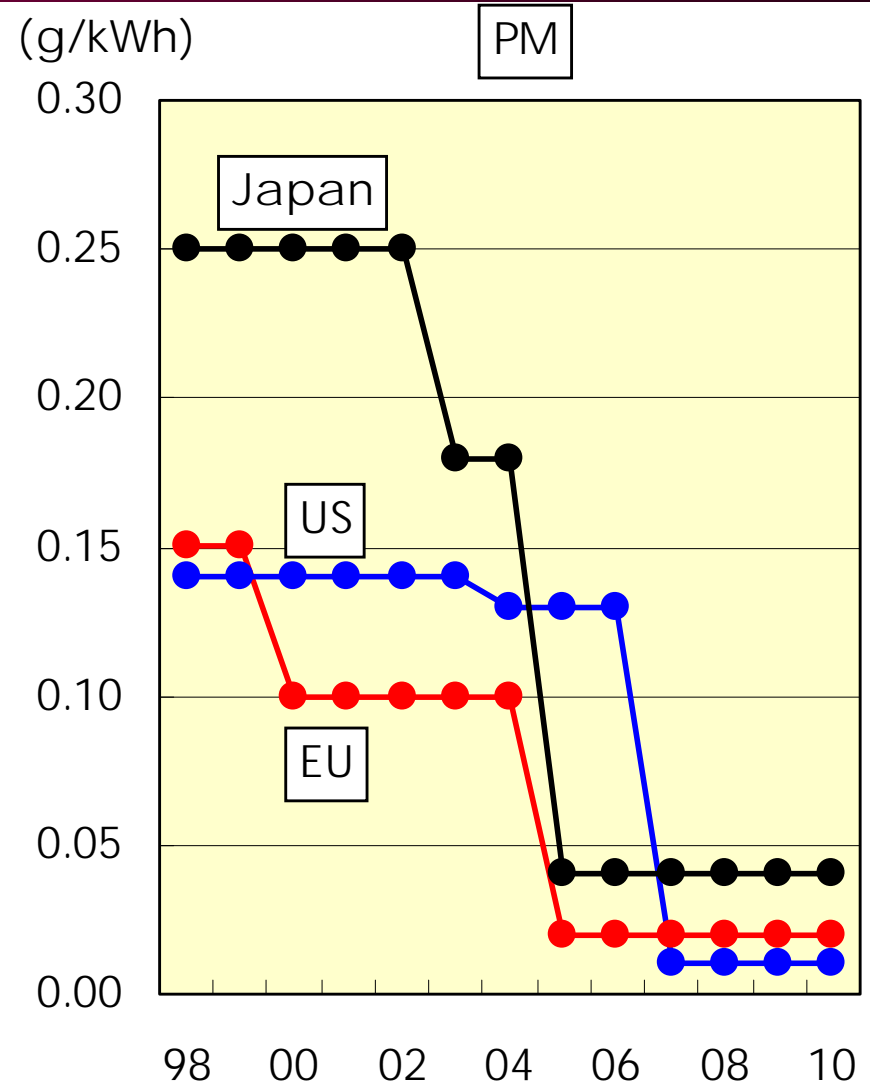
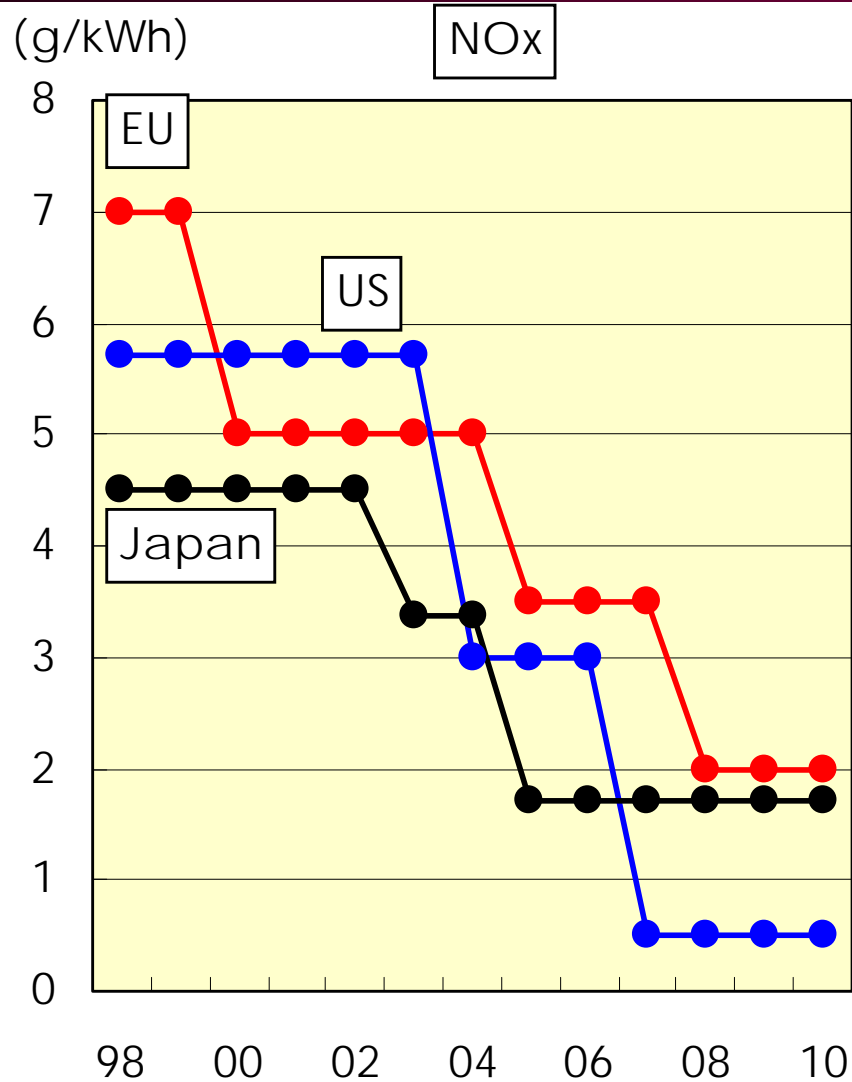
(Source) Statistical Yearbook of China

Increasing Dependency of Middle East Oil in Asia



(Source) Made from Data in BP Statistics and US.DOE International Energy Outlook

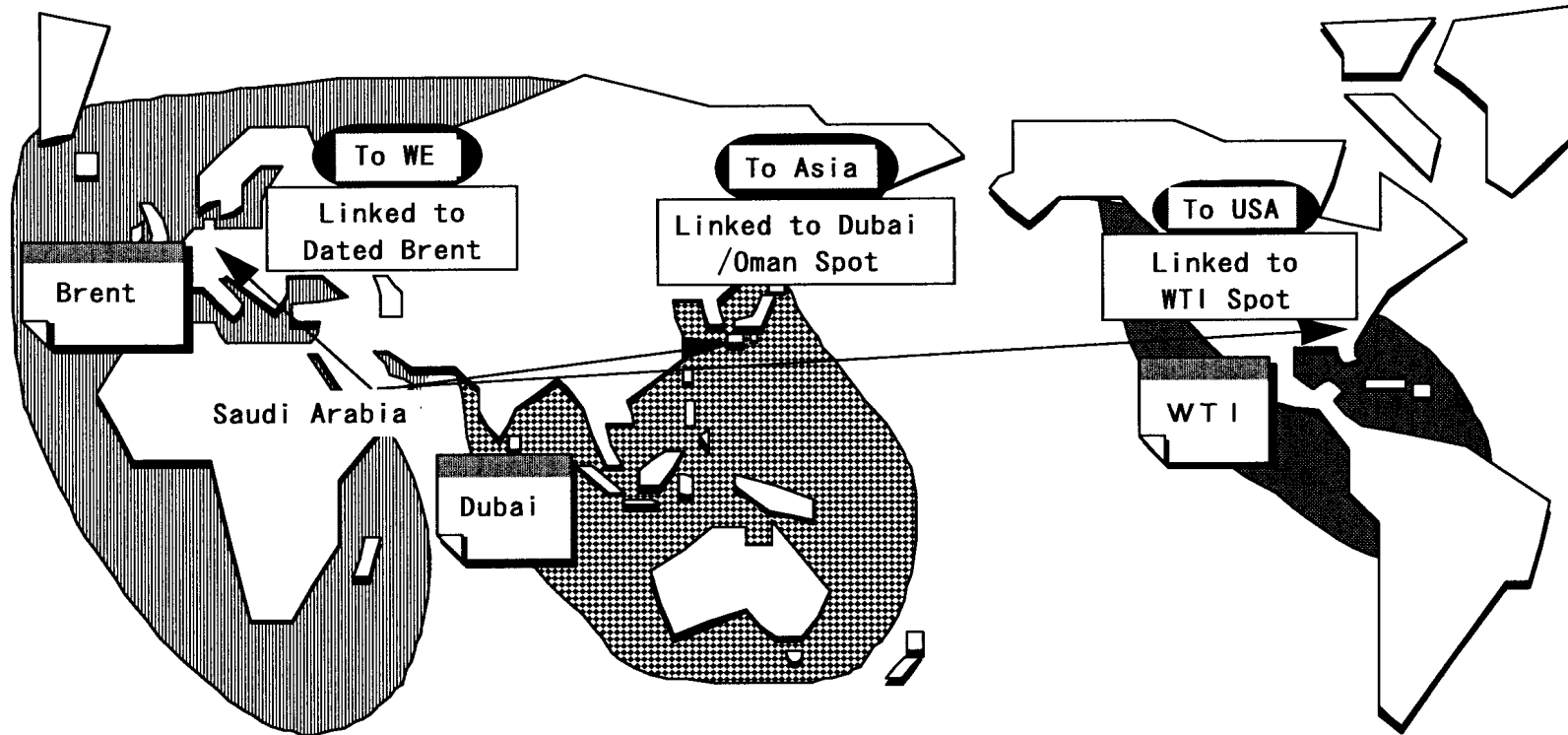
Prospects on Exhausted Gas Regulation in EU, US and Japan up to 2010



Directions on Quality Regulations of Oil Products in EU, US and Japan

- **US: TIER II from 2004, sulfur content:
gasoline--30 ppm, diesel--15 ppm to 2007**
- **EU: EURO IV from 2005, sulfur content:
gasoline—50 ppm, diesel—50 ppm**
- **EU: S content 10 ppm diesel from 2008-9**
- **Germany: S content of 50 ppm from 2001
further S content of 10 ppm from 2003**
- **Japan: diesel S cont. of 50 ppm from 2004
results of pollution lawsuit**
- **S content: 5-10 ppm –World charter
Car maker recommendation – US, EU, Japan**

Crude Oil Pricing Mechanism



Pricing formula :

$$P_x = P_m \pm a$$

P_x : Crude oil export price set by producing country

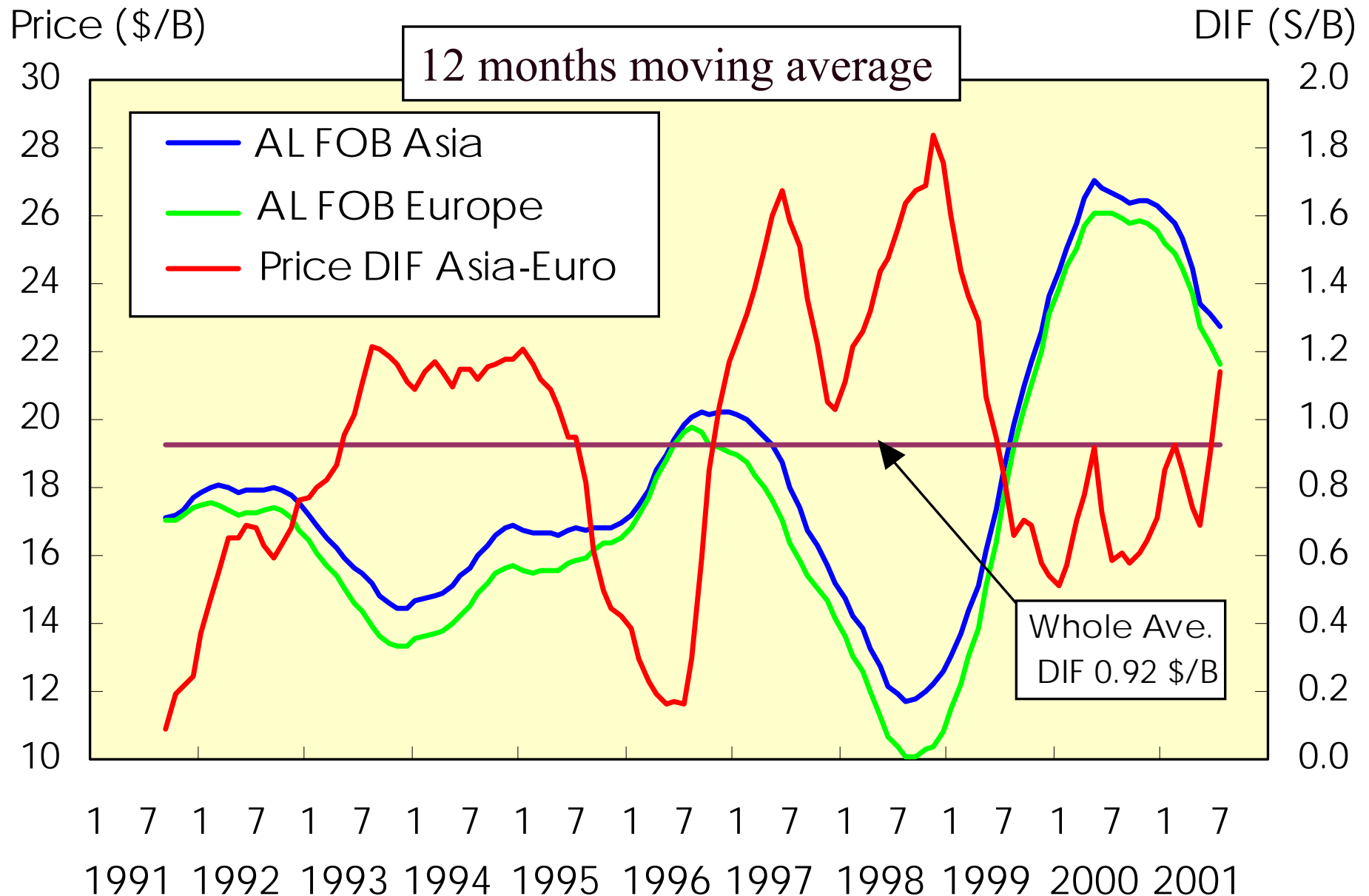
P_m : Marker crude spot price

a : Adjustment factor

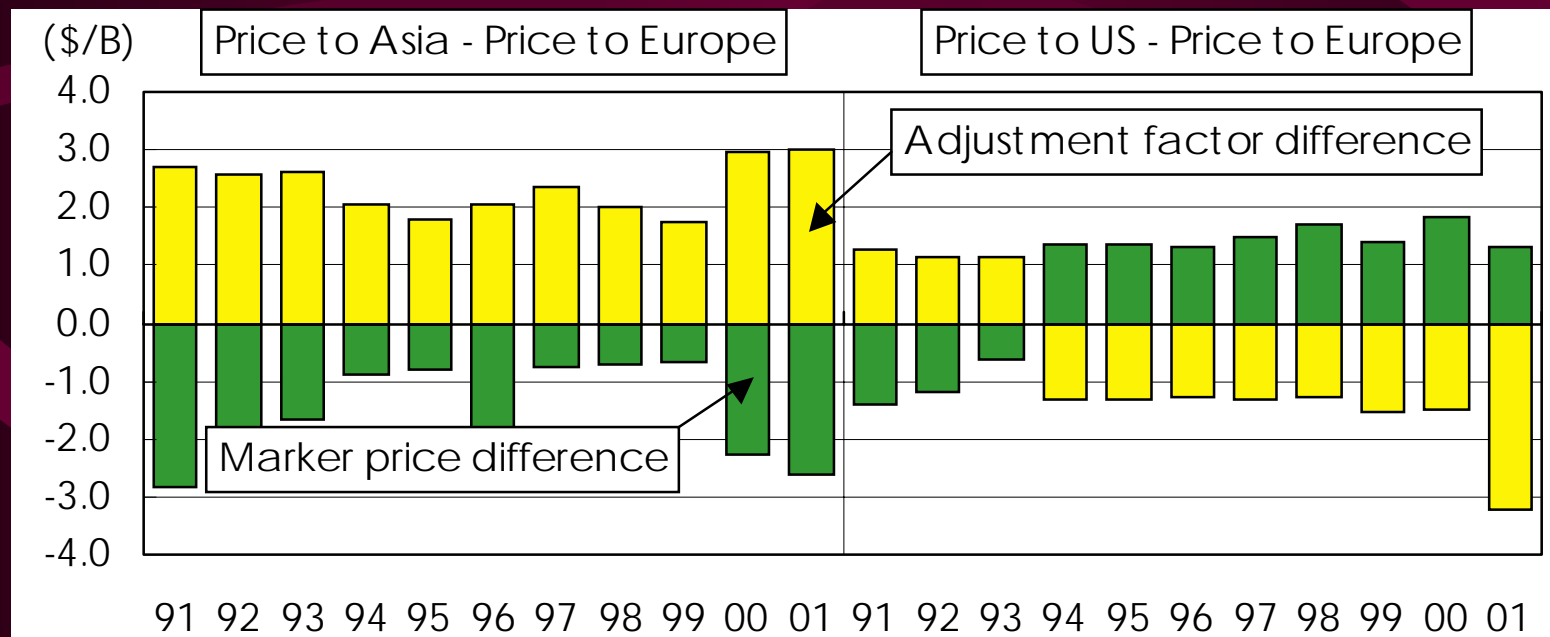
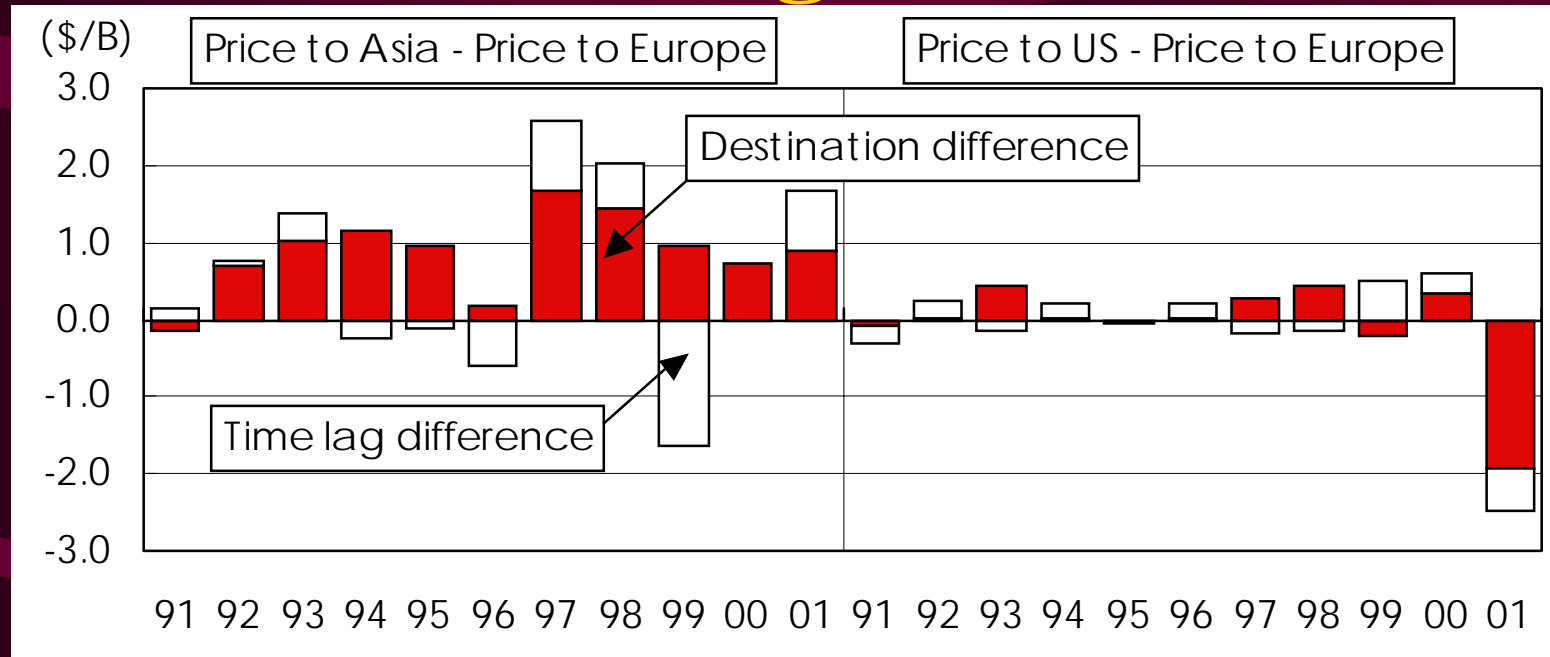
Marker Crude

Crude oil which provides the benchmark price in a given crude oil market

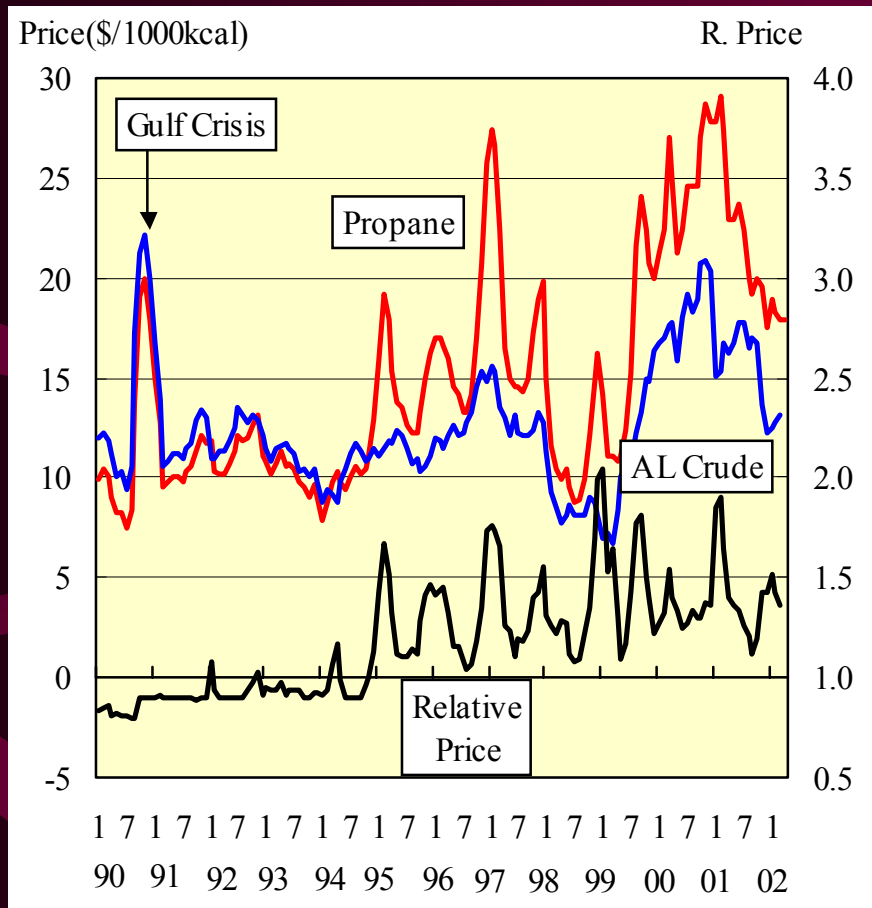
Asia Premium in Crude Oil



Factors Affecting Asian Premium



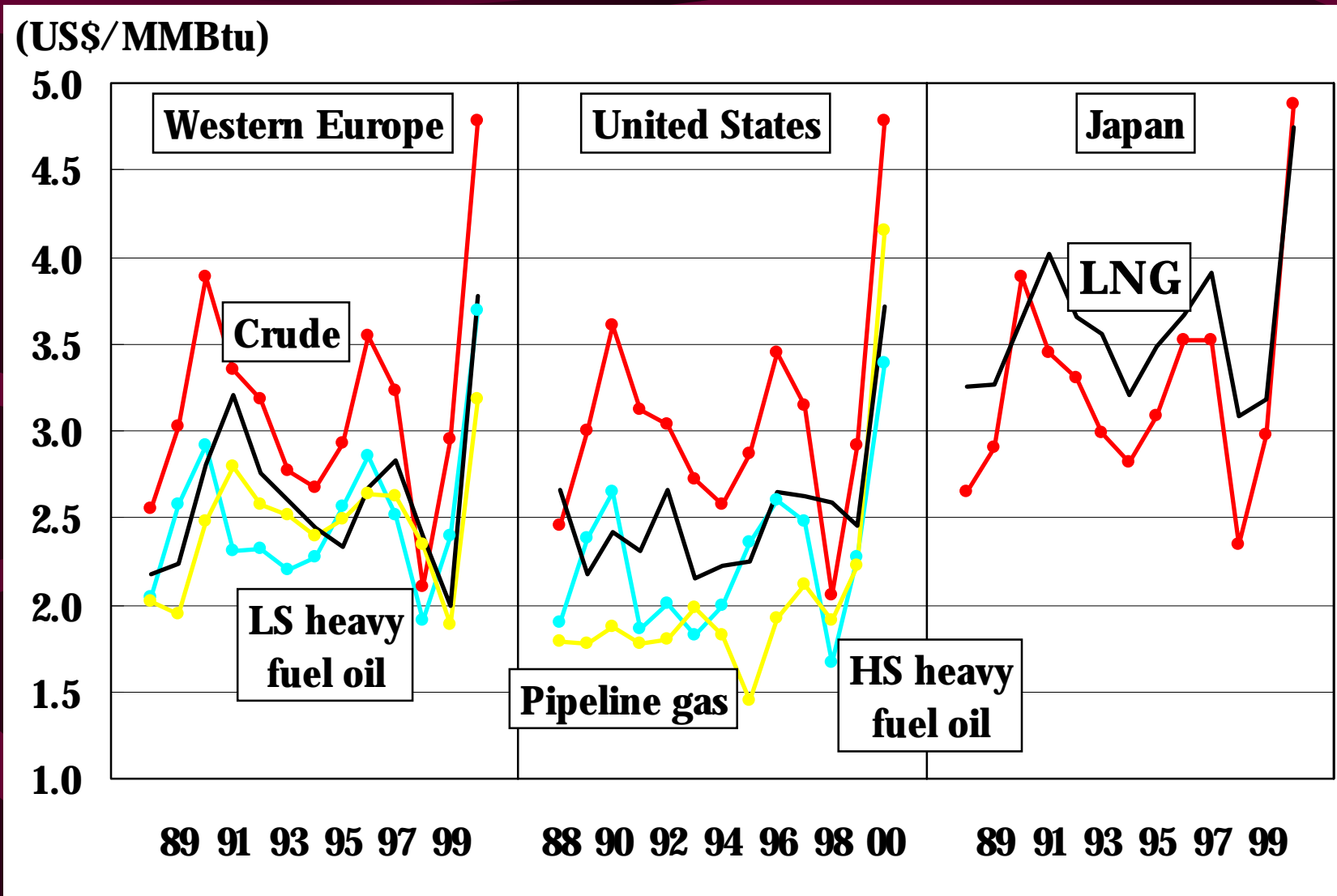
Volatility of LPG Price and Importance of LPG in Asia



	Asia Ex. Japan	Japan
Share in World Trade	26.1%	31.5%
ME Dependency	75.5%	81.9%
Share of Residential Sec.	78.9%	50.6%
Demand Growth 1990--1999	11.1%	0.5%

(in 1999)

Relatively Higher LNG Price in Asia



(Source) Made from data in IEA, Energy Prices and Taxes

Problems Dubai is Faced with

- Marker crude for pricing to Asia in past 15 Years
- Dubai production decreased in recent 5 Years
Over 400,000B/D (1987) → 170,000B/D (2001)
- Spot trading also decreased
- Liquidity and transparency of spot market lowered
- Became unreliable market
- Early solution is required between oil producing and consuming countries

Conditions required for maker

- The prices are formed without arbitrary factors and with good transparency.
- The trade having a certain volume is accepted by many market participants.
- The crude oil has a representative quality in oil producing and consuming area.
- Conditions of trading contract are well arranged and are rational.
- Oil producing area is politically and economically stable.

Conditions required for a market

Base of Rational and Free Trading

Political stabilization in producing country

Fullness of shipping facilities

Reliable management of trading market

Rational contract conditions based on international rules

Widely used and representative quality
A certain volume of trading

A number of market participants
both buyers and sellers

Increase of Trading Volume
Increase of Liquidity

Increase of Price Transparency
Possibility down of arbitrary price manipulation

Alternative Candidate of Marker 1

Ideal—Crude in Asia Consuming Area

- Spot traded crude oil representative in Asian consuming area is ideal
- Daqing is a possible candidate, but China is the closed market controlling most
- Tapis is also a possible candidate, but trading is small similar to Dubai
- There is no appropriate crude in Asia consuming area

Alternative Candidate of Marker 2

Second best ideal—Middle East crude index

- Middle East crude price index formed by future trading is a possible candidate.
- Various market preparations step by step are required.
 - Expansion of oil product trade and spot market
 - Introduction of oil future trading
 - Listing of Middle East crude price index
- Immediate adoption of this index is quite difficult.

Alternative Candidate of Marker 3

Second best ideal—Arabian Light crude

- Arabian Light can be a representative of Middle East crude to Asia.
- A certain volume of Arabian Light spot trading is required for price formation.
- Saudi Arabia is now prohibiting spot trading and regulating destinations
- There is little possibility of this option

Alternative Candidate of Maker 4

Practical—Oman crude (Spot)

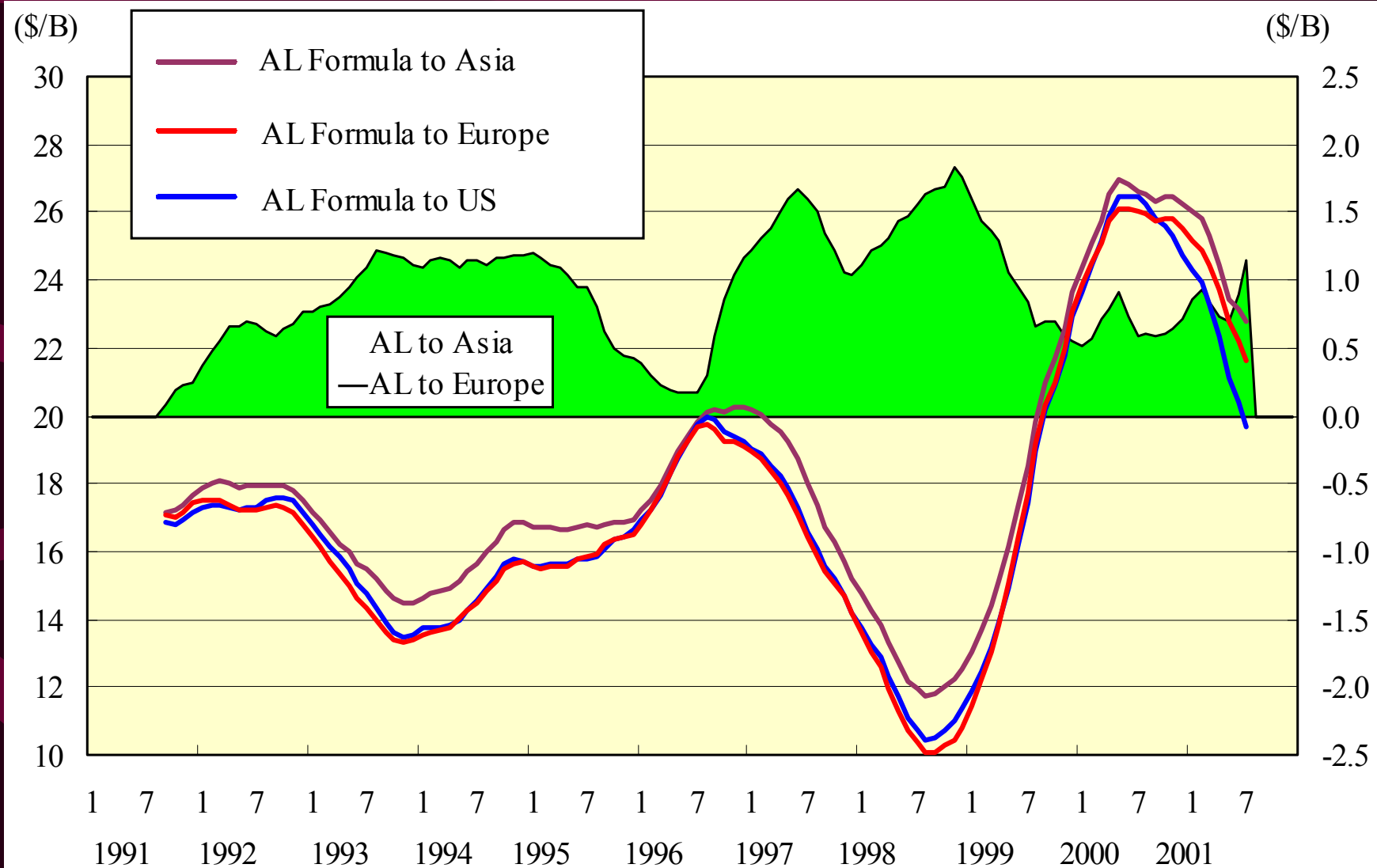
- Oman crude is another practical candidate which has relatively less problems.
- Oman has a certain amount of spot trading
Production size is larger than Dubai.
- Shell possesses 40% of equity.
- There are some apprehensions for market manipulation

Alternative Candidate of Marker 5

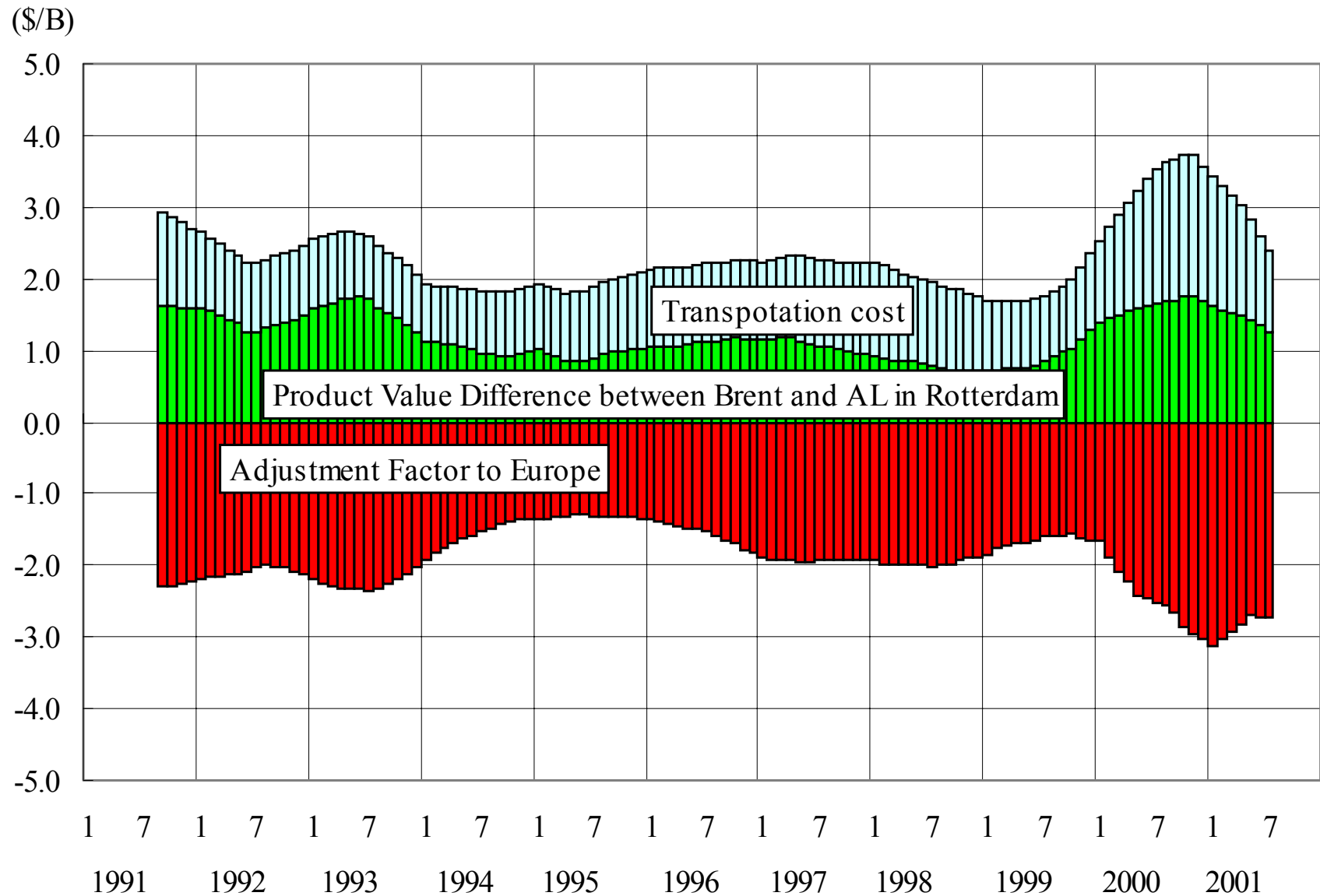
Practical—IPE Brent crude (Future)

- IPE Brent is believed to be a practical candidate of marker.
- A large scale of international trading,
High liquidity and transparency
- Making it easier to argue price differential between East-Suez and West-Suez
- The price is more easily influenced by the supply-demand in European market

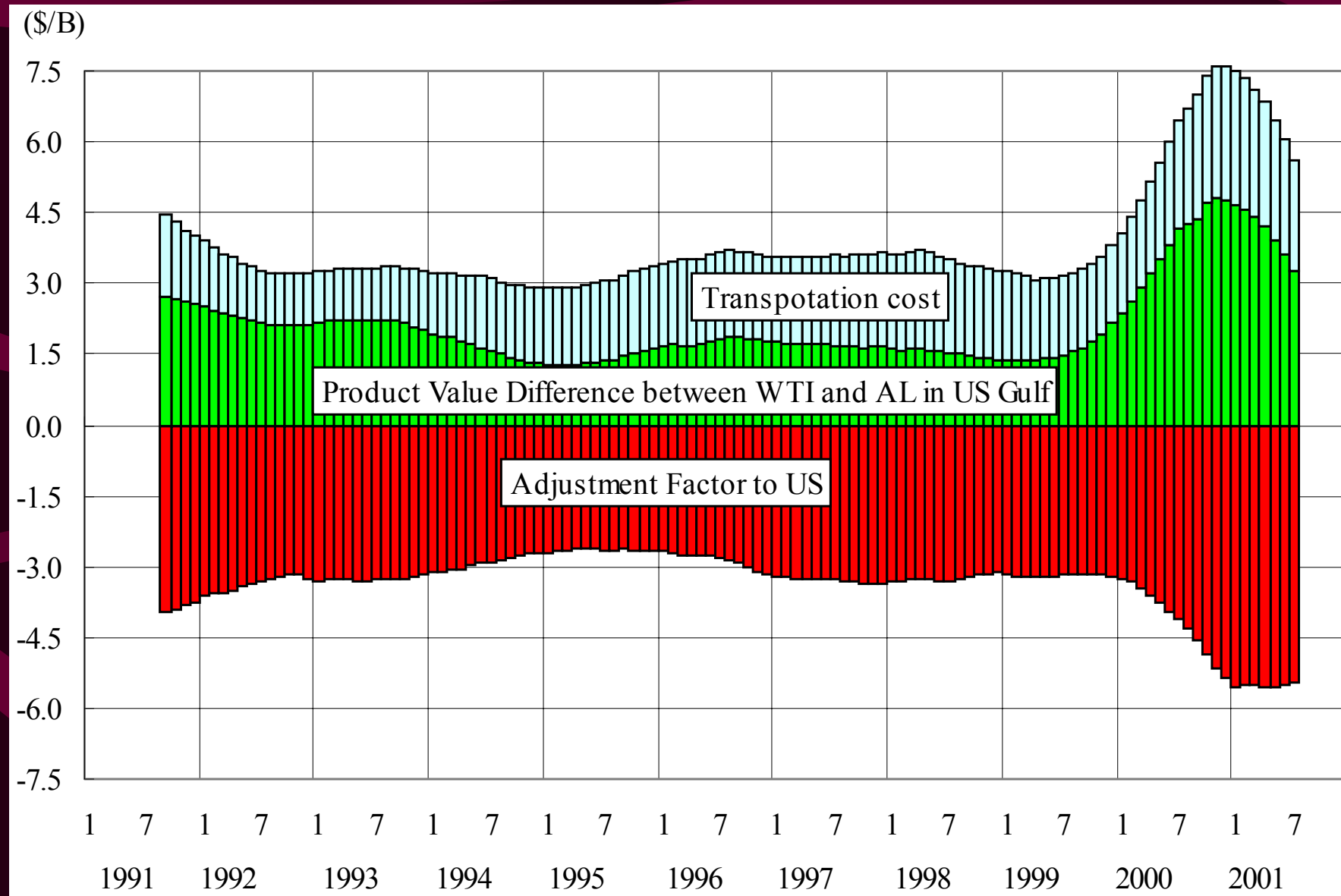
East-West Gaps in Crude Oil Price



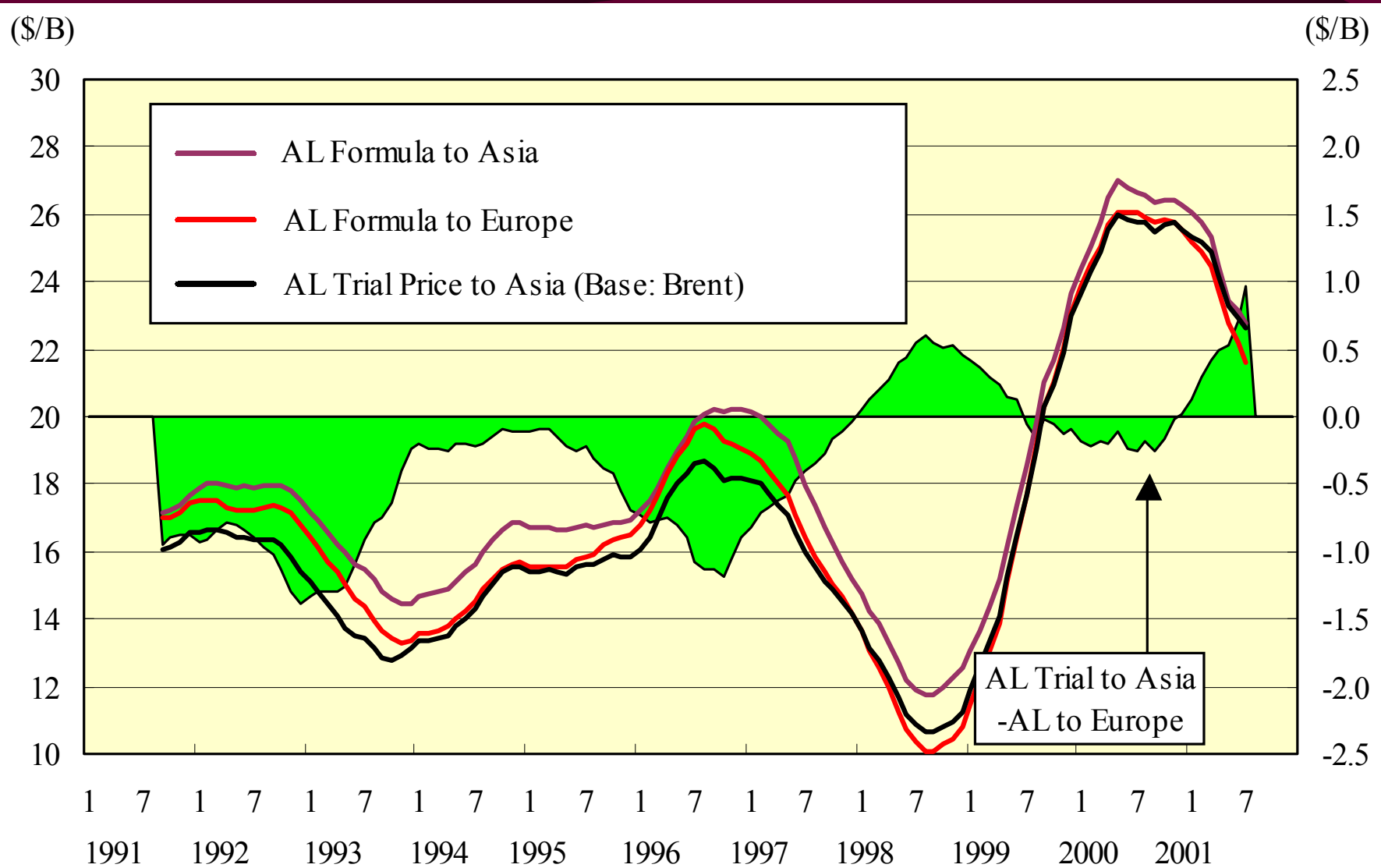
Adj. Factor and Components (1) Europe



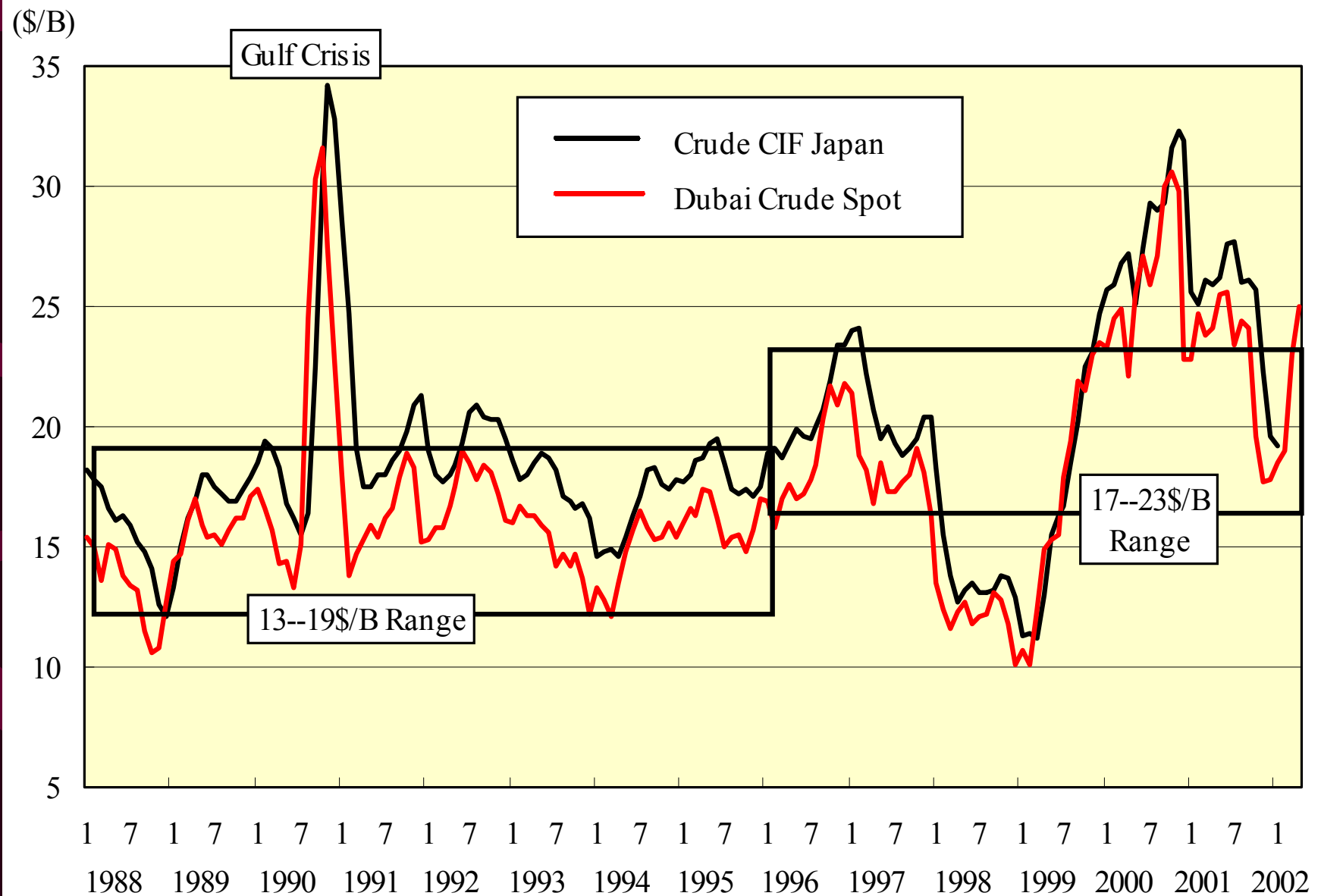
Adj. Factor and Components (2) US



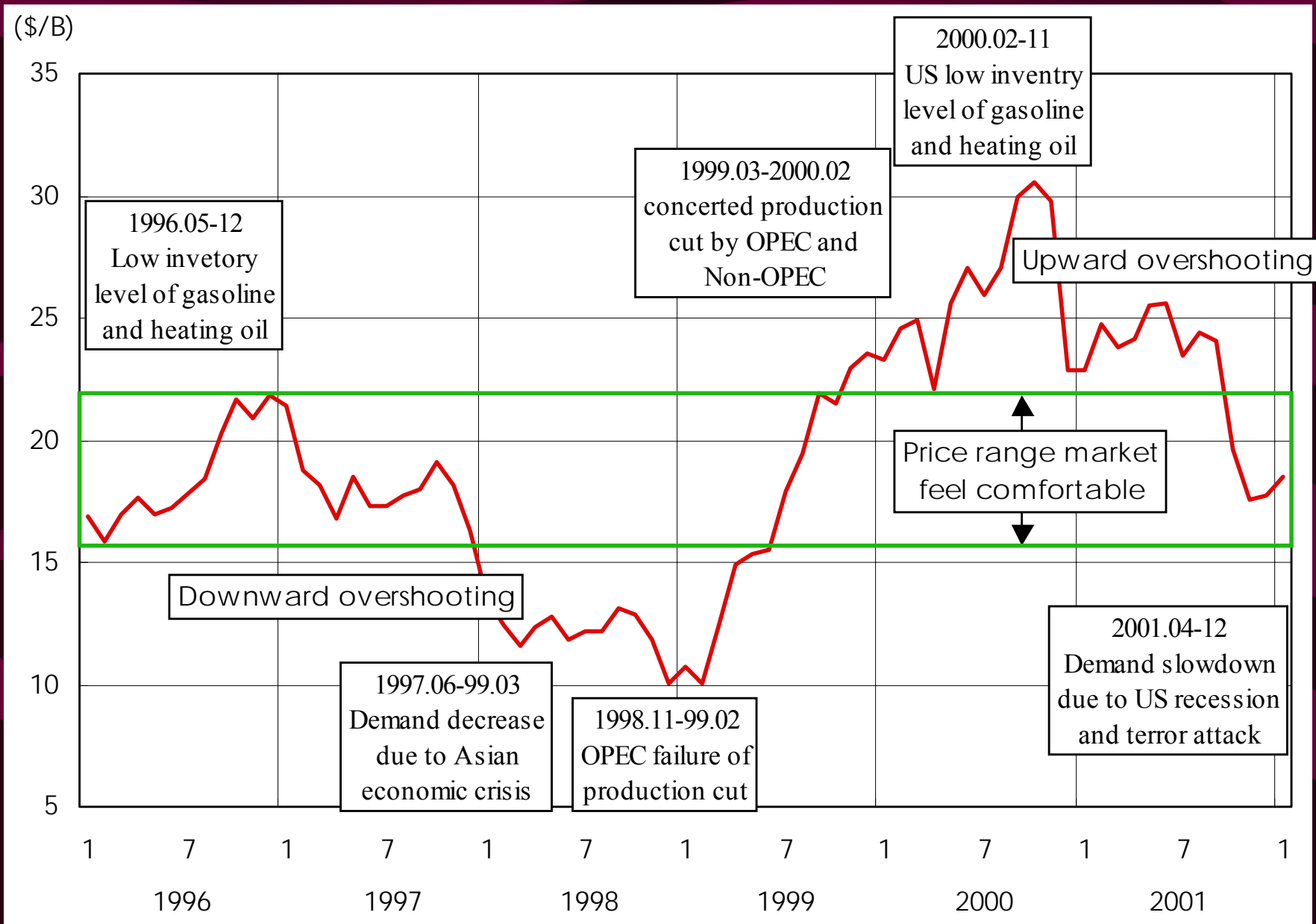
Trial Price of AL to Asia Based on Brent



Oil Price Change in Asia



Large Price Fluctuations from 1996



What is the crucial factor causing jumps and slumps of crude oil prices?

<Price jumps>

- Crude oil production control made by oil producing countries centering OPEC
- Bottlenecks due to shortage of refining capacity, low level of oil product inventory, etc
- Price overshooting induced by oil future trading

<Price slumps>

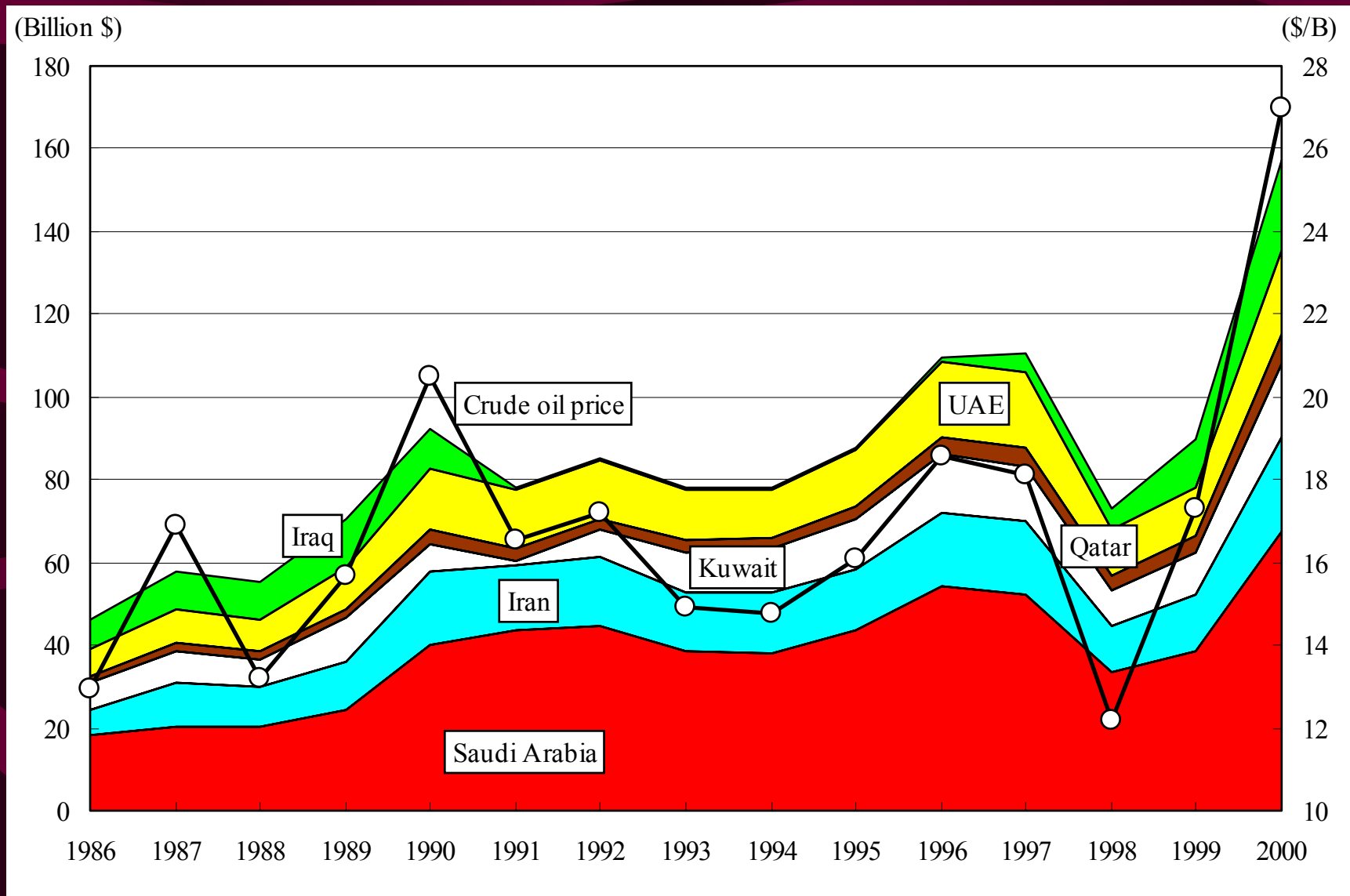
- Unexpected decrease in oil demand caused by economic recession
- Severe competition among oil producing countries such as OPEC and Non-OPEC
- Price overshooting induced by oil future trading

Influences on Economy of Price Jump

	Japan	China	ROK	Indonesia	Malaysia	Philippine	Thailand
Oil share in prim. energy	51.1%	18.9%	56.2%	32.5%	55.1%	48.6%	49.7%
Oil import val./GDP	0.8%	0.7%	4.4%	1.5%	1.7%	3.2%	3.7%
Oil import val./Total import	11.7%	4.4%	15.0%	8.6%	2.1%	7.5%	9.1%
GDP (billion \$)	4346.8	991.1	406.9	140.7	78.7	76.5	124.4
Net oil import (1000 B/D)	4320	590	2390	- 590	-290	320	700
Trade balance (billion \$)	123.0	36.2	23.9	24.7	19.1	5.0	13.5
Influence of Crude price up of \$10/B							
Oil imp. increase (billion \$)	18.0	3.2	7.6	- 2.2	-1.0	1.3	2.3
GDP loss	- 0.4%	- 0.3%	- 1.9%	1.5%	1.3%	- 1.8%	- 1.9%
Net oil import (1000 B/D)							
Year 2010	4080	2720	3080	- 480	- 40	770	1150
Year 2020	3730	5240	4770	350	250	1290	2010

(Source) Discussion Paper in METI Advisory Group on Energy Security

Changes in oil export revenues

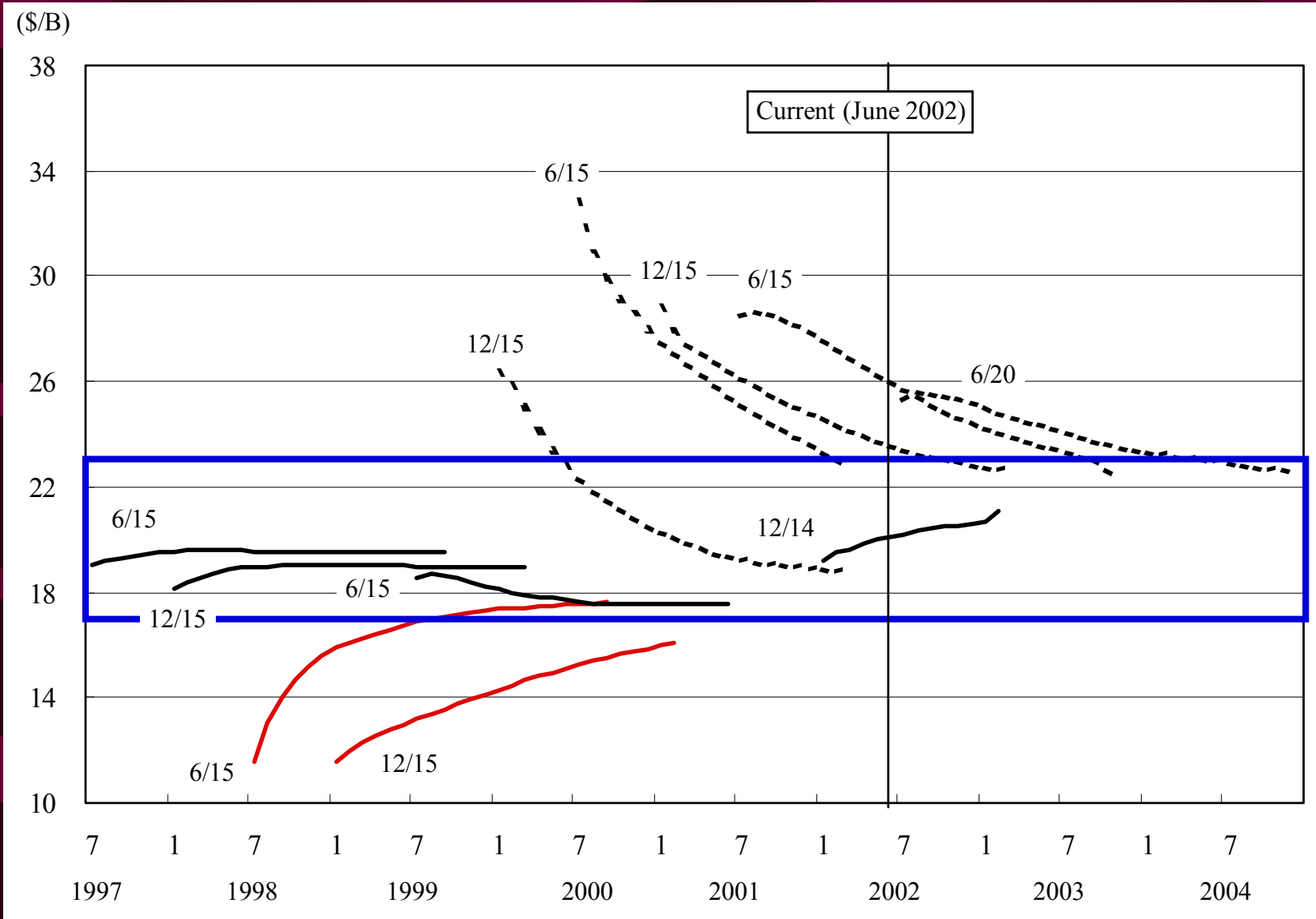


(Source) Made from Data in OPEC Statistics

What is the serious influence induced by jumps and slumps of crude oil?

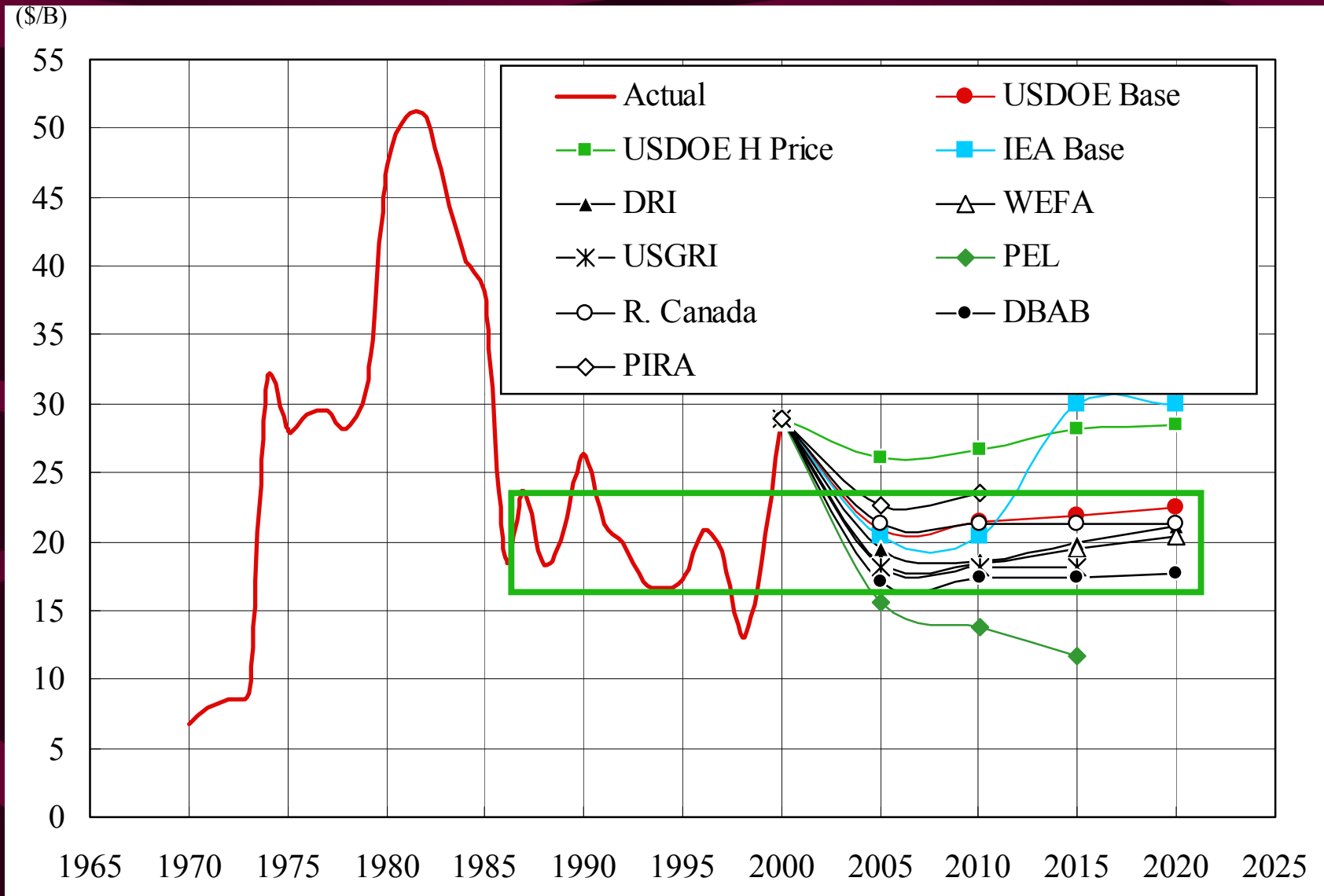
- Influences on economy or people's life
 - consuming countries <when price jumps>
 - producing countries <when price slumps>
- Influences on investments because of large price fluctuations (uncertainties)
 - crude oil exploration and development <producing countries>
 - oil supply facilities such as refining plants <consuming countries>

Price Expectation Curve in Oil Future Market



(Source) Made from Data in Wall Street Journal

Long-term Price Forecast up to 2020



(Source) Made from data in US.DOE International Energy Outlook

Crude Oil Price Level

- \$7-13/B (Average \$10/B) range
OPEC, Non-OPEC defend this price level desperately
- \$12-18/B (Average \$15/B) range
OPEC, Non-OPEC cooperate to keep this price level
Start new crude oil development in Non-OPEC
- \$17-23/B (Average \$20/B) range
Non-OPEC change to price taker, maximum production
Start conversion to alternative energy
- \$22-28/B (Average \$25/B) range
OPEC hope to keep this price level,
Independent production cut by OPEC
- \$27-33/B (Average \$30/B) range
All consuming countries blame this price level

Where is a reasonable price level for producer, consumer, and investor?

- Price level by which oil producer can maximize her oil revenue reasonably
- Price level under which new oil development and alternative energy introduction can not progress largely
- Price level and fluctuations under which long-term investment can be made surely

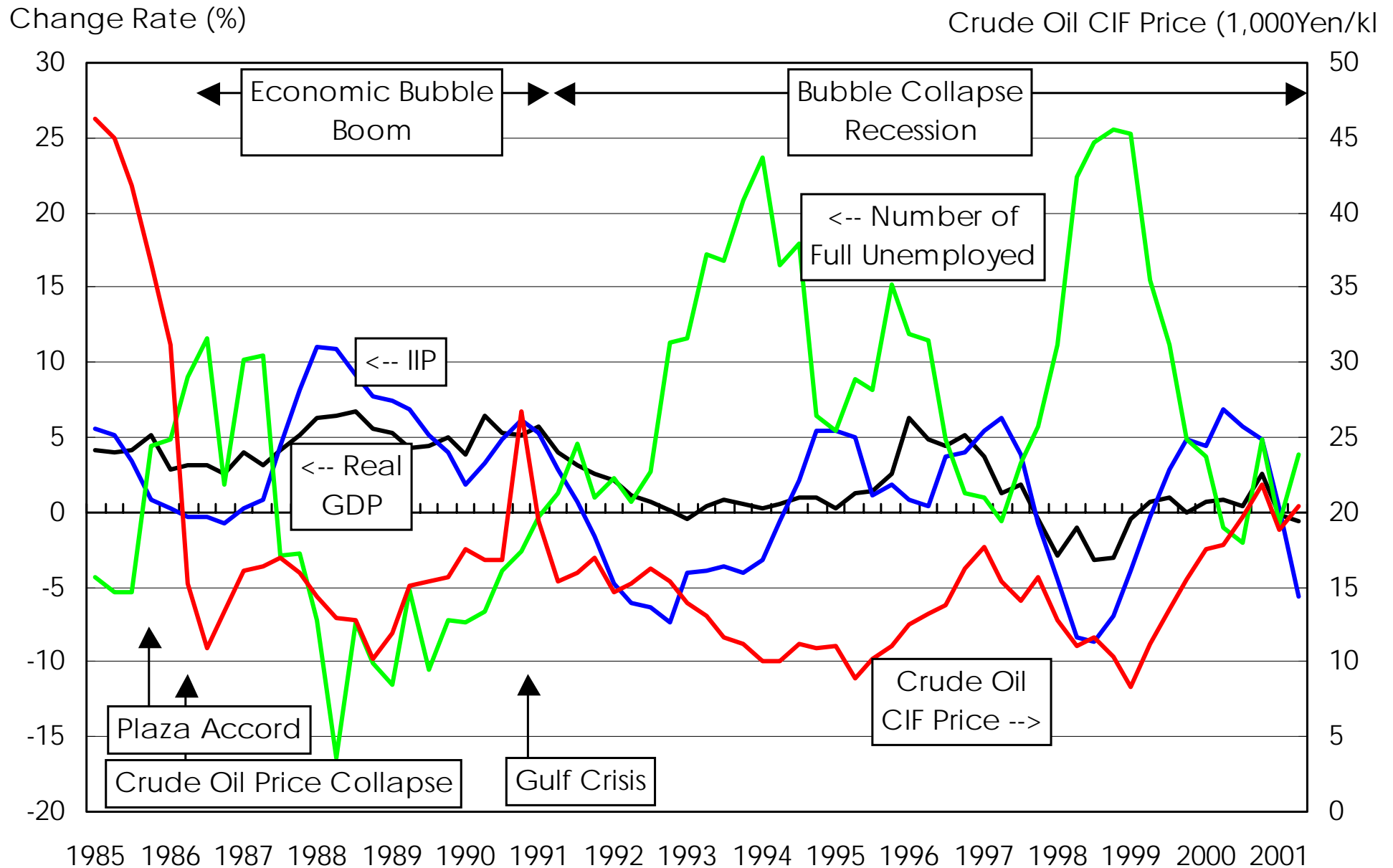
What kind of measures we have for minimization of price fluctuation? (1)

- To set up reasonable price band by oil producing countries
 - Present price band \$22-28/B by OPEC is relatively high, considering from new crude development and competition with alternative energy
- To grasp correct information on supply-demand in oil producer and consumer
 - Weekly announcement of oil inventory data by US. API and US.DOE often influence to actual markets
 - Estimation of Asian oil demand etc. in IEA oil market report often have a uncertainty

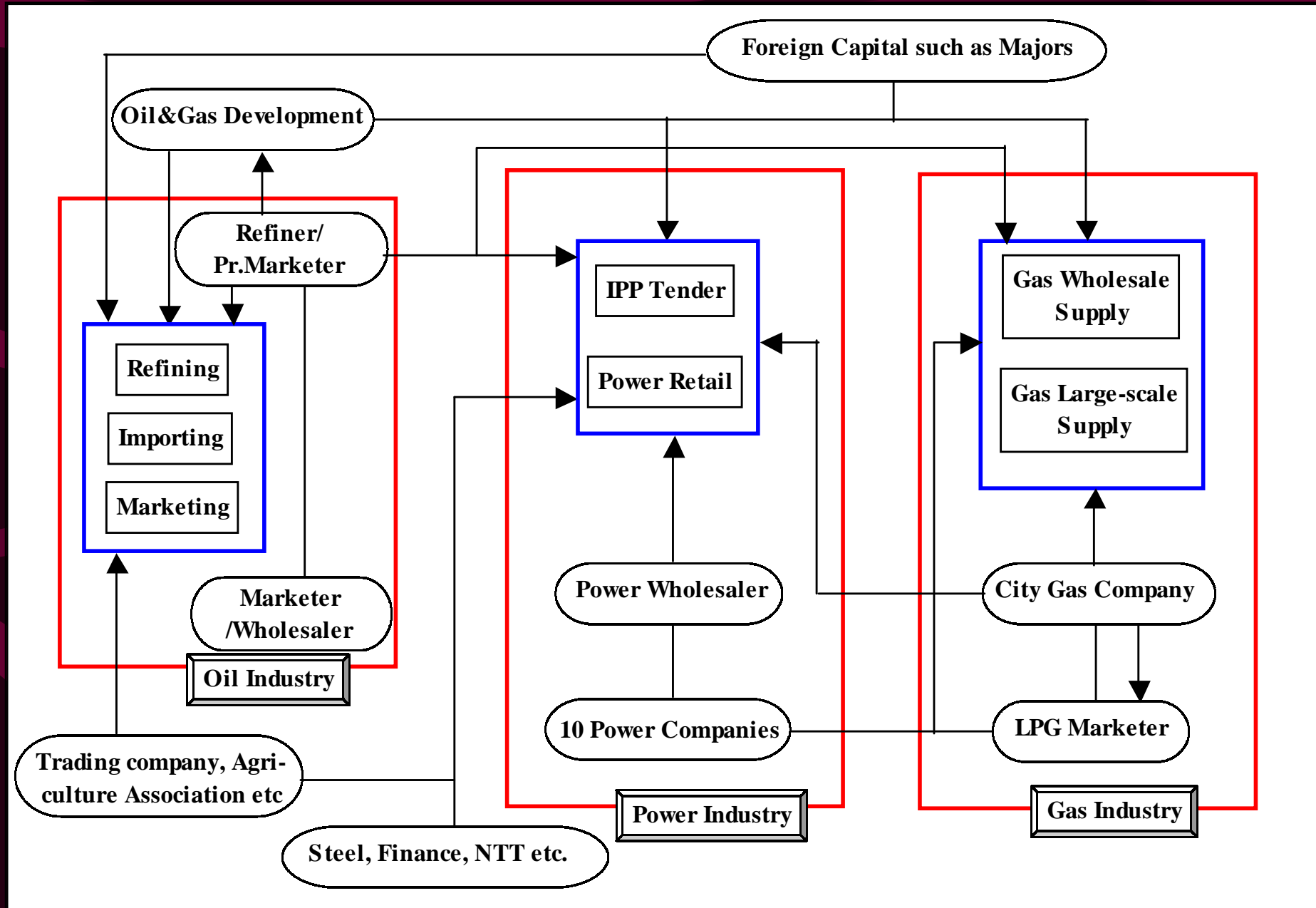
What kind of measures we have for minimization of price fluctuation? (2)

- To prepare appropriate spare capacities
 - on crude oil production (producer side)
 - on refining plants (consumer side)
 - on oil product inventory (consumer side)
- To have a flexibility on effective use of existing oil reserve for emergency
 - OECD countries have about 120-days stocks
 - Asian countries now also start to build up oil reserve
- To make a rule for preventing price overshooting induced by oil future trading

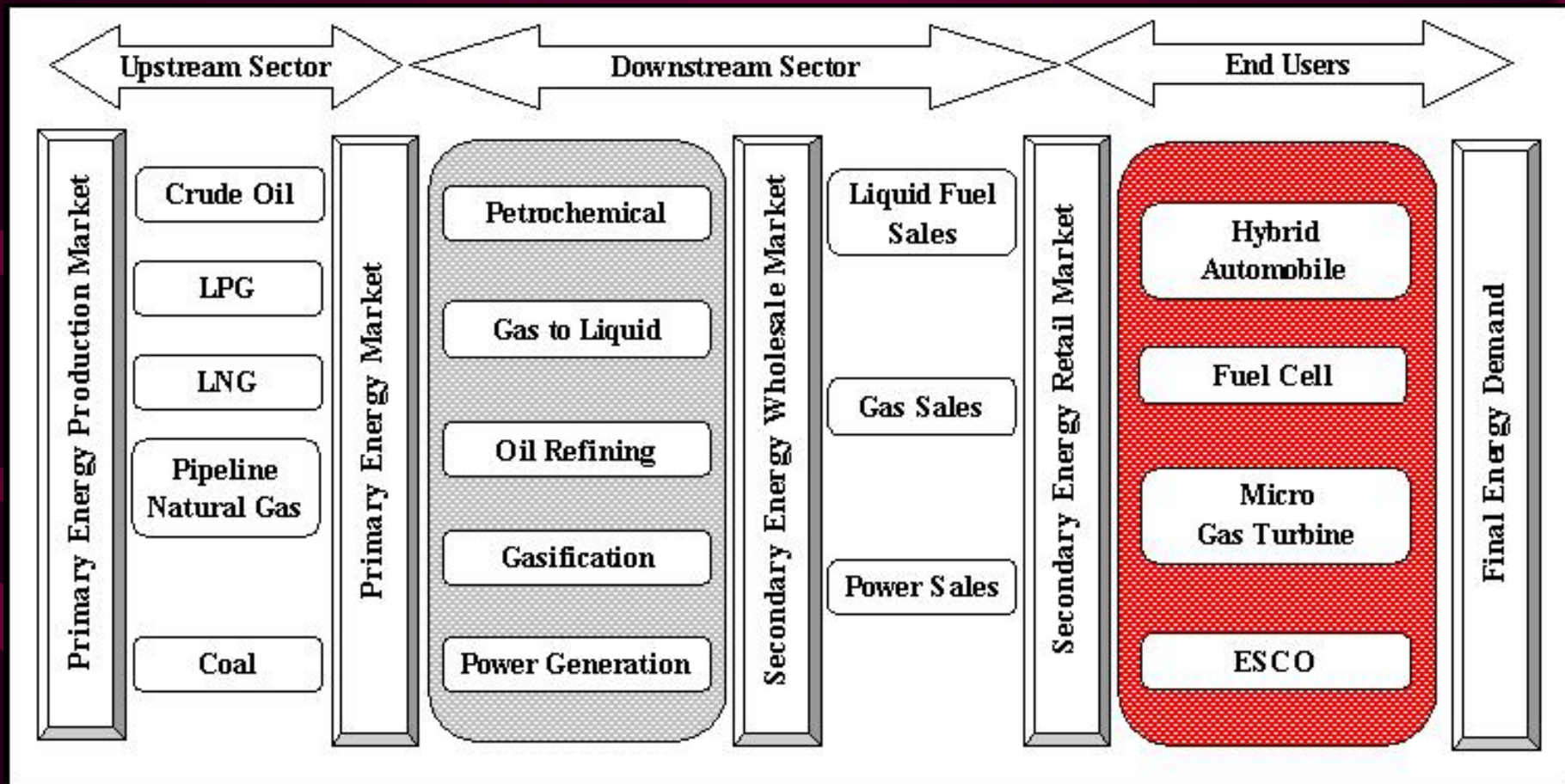
Bursting of Economic Bubble and Recessions



Energy Industries Becoming Borderless

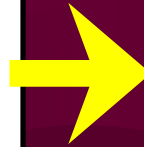


Integrated Comprehensive Energy Industry (BTU Industry)



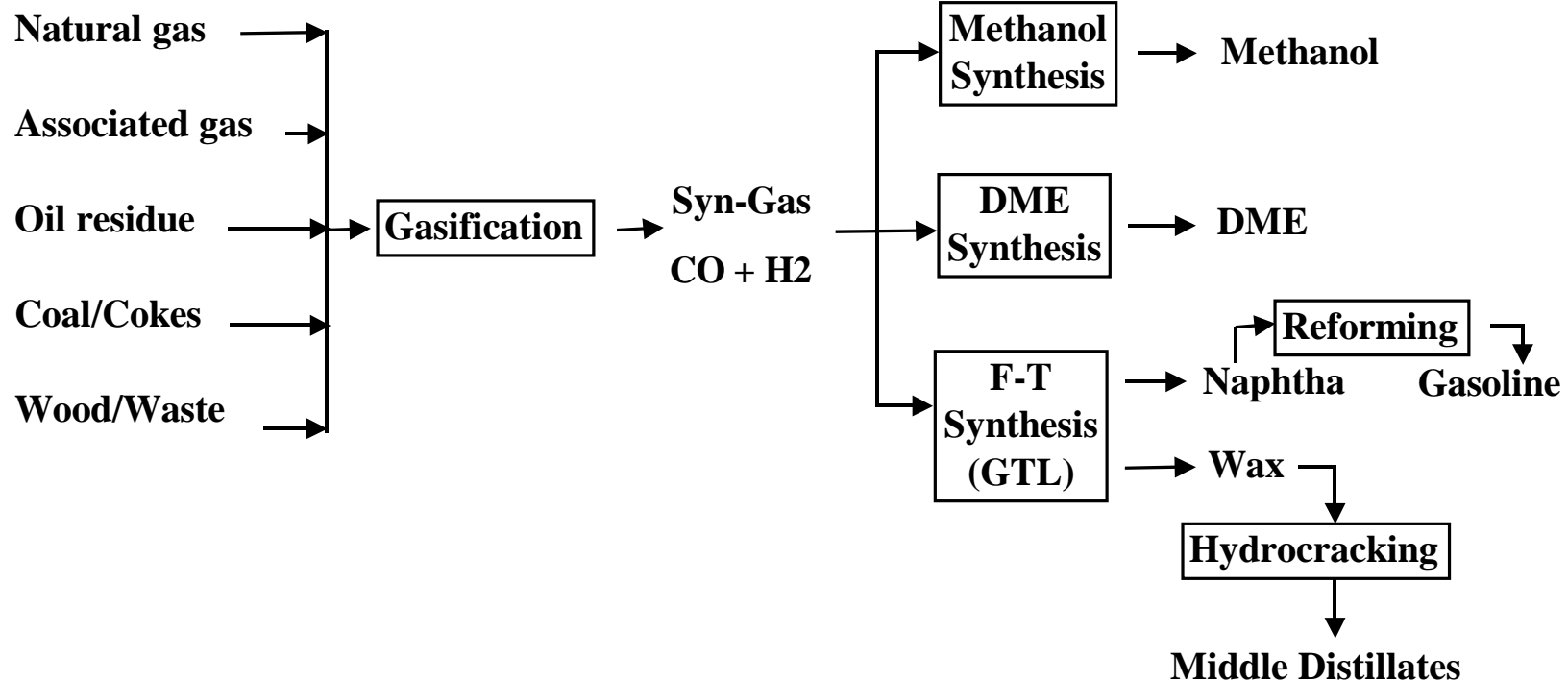
Expansion of Natural Gas Utilization

Gas from small-scale field
Surplus gas for LNG to Asia
Gas flared or leaked



First pass : LNG
Second pass : Pipeline gas
Third pass : Liquid fuel(GTL)

Production of value-added energy from syn-gas



Characteristics in Asia Oil Market

	Asia	US / Europe
Cru- de	<ul style="list-style-type: none"> • Non-matured oil future • Low Price Transparency • ME crude main stream • Increase in W. Africa crude • Price marker outer region 	<ul style="list-style-type: none"> • Matured oil future • High Price Transparency • ME crude marginal • Various competitive crudes • Price marker inner region
Pro- duct	<ul style="list-style-type: none"> • Regulated market • Low need for risk manage • Singapore only one market • Large cargo trade • Formation of product price Crude Price + Cost 	<ul style="list-style-type: none"> • Competitive free market • Development of domestic and regional spot market • Various Trade: cargo, barge • Tight relation between crude and product by spot, future

Basic Price Marker of Products

Market prices in Singapore(MOPS)

- Reason for using MOPS
 - No other excellent price Marker
 - Most of Asian Trades based on MOPS
 - Possible price hedge using swap trading
- Problems having MOPS
 - Existing risk of Manipulation
 - Arbitrary announcement of price information

To prepare international oil market
in East Asia is important

Summary of Strategic Issues in Asia

- **To prepare emergency responses -- oil reserves**
 - Framework of international cooperation in Asia, Alliance with IEA
- **To stabilize oil market and oil prices**
 - Relations among energies, Effective use of oil reserves
- **To prepare international oil market in East Asia**
 - Measures to Asian Premium, Global arbitrage
- **To expand natural gas utilization in Asia**
 - Competitive right option in the right place, Small-scale field
 - Measures to local and global environment problems
- **Importance of 3E (Energy security, Economy efficiency, Environment protection)**