Asia's Growing Oil Import Dependence and Its Response Measures
- An Examination on Japanese Leadership Potential -

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Introduction

The economic crisis having occurred in 1997 sent the economic growth decelerating or falling in many Asian economies. In the long run, however, they are expected to rebound from the crisis and attain a healthy economic growth again. As a result, Asia's oil demand, 17 million B/D (barrels/day) in 1995, is likely to recover from the temporary sluggishness in 1998 and surge to 30.9 million B/D by 2020 (up 2.4%/year on average in 1995 - 2020). As of 1995, Asia imported 11.8 million B/D of oil largely from the Middle East. Given the expected oil demand growth ahead, Asia's rising dependence on oil imports from outside the region will be unavoidable.

Based on these oil supply and demand situations in Asia, this report first discusses how the Asian economies recognize oil security issues in relation to their rising oil import dependence. Characteristics and implications of their recognition are discussed as well. Second, we summarize and evaluate the status quo of the measures currently implemented or under planning by the Asian economies in an effort to cope with the dependence. Third, we consider what "contribution" Japan, the largest economic power in Asia, can make to the Asia's oil security issues. There are three points to be discussed: (1) Does Asia's growing oil import dependence really matters to Japan? (2) What measures Asia should take to ease growing oil import dependence? (3) What roles Japan (government and firms) can fulfill in helping Asia unfold such measures?

1. Relation between Japan and Asia: Why Japan Ought to Fulfill "Role"?

1-1 Asia is Japan's important "partner"

After the severe experience of the first and second oil crises, Japan has taken various oil security measures. Thanks to the measures, Japan's preparedness for an oil supply disruption is far greater than that of Asian developing economies. Under the circumstance, one might assume that Japan could manage problems caused by an oil supply disruption in the future while the Asian counterparts would not. But, can Japan really remain as "an idle spectator" in the event of such mishaps?

In recent years, Japan and the Asian economies have increasingly fastened the economic ties. Since the early 1990s, more than 30% of Japan's imports of goods and services in value have been shipped to Asia. Also, rising year after year, Asia's weight in Japan's total import values reached 37% by 1998. Thus, Asia became Japan's largest trading partner by now (Fig. 1-1).

In addition, from Japan, huge investment funds are flowing into Asian areas. The share of Japan's investments to Asia in the total overseas direct investments has stayed at the 20% level since 1994, up from 12% in 1990. Also, of bilateral ODA (official development aid) grants, more than 60% have gone to Asia in the 1990s, with only exception of 1991 when massive money went to the Middle East to finance its rehabilitation from the Gulf War. As

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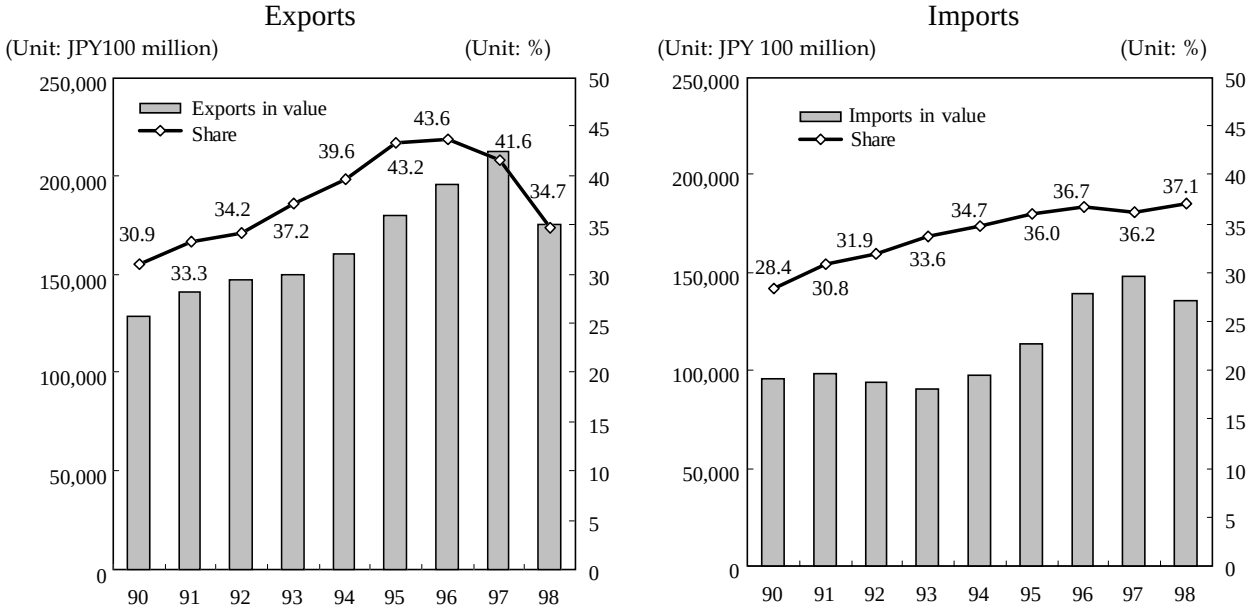
* To start with, we define the following terms: "Asia" in this report covers the East Asian economies, the Southeast Asian economies and the South Asian economies, and does not include the Middle East, the Pacific economies in Oceania, and North and South Americas. Meanwhile, nine economies (Japan, South Korea, China, Taiwan, Singapore, the Philippines, Indonesia, Thailand and India) are picked out in the section 2-2 and subsequent sections where we discuss Asia's recognition of oil security issues and relevant measures. "Disruption" in this report means a considerable fall in or a halt of oil exports or oil production in oil-producing countries. The "non-availability or availability problem" represents a situation where oil supply is in short in consuming countries which results in shrinking economic and industrial activities. "Effects of higher oil prices" represent a situation where consuming countries, though not plunging in non-availability yet, are inevitably damaged by macroeconomic effects of higher oil prices. "Security" in this report is used as a term that is related to the effects of both "non-availability or availability problem" and "higher prices."

these figures show, Asia is placed as the prime target areas of Japan's investment today (Fig. 1-2).

The economies in Asia were forced to decelerate by the financial collapse started in the summer of 1997. Its effect also reached Japan, where the exports tumbled from 21.2 trillion yen in 1997 to 17.6 trillion yen in 1998. Imports were also forced to shrink from 14.8 trillion yen in 1997 to 13.6 trillion yen in 1998. Thus, Japan's economic ties with the Asian economies have been fastened so much that

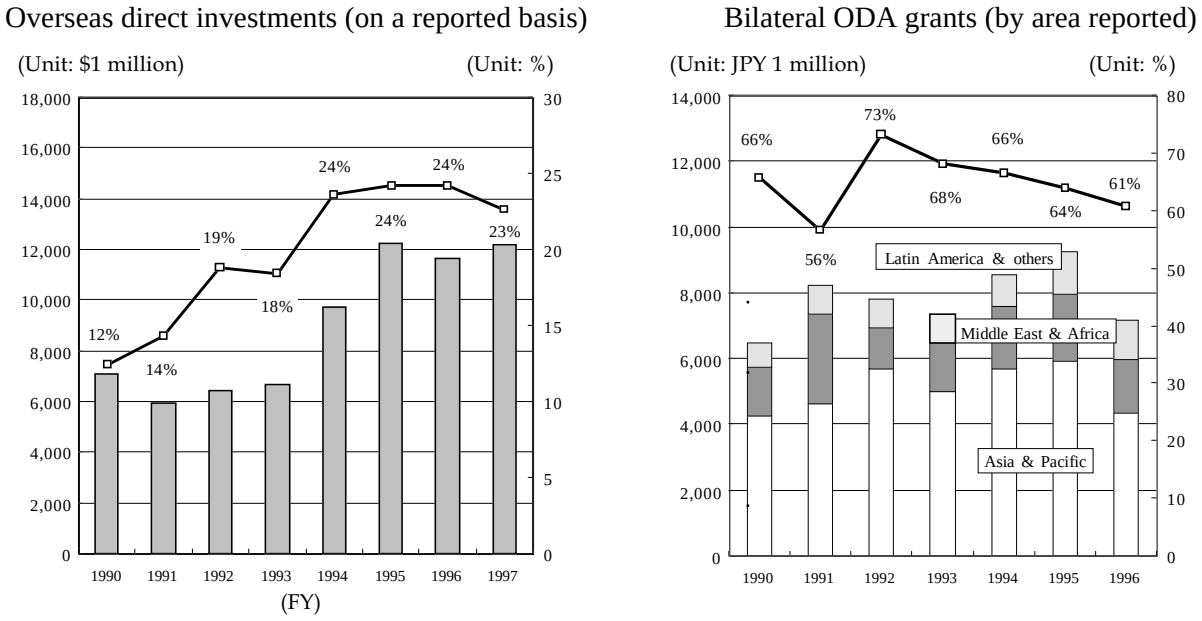
Fig. 1-1 Japan's Trade with Asian Areas and Share (1990 - 98)



(Note) The shares in the charts were obtained by dividing the values of Japan's exports & imports to and from Asian areas by those worldwide.

(Source) Prepared from "Yearbooks of Economic Statistics" (Bank of Japan) and "Trade Statistics."

Fig. 1-2 Flows of Japan's Economic Cooperation Funds into Asia



(Note) Overseas direct investments: The figures represent the shares held by Asia in Japan's overseas direct investments worldwide. Bilateral ODA (official development aid): The cost inseparable by area, like those incurring in survey missions and development that involve plural areas, was excluded. The figures show the shares held by Asia & Pacific in Japan's bilateral ODA records excluding the inseparable portion by area.

(Source) Prepared from the "JETRO White Paper on Investment" and "Handbook to Overseas Economic Cooperation."

their economic conditions can surely have a crucial effect on the Japanese economy not merely during favorable times but also at a decelerating phase.

Stable energy supply at reasonable prices is indispensable for the Asian economies. Now that the Asian economies are Japan's important partners in trade and investment, it is essential for Japan to get positively involved in their preparation of oil security measures, so that energy supply restraints should not cause the Asian economies to slow down.

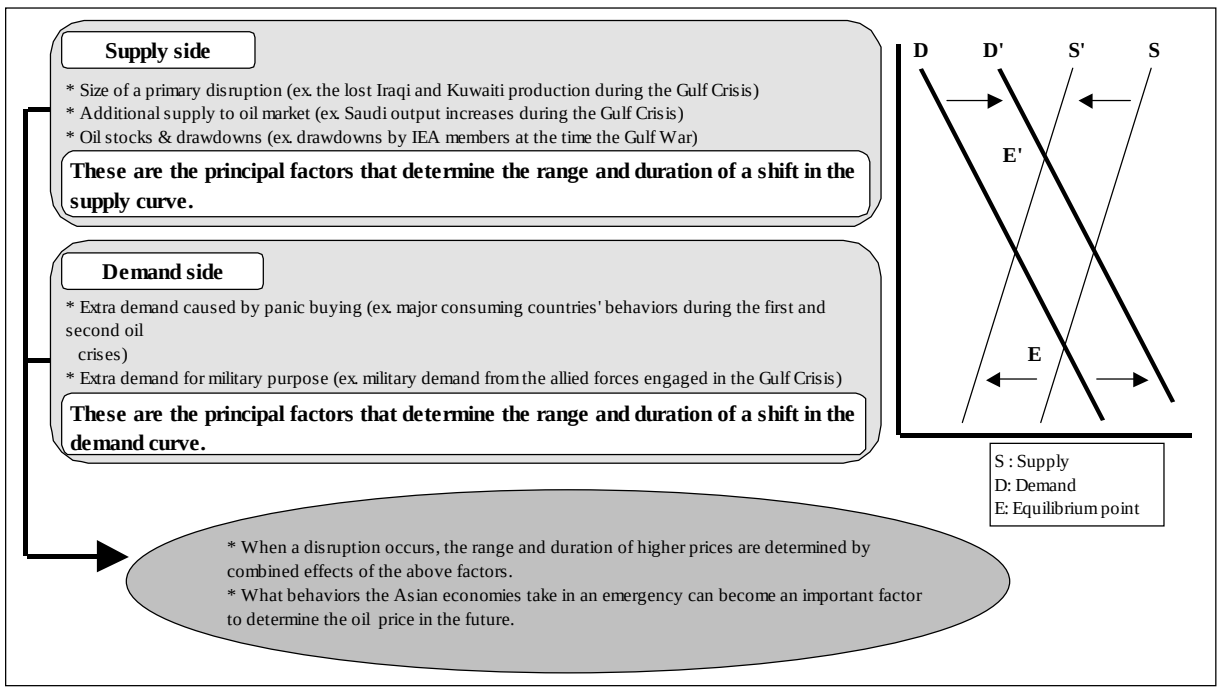
1-2 Asia can become a "disturbing factor" on international oil market

In the current oil market, local fluctuations in oil supply and demand or in the oil price should have ripple effects worldwide. Asia's oil demand is expected to keep growing at a faster pace than in the U.S. and Europe. The U.S. DOE (Department of Energy) put that Asia's share in the world's oil demand would rise from 25% in 1996 to 28% by 2020. Even a sharp fluctuation occurring in a single area could have the graver impact on the oil market worldwide, if the area has the heavier weight in total. From now on, problems in the Asian oil market is likely to cast increasingly critical impacts on all oil-consuming countries. If so, Japan, a big oil importer, may receive more serious macroeconomic effects than others.

When a disruption occurs, it is not merely the size of disruption but demand-side behaviors that determine oil price levels. The determinants on supply side include: how much oil supply is lost primarily in the area responsible for the disruption; to what extent the producing countries not responsible for the disruption can increase their oil supply (production) to make up for the losses; and how much oil stockpiles consuming countries have and can draw down in emergency. All these factors in combination can determine to what extent, and how long, the supply curve should be shifted leftward. On demand side, oil demand can be curbed by such measures as energy demand control and fuel switching. But, depending on a cause of disruption, military demand can produce extra oil demand as in the case of the Gulf War. In addition, we must note that mounting fears held by oil-consuming countries can cause panic buying as in the past oil crises which, combined with falling oil supply due to a disruption, can send oil prices sharply up. It is oil-consuming countries' demand control efforts, the size of extra oil needs for military use, and consuming countries' behaviors against a disruption that determine to what extent, and how long, the demand curve should be shifted rightward (Fig. 1-3).

Asia's oil demand claims increasingly heavier weight in the global oil market. Also, as discussed later, the Asian economies, not necessarily well prepared for oil supply security, can cause higher oil prices by overreacting to a disruption. For these rea-

Fig. 1-3 Contributors to Oil Price Increase When a supply Disruption Occurs



(Source) IEEJ

sons, oil-consuming countries, including Japan, would not be allowed to remain as "idle spectators" once the Asian oil market gets confused in an emergency.

2. Asia's Rising Oil Import Dependence and Recognition of the Issue

2-1 Asia's rising oil Import dependence

In reflection to its strong economic growth (with GDP up an average 4.8%/year in 1986 - 1996), Asia's energy demand kept growing by 4.5%/year over the same period. The Asian economic crisis lingering since 1997 causes temporary slowdowns in energy demand today. But, the IMF (International Monetary Fund) and the PECC (Pacific Economic Cooperation Conference), among others, put in their short-term economic outlooks that the Asian economies, including Indonesia thrown in a political mess right now, are likely to bounce back to a positive growth by 2000. Thus, the slowdown in the Asian economy looks short-lived. According to the long-term economic outlooks prepared by the U.S. DOE and the IEA (International Energy Agency), the Asian economy is projected to grow at a high pitch of over 4% between 1996 and 2020. Along with the robust economic growth, Asia's energy demand, excluding Japan, is projected to grow 3.1%/year between 1995 and 2020. (Inclusion of Japan, up 0.6%/year over the same period, sends Asia's energy demand growth down to 2.4%.) Even today, Asia fails to cover its needs with local energy production, and energy imports from outside the region swelled by 7.7%/year over a decade from 1986 through 1996. Thus, Asia has become heavily reliant on energy imports.

Let's examine the present shape of Asia's energy supply structure in detail. By fossil energy source, 1998 records of Asia's energy imports from outside the region (in tons oil equivalent) show that Asia imported 500 million tons of oil, 17 million tons of natural gas, and 120 million tons of coal from outside the region. These put the import dependence at 60.3%, 8.1% and 12.2%, respectively. Oil unveils by far heavy dependence on outside sources. By area of importation, 1997 records show that, of oil imports, most heavily reliant on outside sources, as much as 74% came from the Middle East where domestic and regional political problems actually lead to oil price shocks in the past. On the other hand , natural gas supply sources were diverse and included Indonesia (share in total import at 42%), Malaysia (25%), Australia (11%), Brunei (10%) and the UAE (7%). Natural gas also showed a high rate of procurement within the region. Similarly, coal supply sources were diverse and included Australia (51%), North America (15%), Indonesia (12%), China (12%) and Africa (8%). An additional advantage of coal is that it is procured largely from the politically stable industrialized countries in relative terms. Judging from these data on which fossil energies are imported from which areas, Asia's energy supply structure seems vulnerable, particularly in regard to oil.

The U.S. DOE predicts that Asia's growing oil demand will make this region ever more imported-energy-dependent from the outside. Asia's (and the Pacific region's) net oil imports from the outside are forecast to double from 11.8 million B/D in 1995 to 23.2 million B/D in 2020. Furthermore, oil imports from the Middle East are projected to jump 2.3 times from 8.7 million B/D (Mideast dependence 74%) in 1995 to 20.1 million B/D (87%) by 2020. These projections mean that Asia has to procure most of its incremental oil imports from the Middle East (Fig. 2-1).

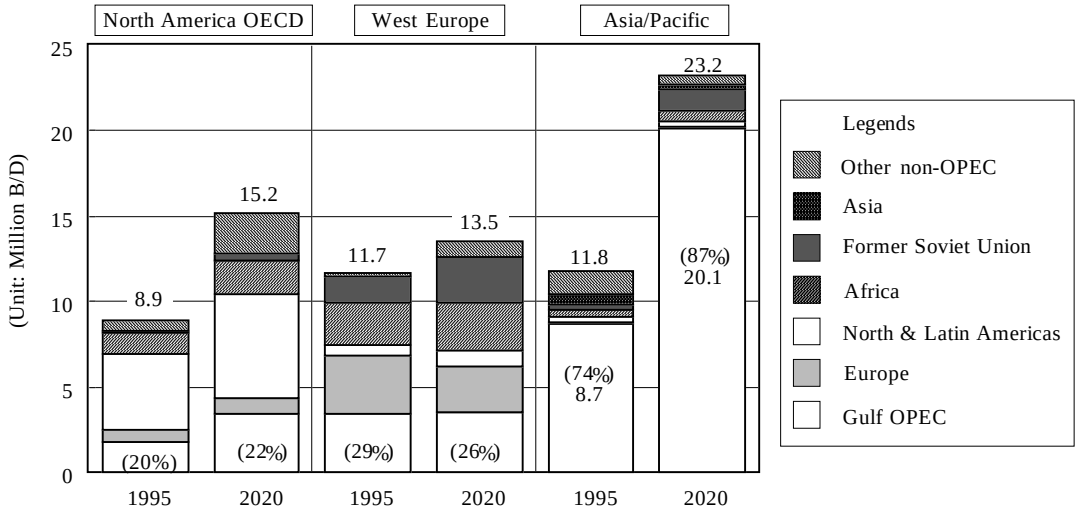
In addition to rising dependence on oil imports from the outside, above all from the Middle East, Asia contains many political tensions within the region, notably the North Korea problem, the conflicts between mainland China and Taiwan and the sovereignty disputes over the Spratlys islands, all becoming sources of potential threats to Asia's energy security.

Based on these characteristics of the Asian region, i.e., growing dependence on the Middle East oil, possibility of an oil supply disruption in the Middle East and possibility of political tension in Asia getting worse, it can be argued that the Asian economies are urged to prepare energy security measures more than ever.

2-2 Asia's recognition of oil security as an important issue

Due to the aftereffects of the first and second oil shocks, oil used to be regarded, by the first half of the 1980s, as a "strategic commodity" of which production, exports and prices can be easily influenced by producing countries' political intentions and the OPEC's "cartel-like" behaviors. Today, however, many believe oil has neared the ordinary "market commodities" of which supply and demand, as well as prices, are governed by a market mechanism thanks to changing environment as follows. (1) Growing non-OPEC oil production after the oil crises, combined with greater energy conservation efforts and advancing alternative energy development in industrialized countries, have sharply eroded the market shares held by the OPEC and the Mideast oil pro-

Fig. 2-1 Oil Supply Outlooks for Major Consuming Areas



(Note) India is not included in Asia/Pacific. The percentage in the chart shows the dependence on the Gulf OPEC.
(Source) DOE/EIA, "International Energy Outlook 1999"

ducers. The world's OPEC dependence (Mideast reliance) plunged from 51% (59%) in 1977 to 42% (47%) by 1998. (2) Along with these changes in terms of both supply and demand and market structure, futures and spot markets for oil have developed and the "market" price has become a widely accepted marker to determine the oil price. (3) Oil consuming countries, particularly those in the industrialized world, have made steady efforts for security measures, typically the introduction of oil stockpile system.

Now that the oil market has changed in that way, consuming countries come to have a brief that an oil security problem, if any, is likely to stem from, not an intentional cause of any producing country, but an accidental incidence, like a war. Also, it has become a dominant view in consuming countries that a problem of physical supply shortage become less relavant and that higher oil prices can be a more likely cause of macroeconomic damages. Thanks to oil security measures taken in the past, Europe and the U.S., among others, have improved their preparedness for a disruption in various forms. They include a falling share of oil in primary energy mix (58% to 43% in Europe, and 47% to 40% in the U.S., both over the 1977 - 1997 period), lower Mideast dependence (66% to 40% in Europe, and 29% to 20% in the U.S. over 1977 - 1997), and the availability of emergency petroleum reserves within the IEA framework (which amount to 129-day net imports as of October 1998). As for the Asian perception, an IEE's study conducted in 1997 showed that the Asian economies have much greater concern over oil security than the U.S. and Europe. Non-availability problem also remain stronger than in the U.S. and Europe (Fig. 2-2).

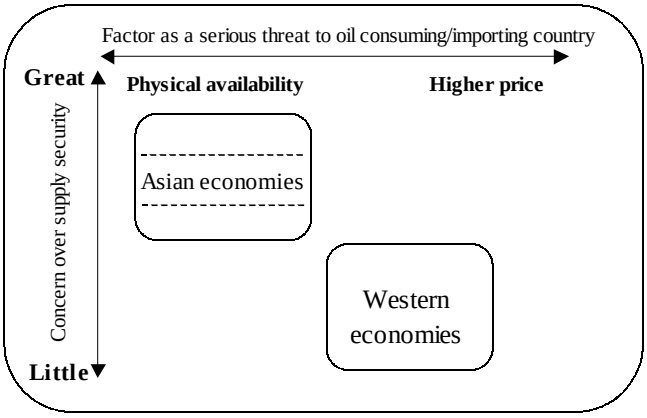
Meanwhile, the magnitude of oil security concern is uneven in Asia, which contains large numbers of countries different in such points as the development stage of the economy and availability of oil resources. In specific terms, Japan, South Korea and Taiwan, all being big importers in reflection to their substantial economic size, take oil security issues serious. In contrast, oil-producing China and Indonesia take them not so serious as the three do (Fig. 2-3).

The magnitude of oil security concern held by the Asian economies may reflect such factors as Asia's growing oil imports as a result of its economic development and self sufficiency of local producing countries. If these assumptions are correct, the strong likelihood is that Asia should have even greater oil security concern ahead in reflection to swelling oil imports from non-Asian producers, or many Asian oil producers to become net oil importers.

Given that domestic and foreign voices urge the Asian economies to advance economic rehabilitation programs today, few of them can afford swift and massive efforts for the preparation of oil security measures. Yet, we should emphasizes that, although Asia is now in a difficult economic situation, it dose not lessen potential needs for oil security measures at all.

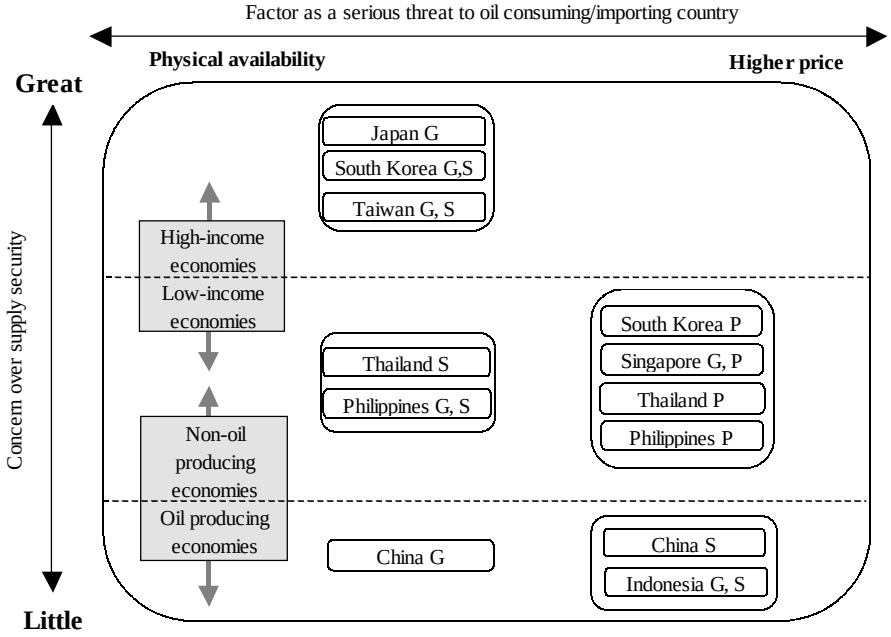
Depending on their recognition of oil security issues, the type of security measures they are in need of can be divided into few groups. Unevenness of their recognition of status quo means that different options should be recommended for different types

Fig. 2-2 Asia's and US/European Recognition of Oil Security (Conceptual Drawing)



(Source) Prepared from Ken Koyama & Hitoshi Endo, "Status Quo of Asian Economies' Oil Security Problems and Response Measures," a presentation at an IEEJ regular study briefing in October 1997.

Fig. 2-3 Recognition of Oil Security within Asian Region (Conceptual Drawing)



(Note) Of the letters following the economies' name, G stands for government organizations, S for national oil corporations and P for private oil companies.
(Source) The same as Fig. 2-2.

of worries. Yet, a few options can be cited as particularly important: (1) Now that a disruption can be caused primarily by a political or military accident, it is above all important to strengthen emergency preparedness. (2) Given persisting fears for physical availability largely among the governments, to bolster the response measures for availability issues should be respected more than others. Is Asia making progress in the preparation of response measures to reduce its security concern? Specific measures currently in progress are reviewed in Chapter 3.

3. Response Measures to Growing Oil Import Dependence and Japan's Role

3-1 Status quo and evaluation of Asia's commitments to response measures

In Asia various response measures to oil security are under way in reflection to its growing oil imports from non-Asian sources and an intensifying recognition among the Asian economies of their oil

security problems. By type, the response measures can roughly be divided into three groups: (1) measures to curb oil imports from non-Asian sources, (2) measures to secure oil imports, and (3) measures to strengthen preparedness for emergency.

The measures to curb oil imports from non-Asian sources are designed to promote energy conservation and alternative energy use. Most of the Asian economies put the promotion of energy conservation among the top priorities of their energy policy. In this connection, we analyzed individual governments' outlooks for their economy and energy supply and demand. Our findings show that China, one of the least energy-efficient economies right now, is expected to improve its energy intensity (tons oil equivalent/US$1,000) by more than 20% from 1.20 (1997) to 0.92 by 2010, but scant progress will be made in conservation in any other economies. Namely, in all economies but China, energy consumption is likely to keep expanding at an identical pace to the economic growth.

As for alternative energy use, individual governments have been encouraging the use of natural gas, nuclear power and coal. Helped by the favorable winds blowing from global warming problems, LNG projects that target the Asian market, 73.1 million tons in terms of liquefaction capacity currently in operation in total, reach a hefty 193.4 million tons if combined with the capacity under planning. Also, many natural gas pipeline projects both international and domestic, are under examination. The U.S. DOE projects that, while Asia's primary energy demand will grow 3.7%/year between 1995 and 2020, its natural gas demand is likely to increase 7.6% over the same period. Introduction of coal-fired power generation is also under examination above all positively by coal-rich China and India, where ballooning energy demand is likely (with coal demand up 3.1% in 1995 - 2020 according to the DOE). Nuclear power generation, though amid unfavorable winds in the U.S. and Europe, is still counted in Asia as an important alternative energy source to oil. At present, South Korea, Taiwan, China and India, in combination, have 33 nuclear power plants of a combined 21.3 GW capacity in operation, and an additional 36 plants, or 25.9 GW in total, under construction or planning (with nuclear power demand up 4.0% according to the DOE).

The greater use of natural gas, coal and nuclear power can contribute to curbing Asia's oil demand to certain extent. Yet, the strong likelihood is that, in absolute terms, oil demand will continue to grow (up 3.1% according to the DOE) in parallel with surging energy demand overall. In Asia, oil exploration & development are under way principally by national oil corporations, such as CNPC (China), Pertamina (Indonesia) and ONGC (India) with introduction of foreign oil companies' capital and technology. But, the DOE projects Asia's oil production capacity will grow only by 0.6%/year between 1997 and 2020. If so, Asia has no choice but to depend on the imports to cover most of its swelling oil needs in the future. From oil security aspect, this situation means Asia is required not merely to step up the measures to curb oil imports from non-Asian sources, but also to supplement such import reduction efforts with additional measures.

Measures to secure oil imports are under way as well. To secure oil imports in quantitative terms, the Asian governments primarily endeavor to deepen their political and economic ties with oil-producing countries and strengthen bilateral relations through reciprocal investments in the oil sector. South Korea and China are moving particularly positive toward investments in the upstream sectors of oil-producing countries. South Korea has already launched into Yemen, Egypt, etc., and China in Iraq, Venezuela, Kazakhstan, etc. Among the Asian economies ready to approve the entry of oil-producing countries' capital in their downstream sectors, China and India plan to build joint venture refineries with Saudi Arabia and others. Ssangyong Oil Refining of South Korea and Petron of the Philippines have already accepted the Saudi capital.

Along with the efforts to produce closer ties between the consuming and producing countries, diversification of import sources has advanced as well. Desulfurizers-short Asia has strong demand for low-sulfur crude oil. Backed by improving economics and greater output of African crudes, Asia has constantly increased its crude oil procurement from Africa. Asia's crude oil imports from Africa, a mere 40,000 B/D in 1991, or 0.6% of its total oil imports in that year, increased to some 800,000 B/D, or 6.6%, in 1997. Apart from Africa, the Asian economies started, or set to increase, oil imports from non-Mideast areas, such as Sakhalin, Latin America, Alaska, the North Sea and Australia. Yet, generally the imports from all non-Mideast producing areas but Africa may be as limited as 100,000 B/D or so each. Given that the new sources involve a longer transport distance (higher transport cost) than their Mideast counterparts, diversification of import sources should have their own limits in playing a key role in diversifying Asia's oil imports.

Growing imports from the Middle East, etc. highlight another crucial issue: the security of alternative transport routes to detour the Strait of Malacca, already congested with heavy tanker traffics. At present, under a Trans-Malay pipeline project, two

options are examined as alternative routes to the Strait of Malacca (one running between Muang and Sichon, Thailand, and the other between Alor Setar of Malaysia and Sai Buri of Thailand).

If higher prices are the most likely cause that damages consuming countries when an oil disruption is triggered by some accidental mishaps, as discussed in the preceding chapter, what we need most is the preparation of the measures that can effectively function in emergency.

From the standpoint that we need some measures that simultaneously enable us to cope with problems of availability and higher oil prices, it is stockpiling that offers an effective option. In this connection, many Asian economies realize they are in short of preparedness for emergency, but only Japan and South Korea have a government stockpile system right now. The Asian economies that mandate oil companies to have stockpiles are also limited to Japan, South Korea, Taiwan, Thailand and Indonesia. The stockpiling system is absent in China, Singapore, the Philippines and India. Also, the fact that few oil companies keep their stockpiles larger than running stocks leaves the Asian economies' preparedness for an oil disruption questionable. Given intensifying global competition on the oil market, as well as the stern realities that many Asian economies have to strive for post-crisis industrial restructuring right now, we can hardly expect stepped-up efforts for stockpiling because they certainly send the cost up. (The Thai government even eased the requirements for stockpiling to help oil companies slash inventory costs.)

Aside from stockpiling, to establish a multilateral international cooperative framework, like the IEA, appears viable as a measure to minimize confusion of the international market that results from an oil supply disruption. ASEAN countries already have the ASEAN Petroleum Security Agreement (ASPA) as a framework to respond to sharp fluctuations in oil supply and demand by mobilizing concerted efforts among the parties. But, given its mechanism to invoke the system as well as the price condition for transaction, effectiveness of the ASPA seems questionable. In other words, Asia is still behind in this area. Considering the gaps between the realities and the response measures actually taken, the former including higher reliance on non-Asian oil imports and Asia's keen recognition of its oil security problems, we have to conclude that Asia is extremely in short of preparedness for emergency.

3-2 What role can Japan fulfill?

Why Japan ought to fulfill a vital role in Asia's oil security issues? The reasons are summarized as follows, though overlapping Chapter 1 to some extent. First, the Asian areas are Japan's largest trade and investment partners. Given the fastening-ever economic links to them, the deterioration of the Asian economies, if caused by an oil supply disruption, can lead to the deterioration of the Japanese economy as well. Second, given growing weight of the Asian economies' demand on the international oil market, the Asian economies' panic buying behaviors, if any, can trigger higher oil prices across the international oil market. Namely, many concern that lack of oil security measures among the Asian economies may not merely cause slowdowns in the Asian economy but also send the international oil market plunging in confusion. From these points, the fact that the Asian economies remain vulnerable to oil security issues poses a subject that Japan can never overlook.

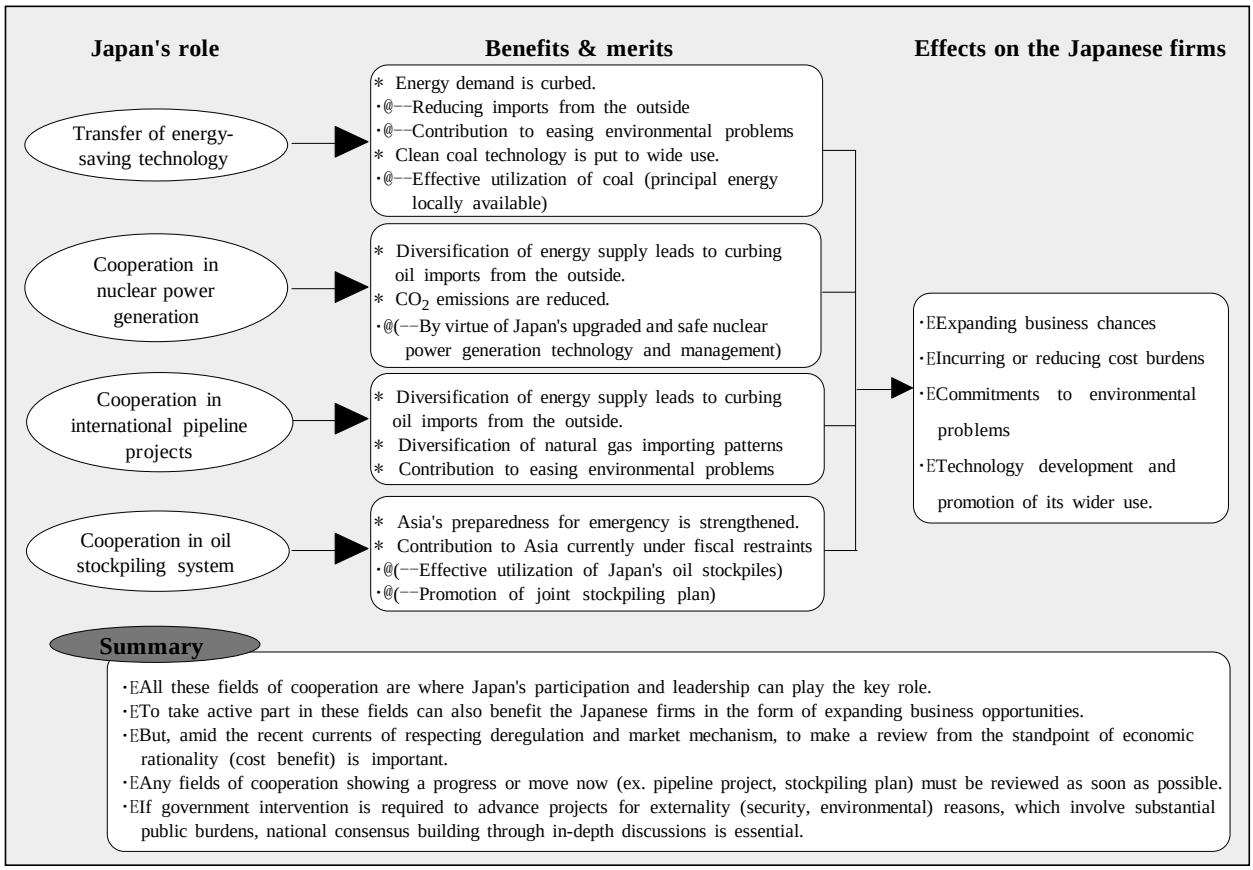
Then, what role can Japan fulfill in helping the Asian economies overcome their vulnerability to oil security issues? As a principal item, Japan can cooperate in technology transfer, particularly as an advanced country in energy conservation, and alternative energy development. Among others, the promotion of oil development in and outside Asia, diversification of energy import sources, and introduction & strengthening of oil stockpiling system can be cited. Of course, these policies should be promoted by taking Asia's status quo into account. Namely, so as not to impede the current trends of deregulation & market mechanism, that are respected in the process of getting out of the economic crisis, attention should be paid to such points as public-private burden sharing and promotion of cost-effective ness of the response measures.

Japan's cooperation has already been under way in various fields, which, depending on future developments, can produce many benefits and merits (Fig. 3-1).

To promote the dissemination of energy-saving technologies is effective not only as an approach to curb Asia's oil imports from the outside, but also from the standpoint of global/regional environment problems. Right now, Japan offers cooperation to individual Asian economies primarily by getting involved in model projects for the efficient use of energy and holding various workshops designed for technology dissemination. Among such model projects, those to disseminate clean coal technology may be particularly beneficial for an extra utility. Namely, on top of energy conservation, clean coal technology (CCT) can facilitate effective utilization of Asian coal resources, which, without CCT, could be restrained in the future due to NO_x and SO_x problems.

Cooperation in nuclear power development is

Fig. 3-1 Roles Japan Can Fulfill (Summary)



(Source) IEEJ

likely to prompt the transfer of knowledge and technology acquired by Japan from her rich experience of nuclear power plant management on the strength of upgraded and safe technologies. To spread nuclear power generation is beneficial in dual points; curbing Asia's energy imports from the outside and trimming CO_2 emissions. At present, Japan's cooperation primarily takes such forms as receiving & sending experts and organizing international conferences, seminars and the like. Technical cooperation in the energy conservation and nuclear power fields can be counted as a horizontal development of Japan's well-established technologies, so it is regarded as business chances for the Japanese firms. For this reason, how an investment environment is created from now on can greatly affect progress in the cooperation projects.

Also, area-wide projects are under consideration in hopes to facilitate alternative energy use. One of them is a pipeline project that links the natural gas-rich areas, such as Sakhalin and East & West Siberia, to the consuming areas in North East Asia. Natural gas pipeline, much expected for its contribution to the diversification of energy supply and natural gas importing patterns at one hand, has various conditions to be cleared at the other. On supply side, an international pipeline project tends to need huge investment funds. This highlights the need for long-term contracts to reduce investment risks. On demand side, an important condition is that not merely gas-producing countries but also all parties, including transit countries, must assure the security of pipeline gas supply. This requires successful efforts to strengthen bilateral or multilateral relations between the concerned parties and organize cooperation among all project participants. To assure good economics of the project is another subject of primacy, because an additional minimum condition is a long-range assurance that pipeline gas can be procured at a price competitive with rivaling fuels, including LNG. When these essential conditions are reflected on Asia's situations today, the North East Asia natural gas pipeline project can face several problems to be solved. For one thing, Asia's long-term demand outlook remains uncertain, because, due to the Asian economic crisis, its energy needs and natural gas demand are slowing down for the present. For the other, LNG-importing countries, including Japan, have already made huge investment to install infrastructure to receive LNG imports. Among others,

on top of uncertain economics of the pipeline construction, political tension existing in North East Asia may pose a problem to the pipeline project. Yet, as an examination of this project is already initiated, we should swiftly start a discussion about firstly whether or not and secondly how Japan should get involved in this project.

To help Asia improve its preparedness for emergency, Japan can offer cooperation from the standpoint of how Japan's oil stockpiles can be put to effective use. In Japan, the Subcommittee of Emergency Response on Petroleum Reserve, a unit of the Petroleum Council, unfolded a debate over a desirable stockpiling system for Japan. In its latest recommendations made in June 1999, the subcommittee stated that Japan should not stick to the long-standing concept that the stockpiles were the "last resort" for Japan. Then, the subcommittee called for the effective use of "CERM (Coordinated Emergency Response Measures) under the IEA framework by flexibly releasing Japan's petroleum stockpiles so that higher oil prices and market confusion could be controlled at an early stage of an oil supply disruption.

Meanwhile, a plan to establish an Asian stockpiling system emerged recently. When the APEC Okinawa meeting was held in 1998, an APEC-member joint stockpile plan was reportedly discussed in the export meeting. This plan has many impediments to be eliminated, such as how to cope with conflicting interests of oil-producing APEC member countries that are critical of the idea of introducing a stockpile system, pros and cons of pouring national budgets, and how to shut free riders out. The Asian economies keenly recognize lack of their oil security measures. But, due to fiscal restraints, many of them simply cannot afford advancing such measures. By taking these situations into account, Asia needs to consider an approach that is more achievable. In this process, Japan may find many issues and opportunities that allow Japan to play a leading role as one of the few Asian economies that have emergency oil stockpiles, and as an experienced country having participated in many systems of international cooperation within IEA.

So far we described cooperation under way and some projects under consideration. In what points Japan can "contribute" to making Asia better prepared for oil security measures are summarized below.

What characterizes Japan, as an Asian country, is that Japan experienced a high economic growth first and has accumulated technology and capital. For this reason, an approach that enables Japan to "contribute" to the Asian economies efficiently is to advance a horizontal development of Japan's well-established technology and capital. This approach seems to enable the Asian economies to introduce much-needed technologies and processes in a cost-effective manner. The Asian economies, still struggling with the economic crisis, have constraints of tight fiscal conditions and, therefore, have greater needs for more cost-effective measures than ever.

Viable energy security measures for the Asian economies include diversification of energy sources and importing patterns and sources, effective utilization of local energy sources, typically coal, and stepped-up preparedness for emergency. Japan's technology and capital can be applicable to these measures as well. In recent years, a response to environmental problems has become a prime concern of energy policy comparable to security issues. In this regard, energy conservation technologies and alternative energy development can enable simultaneous achievements of CO_2 reductions to help ease global warming and elimination of more local environmental problems, notably SO_x and NO_x problems. To promote these technologies regionwide not merely benefits the Asian economies but also helps Japan comply with the commitments pledged at the Kyoto Conference on Global Warming (COP3). This can also furnish Asia regionwide with a significant approach to acid rain control.

Then, what effects Asia's oil security issues can have on the Japanese firms? It is the private firms that have shouldered most of Japan's technology and capital accumulation. Namely, the likelihood is that the Japanese firms will be the prime mover of the horizontal development of technology. The firms on their part may find this move beneficial, as it can lead to expand their business opportunity in Asia, although a careful examination on market situations and investment conditions in the targeted countries is essential.

Amid the currents to respect deregulation and market mechanism much, we are required to have more cost-effective measures than ever in our attempt to improve energy security and environmental problems, which represent externalities of the economy. For the same reason, the strong likelihood is that a market mechanism-oriented vector works in our effort to overcome Asia's vulnerability to oil security so that we can increase cost effectiveness as high as possible. Yet, it is still possible that government intervention with substantial cost burden to our national economy may be required to cope with the problem of externalities, i.e., energy security and environment problem. In that case, however, a national consensus is essential as a neccesary and sufficient condition for the intervention to be implemented.