Asia Oil Price Analysis 1: Middle Eastern Crude for Asian Market Priced at Comparatively Higher Levels and Switchover of Marker Crude Inevitable to Gain Market's Confidence

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Highlighting Points

- Prices of Middle Eastern crude for the Asian market are set at levels $1.0-1.5/bbl higher than those for U.S. and European markets. Crude oil prices have a far-reaching impact on the whole energy-related area, a widening differential of which is bound to weaken industrial competitiveness of those countries affected.

- The price differential of around $1/barrel has been observed even when crude oil prices have been in the stage of upward movement in and after 1999, with the differential widening to $1.5/barrel in and after the beginning of 2002. This demonstrates oil-producing countries' intention to keep the premium on crude oil prices at the current level or at higher levels.

- Production and trading volumes of Dubai crude -- the marker crude for the Asian market -- have fallen considerably in recent years, totally losing the confidence of the market. It now appears necessary to begin negotiations with oil-producing countries in favor of a new marker crude.

- To face the problem of comparatively higher-priced Middle Eastern crude for the Asian market, it will be necessary for the Asian market to exercise its power to counter the current problem, making it essential to streamline the East Asian oil market and to ensure flexibility in selecting fuels at consumption ends.

Introduction

As we entered the 1990s, it became obvious that prices of Middle Eastern crude for the Asian market are higher compared with those for U.S. and European markets and that these price differentials have taken root in recent years, as production of Dubai crude -- the marker crude for the Asian market – has fallen and hence lost the market's confidence in the current marker crude. While the East Asian market, including Japan, ROK, Taiwan and China, is comparable with the U.S. and European markets in size, the market is not fully streamlined, and therefore unable to set an international price of its own. This report is aimed at analyzing the problem of comparatively higher prices of Middle Eastern crude for the Asian market and at suggesting several measures to counter the problem, including the introduction of a new marker crude, the streamlining of the East Asian market and ensuring the flexibility in selecting fuels at consumption ends.

1. Introduction of the "Formula Method" and Market-Related Crude Oil Price Movements

The international trading of crude oil and refined products began entering into the era of the market with the crash of crude oil prices in 1986, when Saudi Arabia introduced the crude oil sales on a netback price basis. Although OPEC returned to the fixed price system at the end of 1986, with the basket price set at $18/bbl, the crude oil market remained bearish at all times, with a surplus production capacity exceeding 10 million b/d. This prompted the introduction of the formula method in and after the early autumn in 1987 to determine crude oil prices for sales on a long-term contract basis [1].

Under the formula price method, the marker crude oils representing the three major consumer markets -- the U.S., Western Europe and Asia -- were adopted (see Fig. 1). Crude oil prices are established by adding an adjustment factor to be determined by grade of crude by individual oil-producing countries to those marker crude prices on the spot market. WTI (West Texas Intermediate), U.S. domestic crude, was adopted as the marker crude for the U.S. market, while Brent, produced in the North Sea, was adopted as the marker crude for the European market. For the Asian market, Dubai which is traded on the Middle Eastern spot market, was adopted as the marker crude since there was no appropriate crude produced in Asia.

This formula price method related to the market survived the Gulf crisis of 1990. Although OPEC could no longer demonstrate its power to control or set crude oil prices as it did in the past, it can be said that OPEC succeeded in containing the range of fluctuations in crude oil prices in the $13/bbl-$19/bbl band during the period through 1995 by combining the market-related price movements with production controls. Crude oil in the consumption area such as WTI listed on NYMEX determined daily crude oil price fluctuations

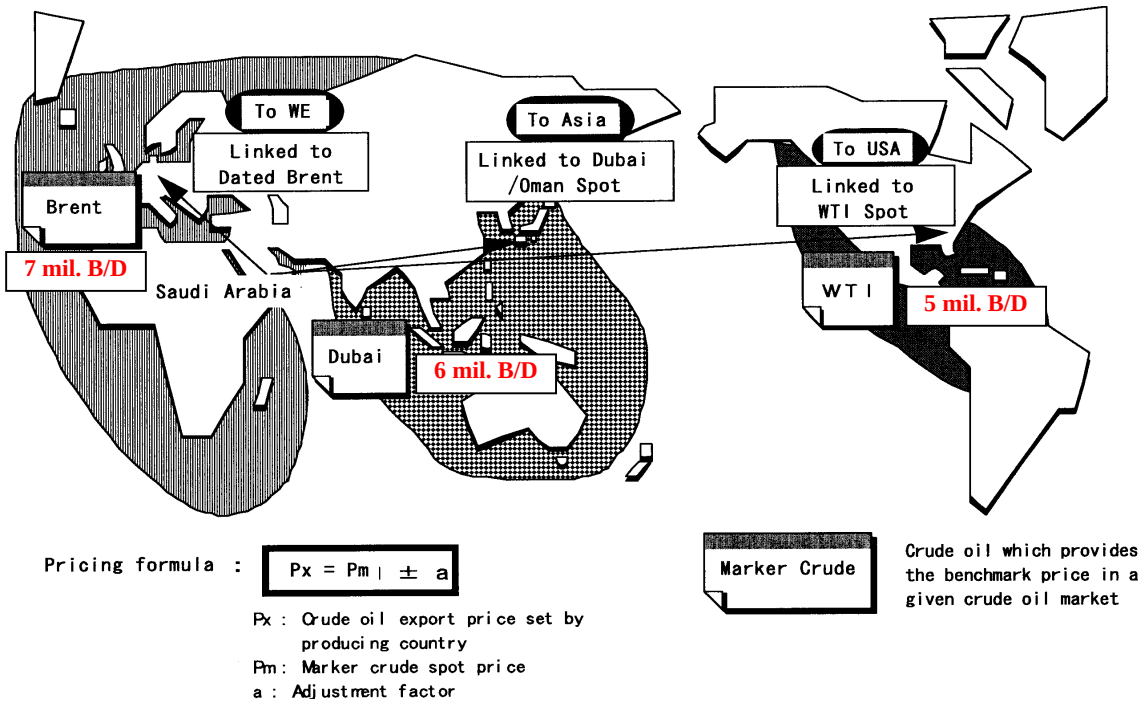
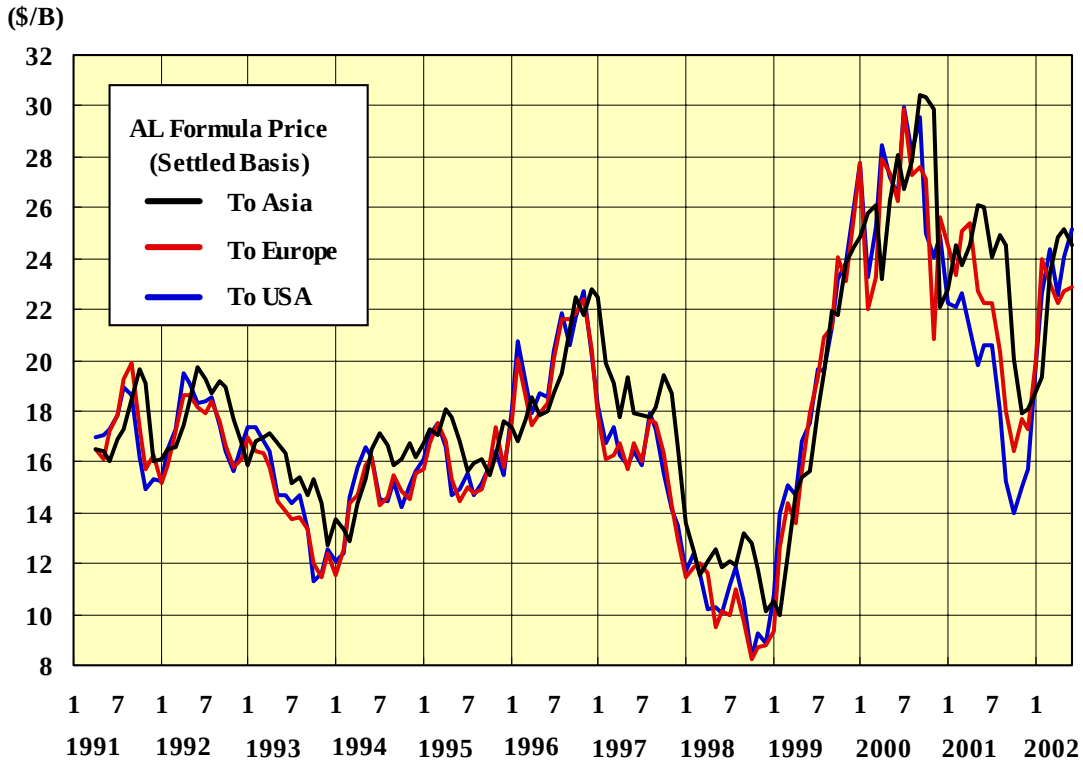


Fig. 1 Determination of Crude Oil Prices in Individual Consumption Areas by Formula Method

Fig. 2 shows formula price movements of Arabian light crude, the representative Middle Eastern crude, over the period from April 1991 in the wake of the Gulf crisis through 2002, as they are destined for Asian, European and U.S. markets. These prices, determined by the price formula, are adjusted for the timing at which Arabian light crude is shipped to respective markets.

These formula price movements indicate the following two outstanding characteristics: (a) there is a timing gap in price changes between prices for the Asian market and those for the European/U.S. markets, and (b) prices for the Asian market are relatively higher than those for the European/U.S. markets. The latter characteristic that the price of one crude for the Asian market is relatively higher than the price of the same crude for the European/U.S. markets is a serious problem given the fact that such a characteristic has an adverse impact on the Asia's competitive power. When arguing about the price differential that fundamentally exists between the price for the Asian market and that for the European/U.S. markets, it is essential to separate the price differential due to the timing gap and the price differential due to destination. The formula prices published in the Petroleum Intelligence Weekly [2] include the price differential due to the timing gap, thus making it necessary to treat them carefully.



(Note) AL: Arabian Light crude oil

Fig. 2 Movements of Formula Prices for Arabian Light Crude (Settled Basis)

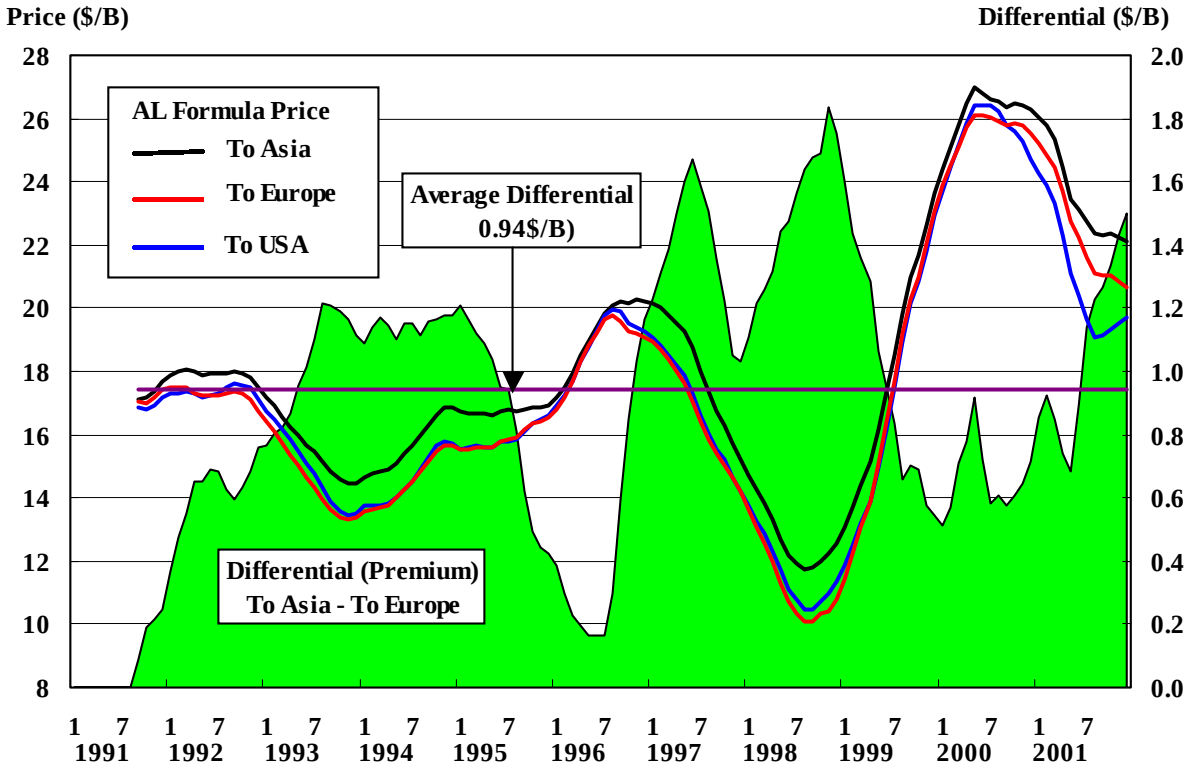
The price differential due to the timing gap is attributable to the gap of timing in reference to the prices determined by the formula for the Asian market and for European/U.S. markets, as illustrated in Annex quoted in the end. When adjusted for the timing of shipment from the oil-producing country in question, the price differential widens between the price for the Asian market and those for other markets. At the stage in which crude prices move in one direction-either downward as in 1997-1998 and in 2001 or upward as in 1999-2000, there always remains price differentials due to the gap of timing for price reference, even in comparison to yearly average prices. One way of eliminating the effect of the price differential due to the timing gap is to compare the differentials between the price for the Asian market and that for the European market and between the price for the Asian market and that for the U.S. market, as they are determined in reference to the timing when the decision to purchase is made or when the crude is shipped from the oil-producing country.

2. Relatively Higher-Priced Middle Eastern Crude for the Asian Market -- $1-1.5/barrel Price Differential (i.e., Higher Premium) vis-à-vis the Same Crude for European/U.S. Markets

An analysis was made of formula price movements in Arabian light crude during the period from 1991 to date, as projected from the price information at the loading point at the time of shipment for Asian, U.S. and European markets (see Fig. 3). Monthly formula prices was treated by using the moving average of twelve months in order to remove short-term changes in price due to seasonal supply-demand fluctuations and so on. We need to consider long-term price differentials which remain after making one year average as a important problem which affects international competitiveness.

Middle Eastern crude prices for the Asian market were higher than those for the European/U.S. markets by around $1/barrel during the period 1992-1995. This price differential widened to around $1.5/barrel in 1997-1998. While crude oil prices increased sharply in 1999-2000, the price differential stood at around $1/barrel again and remained unchanged in 2001. With the beginning of the year 2002, month-to-month formula price differentials widened and therefore formula price differentials on a twelve-month average basis reached to around $1.5/barrel at the end of 2001. The price differential averaged $0.94/barrel over the period from 1991 to June 2002 (Fig. 3). It should be noted that the price differential was nil on a long-term basis between the U.S. market and the European

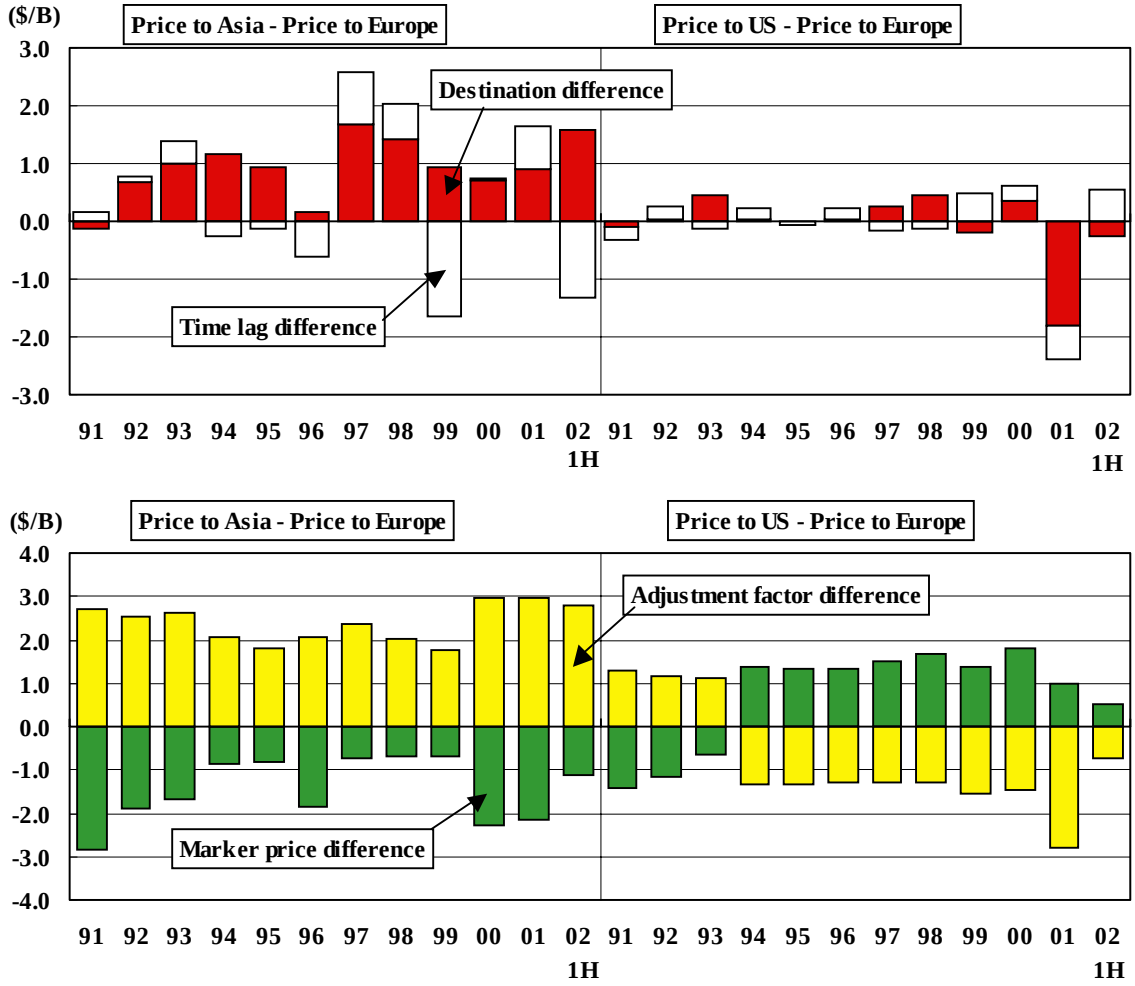
market as the price for the respective markets offset each other, but the oil-producing country's adjustment factor was set in such a manner that the price discount for the U.S. market became quite noticeable in and after the second half of 2000.



(Note) AL: Arabian Light crude oil

Fig. 3 East-West Gaps (Asian Premiums) in Crude Oil Price (12 Month Moving Average)

Fig. 4 summarizes the results of an analysis of yearly average price differentials among consumer markets based on formula prices and of factors contributing to these differentials. These results further demonstrates that the price for the Asian market is $1-1.5/barrel higher than that for the European market. In contrast, the price differential between the European market and the U.S. market was merely $0.5/barrel or less. Moreover, during periods of crude price movements in one direction – either upward or downward – throughout the year the price differential due to the timing gap in reference to the marker crude price became noticeable around 1996 and thereafter. In fact, such a price differential due to the timing gap for the Asian market turned out to be plus $0.6-0.9/barrel in 1997-1998 when crude oil prices plunged sharply and minus $1.7/barrel in 1999 when crude oil prices increased sharply.



(Note) Area-to-area price differentials are those projected from price information at the time of shipment from oil-producing countries, while timing-to-timing price differentials are those due to time lags arising from the reference timing of marker crude prices. Effective January 1994, the marker crude for the U.S. market changed from Alaskan crude to WTI. Effective April 2000, the marker crude for the European market changed from prices of Brent on the spot market to those on the futures trading market.

Fig. 4 Differentials in Formula Prices among Consumption Areas and Contributory Factors

The fact that the price of Middle Eastern crude for the Asian market is relatively higher by around $1-1.5/barrel has been confirmed by not only IEEJ's analysis but also the Korean Energy Institute [3] as well as Facts Inc. by Dr. Fesharaki [4]. It can be said that to separate the intrinsic price differential due to destination from that due to the timing gap (time lag) is the basic way of approach to an analysis of the price differential due to destination and this way is an internationally adopted one in common, when attempting to argue about the

so-called “Asian Premium” on petroleum. On a long-term basis, i.e., looking at the 1990s or at least the latter five-year period of the decade, the Middle Eastern crude oil price for the Asian market was relatively higher by around $1/barrel on average than those for the European/U.S. markets, whereas no such price differentials were noticed between the European market and the U.S. market.

Table 1 Analyzed Results on Oil Asian Premiums by Various Research Organizations

	IEEJ			KEEI			Facts Inc.		
	Asia - Europe	Asia - USA	USA - Europe	Asia - Europe	Asia - USA	USA - Europe	Asia - Europe	Asia - USA	USA - Europe
1991	-0.13	-0.03	-0.1						
1992	0.69	0.67	0.02						
1993	1.01	0.56	0.45						
1994	1.15	1.13	0.02				1.03	1.07	0.04
1995	0.95	0.95	0	1.02	0.96	0.06	1.09	1.04	0.05
1996	0.17	0.15	0.02	0.2	0.09	0.11	0.52	0.52	0
1997	1.67	1.41	0.26	1.58	1.36	0.22	1.74	1.57	0.17
1998	1.43	0.98	0.45	1.42	1.06	0.36	1.03	1.04	-0.01
1999	0.95	1.15	-0.2	1.1	1.2	-0.1	0.89	1.2	-0.31
2000	0.72	0.37	0.35	0.73	0.58	0.15	0.88	0.44	0.44
2001	0.89	2.68	-1.79				*1.02	*2.80	*-1.78
2002	*1.59	*1.83	*-0.24						
Average	0.94	1	-0.06	1.01	0.87	0.13	1.02	0.98	0.04

(Note) Figures marked with * indicate results obtained up to the point of analysis for the year concerned.

(Source) KEEI: The Energy Institute of Korea for the reference material [3], Facts Inc. for the reference material [4] and IEEJ: the Institute of Energy Economics, Japan, This study

From the above, it can be said that formula prices for the Asian market are obviously higher than those for the European market. The largest factor behind this is the failure of oil-producing countries’ to adjust factors to wipe out the price differentials between the two marker crude oils corresponding to the two markets -- i.e., Dubai and Brent -- even when the price differentials between the two narrow rapidly (see Fig. 4). Meanwhile, the differentials between the price for the U.S. market and that for the West European market tend to be offset, thus ruling out the possibility of one price being comparatively higher than the other on a continuous basis. In 2001 alone, however, oil-producing countries’ adjustment factors were set in such a manner that the price for the U.S. market turned out to be discounted.

Since energy prices in Asia are determined based on crude oil prices, the comparatively higher prices for the Asian market are not limited to oil but are applicable to all other energy sources. In fact, Japan's LNG import prices are determined by a formula, using the average crude oil import price (CIF Japan basis) as the marker. Coal prices are also determined through negotiations between major coal-exporting companies and coal-importing consumers in reference to crude oil prices. Should the area-to-area crude oil price differentials widen in the future, it will become an extremely serious problem detrimental to Asia's competitiveness in the international market.

3. Loss of Reliability on Dubai Crude as Marker Crude Because of Its Production Decrease and Unavoidable Shift to Other Crude as New Marker Crude

Production of Dubai crude was more than 400,000 b/d in the latter half of the 1980s, but began decreasing in the 1990s to drop to the current level of merely 170,000 b/d. Due to the increase in oil demand in Asia, the Dubai crude exports were limited to Asia in the 1990s.

Under such circumstances, the price of Dubai crude on the spot market only had to include lover transportation cost for exports to Asia, ruling out a deal for the U.S. and European markets via the Cape of Good Hope which required higher transportation cost. This is a background of the comparatively higher crude oil prices for the Asian market, as computed by the marker crude price.

As there is only a slight spot trading of Dubai crude after India's bidding for the crude, amidst the sharply falling production of Dubai crude, it takes some difficulties to determine the price of Dubai crude on spot trading at present. In reality, the spot price of Dubai crude is determined by Platt's assessment, in consideration of the price of Brent and the spread between Brent and Dubai prices, based on the spread trading of Brent and Dubai on the forward trading market. Since Dubai crude was used in the crude oil bidding for an Egyptian refinery in 2001, the price of Dubai crude was permitted to rise unevenly.

In this connection, the price formation mechanism of Dubai crude is in question due to its low liquidity and transparency and hence is beginning to lose the confidence of the market completely. Both sellers and buyers of Middle Eastern crude are now reaching the limit of

tolerance of the fragility of the very foundation on which the crude oil prices are determined to begin with. Against this backdrop, Japanese and East Asian oil companies are set to begin negotiations with Middle Eastern oil-producing countries to change the marker crude for the Asian market.

Table 1 Alternative Candidates for Marker Crude for Asian Market and Their Strong/Weak Points

Alternative Candidates	Strong/Weak Points
Idealistic crude	
Daqing crude	● Although China is a large consumer market, the oil market is under administrative control and is not free. ● Spot exports are limited and the market is localized, ruling out dealings with U.S. and European traders. ● Greatly differ in properties from Middle Eastern crude oil.
Arabian light	● Large in production scale, allowing trading on a global scale. Can represent M.E. crude for Asian market. ● Saudi Arabia bans spot trading to keep prices from falling. Destinations for exports are restricted. ● Saudi Arabia monopolizes sellers' market.
Price index for M.E. crude	● It is necessary to expand oil products trading in East Asia and streamline spot trading market. ● It is necessary to streamline products futures trading market and to post price index for M.E. crude. ● Streamlining of various aspects is necessary, making its immediate realization difficult.
Realistic crude	
Oman	● Spot trading to some extent already exists. Larger in production scale than Dubai crude. ● Shell holds 40 percent concession interests, leading to apprehension of price manipulation by Shell.
IPE Brent	● Large-scale trading in international market. High liquidity of market and high transparency of prices. ● Having marker crude in common, the verification of price differentials for European market becomes easy. ● Price fluctuations reflecting supply and demand in U.S./European markets constitute new risks. None of actual trading in Asian market.,

Idealistic alternative candidate marker crudes for the Asian market include: Daqing crude as viewed as representing the consumption area; Arabian light crude as viewed as

representing the oil-producing countries; and the price index for the Middle Eastern crude (on the futures trading market) based on product prices on the spot market as viewed as representing the market (see Table 1). All of these candidates, however, have their respective bottlenecks greatly hampering their actual employment as a marker crude. In this connection, the more realistic candidate marker crude is either Oman or IPE Brent (on the futures trading market) for the European market, despite their respective problems. Now that an abnormal movement of Dubai crude has become salient, it is believed to be a process that cannot be avoided to have negotiations with oil-producing countries for changing the marker crude.

4. Streamlining of East Asian Oil Market and Assuring of Flexibility of Important Oil-Consuming Areas

Meanwhile, streamlining the East Asian oil market is an option, for which steady preparations can be made by oil-consuming countries, if they think it necessary to do so. It will be necessary to dispatch to oil-producing countries accurate information on energy-to-energy competition in Asian consuming areas. A typical signal to be displayed will be oil product prices mirroring supply and demand of energy and oil in Asia. The real counterforce to face down oil-producing countries cannot be exerted unless it is acquired by consumer countries themselves.

It will be difficult to streamline the East Asian oil market to demonstrate its power in a short period of time, because there are so many problems lying ahead. However, if deregulation measures are implemented in Asian oil-consuming countries to increase their international competitiveness, the streamlining of the oil market is expected to move forward in the medium- and long-term perspectives. Step by step measures to promote the streamlining of the market is essential though time-consuming. There is every indication that the oil market is being gradually becoming more streamlined demonstrated by the beginning net trading of oil products and listing of crude oil on the futures trading market.

In Asia, where a sharp increase in crude oil production is not expected, technological development for production of liquid fuel from abundant coal and natural gas resources can provide an option along this line. Unlike Europe and the U.S., the Asian market lacks

competitive relations developed by a variety of crude oil supply sources and therefore it will be beyond its power for the Asian market to try to solve this problem within the framework of oil alone, thereby making it necessary to study countermeasures by linking oil with alternative options encompassing all energy sources including coal and natural gas.

From the viewpoint of improving the flexibility of selecting fuels in the consumption area, the “gasification furnace” is a promising technology with a bright future, with feedstocks to be put into the furnace having an extremely wide range from natural gas, to begin with, residual oil, coal, coke to biomass.

With gasified synthetic gas (a mixture of carbon monoxide and hydrogen) as a starting point, a number of high values added can be produced in the form of industrial gas, chemical feedstock, liquid fuel, electric power, etc. With the gasification furnace as an example, a technology having great flexibility should be positioned strategically and utmost efforts should be made toward its commercialization and achievement of economic viability.

(References)

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ANNEX

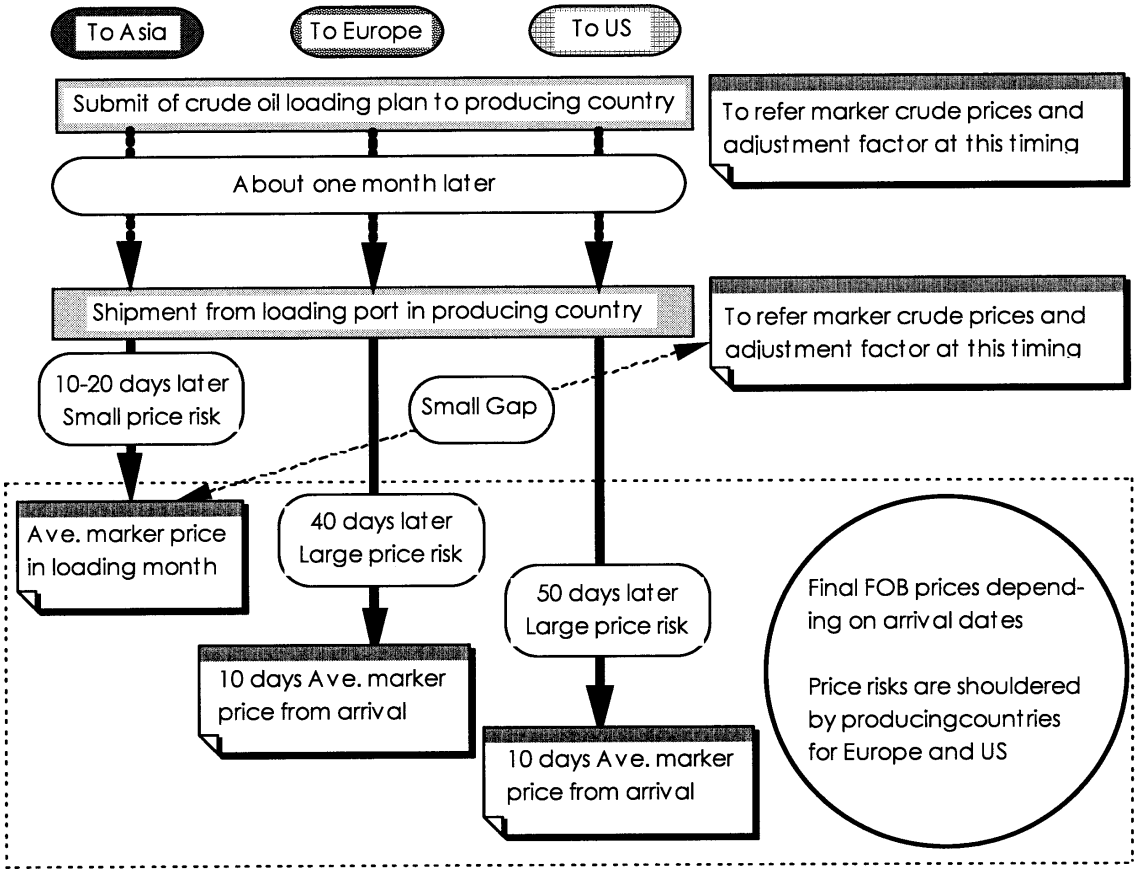

Fig. A1 Chains of Crude Oil Supply Shown by Destination Area and Timing of Price Reference

A flow of crude oil from an oil-producing area to an oil-consuming area consists of several stages such as the submission of a plan for cargo loading, shipment from the producing country and arrival at the consuming country, as shown in Fig. A1. Under the formula of Saudi Arabia, reference is made to marker crude prices at the timing of cargo arrivals at consuming areas– 40 days or 50 days after the cargo shipment. For this reason, when final prices at consuming areas in Europe, the U.S. and Asia are converted to prices at the timing of cargo shipment, there always exist differential prices due to the gap in price reference timing. It is a common practice, however, to hedge against the risks accompanying the oil price fluctuations by fixing the price at the timing of decision made for purchasing the crude oil in question.

When crude oil cargoes are shipped to European and U.S. markets, it normally takes 40 days or 50 days for those cargoes to arrive at consuming areas, meaning that there exist possibilities of wild price fluctuations during these 40-day or 50-day periods. In actuality, however, oil-producing countries bear these risks. Of course, it is possible to finally determine the shipment prices by using the marker crude price at the timing of cargo arrival, but this is only an argument based on the result and it is impossible to use the price in advance when making a decision whether to purchase the crude oil in question or not.

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