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The Summary of Research Results

Proposals on Measures for Reducing Asian Premium of Crude Oil

-- Changes in Pricing, Unity among Consuming Countries and Preparation of Oil Market --

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<The Purpose of Research>

Crude oil prices for the Asian market remained higher than those of European and U.S. markets by $1 ~ 1.5/barrel from about 1992 up to now. This problem has a far-reaching effect not only on oil but also on all areas where energy prices are linked to crude oil prices. The financial burden extra costs due to relatively higher crude oil prices is expected to eventually suppress economic and industrial activities in Asia. This is also believed to have a negative effect on oil-producing countries in the long-term. Such a problem caused by high crude oil prices over the extended period cannot be overlooked, when taking into account the adverse impact it will have on the international competitiveness of the Asian economy and society as a whole. The purpose of this report is to examine several concrete proposals aimed at reducing the Asian premium and to consider medium- and long-term objectives to be achieved by oil-producing and oil-consuming countries.

<The Major Conclusions>

1. Prices of Middle Eastern crude for the Asian market have been higher than those for the U.S./ European markets by $0.94/barrel on average over the period from 1991 to the first half of 2002, with a yearly average increasing sometimes to the $1.5/barrel level. Judging from the netback values in the Singaporean market, the refining margins in Singapore have remained at around minus $1/barrel in and after 1999. These higher oil prices for the Asian market – the “Asian Premium” – have imposed an additional burden reaching $4-8 billion on the Asian market, thus posing a serious problem as it badly weakens the international competitiveness of the Asian economy and society. The higher crude oil prices are not limited to oil but have a far-reaching impact on the whole energy-related areas.

2. As production of Dubai crude, which is currently the marker crude for the Asian market, has decreased considerably in recent years and hence the market has lost confidence in its price-forming capability, it is necessary to change the marker crude. In this connection, the following two short-term measures of crude oil pricing aimed at reducing the Asian Premium are proposed: (a) pricing in reference to Brent crude; and (b) pricing by adopting the average of formula prices for the U.S. and European markets. As far as top priority is given to reducing the Asian Premium, the change in the marker crude to Oman crude cannot offer a satisfactory solution.

3. For the purpose of supporting the short-term measures aimed at reducing the Asian Premium and strengthening the influential power of the Singaporean market, it is essential to increase oil products trading in Asian countries as a whole and streamline/expand the oil products market. Asian oil-consuming countries are urged to endeavor to streamline the oil market so that reliable information concerning the competitive relations and other subject matters in the market can be dispatched to the oil-producing countries. Moreover, the united actions by the oil-consuming countries are necessary to strengthen their power of bargaining with the Middle Eastern oil-producing countries.

4. The task to be addressed by both oil-producing and oil-consuming countries from medium- and long-term perspectives is to realize spot trading of crude and formation of crude oil prices by the Middle Eastern oil-producing countries themselves – proposal (c) under which the Asian Premium can be eliminated – and build up a global link of crude oil and oil products markets by strength-ening the market functions, in which U.S., European and Asian markets as well as Middle Eastern oil-producing countries are linked together on a worldwide basis. Such a global link, once built up, is expected to establish the prices of Middle Eastern crude oil which is leading the world crude oil market and thus contribute to stabilizing crude oil prices, which would fluctuate wildly in case supply cushions are weakened.

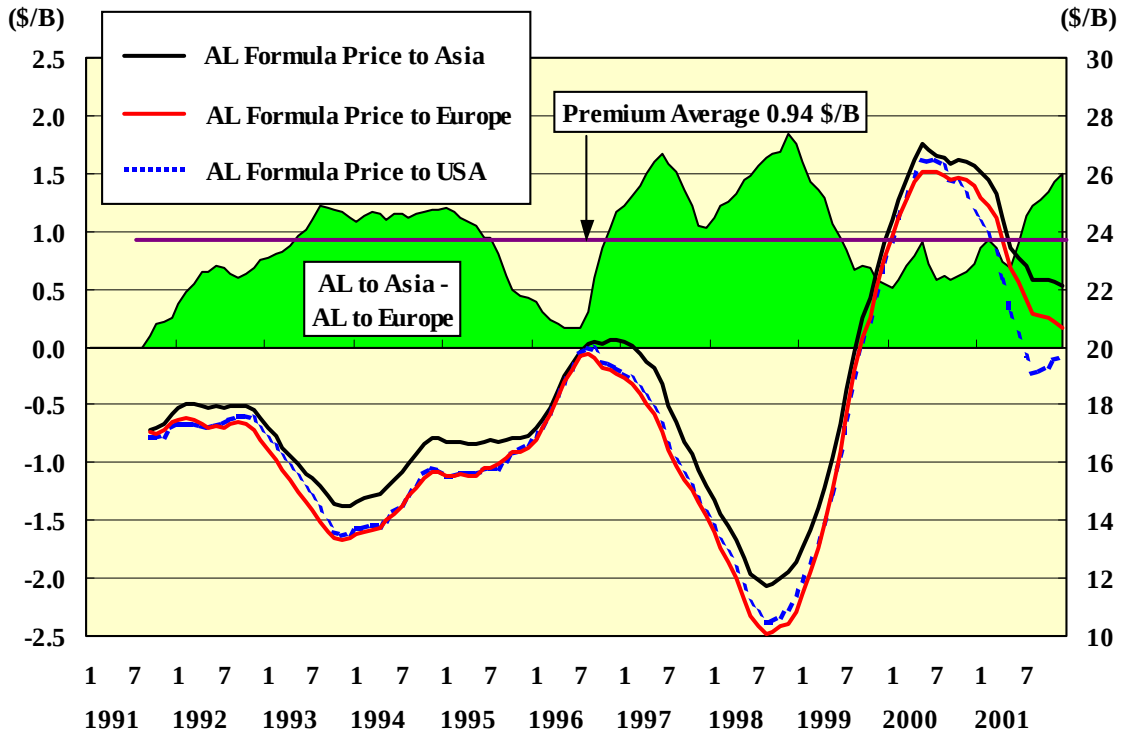
1. Higher -Priced Crude Oil for the Asian Market and Its Cause

Formula prices of Arabian Light crude for the Asian market have been higher than those for European/U.S. markets by $1 ~ 1.5 / barrel over the period of ten years or so in and after 1992 (Fig. 1). This premium is not a temporary one - seen on the basis of yearly averages - and should be taken up as an important problem as it has an adverse impact on the economic competitiveness of the countries involved. On the other hand, the formula prices of Arabian Light crude for the European market had been almost identical with those of the U.S. market through the end of 1999.

Price differentials (premiums), which were seen during the period of more than ten years from 1991 till June 2002, averaged $0.94/barrel. (a) The price differentials widened to around $1.5/barrel during the period 1997 ~ 1998, (b) the price differentials remained at around $1/barrel during the period 1999 ~ 2000, and (c) the price differentials are widening again during the period from 2001 into 2002. When considering them, it can be assumed that oil-producing countries have continued to maintain and/or widen these price differentials in recent years.

The largest factor for these premiums lies in the oil-producing countries' failure to have their adjustment factors respond accordingly, even when the price differential between Dubai crude, the marker crude, and Brent crude narrows rapidly, in which case the adjustment factors should be such that the effect of narrowed price differentials between Dubai and Brent be nullified. When pricing Dubai crude whose destination was limited to the Asian market because of oil demand increase in Asia and production decrease of Dubai, the transportation cost between the Middle East and Singapore is the only factor to be considered. This is one of the structural factors leading to relatively higher crude oil prices for the Asian market.

Fig. 1 Changes in Formula Prices of Arabian Light Crude and Asian Premiums
(FOB basis at the timing of shipment, twelve-month moving averages)



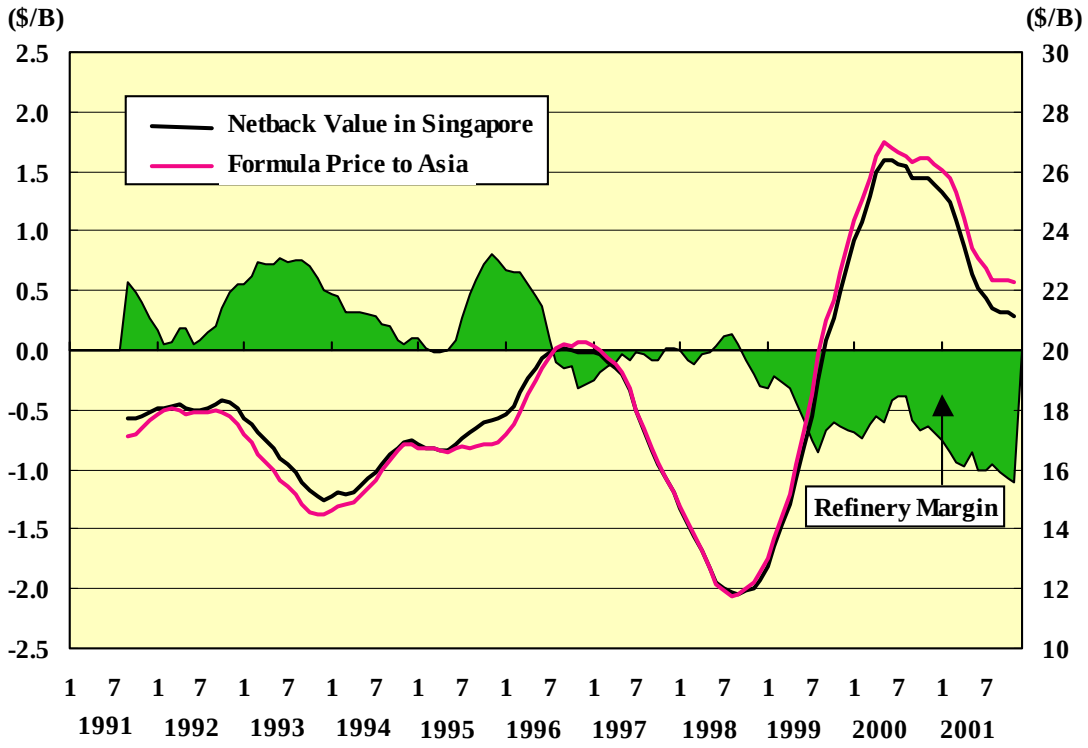
The fact that the price of Middle Eastern crude for the Asian market is relatively higher by around $1-1.5/barrel has been confirmed by not only IEEJ's analysis but also the Korean Energy Institute [1] as well as Facts Inc. by Dr. Fesharaki [2]. It can be said that international understanding on the existence of Asian premium on oil was already in accord and established.

2. Influences of Higher -Priced Crude Oil for the Asian Market

Oil imports by Asian countries as a whole totaled 15 million B/D in 2000. Assuming that crude oil prices for the Asian market are higher than those for other markets by $1 ~ 1.5/barrel, this means that there was a income transfer totaling $5.5 ~ 8.2 billion (¥687.5 ~ 1,025 billion, assumed at 125 ¥/$) from oil-consuming countries to oil-producing countries. It should be noted that Asian oil-consuming countries have shouldered the burden of such a high extra cost as shown above over the past decade or so.

Judging from the netback value of Arabian Light in the Singapore market, Arabian Light to Asia has experienced such a higher formula price that the refining margins become negative to around minus $1/barrel since 1999 (Fig. 2). If this situation is common to all oil-consuming countries in Asia, neither oil-consuming countries nor oil industries in Asia should keep quiet at the existence of the higher formula prices of crude, causing economic losses such as this.

Fig. 2 Changes in Formula Prices of Arabian Light Crude for Asian Market and Refining Margins in Singapore
(Twelve-month moving averages)



Since energy prices are established in reference to crude oil prices in Asia, the issue of higher prices is not only limited to oil but also applies to all other energy sources. In fact, Japan's LNG import prices are determined by a formula, with Japan's average crude oil import price (CIF basis) as the marker. Coal import prices are also determined in reference to crude oil import prices in negotiations between major coal-exporting companies and Japan's coal users. Should Asia's crude oil import price differentials widen against the Asian interests in the future, it will become a problem of grave concern as the matter threatens to undermine Asia's international competitive power.

As the prices of LNG for the Asian market are determined on calorific value parity with crude oil, unlike the prices of LNG for the U.S./European markets where they are set at levels competitive with pipeline gas prices, LNG for the Asian market has to face the premium problem of its own. Meanwhile, LPG prices have been notified unilaterally by Saudi Arabia to buyers under the system employed by Saudi Arabia at the end of 1994 and LPG consumers in Asia are currently suffering from high prices raised to the level that prevailed at the time of the Gulf crisis. LNG and LPG prices for the Asian market, which are set in the way outlined above, are also leading to higher energy prices as a whole.

3. Loss of Reliability on Dubai Crude and Inevitable Marker Change

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. It takes some difficulties to determine the price of Dubai crude on spot trading at present because of the decline in Dubai production. 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 both on the forward market.

Table 1 Alternative Candidates of Marker Crude 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.,

In this connection, the price formation mechanism of Dubai crude was always 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 vulnerability 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.

Idealistic alternative candidate marker crudes for the Asian market include: Daqing as viewed as representing the consuming area; Arabian Light as viewed as representing the oil-producing countries; and the price index for the Middle Eastern crude (on the futures market) based on product prices on the spot market as viewed as representing the market (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 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.

Since the shipment of Oman crude is also limited to the Asian market, the problem of relatively higher crude oil prices for the Asian market with Dubai as the marker crude is also seen even when Oman is selected as the marker crude. This means that a shift from Dubai to Oman as the marker crude will not greatly contribute to reducing the Asian premium, although it may contribute to recovering the reliability of prices. So long as the reduction of the Asian premium remains an important issue with higher priority, shifting of the marker crude to Oman is not necessarily an appropriate measure.

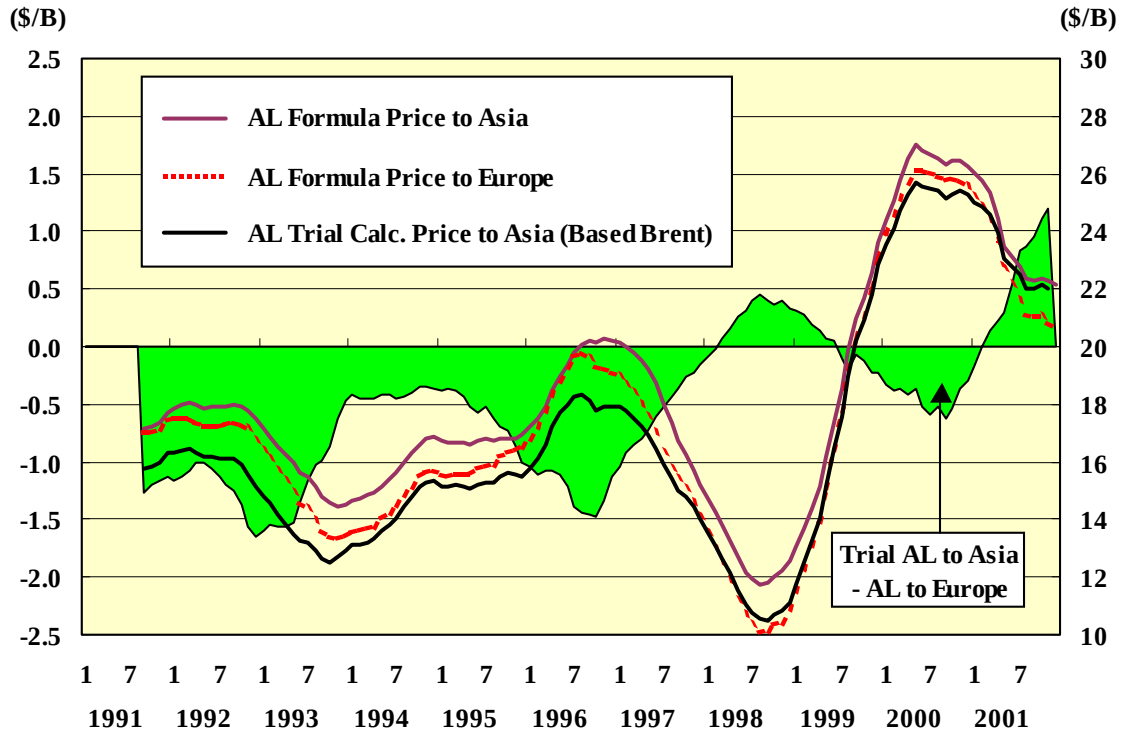
4. Pricing based on IPE Brent as the New Marker (Proposal 1)

The first proposal aimed at reducing the Asian premium of oil is to adopt IPE Brent , the marker for the European market, as the marker for the Asian market. Since importance is attached to Asia's international competitiveness vis-à-vis Europe and the U.S., it is essential to place the crude oil price level, which is a representative criterion for energy costs, in one consuming area at the same level as close as possible as those in other consuming areas. Since the basic idea is an identical price level in all consuming areas, the transport cost of Brent is not considered here.

The basic crude oil price formula designed to determine selling prices for the Asian market, with the price of Brent crude as a reference, is as follows: (Selling price of crude oil for the Asian market) = (Price of Brent crude) ± (Adjustment factor set by oil-producing country). The adjustment factor in the formula shown above is estimated from (a) the quality differential between the marker crude and the crude oil in question in the consuming market; and (b) the cost of transportation from the oil-producing country to the Asian consuming market.

Newly estimated formula prices for the Asian market, with Brent crude prices as the marker, are obviously lower than the current formula prices for the Asian market (Fig. 3). The differentials between the estimated prices for the Asian market and the current formula prices for the European market are reduced to average +$0.06/barrel in and after 1997. The refinery margin is also improved to average +$0.18/barrel in 3 years since 1999. This method of pricing can be proposed as one of the effective methods of reducing the Asian premium.

Fig. 4 Relationship between Newly Estimated Formula Prices for Asian Market with Brent Crude as Marker ("Estimation 1") and Current Formula Prices
(Arabian Light crude, Twelve-month moving averages)



Nevertheless, this method is not without problems. First, Brent crude prices are determined by supply and demand of oil in the European market and hence they are not necessarily in conformity with supply and demand in the Asian market. Second, Brent crude is not entirely free from artificial pricing, since it is subjected to notorious market operations. When selecting a marker crude, careful studies of these problems should be made. Of course, it is important to be remembered that there is no perfect marker crude.

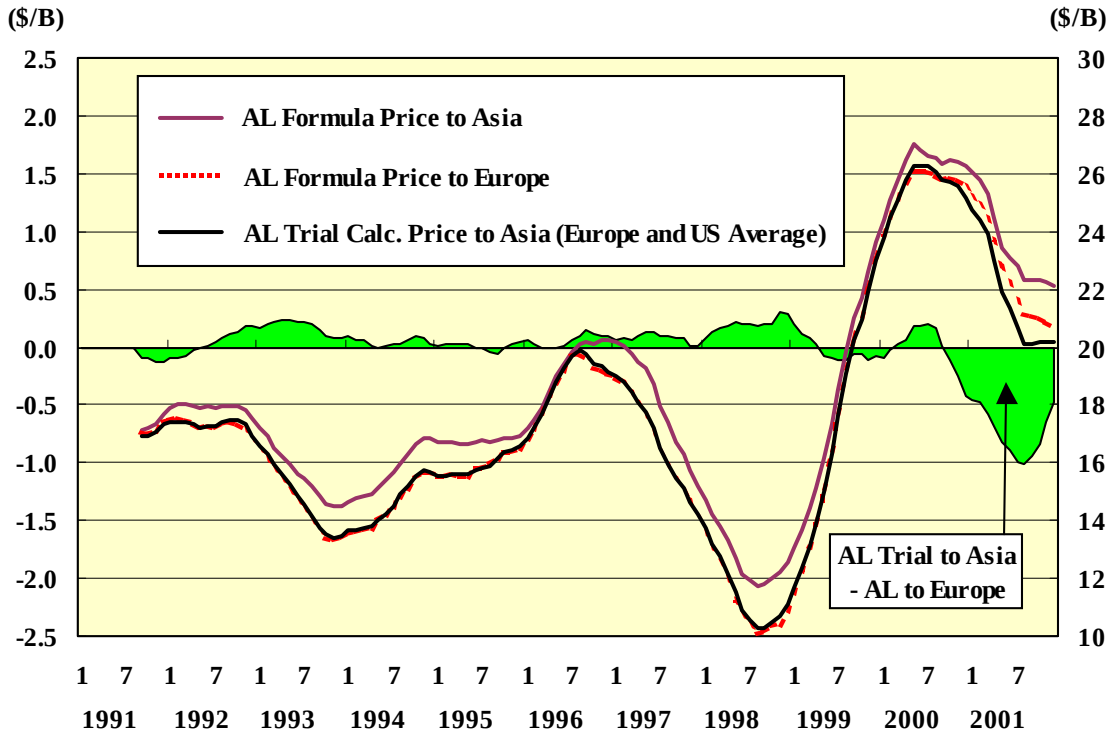
5. Pricing by the Average of Formula Prices for Europe and U. S. (Proposal 2)

The second proposal aimed at reducing the Asian premium of oil is a method of determining the selling price for the Asian market by using the average of the current formula prices for the European market and the U.S. market. A method is proposed, under which prices of Arabian Light crude determined daily at the timing of shipment from Saudi Arabia for the European and U.S. markets are averaged monthly and the average of both is used to determine the selling price for the Asian market.

Based on these formula prices obtained by averaging monthly formula prices for the European market and those for the U.S. market, the Asian premium can be virtually eliminated over the entire decade from 1991 to 2000 (Fig. 4). The differentials between the

estimated prices for the Asian market and the current formula prices for the European market are reduced to average -$0.10/barrel in and after 1997. The refinery margin is also improved to average +$0.45/barrel in 3 years since 1999. This method of pricing can be proposed as one of the effective methods of reducing the Asian premium.

Fig. 4 Relationship of Current Formula Prices for Asian Market and Corresponding Newly Esti-mated Prices (Estimation 2) by Using Average of Formula Prices for European Market and U.S. Market
(Arabian Light crude, Twelve-month moving averages)



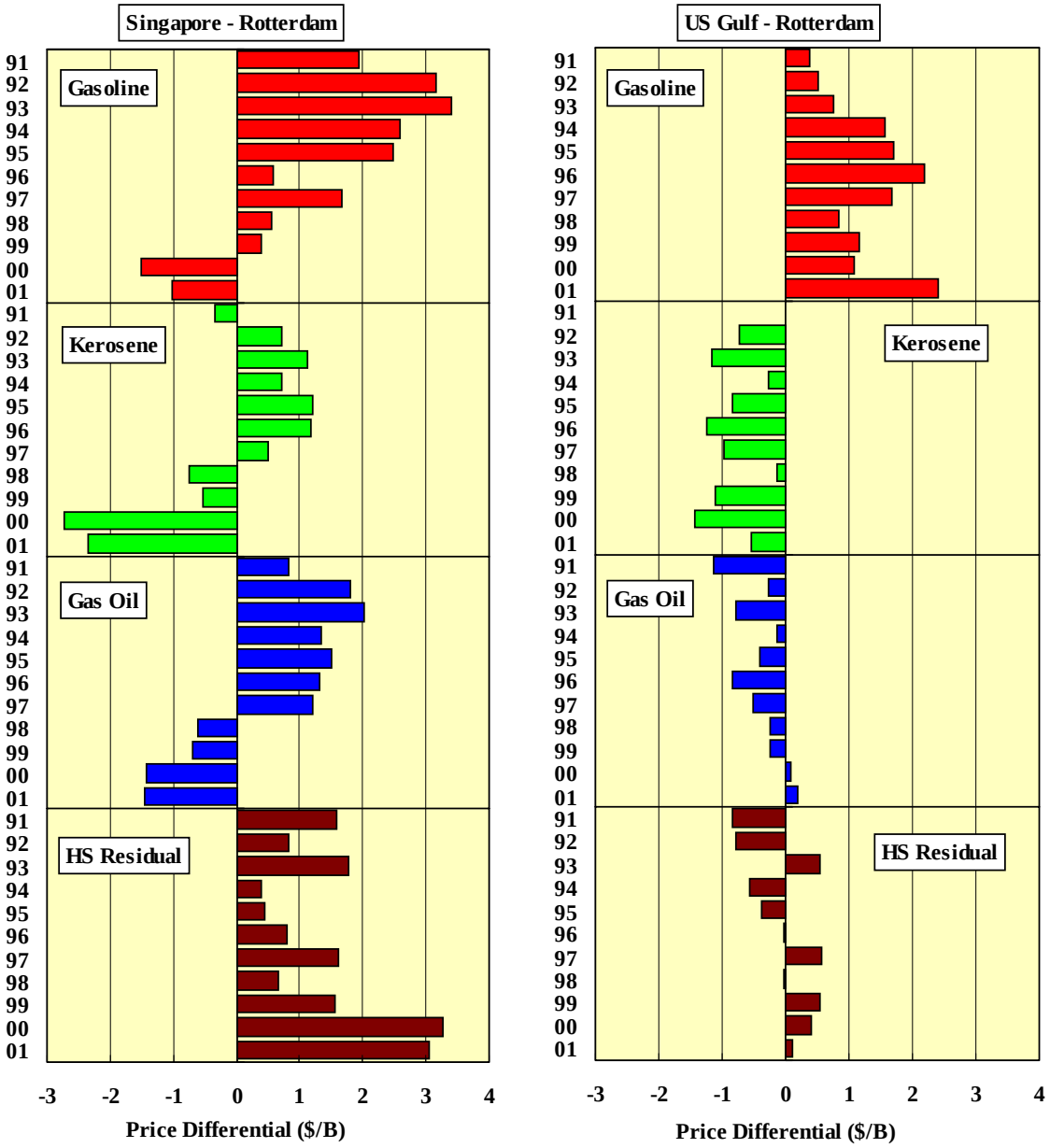
This method, however, is not flaw less. First, the pricing reflects the current oil supply and demand in Europe and the U. S. and hence is not necessarily in conformity with supply and demand in Asia. Second, the method is problematical in that it is necessary to compute averages of formula prices for the European market and those for the U.S. market for each crude oil, leading to complicated calculations due to the absence of the common marker crude. However, the determination of selling prices are not delayed considerably, compared with the current method of computing the average of Dubai and Oman crude prices.

In summary, the short-term measures aimed at reducing the Asian premium on oil are the following two; (a) pricing by using IPE Brent, the quality differential between crude oils in the Singapore market and the transport cost to East Asia (b) pricing by using monthly average of formula prices for European and U.S. markets. It is necessary to add studies from business standpoints as quickly as possible and to prepare an achievable concrete plan.

6. Price Formation in Asia Differs from that in Europe and U. S. and Importance of Oil Market Preparation

The oil product market in Singapore is the only such market in Asia, which is engaged in active international trading at present. The relationship between Singapore and Rotterdam in terms of oil product prices had been such that prices of all products in Singapore were relatively higher than those in Rotterdam until 1997 (Fig. 5). This makes it clear that product prices in Asia had been structurally higher and quite separated from those in European/U.S. markets.

Fig. 1 Oil Product Price Differentials between Asian and European/U.S. Markets



In and after 1998, however, price differentials for white products such as gasoline, kerosene and gas oil narrowed, thus making prices in Singapore lower than those in Rotterdam, while prices of high-sulfur residual oil in Singapore became even higher. After all, the market in Singapore is obviously making an entirely different movement from European/U.S. markets. When these European/U.S. oil markets are compared with the Asian oil market, they differ considerably in various aspects (Table 2).

Table 2 Characteristics of Asian Oil Market and Differences from European/U.S. Markets

	Asian Oil Market	European/U.S. Markets
Crude	• Futures trading market remains underdeveloped. • Price transparency is low. • Middle Eastern crude is predominantly used. Imports of West African crude are increasing. • No locally produced crude is used as a marker crude.	• Futures trading market is fully mature. • Price transparency is high. • Use of Middle Eastern crude is limited. A variety of competitive crude exist. • Locally produced crude is adopted as a marker crude.
Products	• Regulations are in force and necessity for risk management is small. • Singapore is the only international market. • Trading is done primarily in large-scale cargoes. • Product price is formed by adding cost to crude oil price.	• Free market in which keen competition is carried on. • Spot product trading market is developed in a country and in a region. • A variety of trading in cargoes, barges, etc. • Product price is formed by spot and futures trading. Crude oil prices and product prices mutually influence each other.

We can presume that the high product price structure in Asia until 1997 had been supported by a formation chain of (a) crude oil prices on a global basis in accordance with the supply and demand balance in Europe and the U.S., first, (b) crude oil prices for Asia, next and (c) Asian product prices, finally. As a result of surplus refining capacities and declined demand for oil, a new phase has been watched since 1998, in which oil product prices are beginning to exert pressure on crude oil prices in the Asian market. Nevertheless, a link in which product price relations are loosely adjusted has not been established between Asian and European/U.S. markets.

The power to balance and adjust Asian oil product market through the global link is believed essential so as to curb the oil-producing countries' one-way move to press oil-consuming countries to accept their crude oil prices. To achieve this objective, it is important to streamline and strengthen Asian oil product market, by revitalizing its international oil product trading activities through the deregulation of each Asian country's domestic oil market etc. Moreover, it is necessary to improve the liquidity and the transparency of the market by introducing new systems such as the futures market which has been well developed and matured in Europe and the U.S.

7. Unity among Asian Consuming Countries Required for Intensification of Negotiating Power

Osaka hosted the Eighth International Energy Forum (IEF) during the period September 21-23, 2002, in accordance with an invitation by Japan which acted as vice-chairman country at the Seventh IEF held in Saudi Arabia in 2000. It was the first such dialogue between oil-producing and oil-consuming countries to be held in Northeast Asia – one of the world's largest oil-consuming regions. The forum was participated in by representatives of 70 countries and thirteen international organizations, including representatives of as many as fifteen Asian countries.

At a meeting of "ASEAN (Association of Southeast Asian Nations) Plus 3 (Japan, ROK and China)," the Philippines brought the Asian Premium issue up for discussion, which was followed by the plenary session of the forum where India and Japan called the forum's attention to the importance of the issue. As a consequence of these moves, it was agreed that more detailed studies be made on the premium issue among all parties concerned by the time the next forum is held two years later.

The voice of Asia, which is increasing its dependence on Middle Eastern oil, will be absolutely essential in the dialogue between oil-producing and oil-consuming countries in the future. It is necessary for Asian oil-consuming countries, including Japan, ROK, China and ASEAN countries, to be united at various stages of political parties, governmental bodies and private sectors in order to strengthen their bargaining power vis-à-vis the oil-producing countries. In this connection, it is worthy of special mention that Asian oil-consuming countries acted in concert, raising their voices against the Asian Premium.

In the absence of keen competition among a variety of crude oil supply sources in an area such as Asia, it cannot be expected that the issue of the Asian Premium is solved within a framework of oil alone. It is necessary to have competitive relations with alternative energy sources having abundant reserves such as coal and natural gas enter the same arena with oil. It is also an important theme to be addressed jointly by Asian oil-consuming countries that various devices are contrived on the consumption side in such a manner that Asia can take advantage of its position as a large-scale oil-consuming area in the world.

8. Pricing Based on Spot Trading of Arabian Light (Proposal 3)

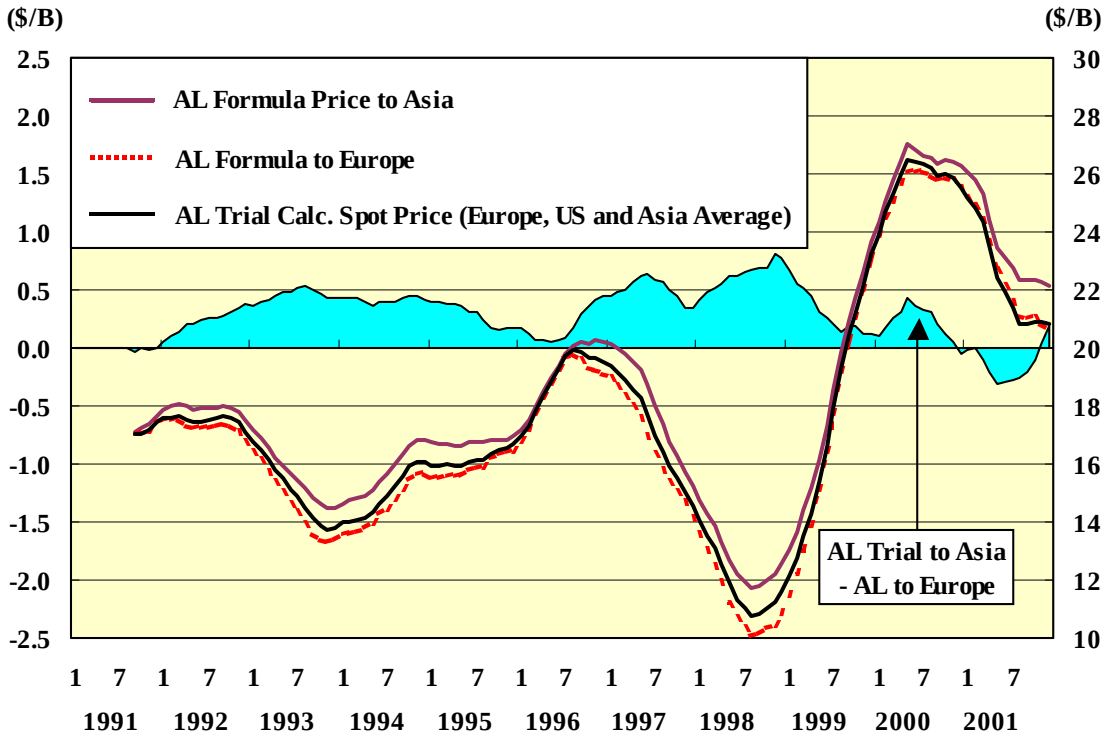
The third proposal is to encourage spot trading of Arabian Light crude, thus establishing spot prices of the crude, and use them as the common marker crude. For example, when Saudi Arabia delivers one million barrels of Arabian Light crude daily on the spot market, it is believed certain to establish crude oil prices as the global standard. Major Middle Eastern oil-producing countries can also deliver a certain volume of crude oil each to let the market do spot trading, thus making it possible to establish standard prices of crude oil represented by Arabian Light.

The estimated selling price for the Asian market based on the assumption that the average of the formula prices for European, U.S. and Asian markets be the spot price is obviously calculated to be lower than the current formula price for the Asian market (Fig. 6). The

differentials between the estimated prices for the Asian market and the current formula prices for the European market are reduced to average +$0.33/barrel in and after 1997. The refinery margin is also improved to average +$0.07/barrel in 3 years since 1999. This method of pricing can be also proposed as one of the effective methods of reducing the Asian premium.

If spot trading of Middle Eastern crude is realized and prices of Arabian Light crude as representative of the Middle Eastern crude are established to serve as the marker for Middle Eastern crude, the Asian premium of crude oil in the oil-producing country can be eliminated in principle. Therefore, this means that this is the fundamental solution to the Asian premium problem.

Fig. 6 Relationship between Newly Estimated Formula Prices for Asian Market Based on Spot Trading of Middle Eastern Crude (Estimation 3) and Current Formula Prices
(Arabian Light crude, Twelve-month moving averages)



The most controversial aspect of this method, however, is that oil-producing countries, which had a bitter experience in spot trading in 1986 when crude oil prices crashed, will be reluctant to accept it. Saudi Arabia, in particular, which was caught in a downward spiral amid the crash in crude oil prices by the crude oil sales on the netback value basis, prohibited crude oil sales on a spot basis and strictly limited destinations of crude oil exports to maintain the current method of pricing crude oil by the price formula. Under such circumstances, the possibility of Saudi Arabia's accepting such spot trading is extremely slim.

9. Global Link of Oil Price and its Stabilization (Conclusion)

The existence of the Asian premium on crude oil prices imposes a heavy cost burden on oil-consuming countries in Asia where demand for oil is projected to grow in the future, posing a serious problem as it has a great impact on the international competitiveness of the Asian economy and society. Relatively higher crude oil prices have a far-reaching effect not only on oil but also on all energy sources which are priced in reference to crude oil prices.

While the stabilization of crude oil prices for the Asian market is certainly an important problem, the reduction of the Asian premium on oil as small as possible is an even more important issue from the viewpoint of Asian national economy and improvement of international competitive power. Asian consuming countries should deal with these premium issues in energy prices through the unity of various stages such as politics, government and industry.

The short-term measures aimed at reducing the Asian premium on oil are the following two; (a) pricing by using IPE Brent, the quality differential between crude oils in the Singapore market and the transport cost to East Asia (b) pricing by using monthly average of formula prices for European and U.S. markets. In order to support short-term measures such as changing the marker crude or the pricing, it will become important in the future to streamline and expand the oil product market by increasing oil product trading in a variety of oil-consuming areas in Asia.

This will also strengthen the activities of the Singaporean market – the only international oil product spot trading market in Asia at present. Moreover, it is important to form a global link in respect of oil product prices in a tie up with the Rotterdam market in Europe and the Gulf market in the U.S. When the market functions of the global link become powerful, with Asia incorporated in it, oil-producing countries will inevitably come to play within that framework.

It is an important measures required from medium- and long-term perspectives to substantially solve complex problems that oil involves to realize the spot trading of Middle Eastern crude and to improve and expand the crude oil market. While Middle Eastern oil-producing countries remain cautious about the recurrence of a collapse in crude oil prices, the possibility of having another crash does not appear to be so large, now that their surplus production capacity has been reduced considerably. When the spot trading of crude is realized in the main stream by Middle Eastern oil-producing countries, thus establishing reference prices, the chronic problem of the Asian premium will automatically be eliminated.

When the oil-producing countries' market is improved and expanded by spot and futures trading of Middle Eastern crude, it can be expected that the Middle Eastern crude market will function as the very center of the global crude oil market, instead of the marginal Brent and WTI crude markets.

When this crude oil market function is linked with the global oil product market function as outlined above, thus establishing a mutually affecting relationship between crude oil and oil products on a global basis, we can expect to have a large adjustment function, through which the

wild fluctuations of crude oil prices, a grave problem since 1996 due to a weakened supply cushions, can be eased on a global basis. This is essentially a subject matter of establishing a reasonable world system from medium- and long-term perspectives, with both oil-producing and oil-consuming countries endeavoring to strengthen a global market function.

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