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Analysis of Current Situation of Oil Distribution and Pricing Mechanisms in Asia[♦]

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Abstract

The demand for oil products in Asia, particularly in China and India, is now growing strongly. The demand is estimated to rise to 29.9 million b/d by 2015, demonstrating growth of 15% (approximately 3.9 million b/d) compared to 26 million b/d in 2009. As for supply, until 2008, Asian countries had strived to upgrade their refining capacities only proportionate to demand. Contrary to this, large-scale projects to upgrade facilities undertaken by China and India in 2009 pushed up the refining capacity to 28 million b/d, outpacing demand by 2 million b/d. China and India have plans to upgrade their refining capacities by 3.3 million b/d and 1.2 million b/d by 2015, respectively, which means that supply will surpass demand (29.9 million b/d) by 3 million b/d by 2015. These facts reveal the issue of overcapacity of refining facilities. It is important for the Japanese oil refining sector to curtail such overcapacity so as to achieve an optimal supply-demand balance, to promote trading of products with an emphasis on Japan's advantages, and thereby to reinforce its international competitiveness.

Major Asian countries can be divided into two categories in accordance with their oil pricing mechanisms: i.e. countries where oil price is determined based on the free market mechanism, such as Japan, South Korea, etc; and countries where the oil pricing mechanism is regulated by the government, such as China, Taiwan, India, etc. It is important to keep a close watch on the countries with a regulated pricing mechanism, as the recent trend shows that these countries will take steps for deregulation in the future.

Oil pricing is closely connected to demand. The climate of demand is the key factor for determining a profitable price. The Japanese oil sectors will need to strive to eliminate the factors which would be obstacles to fair pricing, by means of addressing the overcapacity so as to achieve an optimal supply-demand balance and coming up with effective frameworks to ensure a sound market. In addition, in order for the Japanese oil sectors to sustain their supply chains while maintaining an optimal supply-demand balance, they would need to move ahead to take restructuring steps including a new pricing mechanism so as to attain both "adequate refining margin" and "shortening time lags."

[♦] This paper is a modified part of report of the on Analysis, "Current Situation of Oil Distribution and Pricing Mechanisms in Asia". This survey was conducted by the Ministry of Economy, Trade and Industry in FY2009

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1. Overview of Oil Sectors of Major Asian Countries

1-1 Distinctive Features of Singapore Oil Market

Singapore is among the most active oil markets in the world, including New York, Houston, and Northwest Europe. In the Asia and Oceania region, "MOPS (Mean of Platts Singapore)" for the Singapore oil spot market is commonly used as the benchmark price for trading oil products.

Singapore has a spot market with high volatility. Here are the three background factors giving rise to such high volatility:

(i) Geographical Conditions

Singapore has been prospering as a trading port for a long time, receiving benefits from its geographical position as a connecting point between Europe and Northeast Asia. Singapore has a long history of oil trade, and has robust demand in bunker oil.

(ii) Tax Preferential Treatment

A reduced corporate tax rate of either 10% or 5% is applied to companies engaged in international trade of products including oil products and petrochemical products.

(iii) Ample Storage Capacity

As of the end of 2009, Singapore has six independent oil storage terminals which are capable of stockpiling approximately 8 million kiloliters of oil petrochemical products.

The core functions of these oil terminals are break bulk services, blending (for quality control), bunkering services, etc.

Singapore has served as the distribution center for oil products in Asia. Many international oil majors see Singapore as their sales hub in the Asia-Pacific region.

Presently, the refining capacities of three private companies, ExxonMobil, Shell and SRC, account for 1.357 million b/d.

Fig. 1-1 Refining Capacities of Singapore Refineries

Oil Refinery	ExxonMobil Refining & Supply Co., Ltd.	Shell Eastern Petroleum (pte.) Ltd.	Singapore Refining Co. Private Ltd.	Total
Location	Jurong Island	Bukom Island	Jurong Island	
Refining Capacity (in thousand b/d)	605	462	290	1,357

1-2 Oil Sectors in South Korea

The South Korean oil sector is dominated by four companies, "SK Energy," "GS-Caltex," "Hyundai Oilbank" and "S-Oil." Apart from these four companies, importers/exporters, LPG importers, electric power company, petrochemical companies, etc. make up the distribution channel. These four top companies, with 75% market share in total, take oligopolistic control over the

market. Among these four companies, SK Energy and GS-Caltex have particularly large shares, i.e. 29.3% and 25.1%, respectively.

The surge in oil demand had underpinned the growth in refining capacity to reach 2.598 million b/d in 1997.

However, the Asian economic crisis that emerged in 1997 has calmed down demand, especially demand for diesel and gasoline, and the issue of a supply/demand gap has been left outstanding and unaddressed thus far.

Oil plants and port facilities in South Korea are designated for exporting.

Fig. 1-2 Share of Refining Capacity (2009)
(in thousand b/d; %)

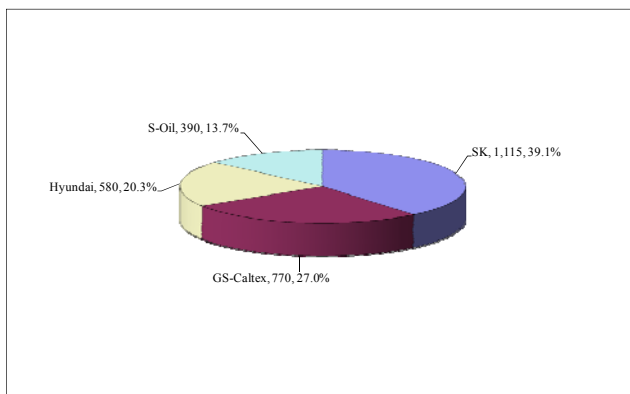
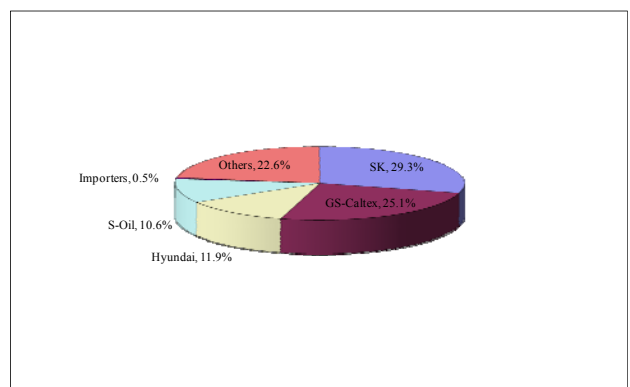
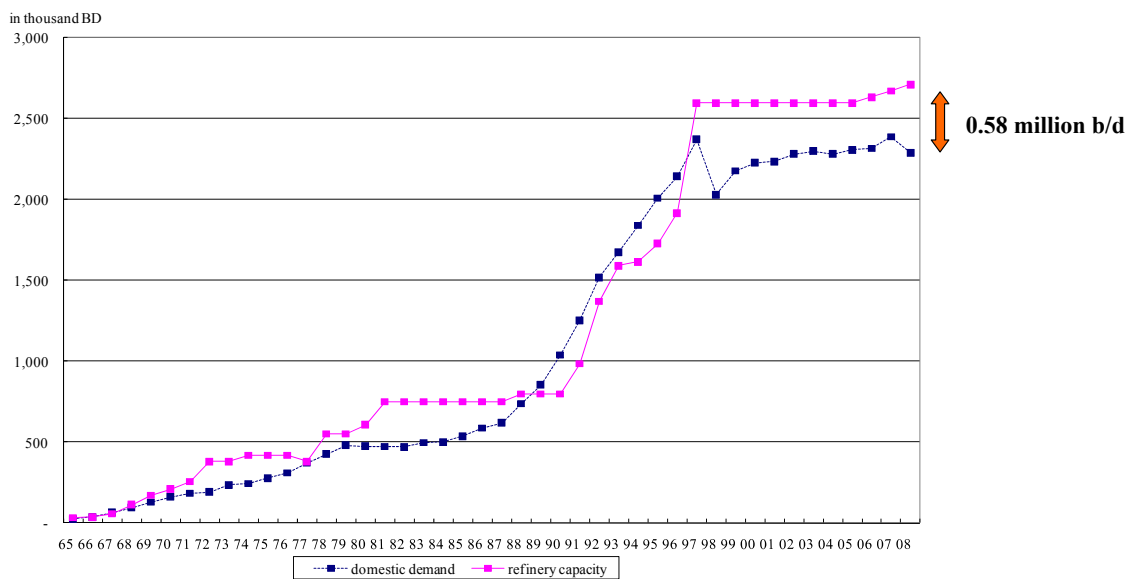


Fig. 1-3 Oil Sales Share (2008)



(Source) KNOC

Fig. 1-4 Transition of Domestic Oil Demand and Refining Capacity



(Source) KNOC

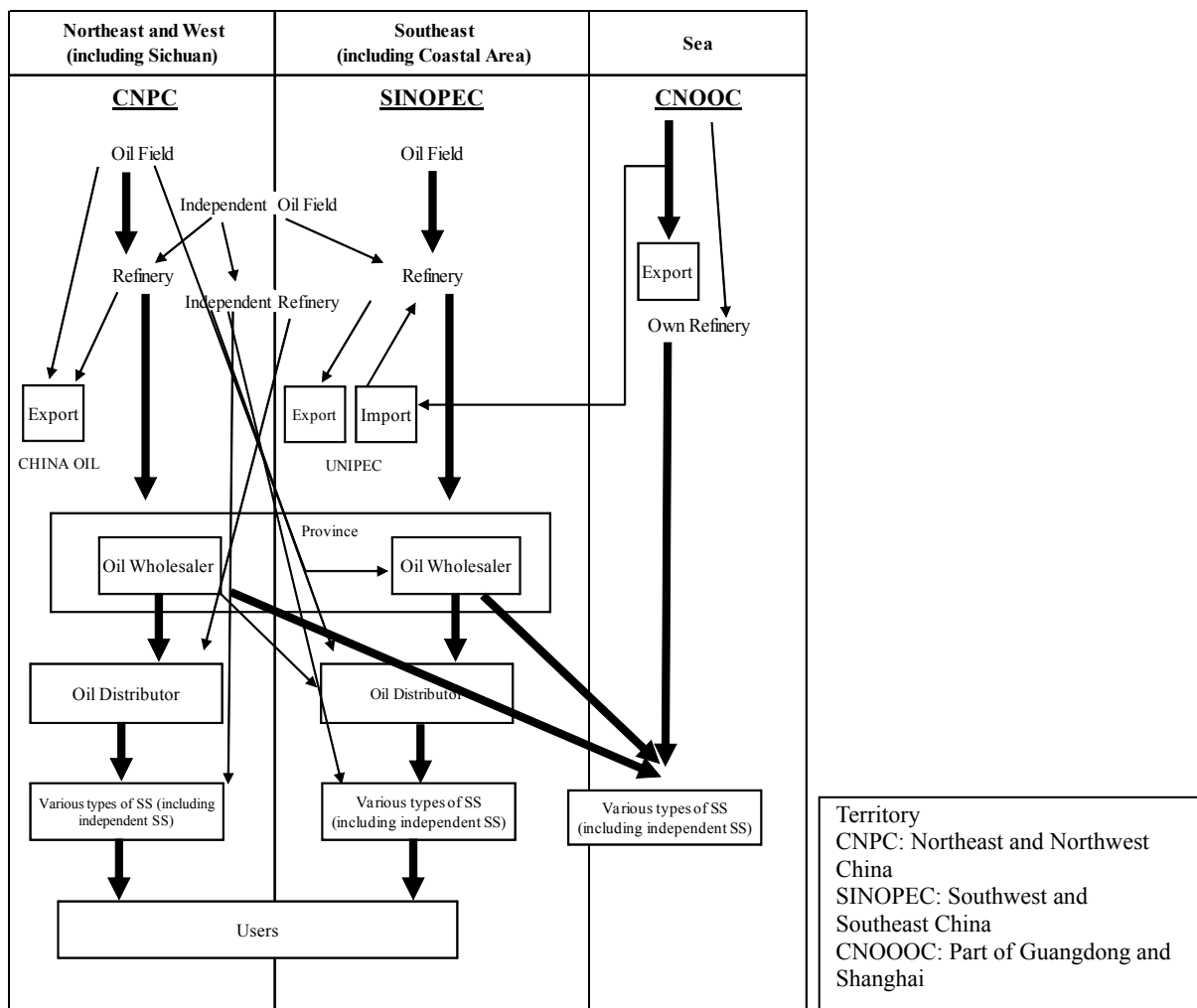
1-3 Oil Sectors in China

(1) In February 1998, the Chinese government implemented a program to consolidate and realign two oil producers/suppliers, China National Petroleum Corporation (CNPC) and China Petroleum & Chemical Corporation (SINOPEC).

The objectives of this program were as follows: to ensure growth and profitability of the oil sector, which is the key industry of China, by means of promoting streamlined business operation of state-owned oil companies; to build a solid framework to induce competition among multiple oil sectors and to adopt market principles and mechanisms, for the purpose of activating the oil sector; and to create a multi-segment oil company capable of competing with international oil majors, consequently to enhance the international competitiveness of China. Thus, CNPC and SINOPEC were realigned into two new companies sharing the integrated upstream and downstream business segments.

(2) With the upward trend in turnover of upstream business segments, CNOOC has taken steady actions to expand its business domain from its downstream business segment to refining

Fig. 1-5 Distribution Flow of Crude Oil and Oil Products



Oil for special sectors (armed forces, railways and air transportation) have different flows.

(Source) The Oil Information Center

business, and further to wholesale and retail services. CNOOC presently carries out its wholesale and retail services in Shanghai and Guangdong.

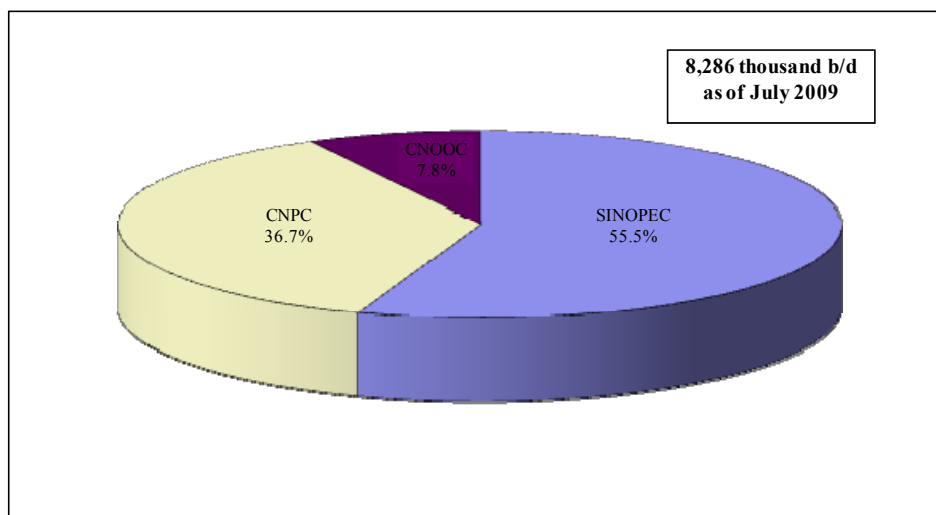
(3) A brief overview of the business territories of the three major petroleum groups are shown as follows. Recently, in some areas, these groups carry out their businesses in each other's domains.

Fig. 1-6 No. of Service Station of Each Oil Companies

As of end of 2009	CNPC	SINOPEC	Others	Total	Foreign Capital Company
	17,000	28,000	40,000	85,000	3,000

(Source) Oil Information Center

Fig. 1-7 Share of Oil Refining Capacity of State-owned Oil Companies



(Source) Rim Intelligence Co.

1-4 Oil Sectors in Taiwan

(1) In Taiwan, the oil sector has long been monopolized by "CPC Corporation, Taiwan," the government-owned oil company. However, Formosa group, whose core business is petrochemical products, constructed a new industrial complex for a petrochemicals plant and oil refinery plant. Formosa launched its business in the oil market under the brand name of "Formosa Petrochemical Corp. (FPCC)" in 2000.

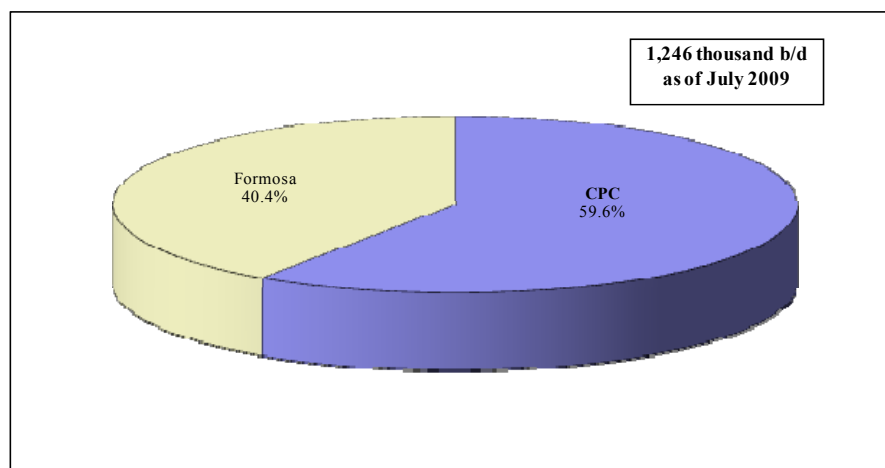
(2) The deregulation in 2001 allowed entry by ExxonMobil into the importing and distribution market, however, it withdrew from its Taiwan businesses in 2003. The market has been dominated by CPC and FPCC since the withdrawal of ExxonMobil.

(3) CPC has oil refinery plants in Kaohsiung, Taoyuan and Talin, which are capable of refining 742 thousand b/d in aggregate. Among these three plants, the Kaohsiung plant has the longest history, having started operations in the beginning of 1950 with a refining capacity of just fifteen thousand b/d. It is now capable of processing atmospheric distillation of 240 thousand b/d,

and has various petroleum complexes adjacent to its refining facilities. The Talin plant, built in 1996, has a topper capacity of 350 thousand b/d. The Taoyuan plant, built in 1976, has a topper capacity of 187 thousand b/d.

(4) Formosa owns three topper facilities with a total capacity of 504 thousand in Mailiao, Yunlin County. Formosa has a distinctive characteristic in that it has oil cracking capacity superior to CPC. Formosa aims to enhance the residual process capacity of its plants.

Fig. 1-8 Share in Refining Capacity



(Source) Rim Intelligence Co.

1-5 Oil Sector in India

(1) Indian state-owned oil companies consist of two upstream business company groups and four downstream business company groups.

(2) State-owned companies have dominated both the upstream and downstream business markets. However, private sectors also have made their way into the oil market; for example, Reliance Industries built the Jamnagar Refinery, and Essar Oil Ltd. launched into the oil refinery business in 2007. In 2009, Reliance also started operation of a second refinery in Jamnagar capable of refining 580 thousand b/d, which produces oil for export. Essar Oil Ltd. also started operation of the refinery at Vandinar in 2007 and initiated its oil refining business.

All private oil sectors are export-oriented, and the domestic distribution of oil is the responsibility of the state-owned companies. However, the Indian government has laid out a program to strengthen exports.

Reliance's second refinery in Jamnagar concentrates on exporting gasoline to the United States and diesel to Europe. The volume currently exported to Asia is very small.

(3) The refining capacities of each of the Indian major oil companies as of July, 2009, all of which totals 3.574 million b/d, are as follows:

Oil and Natural Gas Corporation Ltd. (ONGC): 0.222 million b/d

Indian Oil Corporation Ltd. (IOCL): 1.2 million b/d

Bharat Petroleum Corporation Limited (BPCL): 0.39 million b/d

Hindustan Petroleum Corporation Limited (HPCL): 0.26 million b/d

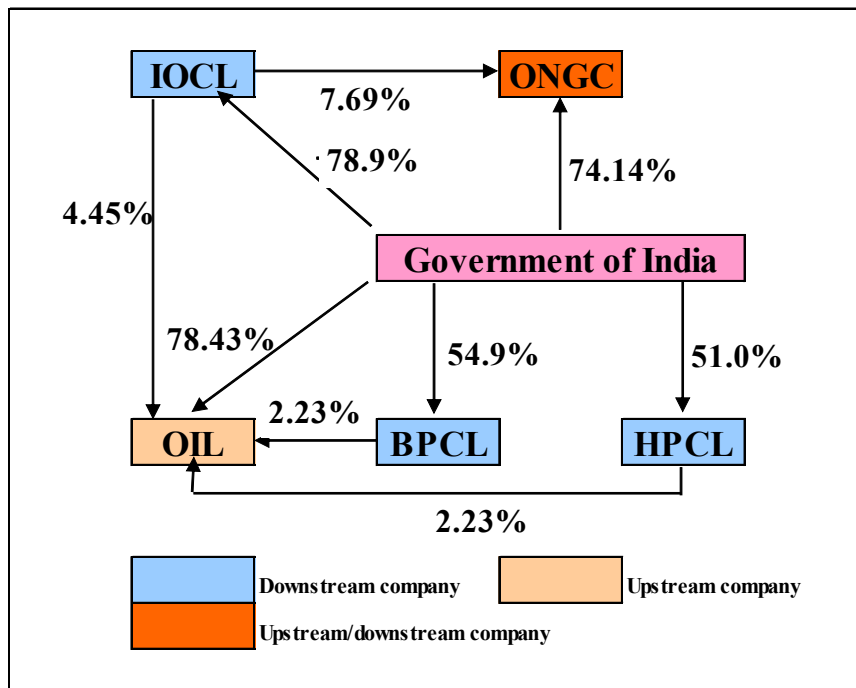
Oil India Ltd. (OIL): 0.06 million b/d

Reliance: 1.232 million b/d

Essar: 0.21 million b/d

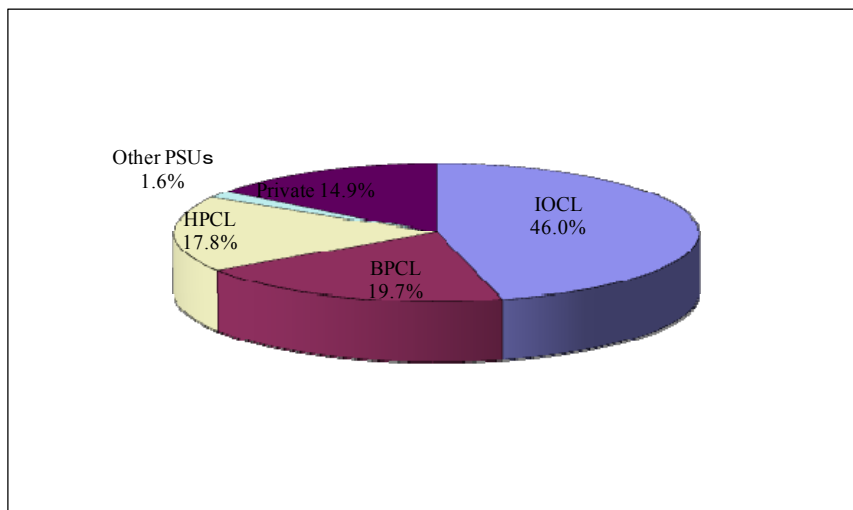
India has a program in place to ameliorate and expand oil-related facilities. India's oil refining capacities, compared to other Asia nations, are projected to overtake Japan and come in second after China.

Fig. 1-9 Relationship between Indian National Government and State-owned Oil Companies



(Source) Respective company websites

Fig. 1-10 Share of Oil Products Sales in India



(Source) Petroleum Planning & Analysis Cell

2. Current Statistics and Prospects of Oil Demands in Asia

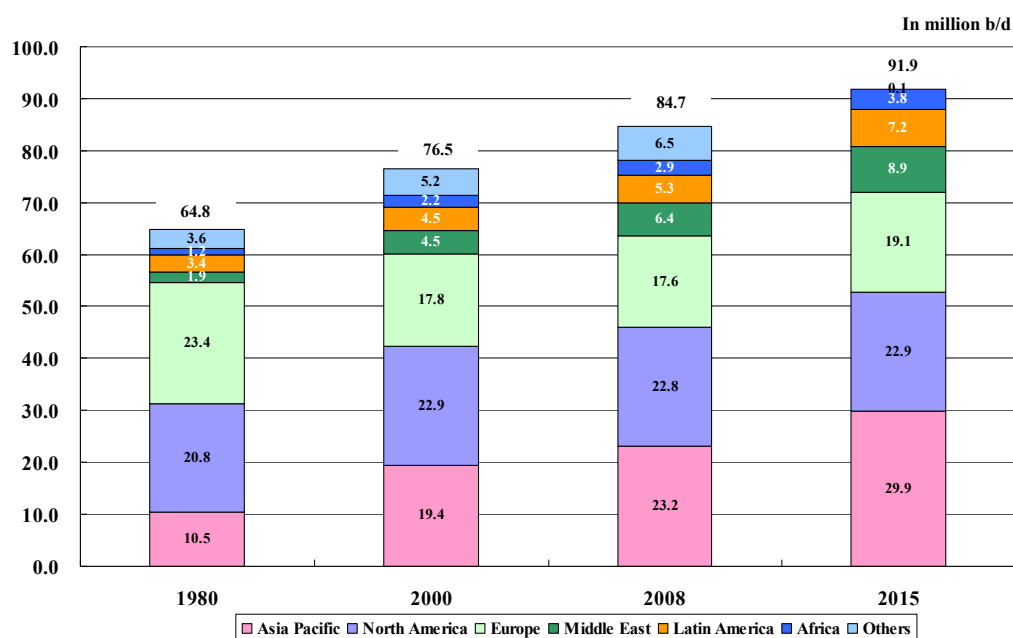
2-1 Current Statistics and Prospects of Oil Demands

Oil demand in Asia is growing strongly. The upward trend will continue until it reaches 32.5% of global share by 2015.

A look at Asian nations shows a downward turn in Japanese oil demand and a surge in oil demand in China and India. Demand for the entire Asian region is forecast to rise to 29.9 million b/d by 2015, marking growth of 15% (2.6 million b/d) compared to 26.0 million b/d in 2009.

As for supply, until 2008, Asian nations have upgraded refining capacities only proportionate to demand. However, in 2009, China and India made large-scale upgrades to their refining facilities, pushing up the refining capacities of the entire Asian region to 28 million b/d and generating a surplus of 2 million over demand (26 million b/d). This overcapacity particularly triggered a declining impact on export of oil to regions outside Asia. In order to address this issue, Asian nations have downsized their utilization rates, however, such action falls short of being a fundamental solution. In addition to this, the refining capacities in Asian countries will rise to 32.5 million b/d, which is a growth of approximately 4.5 million b/d in 2015 compared with 28 million b/d in 2009, owing to the upgrading in refining capacity of China (+3.3 million b/d) and India (+1.2 million b/d). This means that the capacity will outweigh demand (29.9 million b/d) by approximately 3 million b/d, revealing the issue of overcapacity of oil refining facilities.

Fig. 2-1 Oil Demand in World/Asia



※International bunkers are included in “others” for 1980-2008 and in each area for 2015.

(Source) IEA

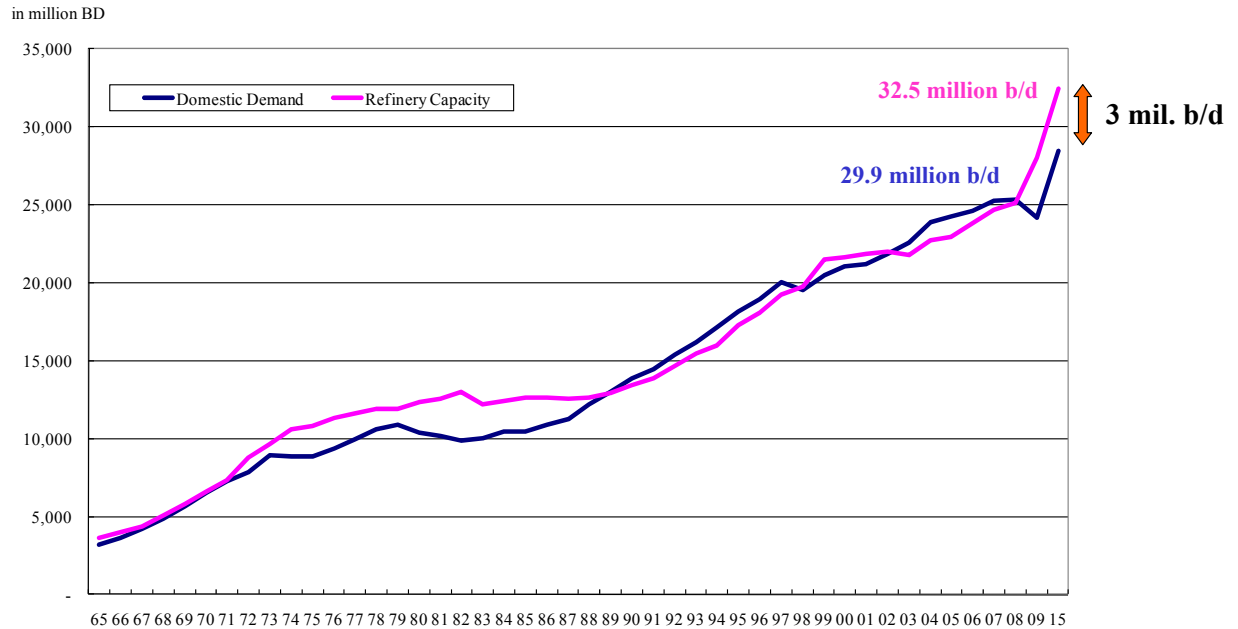
Moreover, countries such as China and India plan to further upgrade their oil refining functions by installing new heavy oil cracking facilities such as coker units and RFCCs for the period from 2009 to 2012. This will lead to an increased exporting position of gasoline, kerosene (including jet fuel) and diesel oil in Asia, and intensified international competition among oil sectors.

Fig. 2-2 Oil Demand in World/Asia

	2009		2015		Growth Rate		Increase/Decrease	
	Oil Demand	Refinery Capacity	Oil Demand	Refinery Capacity	Oil Demand	Refinery Capacity	Oil Demand	Refinery Capacity
Japan	4,370	4,895	3,592	4,295	82.2	87.7	▲ 778	▲ 600
Singapore	976	1,305	1,280	1,415	131.1	108.4	304	110
China	8,400	9,669	11,630	12,922	138.5	133.6	3,230	3,253
South Korea	2,180	2,679	2,200	2,729	100.9	101.9	20	50
Taiwan	936	1,246	1,040	1,292	111.1	103.7	104	46
India	2,908	3,574	3,810	4,814	131.0	134.7	902	1,240
Total	26,000	28,042	29,900	32,468	115.0	115.8	3,900	4,426

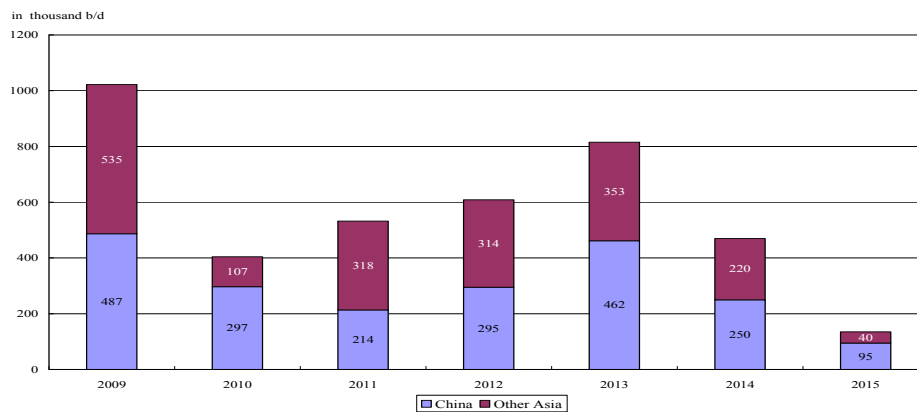
(Source) IEA etc.

Fig. 2-3 Oil Demand and Refining Capacities in Asia



(Source) BP etc.

Fig. 2-4 Upgrading Capacity Additions in Asia



(Source) IEA

Singapore, influenced by the changing climates as mentioned thus far, began to see substantial fluctuation in refining margins that are generated from each oil product.

Before the occurrence of the financial crisis, the margin of middle distillates once exceeded 40 dollars, thanks to various positive driving factors such as special demands from the Beijing Olympic Games and Sichuan Earthquake revivals. However, as triggered by the financial crisis, coupled with tentative factors including inventory liquidation and drop in demand as well as systemic factors such as new construction and upgrading of facilities by India and China, the refining margin fell below 10 dollars in 2009, which still remains stagnant. In 2010, the refining margin began to hit 10 dollars; however, the situation still calls for careful attention because of substantial impact by the slowdown in production by key countries.

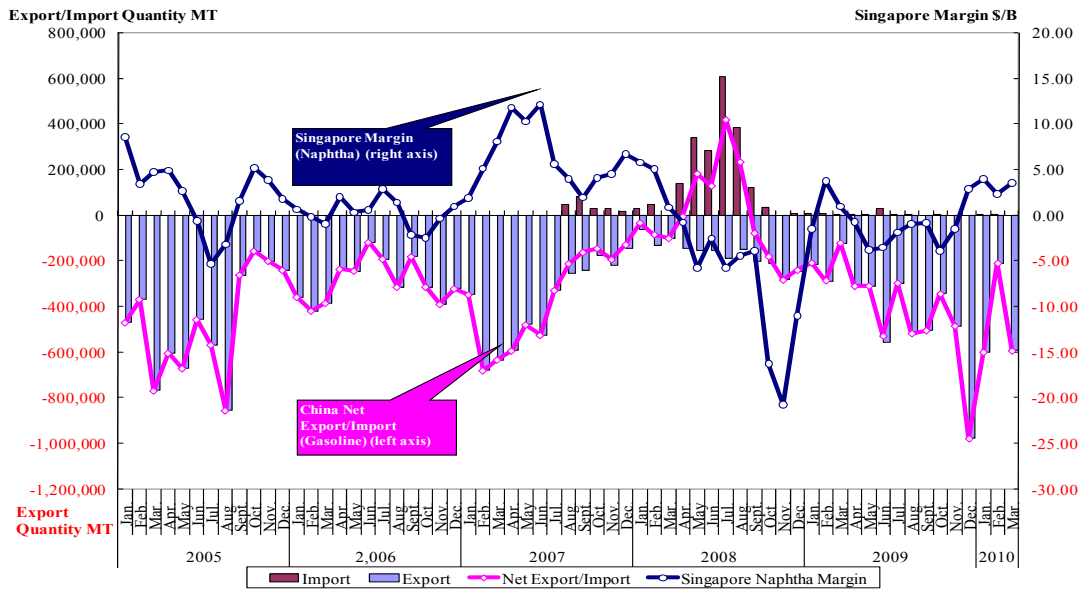
Fig. 2-5 Transition in Singapore Crack Margin Futures



(Sources) Various information sources

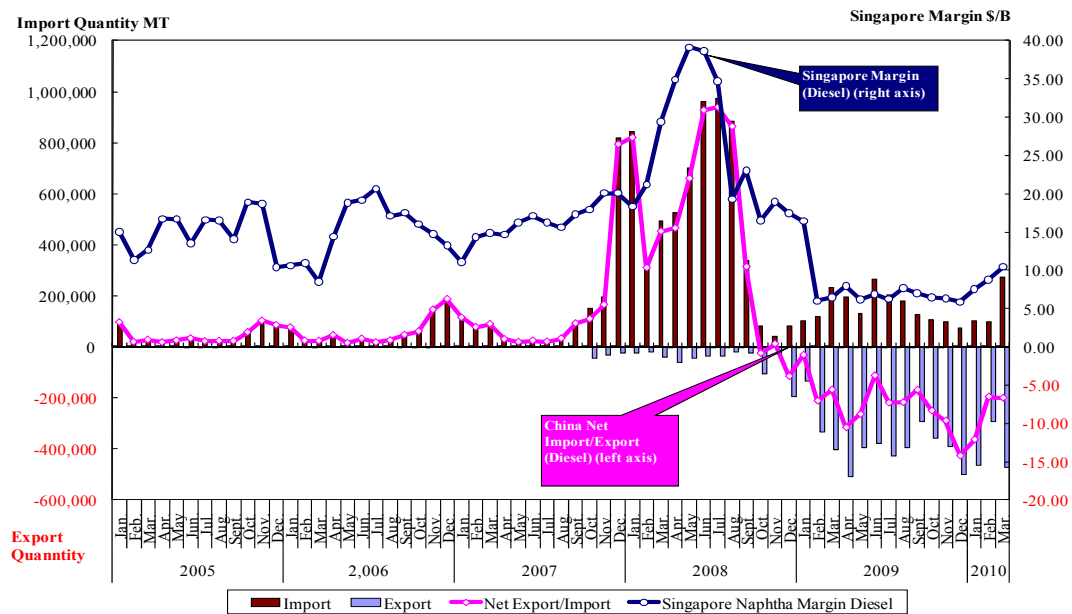
The supply-demand climate in China is an important factor affecting the supply-demand climate and oil price of the entire Asian region. Market players are paying attention to the import/export trends in China. Such trends drastically changed after the occurrence of the financial crisis. China has had a trade surplus of gasoline and diesel oil due to the expansion and upgrading of oil refineries. This is one of the factors leading to the stagnant refining margin in Asia.

Fig. 2-6 Transition in Export/Import of Gasoline and Refining Margin in Singapore



(Sources) Statistics of General Administration of Customs of the Republic of China and other sources

Fig. 2-7 Transition in Export/Import of Diesel Oil and Refining Margin in Singapore



(Sources) Statistics of General Administration of Customs of the Republic of China and other sources

2-2 Trade of Oil Product in Asia

The itemized outlook for the net import/export of key countries in the Asia and Pacific region by product shows that gasoline and diesel will see growth in exports from China, India and South Korea, and heavy oil will see growth in imports by Singapore.

Import/export of gasoline and heavy oil of Japan remains almost unchanged and the trade balances are even. However, export of diesel oil which has been on upward trends recent years is forecast to drop by half by 2015.

Fig. 2-8 Net Export/Import of Gasoline

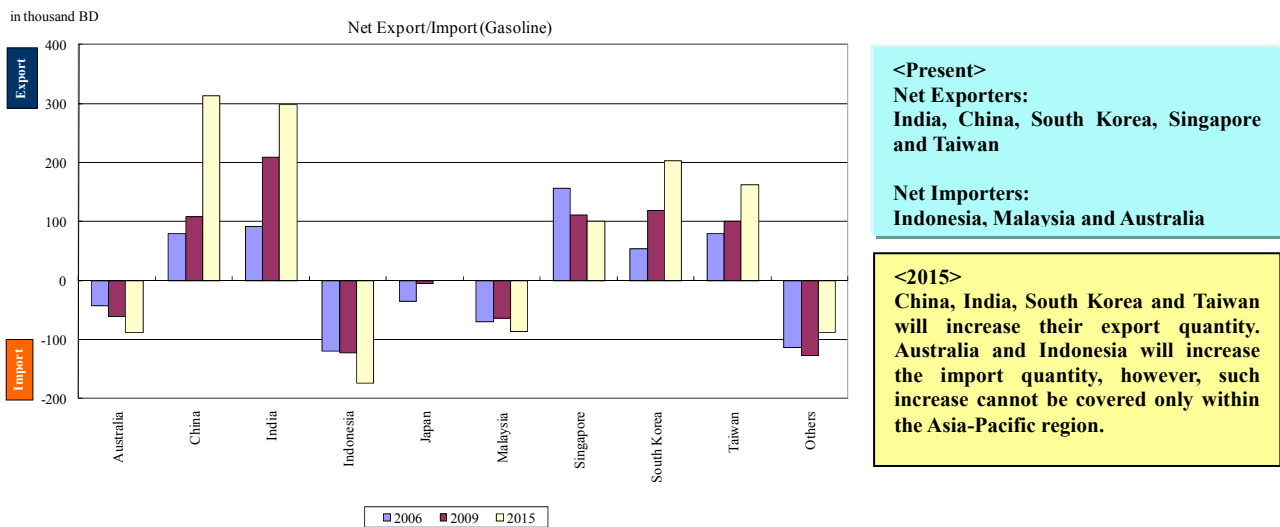


Fig. 2-9 Net Export/Import of Diesel

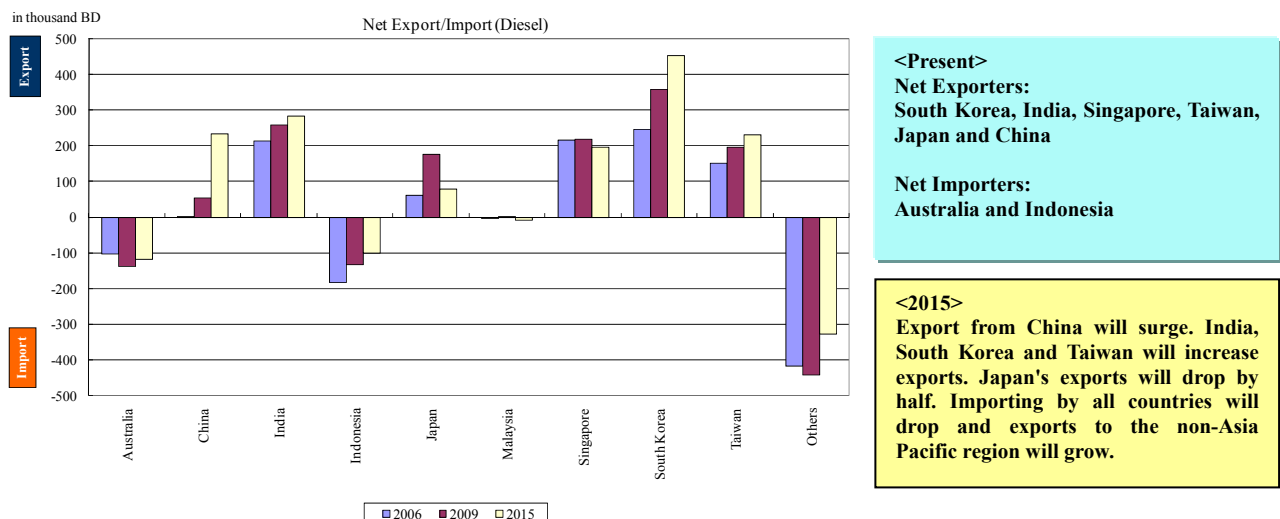
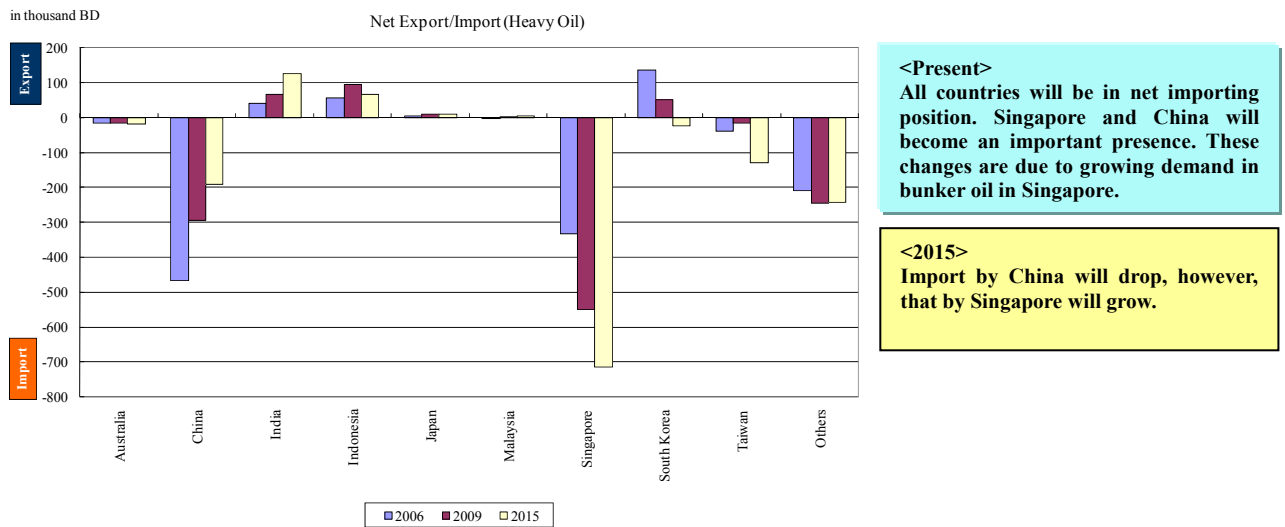


Fig. 2-10 Net Import/Export of Heavy Oil



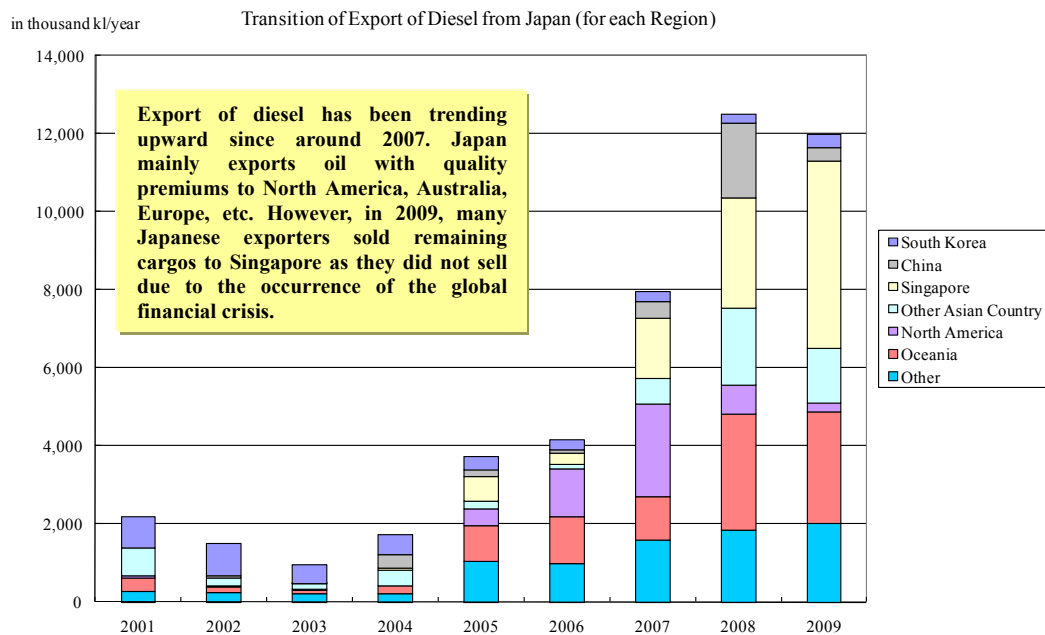
(Source) Various information sources

2-3 Japanese Oil Sectors' Challenging Issues Relating to Oil Supply and Demand

The Japanese oil refining sector confronts systemic changes, such as slowdown in demand, exacerbated climates for exports, and a drop in the refining margin. In order to cope with these climate changes, necessary steps shall be taken to implement the commitments specified as (i) through (iii):

- (i) commitment to curtail overcapacity to ensure optimal supply-demand balance;
- (ii) promotion of trade of products with an emphasis on Japan's advantages (e.g. advantage in

Fig. 2-11 Transition in Exports of Diesel by Japan, Itemized by Importers



(Sources) Trade Statistics of Japan

product quality in terms of environmental friendliness); and

(iii) strengthening of international competitiveness.

To this end, the matters of utmost urgency and importance are as follows: to identify the supply-demand situation and policy measures relating to oil distribution in key Asian countries; to attain an optimal domestic supply-demand balance; to secure robust supply of oil products in the medium to long term; and to build sound supply chains.

Fig. 2-12 Recent Refining Capacity Reduction Programs

Company Name	Refinery	Reduction in Topper Capacity (in thousand BD)	Timing
JX Nippon Oil & Energy Corporation*	Toyama	60	2009.5
COSMO OIL Co., Ltd.	Chiba	20	2010.2
COSMO OIL Co., Ltd.	Yokkaichi	50	2010.2
COSMO OIL Co., Ltd.	Sakaide	30	2010.2
JX Nippon Oil & Energy Corporation*	Oita	24	2010.5
JX Nippon Oil & Energy Corporation*	Kashima	21	2010.5
JX Nippon Oil & Energy Corporation*	Negishi	70	2010.5
JX Nippon Oil & Energy Corporation*	Mizushima	110	2010.6
JX Nippon Oil & Energy Corporation	Osaka	115	** 2010.10
Showa Shell Sekiyu K.K.	Ogimachi	120	2011.9
Idemitsu Kosan Co., Ltd.	Not decided	100	2013-2014
JX Nippon Oil & Energy Corporation	Not decided	200	~2014
Total		920	

* Including Nippon oil Corporation & Japan Energy Corporation

** Joint Venture with CNPC (Refinery for Export)

(Sources) Respective company websites

3. Present Status and Challenges of Oil Pricing in Asia

3-1 Oil Pricing in Asia

The pricing mechanisms of Asian key nations have been formulated amidst the deregulation and globalization trend in the oil sectors. In Japan, South Korea and Singapore, prices are determined according to the market mechanism without any intervention from the government, and are, directly and indirectly, affected by the Singapore market (MOPS).

Contrary to this, in China, Taiwan and India, the government-owned oil companies take control over the oil supply system. In addition, the government regulates the price by such way as subsidizing specific companies.

It is important to keep a close watch on the countries with regulated pricing mechanisms such as China and India, as the recent trend shows that these countries will take steps for price deregulation in the future.

Fig. 3-1 Outlines of Oil Pricing Mechanisms in Key Countries of Asia

Country	Government Control	Basic Information on Oil Pricing Mechanism	Whether country has subsidy program/overview	Benchmark for Price Adjustment	Futures Market	Recent Topics	Oil Sectors (refiners and importers)
Japan	Market Principle	(i) to be gradually shifted to a new pricing mechanism after October 2008 (to be in full force after July 2009) (ii) price is set on a weekly basis; linked to market price; categorized by type of oil; predetermined price	Japan has no government regulation on pricing on the domestic market.	Transaction price on petroleum product market (futures, spots)	TOCOM/C-COM	(i) partial amendment on new pricing mechanism (ii) re-listing of TOCOM/diesel in May 2010	19 private companies (10 wholesalers and 9 refiners)
South Korea	Market Principle	(i) MOPS link/daily basis since July 2007 (ii) presumptive price is calculated based on "MOPS+a+Tax" formula (a includes freights and margins)	South Korea has no government regulation on pricing on the domestic market. South Korea has no long-term subsidy program relating to consumption of petroleum products.	MOPS (Mean of Platts in Singapore)	under discussion	In 2008, the government implemented temporary price lowering measures to cope with a soar in crude oil price, including reduction in import tariffs. The domestic oil market still remains completely liberalized.	4 private refiners/wholesalers
Singapore	Market Principle	(i) Singapore has no regulation on the domestic oil market, except for environmental and safety requirements, and the access to market is not limited. (ii) Singapore has no government-controlled pricing mechanism.	(i) Singapore has no government regulation on pricing on the domestic market. (ii) Singapore-based companies are entitled to benefit from Global Trader Program (GTP).		SGX (heavy oil only)		3 private refiners/wholesalers 6 independent oil storage terminal operators (terminals for import)
China	Government-controlled pricing (benchmark price system)	(i) Since January 2009, government has controlled the retail price of petroleum products including gasoline, diesel for automobile, jet fuel, etc. (ii) the government determines the price taking into account the fluctuation in three types of crude oils. (iii) The governing law for the pricing mechanism is the "Petroleum Product Pricing Law."	(i) Government-controlled petroleum company (SINPEC only) is subsidized to cover the losses arising from the government-controlled pricing. (ii) Increase/decrease of import tariffs	Crude oil price Economic indicators	Beijing Shanghai (heavy oil only)	Discussion is under way to shorten the price adjustment cycle from 22 business days to 15 days, and to change the benchmark fluctuation band of crude oil from 4% to 3%.	three government companies and many small-sized refineries
Taiwan	Government-controlled pricing	(i) The government had controlled the price of gasoline and diesel for automobile for the period from 1993 to 1998 (price cap system). (ii) In 2000, the government liberalized the petroleum product market → the government-controlled pricing regime has been abandoned, however, the government has frequently invoked contingency market intervention measures from 2005. (iii) The government has adopted a pricing mechanism linked to crude oil price from May 2008 → conditional liberalization of oil price	(i) After 2005 when crude oil soared, the government reduced the tax (including incise tax) for the purpose of lowering the retail price of gasoline and diesel for automobiles. (ii) Reduction in import tariff	Crude oil price (WTI)	N/A	(i) The government laid out the "Action Plan for Stabilizing Current Prices" in May 2008 to cope with increase in deficit of CPC. → the government switched its policy for retail price of petroleum products, from government-controlled pricing to pricing linked to benchmark crude oil price on the global market. (ii) After June 2008, prices of gasoline and diesel for automobiles have been gradually increasing or decreasing.	1 government-controlled company and 1 private company
India	Government-controlled pricing	(i) The retail prices of gasoline and diesel for automobiles had been subjected to "Administered Pricing Mechanism (APM)" until the end of March 2002. The government still controls the retail price of kerosene which has large household demand. (ii) The government lifted the mechanism to control the retail price of gasoline and diesel for automobiles, however, as 85% of the market shares are occupied by government-controlled petroleum companies, the retail prices for these products are controlled de facto. (iii) For gasoline and diesel for automobiles, the pricing mechanism shifted from government-controlled pricing to de facto controlled pricing. However, for the kerosene and LPG for household use, new government-controlled pricing mechanism is implemented. (iv) The retail price of petroleum product is pegged to a low level, by recognizing the loss of the government-controlled petroleum company as "Under-Recovery." (v) The government issues "oil bond" for the purpose of financing the subsidies for oil companies and to cover the Under-Recovery of oil companies. (vi) The government has suppressed the retail price by reducing the incise tax since		MOPS (Mean of Platts in Singapore)	MCX NCDEX	(i) Discussion for adopting a market principle linked to global market price is being discussed. (ii) Lifting of government-controlled pricing of gasoline and diesel is being discussed.	5 government-controlled companies and 2 private companies

(Sources) Various information sources

3-2 Oil Pricing Mechanism under Free Market Regime

(1) Singapore

(i) Singapore has been an active market for oil trading, thanks to factors such as (i) geographical advantage, (ii) preferential tax treatment. and (iii) well-equipped terminal The Singapore market is the center of oil spot trading in Asia, and is among the world's largest including New York, Houston and Rotterdam.

Platts, in pursuit of a fair and transparent price evaluation system, introduced a system named "Platts Window." "Platts Windows" first launched into service in around 1992 to 1993, and consequently in Europe in 2003 and in the United States in 2007.

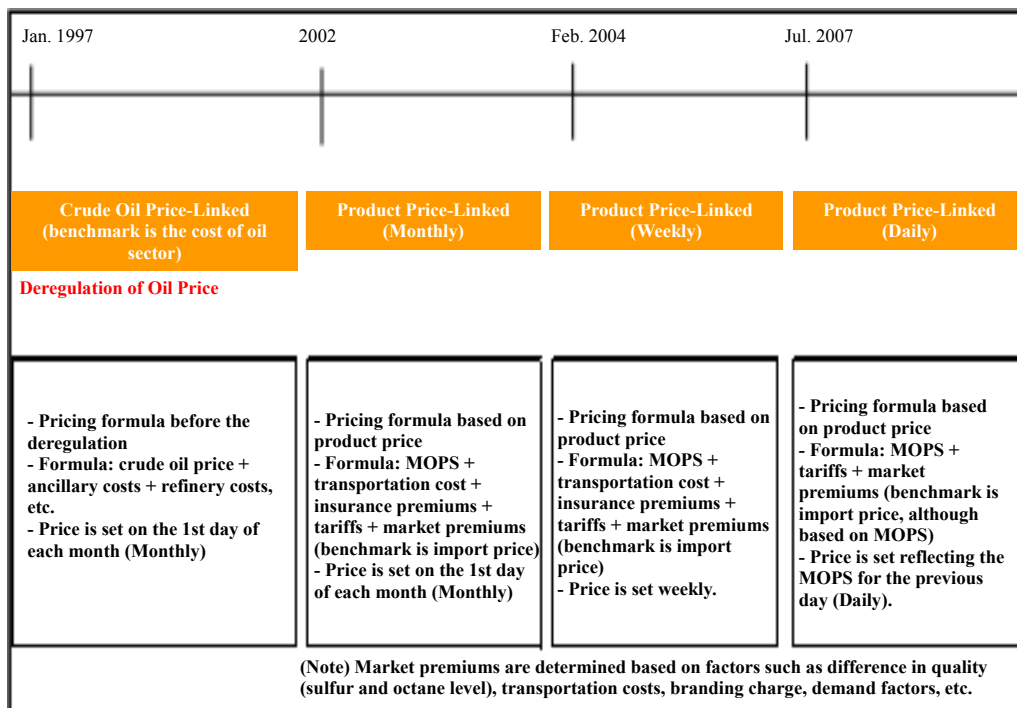
Platts provides a business platform for market participants, and adopts the Market on Close (MOC) system for evaluation of oil products.

(2) South Korea

(i) South Korea had taken policy measures for market reform and deregulation after the second half of the 1980s. In 1997, against the backdrop of these policy measures, South Korea deregulated the domestic sales prices of gasoline, diesel, kerosene and heavy oil.

South Korea has employed the oil pricing formula based on MOPS since 2002. Thereafter, South Korea decided to set the price on a monthly basis, then on a weekly basis, and finally decided to set the price on a daily basis in 2007.

Fig. 3-2 MOPS-linked Pricing of Korean Major Oil Company



(Source) The Oil Information Center

(ii) After President Lee Myung-bak assumed office, the South Korean government, starting from April 2008, implemented a series of temporary programs for lowering oil price and stimulating competition among oil sectors, so as to cope with various issues arising from the soar in crude oil price. Such programs include reduction in import tariffs, lifting of horizontal restraint, and deregulation for the large-sized supermarkets to operate service stations in the same store premises. Thereafter, crude oil price dropped sharply; however, these programs are still in place without being reviewed.

These programs operated favorably to consumers as it stimulated competition among oil sectors. However, these programs resulted in worsening in turnovers of some distributors. The most influencing government-initiated price lowering program was the deregulation for the large-sized supermarkets to operate service stations in the same store premises.

As of the end of January 2010, seven sites have launched into operation where supermarkets and service stations are combined, such as "SK Energy and E-Mart," "GS Caltex and Home Plus,"

and "S-Oil and Lotte Mart."

These complexes of supermarkets and service stations had a detrimental impact on the business of other service stations existing in their perimeter areas. Their turnover dropped by 25 - 40%. The local governments take into account the benefits of local interested parties upon the granting of approval for building such complexes. Although these complexes are endorsed by the national government-initiated program, local governments need to balance the benefits of the complex operators and existing local parties.

In addition, the creation of a futures market was being discussed as one of the programs for lowering oil price, however, the government has not reached a conclusion.

Fig. 3-3 Overview of Government-Initiated Oil Price Lowering Programs

Phase	Program Name	Before February 2008	Deregulation	Timing
Oil Supply	(i) Reduction in import tariffs	Tariff on petroleum products: 3%	1%	2008.4.1
	(ii) Requirement for importers to store oil and qualification of registered importers	Quantity equivalent to domestic sales volume for 40 days	Quantity equivalent to domestic sales volume for 35 days	2008.5
	(iii) Relaxed requirement for registration of importers	Quantity equivalent to domestic sales volume for 60 days, or ten thousand kiloliters	Quantity equivalent to domestic sales volume for 45 days, or 7,500 kiloliters	2008.11
Wholesale - Retail Phase	(i) Lifting of horizontal restraint	Only vertical transaction was allowed, and horizontal transaction was prohibited. (Barter trade between wholesalers had been already permitted.)	Transactions between distributors, transactions between service stations, and transactions between private stores Deregulation of horizontal transactions	2009.5.1
	(ii) Publication of wholesale price of each oil company (for each distributors and SS)	Wholesale price of each oil company was not published.	Wholesale price of each oil company is to be publicized.	2009.5.1
Retail Phase	(i) Review of trademark indication system	Transaction between affiliates (installation of two or more sign poles was allowed)	No-brand or private brand allowed	2008.9.1
	(ii) Deregulation of large-sized supermarkets to operate SS in the same store premises	N/A	Permitted (for the time being, business collaboration between "SK and E Mart," "GS Caltex and Home Plus" and "S-Oil and Lotte Mart" have been approved)	2008.11.1
	(iii) Review of system of publication of petroleum product prices	South Korea had a system for publication of retail prices. (monitor price by KNOC)	Companies are required to set up a website and publicize the price on the website on a daily basis.	2008.4.15
Market Transaction	Establishment of futures market	No futures market existed.	Under discussion	Under discussion

(Source) Information from various sources

(3) Japan

The new pricing mechanism applied from October 2008 employs TOCOM and RIM as the benchmarks. The new mechanism has generated some good outcomes, such as correction of gaps between wholesale price and retail price. However, after 2009, Japan has been facing an ongoing recession in oil product demand influenced by the serious global economic crisis. Such supply-demand climate prevents the domestic product market price from rising to a level appropriate to the crude oil price. Moreover, the pricing mechanism linked to the crude oil price has not reach a level sufficient to pay the costs.

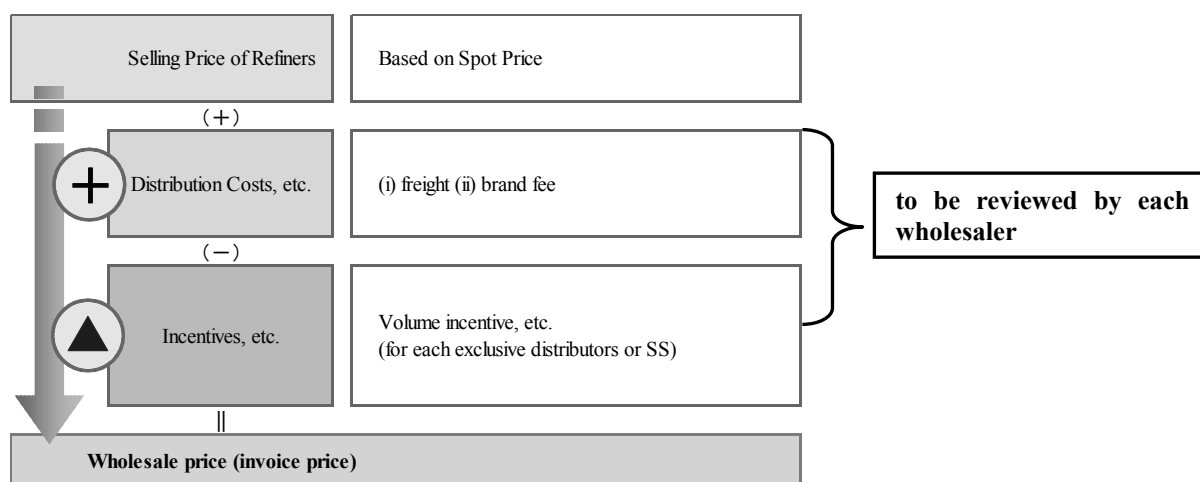
This circumstance has pushed down the refining margin, causing the oil wholesalers' business performance to worsen and slide into substantial deficit, coupled with the drop in the export

margin.

Some oil wholesalers, in an attempt to pave their way out of this crisis, have moved forward to improve the supply-demand climate from the beginning of 2010, by such means as shutting down facilities and partially revising the new pricing mechanism so as to secure an appropriate refining margin (e.g. review of pricing benchmarks and formulae).

The current review focuses on "brand fee hike" and "shortening of time lags."

Fig. 3-4 Revision of New Pricing Mechanism (Diagram)



(Source) The Oil Information Center

Fig. 3-5 Revision of New Pricing Mechanism Itemized by Oil Wholesalers (Outline)

Wholesaler	Timing	Benchmark	Price Adjustment		Day of notice to distributors
			base term	applicable terms	
JX Nippon Oil & Energy Corporation	June	RIM (ground)	Friday - next Thursday	Saturday - next Friday	Friday of next week
JX Nippon Oil & Energy Corporation	Oct.	RIM (ground), crude oil price, trends in domestic product market, etc.	Latest actual data (before Thursday)	Saturday - next Friday	Friday of same week
COSMO OIL Co., Ltd.	Apr. - Sept.	RIM (ground) quasi-CIF	Same as above	Same as above	Same as above
Idemitsu Kosan Co., Ltd.	July	international and domestic product market price crude oil price, etc.	N/A	Same as above	Friday of same week
Showa Shell Sekiyu K.K.	June	international and domestic product market price crude oil price, etc.	N/A	Same as above	Friday of same week
EM	1997	spot market Performance of SS	—	Same as above	Thursday of same week

(Source) The Oil Information Center

3-3 Oil Pricing Mechanism under Government-Controlled Price Regime

(1) China

(i) China has in principle maintained the methodologies to determine the regulated price of oil based on product price and crude oil price on the global market, although such methodologies have been amended from time to time.

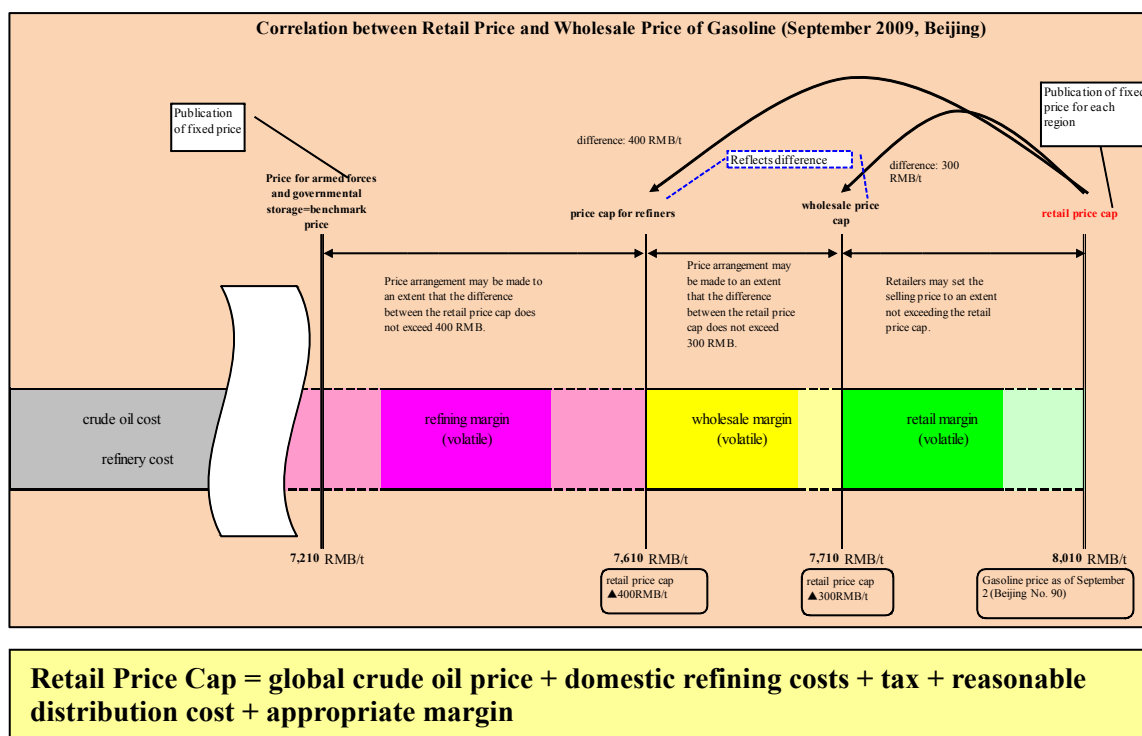
From January 2009, China introduced a new pricing mechanism linking the regulated price to crude oil price.

The objective of the new pricing mechanism is to back up the oil refiners in ensuring the profit margin by strengthening linkage with international crude oil prices. However, the mechanism still bears the nature of government controls, as the government has the sole discretion to make adjustment to the price (amount and timing).

Under this mechanism, the refining margin fluctuates according to three stages, depending on the level of crude oil price. For example, oil refining sectors would enjoy the refining margin when the crude oil price falls below 80 dollars per barrel, but will have a narrower margin when the crude price exceeds 80 dollars per barrel.

The price was changed eight times in 2009, however, no change has been made for the period from the last adjustment in November 2009 to April 2010, in spite of fluctuation in crude oil price. State-owned oil companies have reportedly submitted a request to the government to amend the basic formula for price adjustment (the condition that the price will be adjusted "when global crude oil prices reported a daily fluctuation band of not less than 4 percent for 22 working days in a row")

Fig. 3-6 Correlation between Retail Price and Wholesale Price of Gasoline



(Source) The Oil Information Center

to "when global crude oil prices reported a daily fluctuation band of not less than 3 percent for 15 working days in a row").

(ii) Outline of Tax Reform

On January 1, 2009, the Chinese government made a substantial upward revision of the consumption tax imposed on oil as one of the pricing formula reform programs put into force in the end of 2008. (The Chinese consumption tax corresponds to the gasoline tax and diesel tax of Japan; and the value added tax corresponds to the consumption tax of Japan.)

Under the tax reform, the consumption tax imposed on gasoline and naphtha was raised to 1.0 RMB per liter, which is an increase by 0.8 RMB per liter; and the consumption tax imposed on diesel oil was raised to 0.8 RMB per liter, which is an increase by 0.7 RMB per liter.

(2) Taiwan

The oil pricing mechanism in Taiwan has shifted in a step-by-step manner, from a government-regulated pricing regime to a de facto government-regulated pricing regime, and then to conditional deregulation. Taiwan now takes incremental steps toward deregulation of the oil market.

In 1993, Taiwan introduced a price cap system to mitigate the hike in gasoline and diesel price; however, such price cap system was lifted due to deregulation of the oil product market implemented under the Petroleum Business Act. After 2005, the soar in crude oil price triggered the Taiwanese government to frequently intervene in the price even in normal times, invoking the provision of the Act which justifies "government market intervention in emergency cases." Thus, during this period of time, the market had substantially been under government control. In May 2008, the Taiwanese government shifted its basic policy by laying down a new program entitled "Action Plan for Stabilizing Current Prices," in which the oil product price was linked to the crude oil price on the global market.

The program directs conditional deregulation, under which 40% of the increased portion of oil price is to be borne by CPC (a government-owned oil company) and the government. The government satisfied its burden of 20% by cutting the consumption tax imposed on oil product, and CPC satisfied its burden of the remaining 20% by equivalent cost cutting. Thus, the oil price took a downturn gradually after 2008.

The government-regulated pricing regime resulted in CPC sliding into a stagnant deficit, and consequently gave rise to negative impacts such as the worsened financial standing of the Taiwanese government.

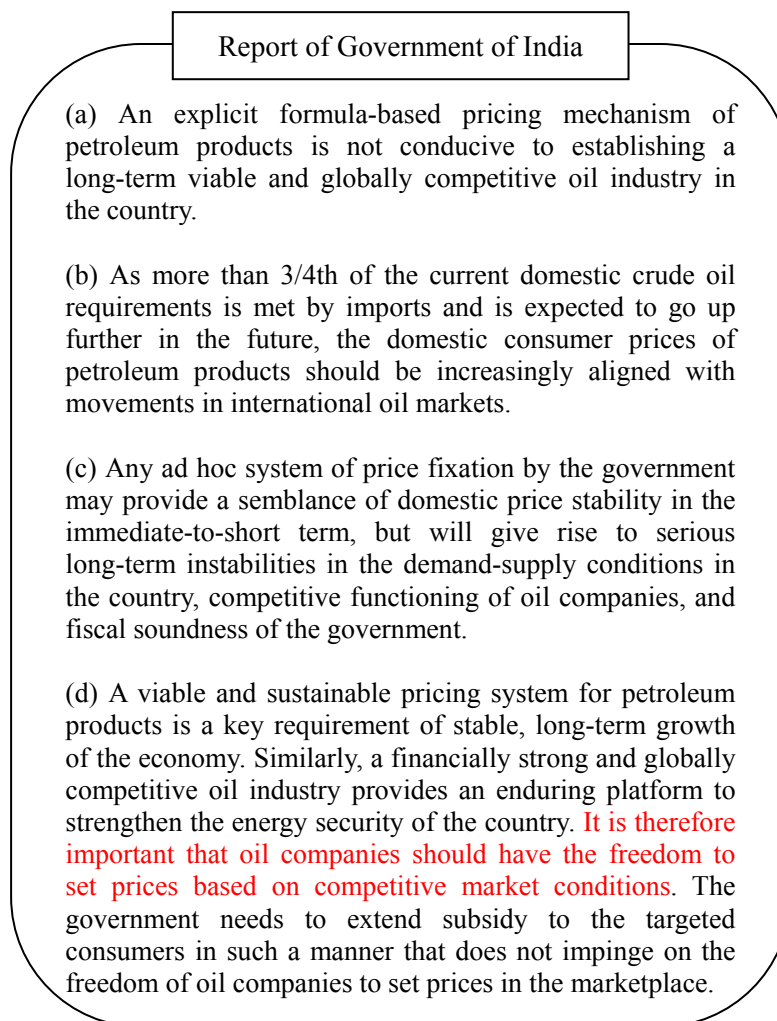
Taiwan has only one government-owned and private oil company, respectively. Therefore, it is easy to regulate the price through the government-owned CPC. In addition, in Taiwan, as there is no intermediary between the refiners and consumers, only two price benchmarks are in use; i.e. wholesale price applicable between refiners/wholesalers and service stations, and retail price applicable between service stations and end-users. Thus, the volatility in wholesale price directly reflects the retail price.

(3) India

The oil pricing mechanism in India shifted in a step-by-step manner, from "government-regulated pricing regime" to "gradual lifting of such regime," and then to "lifting of government control/de facto government control." For the period between 1976 to March 2002, the Indian domestic price of oil products had been regulated under the system called "Administered Pricing Mechanism (APM)." After such period, the increase in demand necessitated the expansion of the supply system, and import of most of oil products was deregulated after April 2002. Against this backdrop, the government-regulated pricing regime under the APM system was lifted; however, household LPG and kerosene continued to be subject to the regulated price.

As for the gasoline and diesel price, the Indian government lifted regulation on the oil price, associated with the abolition of APM. However, Petroleum Planning Analysis Cell, a government advisory board, advised the state-owned oil company having 85% market share to adjust the price as may be required to reflect the climate of crude oil price and product price. The Indian

Fig. 3-7 Report of Government of India



(Source) Petroleum Planning & Analysis Cell

government has determined the price in consultation with the municipal governments and other parties.

The hike in global price pushed down the regulated price to a level insufficient to cover the crude oil cost, refining costs and other costs. The accrued losses fell on the government (by issuance of oil bonds), the upstream business sector, and state-owned oil companies. Moreover, the deficit in state-owned oil distributors reached an unsustainable level in 2008.

From 2010, the Indian government is reportedly considering shortening of the adjustment period of oil product price, and to principally deregulate the price by dismantling the government-regulated pricing regime for gasoline and diesel.

The deregulation of oil pricing is expected to curtail the deficit in government financial standing, as deregulation can eliminate the need to subsidize oil refining sectors for maintaining the regulated price.

These movements toward deregulation are in line with the proposal suggested under the "Report of the Expert Group on a Viable and Sustainable System of Pricing of Petroleum Products" (Report of Government of India) published in February 2010.

(4) Impact of Asian Market Price on Japanese Domestic Market Price

The following is my presumption and analysis laid out to discuss the impact of Asian market price on Japanese domestic market price.

The import price upon the importing of a product into Japan shall be called "Import Parity Price (IPP)" and the net gain upon the export of a product from Japan shall be called "Export Parity Price (EPP)." The following is a comparative analysis between IPP/EPP and domestic spot price:

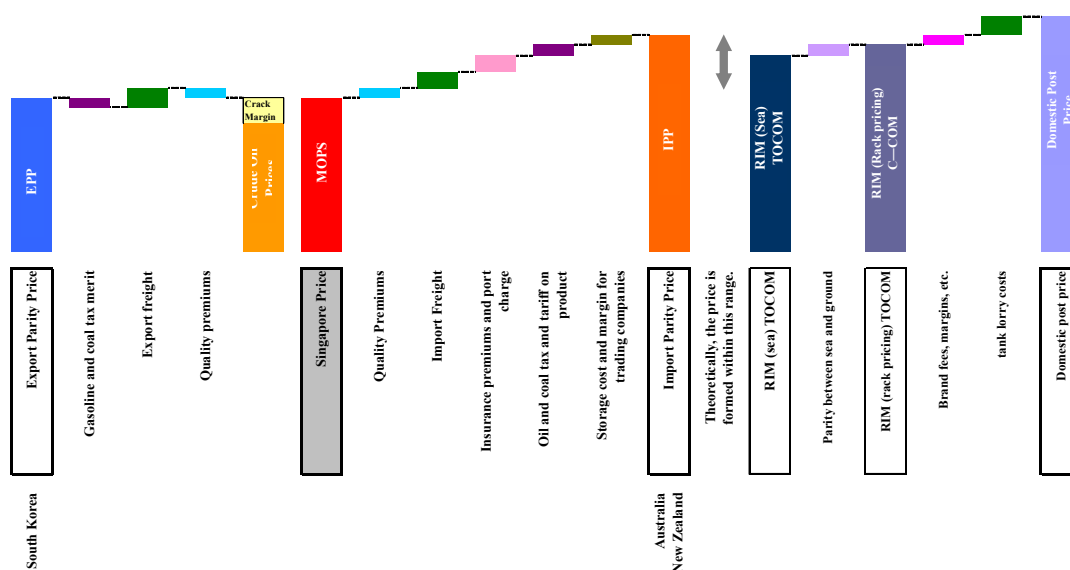
$IPP = \text{MOPS} + \text{quality premiums} + \text{shipping costs} + \text{port charge} + \text{insurance premiums/cost of losses, etc.}$

$EPP = \text{MOPS} + \text{quality premiums} - \text{shipping costs} - \text{port charge} - \text{insurance premiums/cost of losses, etc} + \text{merit of oil and coal tax}$

The minimum and maximum of the domestic spot price will be EPP and IPP, respectively, and has high volatility versus Asian market price. From the analysis of the correlation between gasoline/diesel and Singapore price, diesel shows a stronger correlation with Singapore price because the import/export quantity of diesel is large.

An oil sector grows active in exporting when the wholesale benchmark price of its own country is lower than the EPP. However, when such benchmark price is higher than IPP, traders will grow active in importing, consequently affecting the domestic wholesale price. Thus, the domestic spot price is closely connected to the climate of the Asian market.

Fig. 3-8 Relationship between MOPS Price and RIM Price



(Source) The Oil Information Center

(5) Prospective Trends

Each Asian country had used its own pricing mechanism laid out under its respective policy. However, expansion in product trade will lead each mechanism to influence the others, by means of MOPS. Such influence will be further strengthened as the countries with a government-regulated pricing regime move forward to deregulation and globalization.

In recent years, since the subsidies to cover the oil sector's deficit arising from offering products below cost requires huge government expenditure, and entails problems such as bad government financial standing, even countries with a government-regulated pricing regime such as China, India and Taiwan have begun to taken steps for deregulation, including revision of the calculation formula for regulated pricing or increasing the occasions of price adjustment. Therefore, it is necessary to keep a close watch on these countries.

3-4 Challenges of Japanese Oil Sectors in Relation to Oil Pricing Mechanism

(1) Elimination of Obstacles to Oil Pricing Mechanism

Oil pricing is closely connected to demand. The climate of demand is the key factor for determining a profitable price.

The Japanese oil sectors have dealt with the unexpected level of downturn in demand by such means as cutting down on production. However, such means are merely temporary measures for supply-demand adjustment and fall short of attaining any substantial effect. The Japanese oil sectors will need to attain an optimal supply-demand balance by curtailing overcapacity and to come up with effective market frameworks, in an attempt to eliminate the factors which would be obstacles to fair pricing.

(2) Revision of New Pricing Mechanism

Further, in addition to eliminating the obstacles as mentioned above, the Japanese oil sectors will need to lay out a new pricing mechanism primarily focused on "adequate refining margin" and "shortening time lags" so that they will be able to sustain the supply chain.

4. Oil Distribution in Asia/Topics

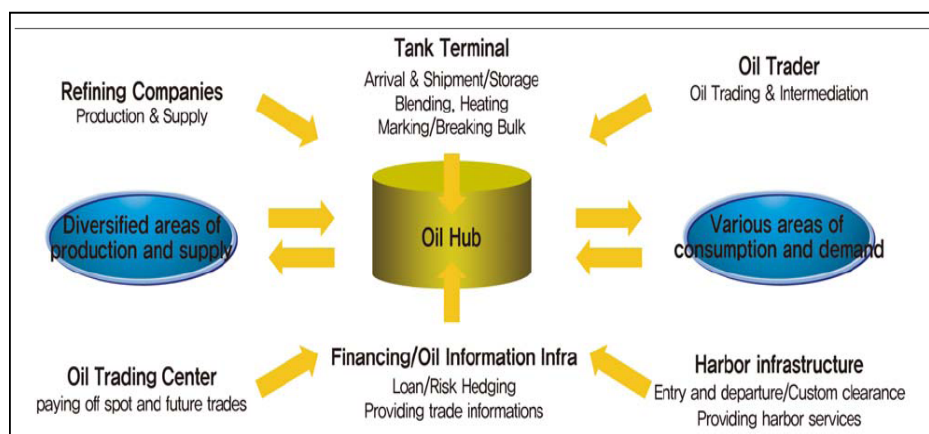
Based on the onsite survey, the following are the three topics regarding oil distribution.

4-1 South Korea/Northeast Asia Oil Hub Scheme

The South Korean government, as one of its national strategies, plans to build an oil trade hub for Northeast Asia. The plan is now being implemented in Yosu and Ulsan, two large industrial complexes in South Korea. The government's ultimate goal is to attain the capability of processing approximately 40 million barrels (6.4 million kiloliters) of oil.

This Northeast Asia Oil Hub Scheme was suggested in the "National Energy Basic Plan," published in August 2008, in which the South Korean government laid out a plan to establish the nation as a logistic hub for trade within Northeast Asia including Japan, China and Taiwan and to North America, while taking advantage of the competitiveness of the South Korean oil sectors. The objective of the plan is to expand the export of oil products and to revitalize trading. This plan also targets the creation of a market similar to Singapore that would play the central role for exports from Northeast Asian countries. This commitment of South Korea, as well as the topic of recovery of oil demand in Asia, calls for further attention.

Fig. 4-1 Northeast Asia Oil Hub Scheme



(Source) Information from KNOC

4-2 South Korea/Deregulation of Large Supermarket/SS Complex

In November 2008, the South Korean government, as one of the government-initiated programs to lower oil price, deregulated a large-sized supermarket to operate a service station in the same store premises.

This new type of supermarket/SS complex sells 1,500 kiloliters of gasoline per month. They offer a price approximately 70 to 100 won/l cheaper than other service stations located nearby. They are striving to attract customers, by such way as neat and bright store design and a transparent fueling hose which enables customers to check the oil quality. They have succeeded in luring price-sensitive customers mainly consisting of young people, and are demonstrating good business performance.

As of the end of January 2010, seven sites have launched into operation where the supermarkets and service stations are combined, such as "SK Energy and E-Mart," "GS Caltex and Home Plus," and "S-Oil and Lotte Mart." This type of business also calls for further attention.

Fig. 4-2 Self-service SS at Supermarket Store



4-3 China/Increase in SS at Convenience Stores

In many cases, the data of service stations in China is uncertain. However, as of the end of 2009, China had 85,000 service stations, 53% of which are owned by two state-owned oil companies (over 70% in terms of sales quantity). The number of service stations is trending upward, along with the growth in the number of automobiles on the road.

As the sale of gasoline, which is the oil sector's core business, is on an upward curve, diversification of the service segments of service stations will be the next task. However, in recent years, particularly in large city areas, a remarkable increase is seen in the number of convenience stores (stores selling rice, beverages, etc.) operating service stations at the same store premises.

In addition, new business models such as service stations offering car wash service and self-service stations have emerged.

Some large self-service stations open 24 hours located in convenient places are selling 2,500

kiloliters per month (Figure 35 is a PBSS in the suburb of Guangzhou.)

Fig. 4-3 SS at Convenience Store in Guangzhou



Fig. 4-4 Large Self-Service SS in Guangzhou



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