

**A CASE STUDY FOR POTENTIAL ASIA-PACIFIC ECONOMIC  
COOPERATION: THE COAL FLOW CONCEPT**

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This sub-thesis is my own original work. All sources used have been acknowledged.

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## Chapter 1 INTRODUCTION

The Asia-Pacific region is manifestly the most dynamic element in the world economy. This region contains about 40 per cent of the world population and the East Asian economy has enjoyed a much faster trade and GNP growth than the Atlantic economy.<sup>1</sup> During the last two or three decades, East Asia's part of the world gross national product (excluding Eastern Europe) doubled from 9 per cent in 1962 to 18 per cent in 1985, and is expected to rise to 22 per cent or more by the end of this century.<sup>2</sup> Actually, East Asian economies like South Korea, Taiwan and Hong Kong recorded around 10 per cent average GDP growth from 1986 to 1988.<sup>3</sup> Many commentators expect continued faster economic growth of the Asia-Pacific region in the future. Paul Kennedy claims in his contribution, "The Rise and Fall of the Great Powers" that:

[it] is reasonable to expect --- that one of the better-known "global trends" of today, the rise of the Pacific region, is likely to continue, simply because that development is so broad-based.<sup>4</sup>

Such economic vitality is leading the Asia-Pacific region towards the position of a major centre of world trade and economic activity.<sup>5</sup>

However, it is also true that there are several issues to be coped with for full realisation of the potential of the Asia-Pacific. First, growing protectionism especially in Western Europe and North

America is a serious challenge to the GATT regime and the export-led growth of East Asian economies.

Second, although developing countries like Indonesia and the Philippines have great potential for economic development, they do not have sufficient infrastructure for further development. In particular, the energy infrastructure is weak, as seen in the recent power crisis in Indonesia due to which factories and office buildings could not receive sufficient electricity, as demanded by them.<sup>6</sup> Despite the need for more investment in this area, developing countries generally are suffering from current account deficits and find it difficult to acquire foreign capital readily. In addition, technology for both construction and operation of such infrastructure is generally insufficient.

Last but not least, environmental issues have been increasing in importance over the last twenty years. The problems of the greenhouse effect and acid rain are emphasised in particular. Acid rain is caused by gaseous emissions of sulphur oxides (SO<sub>x</sub>) and nitrogen oxides (NO<sub>x</sub>), and is damaging aquatic and terrestrial ecosystems, as well as the built environment, around the world. It is predicted that an increase in the content of greenhouse gases including carbon dioxide (CO<sub>2</sub>) in the atmosphere will cause an increase in temperature accompanying climatic changes.



As these issues are global or regional in nature, they basically call for a global or regional approach. Developed countries are beginning to take action to alleviate the environmental impact. However, the crux of the issue is that developing countries do not have either sufficient capital or technology to cope with these problems. Moreover, some countries may give priority to economic development over costly measures to reduce environmental damage. Thus, persuading developing countries to take such measures and assisting them to take action has become vitally important.

In the face of these problems and with the region's prevailing rapid economic growth, the need for economic cooperation in the Asia-Pacific region has been increasingly emphasised as a critical factor of continued growth in the Asia-Pacific economy.

On the one hand, closer economic integration among the countries in the Asia-Pacific, compared to its present Atlantic counterpart, has been achieved without any substantial history of "regional consciousness".<sup>7</sup> In 1983, 60 per cent of Asia-Pacific countries' trade was with other Asia-Pacific countries, comparing to 55 per cent for export and 52 per cent for imports within the European Community.<sup>8</sup> Accordingly, countries in the region increasingly have closer relations with other countries' economic growth in the region.

On the other hand, such regionalism<sup>9</sup> has been stimulated by the ongoing integration in Western Europe as seen in the formation of the EEC and EC, and the plan for a single integrated market in 1992. Actually, several significant organisations have been evolving. For example "a large and relatively comprehensive mechanism" for economic cooperation, the Pacific Economic Cooperation Conference (PECC), was established in 1980 in Canberra, and the Asia-Pacific Economic Cooperation (APEC), consisting of ministers from 12 countries in the Asia-Pacific region, was inaugurated in 1989. However, these should be seen as constituting an early stage in Asia-Pacific economic cooperation, when one sees the more developed situation of Europe in the field of economic cooperation.

The main purpose of this paper is to discuss the potential for Asia-Pacific economic cooperation. Because of the huge capacity and vitality of the Asia-Pacific economy, economic cooperation, which attempts to contribute to economic growth in the region, has vital implications both regionally and globally. As it is difficult to argue the potential for cooperation in general because of the complex interests in this region, this potential would be better examined through a specific case study. I shall focus on energy in the Asia-Pacific as being a key area in this cooperation. One notable plan for Asia-Pacific energy cooperation is "A

Concept for Expanding Coal Flow in the Pacific Region" (the Coal Flow Concept). This is a programme put forward by Japan in 1986 for cooperative interaction among coal producing and consuming countries in the region in order to expand the demand and supply of coal there. Through such expansion of coal use, the Concept attempts to enhance the degree of energy security while creating energy bases in developing countries in order to assist their economic growth. In addition, from Japan's viewpoint as stated in chapter 3, the Concept implicitly includes the motive to expand Japanese exports of capital goods to these developing countries.

The Coal Flow Concept, as envisaged by Japan, is designed to encourage the increased use of energy coal<sup>10</sup> in the region. With this in mind, it includes the following important aspects of Asia-Pacific economic cooperation. First, it attempts to promote information exchange concerning the coal market in the Asia-Pacific region, as a means of improving market efficiency, including information on the technology for the construction and operation of such facilities as power plants, and to alleviate environmental problems, for example, increasing plant thermal efficiency and reducing SO<sub>x</sub> emission. Second, as a means of encouraging increased coal trade, reduction or removal of existing market barriers may be more feasible through expansion of a reliable international coal market, because the

maintenance of energy security is an important motive for protectionism in the energy sector. Third, joint investments in developing coal mines and power plants may contribute to complementing insufficiency in the infrastructure of industrial bases in developing countries, which is one of the essential conditions for economic development. In return, such development can be accompanied by demand for capital goods mainly produced by developed countries.

Although the Coal Flow Concept has been generally welcomed in the region, some concerns still remain. The Australian government and industry generally welcome the plan. Cooperative Committees for the Concept were formed in Australia and Canada in 1988 and 1989 respectively as stated later. Several arrangements to promote coal-fired thermal power plants in developing countries like Indonesia have already been implemented. On the other hand, some anxiety has naturally arisen on the side of coal suppliers. Australia has expressed concerns about the over-supply of coal where coal production capacity gets "out of step" with demand.<sup>11</sup> Some coal suppliers suggest that this plan is basically designed to suppress the price for energy coal by encouraging further investment and supply capacity. These concerns relate deeply to different national interests and perceptions towards the coal market. As economic and national resource situations are very different among coal

exporters and importers, it may be quite natural that such concerns arise. Also concern from the environmental viewpoint has been raised. Allaying such concerns is a critical factor in promoting this plan.<sup>12</sup>

The roles and potential for the Coal Flow Concept will be argued in the framework of Asia-Pacific economic cooperation. The phrase, "Asia-Pacific economic cooperation" should be clarified in the context of the present argument. The main focus on regional cooperation in this thesis is the aspect of mutual gains from the greater economic interaction among the countries of the region. Stuart Harris points out three objectives of regional cooperation. The first objective is to form a stronger voice to represent the region's interest in the global forum.<sup>13</sup> The second objective is to maximise the gains from the region by promoting regional cooperation and coordination of economic activities and policies.<sup>14</sup> The third objective is to promote "political cohesion and stability" through economic interaction, presuming that close economic relations among countries make political conflict less likely.<sup>15</sup> The Coal Flow Concept does not contribute to the first objective directly. Similarly, as far as the third objective is concerned, there is little agreement on political integration among countries in the Asia-Pacific, though regional economic cooperation may contribute to a resultant "political cohesion and stability" through enhanced economic cooperation and

interdependence. The Coal Flow Concept mainly relates to the second objective. Cooperative behaviour including exchange of information and reduction or removal of trade barriers can enhance international exchange. Moreover, if economic aid is needed and well coordinated among involved countries, it may supplement a lack of capital and technology especially in developing countries, not only helping development in the economies of aid-recipient countries but also increasing demand for capital goods among countries including donor countries.

Based on this major objective of regional cooperation in this work, "Asia-Pacific economic cooperation" is defined here as arrangements among states and private sectors in the Asia-Pacific region in order to reduce or remove market barriers and to give positive encouragement to enhancing "the mutual gains from specialisation and voluntary economic exchange".<sup>16</sup> This view of economic cooperation focuses on markets<sup>17</sup> as a main vehicle to amplify regional economic benefits.

Although there has been an extensive discussion of economic integration in the literature, most of this is not suitable for Asia-Pacific regionalism. The theoretical literature on integration has been dominated by Neo-functionalism.<sup>18</sup> This theory attempts to achieve a federation over national sub-systems, "function by function".<sup>19</sup> Neo-functionalists emphasise "the learning process whereby habits of cooperation in one area spill

over into others as a result of the functional imperative",<sup>20</sup> thus enabling the development from independent nation states to regional political integration or unification through economic integration. As this theory has mainly focused on European integration from the late 1950s, underpinned by homogeneity of the pluralist industrialised states and with consensus nurtured by the "end of ideology",<sup>21</sup> its premises are largely different from those of the Asia-Pacific heterogeneity in terms of political system and economic development. In addition, there is little agreement on the goal of political integration in the Asia-Pacific.

In this paper, Asia-Pacific economic cooperation is argued in terms of mutual benefits within market exchanges between national economies. As the central importance of Asia-Pacific economic cooperation lies in promoting mutual benefits in the region, the extent to which these are brought about by cooperation is the most suitable criterion for measuring the potential for such cooperation. Indeed, because the Asia-Pacific region is emerging as a region knitted by "market integration" based on the benefits of trade; and since developing countries are cautious about the potential political dominance by great powers in the region, the overwhelming interests of countries in the region for Asia-Pacific economic cooperation obviously lie in the economic context. Therefore, the main criterion for assessing

potential for the Coal Flow Concept will be the economic cost or benefit for the country concerned.

The proposition of this sub-thesis is that the Coal Flow Concept contains considerable potential in its own realisation, though it also has some limits derived from fundamental differences in the perceptions of parties; and that it also provides a vital example of the viability of economic cooperation in the Asia-Pacific region. This proposition will be characterised by the following three steps.

- (1) On the one hand, considerable benefits can be brought about to both region and involved countries by the Coal Flow Concept. Through implementation of the Concept, not only can markets be developed through enhanced coal use, but demand for electrical equipment and capital goods like power plants emerges as by-products.
  
- (2) On the other hand, there may exist costs and concerns from some countries. They can be minimised by a more intimate exchange of information, proper transfer of capital and technology, and coordination at evolving regional forums such as PECC and APEC. At the same time, it should be noted that there is an inherent limit in realising the Concept based on



fundamental differences in perspectives between sellers and buyers.

- (3) As the above mentioned aspects feature considerable common issues of Asia-Pacific economic cooperation as a promoter of mutual gains from the region at large, the potential for the Coal Flow Concept provides an important example of the viability of Asia-Pacific economic cooperation as well as its inherent limits.

In looking at the Coal Flow Concept within this framework I shall first discuss the need and potential for Asia-Pacific economic cooperation, defining the issues in this paper in the following chapter. Then, the Coal Flow Concept will be summarised, exploring how this concept fits into the jigsaw of Asia-Pacific economic cooperation in chapter 3. Next, roles or benefits which can be extracted from the Concept will be argued from a mainly economic viewpoint in chapter 4, while concerns or costs of the Concept will be explored both at policy and private sector level in chapter 5. Finally, the potential for successful cooperation in the Coal Flow Concept and its implications for Asia-Pacific economic cooperation will be argued in chapter 6 and the concluding chapter.

## Chapter 2 THE POTENTIAL FOR ASIA-PACIFIC ECONOMIC COOPERATION

In order to examine the actual potential for cooperation and to provide a framework for analysis of the Coal Flow Concept, it is necessary to clarify the concept of Asia-Pacific economic cooperation. This phrase implies two strands: economic cooperation and regional cooperation. Accordingly, the exploration in this chapter includes the following points: why economic cooperation is necessary in relation to enhancing benefits from markets; why Asia-Pacific economic cooperation is needed in addition to existing global economic cooperation; and the potential for Asia-Pacific economic cooperation.

### 2.1 The Nature of Economic Cooperation

Considerable benefits of economic cooperation can be realised from the market or international economic exchange. International economic exchange enhances benefits for countries by "permitting a more economical use of limited resources".<sup>1</sup> According to the economic law of comparative advantage, international economic exchange enables access to cheaper raw materials, consumer and capital goods. The flow of capital both supplements shortage of capital in some countries and supplies interest to its creditor. Economic liberals argue that a market system "increases economic efficiency, maximizes

economic growth, and thereby improves human welfare".<sup>2</sup> In regard to this point, international economic exchange can greatly enhance economic benefits of countries participating in the exchange.

However, such benefits usually accompany certain costs for countries. The benefit of close international economic relations suffers the expense of giving up a certain degree of national autonomy.<sup>3</sup> National autonomy here means "the ability to frame and carry out objectives of domestic economic policy which may diverge widely from those of other countries".<sup>4</sup> Such national autonomy includes domestic economic policies which attempt to realise the objectives of welfare states, as well as energy and resource trade security. Welfare states from the mid-twentieth century have attempted to guarantee "full employment and the economic welfare of the masses".<sup>5</sup> But international trade sometimes accompanies considerable loss of market share and workers' jobs in specific goods and commodities in some countries due to factors such as decline in comparative advantage and change of consumers' preferences. This negative effect may lead the country to formulate some protective action in order to secure its industry and jobs for its workers. Indeed, nationalists, pursuing what Robert Gilpin refers to as "benign mercantilism", emphasise "the safeguarding of national economic interests as the minimum essential to the security and survival of the state".<sup>6</sup> At the same

time the securing of supplies of natural resources has been a key issue for nation states since their beginning.<sup>7</sup> An increase in imported natural resources may mean less firm control over a country's necessary resources. Thus, international economic exchange exerts some influence over national autonomy.

Accordingly, the central question of international economic cooperation is, as Richard Cooper states;

how to keep the manifold benefits of extensive international economic intercourse free of crippling restrictions while at the same time preserving a maximum degree of freedom for each nation to pursue its legitimate economic objectives.<sup>8</sup>

For each country, the reason for cooperation generally lies in the greater benefits of international exchange than benefits derived from a freer choice of domestic economic policies without international exchange. Such economic interests need to be explored from both short and long term viewpoints. In other words, even though some cooperative behaviour does not meet the country's economic interests in the short term, it may produce more fruit in the long run than without such cooperative behaviour.

The main purpose of economic cooperation in the present paper is seen as improving markets by complementing market insufficiency and positively vitalising markets through the actions of governments and

private sectors. There are mainly three styles of measures of economic cooperation which serve to improve markets. First, information exchange plays an essential role in the market. Information concerning markets and government policies can contribute to finding further opportunities of international exchange as well as reducing uncertainty in the market. Second, reduction or removal of market barriers enables more active international economic exchange. Third, joint investment supplies capital and technology, positively developing the market through the expansion of production.

The GATT (General Agreement on Tariffs and Trade) based international liberal trading system is the most important model of international economic cooperation. A multilateral system for trade and payments was established, based on various arrangements and institutions including the GATT and Bretton Woods. This system attempted to promote three general principles for trade:

- (1) a liberalising approach;
- (2) non-discriminatory multilateralism;
- (3) openness of exchange (largely between private agents on terms negotiated among themselves)<sup>9</sup>

This cooperation mainly focuses on the above mentioned second style of economic cooperation, namely reduction or removal of trade barriers.

The GATT has provided such a liberal trading framework in the postwar period without systemic collapse, though its insufficiency has now become obvious. In addition to the inadequacy of the GATT-based liberal trading framework, other means to achieve economic cooperation suggest the need for further development of cooperation. Especially, in the face of growing regionalism, a detailed exploration of why regional cooperation can better implement such means of economic cooperation in large fields is indispensable.

## **2.2 Need for Asia-Pacific Economic Cooperation**

As stated in the Introduction, contrasted with the great potential of the Asia-Pacific, problems for realising the potential create a strong need for arrangements and collective actions among the countries in the Asia-Pacific in order to surmount such obstacles. There are three reasons why these issues are largely better solved by regional economic cooperation. First, the global liberal economic system is now under stress as seen in section 2.1. Under the present situation it is difficult to solve trade friction between the United States and Japan, one of the gravest issues in the Asia-Pacific

economy, in the framework of the global system of the GATT. The need for a regional solution for this problem relates to the next point.

Second, regional issues can be better solved at a regional level. On the one hand, global arrangements and institutions, including GATT, are sometimes inappropriate organisations to reflect the major concerns of the Asia-Pacific, especially those concerns derived from the present economic transformations, because they have usually been framed in the first instance by and for European industrial democracies. Also global institutions are large bodies with one hundred or more members, more suited to handling generalised questions, and tending to be dominated by the problems of great powers.<sup>10</sup> For example, since the effects of acid rain are regional, the question of solving this problem is better discussed within the framework of the Asia-Pacific forum. On the other hand, bilateral solutions are unlikely to prove effective, as Peter Drysdale and Hugh Patrick claim, "*[the] overlap of interest within the region is too great for an increasing number of issues to be treated bilaterally*".<sup>11</sup> The most important example of this is the need for "*broadening the framework of the bilateral economic relationship between the United States and Japan to incorporate the interests of other Asia-Pacific countries more fully and automatically*".<sup>12</sup> This is because the adjustment process of the trade friction

between the two great economic powers may damage third parties, especially countries in the Asia-Pacific because of high economic interdependence among countries in this region.<sup>13</sup>

Third, some aspects of information exchange and joint investment are better implemented at the regional level. Bulky commodities like coal are largely traded within the region. Australia, the world's largest coal exporter, exports around 70 per cent of its seaborne coal to countries in the region. Accordingly information about such commodities is better exchanged within the same region. In addition, joint investment is also more suitable for regional cooperation. Benefits and costs from developing production and expanding markets may largely return to the region, because the share of trade within the region is about 60 per cent of the total trade of the countries in the region. Thus, in the face of growing regional market integration, the above mentioned three means of economic cooperation are more efficiently implemented at the regional level in large areas of economic cooperation.

### **2.3 Potential for Asia-Pacific Economic Cooperation**

Various regional bodies or organisations have been formed in many fields of economic interest in the region. the Economic and Social Commission for Asia and the Pacific



(ESCAP) is a conventional regional governmental body; the Pacific Basin Economic Committee (PBEC), and the Pacific Trade and Development Conference (PAFTAD) consists of economists. The major international development of regional economic cooperation is the PECC. In addition, APEC was successfully held in Canberra in 1989. This was the first conference of ministers in the Asia-Pacific region. But regional governmental and non-governmental institutional ties in the Asia-Pacific are much weaker than in Europe and North America.<sup>14</sup>

The major reason for the relatively underdeveloped ties among countries in the Asia-Pacific lies in its "heterogeneity", contrasted with the "homogeneity" of the Atlantic community.<sup>15</sup> There are great political, economic, and social differences among these countries in the Asia-Pacific region. Political systems are different: the region includes capitalist and communist countries. Some countries like Japan, South Korea, and Singapore are resource-poor, while other countries like Australia, Canada and the United States are resource-rich. The situations of development are also very different: Australia, Canada, the United States, New Zealand and Japan are developed countries; South Korea, Taiwan, Hong Kong, and Singapore are NIEs; and others are developing countries. Social and cultural differences are likewise extensive.

Such heterogeneity of the region naturally entails divergence of interests among countries in the region. Removal or reduction of market barriers needs domestic industrial adjustment, since such barriers are usually set in order to protect infant industries or industries that become less competitive due to loss of comparative advantage because of, for example, increasing labour cost. Costs for implementation of such adjustment are different according to the countries' situation including the stage of development, and flexibility towards industrial adjustment. Even joint investment or economic assistance may conflict with other countries' interests. For example, exploitation of coal mines with largely subsidised assistance may threaten conventional coal suppliers' market share. Therefore, the potential for Asia-Pacific economic cooperation should be examined carefully in the context of benefits and costs for each of the countries, because particular actions could produce very different effects on countries concerned in the region.

On the other hand, the region's heterogeneity also gives strong complementarity in the region. This is shown in the history of economic development over two decades. There has been a tendency in the Asia-Pacific for manufactured exports by the lower-income countries to be dominated by "labour-intensive products", and as real wages and skills rise, countries gradually shift to

exporting more "skill-intensive and capital-intensive products", allowing lower-wage countries to take over the "unskilled-labour-intensive market".<sup>16</sup> The growth of industry in the region has provided "significant markets" for such as capital goods, foodstuffs, and raw materials.<sup>17</sup> Investment has been carried out mainly by the United States and Japan. This has been beneficial for investing countries through the return from their investment and from "international sourcing", thereby lowering costs of production, while countries receiving investment benefit from supplementary capital, technology, and more generally, developing industries. Official Development Assistance (ODA) from developed countries including Japan, the United States, Canada, and Australia has assisted industrial and social development in these countries. This has been a "happy combination of factors" for rapid economic development of the region.

Consequently, the central question of Asia-Pacific economic cooperation is how to develop the region's complementarity further, simultaneously solving problems as they emerge, and positively developing the region's economy despite its diverging interests. The potential for Asia-Pacific economic cooperation, as explained in Section 2.1, will be examined in the context of economic benefits engendered for each country. In other words, the extent of benefits and costs to which these measures of Asia-Pacific economic cooperation can bring about to the

countries in the region will be assessed. This theme includes the following three major issues in this thesis:

- (1) how Asia-Pacific economic cooperation works in the heterogeneous setting of the region and the extent to which interests are brought about;
- (2) what costs and concerns emerge from such cooperative behaviour;
- (3) how such costs or concerns are alleviated. Even though the benefits outweigh the costs and concerns, proper solution of these problems is necessary to avoid scepticism of countries towards regional cooperation.<sup>18</sup>

As mentioned in the introduction, the potential for Asia-Pacific economic cooperation should be examined in each specific field, and the Coal Flow Concept is an object for exploration in this paper. Accordingly, the next step is to clarify the Concept and to explore how this Concept can be characterised in the light of Asia-Pacific economic cooperation.

## Chapter 3 THE COAL FLOW CONCEPT: OUTLINE AND NATURE

Since the first proposal of the plan in 1986 the Coal Flow Concept has been steadily developing, though it is still in the early stages. This Concept can be seen largely to coincide with the nature and objectives of Asia-Pacific economic cooperation. Later in this chapter, the Concept will be reviewed according to the original Japanese proposal, and it will be argued to what degree this Concept satisfies the idea of Asia-Pacific economic cooperation.

### 3.1 The Coal Flow Concept

We noted earlier that the essential elements of the Coal Flow Concept were regional economic cooperation and the expansion of coal demand and supply in the Asia-Pacific region. Thus, one of the basic aims of that Concept was to increase regional coal use, assuming a significant growth in coal demand. It is expected that coal use will expand greatly in the Asia-Pacific region, stimulating the need for cooperative arrangements among trading partners. A rapid increase in energy coal consumption in this region is predicted, with the demand for coal in this region rising to more than 130 million tonnes (mt) in 1995, doubling the amount of the mid 1980s.<sup>1</sup> This huge increase will be created mainly by the rapid economic

growth of the region, especially in East Asian economies like South Korea, Taiwan, Hong Kong, and ASEAN countries. Furthermore, economies in the region are already adopting policies to develop the use of coal as an alternative energy source to oil, since oil dependence of between 50 and 60 per cent among oil-importing economies like Korea and Taiwan is still much higher than that of around 40 percent among Atlantic industrialised countries.<sup>2</sup>

It is commonly believed that increased coal use enhances energy security in the region, in terms of price and quantity. The Asia-Pacific region is well endowed with coal reserves, and shares around 50 per cent of the world's known coal.<sup>3</sup> They are exploited and exported by politically stable, developed countries like Australia, Canada and the United States. In addition, while the ratio of coal production in the Asia-Pacific remains at 44 per cent of world coal production, coal has a great potential for further development.<sup>4</sup>

However, there are various factors which may constrain a rapid increase in coal use, including availability of the capital necessary to develop coal-fired thermal power plants and coal mines, and the equally necessary technology for their operation and maintenance.<sup>5</sup> Environmental problems including acid rain and the greenhouse effect require careful consideration in plans to expand coal use. How successfully these issues can be resolved will have crucial implications,

both for the smooth expansion of a coal market and development of the market at large, and for mutual gains from more developed markets in the region.

Advocates of the Coal Flow Concept explain that the Concept attempts to match such potential demand for coal by utilising the abundant coal resources in the Pacific region through appropriate technological and financial cooperation.<sup>6</sup> This Concept was proposed by the Ministry of International Trade and Industry (MITI) of Japan to members in the Asia-Pacific region such as ASEAN, the United States, Australia, and Canada in the First Symposium on Pacific Energy Cooperation (SPEC) in 1986. MITI points out that the Coal Flow Concept includes the following three objectives:

- (1) The improvement of energy security through reducing oil-dependence in the Pacific region.
- (2) The development of energy bases for industry and advancement of living standards in the countries of the Asia-Pacific region through electrification by constructing coal-fired power plants.
- (3) The smooth expansion of the coal trade in the Asia-Pacific region.<sup>7</sup>

However, the real objectives of the Concept from the Japanese viewpoint in terms of economy should be examined here. The objectives could be argued by exploring the background against which Japan promotes the Concept.

Broadly speaking, there are three reasons for Japan's advocacy and positive support for the Concept in economic terms. Although this will be argued in detail in chapter 5, the main points can be briefly stated here. First, the formation of the Concept could contribute to Japan's stable procurement of coal in terms of both price and supply. Japan is promoting trade liberalisation in coal (the eighth coal policy) stated in 1987, mainly for the purpose of reducing both its trade surplus and the cost of procuring coal by substituting low cost seaborne coal in place of its own expensive domestic product. The succeeding policy from 1992 FY, announced in 1991, also takes the same direction with the eighth coal policy. Japan has a strong need for greater supply security through an expanded and reliable international coal market, to bridge the gap between increasing coal consumption and decreasing domestic coal production. Second, from a larger perspective, to enhance an oil-alternative energy like coal is important for Japan, because the rapid increase in energy demand especially for oil in NIEs and developing countries might be a major cause for rapid increases in oil prices in the future. Third, increased demand for coal will increase sales of



coal technology and equipment including power plants and facilities for mining, as will be explained in the next chapter.

Thus, the real objectives of the Concept from Japan's viewpoints can be stated as follows;

- (1) to develop a more expanded and reliable international coal market;
- (2) to enhance energy security at large by increasing the consumption of coal as an oil-alternative energy;
- (3) to increase exports of capital goods in accordance with the development of coal consumption.

The Coal Flow Concept is a set of ideas for promoting expanded coal use in the Asia-Pacific region. It does not extend into envisaging an international body nor does it include a concrete scheme for realising its objectives. Rather, this Concept contains three policy strands of the coal market from the viewpoint of coordinating policies and activities of both government and private sectors. The first strand attempts to form a general consensus on the need for economic cooperation for the purpose of expansion of coal use; the second strand is an exposition of Japan's plan for meeting this

need; the third strand covers the need for cooperating and coordinating the policies and activities involving the coal market among governments and private sectors in the Asia-Pacific region.

Japan calls for cooperation in the field of expanding coal use in the Asia-Pacific region among countries there. There are two reasons why the Concept could not be implemented bilaterally. First, because of complicated national interests in the region, some bilateral cooperation could easily cause concerns or conflicts among countries which are deeply involved in the cooperation. Second, although Japan has accumulated huge capital and technology, including advanced coal use technology, there still remain many areas where other countries have developed techniques superior to Japan's, for example Australia's open cut mining technology. Accordingly, if any country other than Japan began a similar venture, it could be expected to be involved in the same kind of investment and technology transfer.

There are two main categories of operative components of the Concept: first, encouraging information exchange for increased market efficiency; second, transfer of capital and technology for increasing coal consumption and supply for improving the efficiency of both, as well as coping with environmental problems. Although these components are further explored in the

following two chapters, it is useful to look at them briefly here.

Firstly, this Concept values the importance of exchanging information on the coal markets, technology, and policy, as seen in the plan to establish an information network based on "information centers" in countries in the region. The New Energy and Industrial Technology Development Organization (NEDO) started the Coal Information Network System for the exchange of coal-related statistics and other information with the Republic of Korea, Taiwan, Hong Kong, Malaysia, Singapore, Thailand, Indonesia and the Philippines.<sup>8</sup> NEDO has issued a quarterly report "Coal in Asia-Pacific" since 1989, providing such information. It also invites countries including Australia, the United States, Canada and China to participate in the system.<sup>9</sup>

At the same time, this Concept attempts to positively locate network information where a joint investment is needed and explain how it can be carried out. Actually, the Japanese Committee for Pacific Coal Flow (JAPAC) has already sent executive missions to the Philippines, Thailand and Indonesia in 1987, to China in 1988, and to Malaysia in 1989, in order to exchange information about development of both coal use and coal mines. The Committee held the "Coal Flow '91" symposium in Japan in 1991, inviting executives and engineers of coal and power industry from nine countries including

Indonesia, the Philippines, China, Australia and Canada, in order to exchange information and views on advanced technologies including coal gasification, COM (Coal Oil Mixture) and CWM (Coal Water Mixture).

As for the second point, this plan envisages provision of financial and technological aid in the following areas: first, construction, operation, safety and/or environmental protection in planned or existing coal-fired thermal power plants ; second, promotion of both conversion from oil to coal in other industries including the cement, paper, and pulp industries; and third, the residential use of coal.<sup>10</sup> Additionally, it envisages coordination of the planning and implementation of projects which require greater coal use, the development of coal mines, the creation of infrastructure for transportation of coal, and other related work.

Various Japanese organisations relate to the activity. Financial support is to be delivered chiefly through the agency of the Overseas Economic Cooperation Fund (OECF), which is responsible for Official Development Assistance (ODA) in the form of direct yen loans for development projects; the Japan International Cooperation Agency (JICA) being responsible for ODA which does not require payments or returns of loans; and the Export-Import Bank (EXIM) providing Other Official Flows (OOF) in the form of direct or indirect loans to the private sector, deferred payment in export, and

refinancing.<sup>11</sup> Technological cooperation would be carried out through institutions such as JICA sending experts and accepting trainees, sponsored by the Japanese government, the Association for Overseas Technical Scholarship (AOTS) and the Japan Overseas Development Cooperation (JODC), organisations set up by the private sector.<sup>12</sup> Moreover, the NEDO could assist in fields such as the exploration of resources and new energy development.<sup>13</sup>

One prominent organisation which specifically promotes the Concept is JAPAC. This organisation was established in 1987 "as the main promotional medium for this [Concept]" in the private sector.<sup>14</sup> This committee consists of about 80 key Japanese companies and institutions including electric power, coal mining, electrical machinery, construction, and general trading companies as well as banks. This committee has been actively promoting an information exchange campaign, as mentioned above; holding Coal Flow Seminars, and issuing frequent bulletins.<sup>15</sup> Project studies in developing coal mines, transportation and power plants have been concluded concerning two cases in the Philippines, three cases in Indonesia and one case in Malaysia by March 1991.<sup>16</sup>

This plan has actually borne fruit in developing countries since it was first advocated through Japan's economic cooperation. For example, a 40 billion Yen Loan (approximately A\$330 million, at 120 yen/A\$) has been

provided by OECF to build Calaca II Power Plant (300MW, operating from 1992) in the Philippines, and Port Kelang Power Plant (300MWx2, operating from 1988-89) in Malaysia was constructed under the auspices of the Yen Loan and EXIM Loan.<sup>17</sup> In addition, the Central Sumatra Coal Resources Exploration in Indonesia has been assisted by NEDO since 1986 (for 5 years).<sup>18</sup> In total, twelve cases of cooperation had already been actioned, including six cases of construction or improvement of coal fired power plants, and two cases of expanded use of coal throughout industry in general up to early 1989.<sup>19</sup>

The Pacific Coal Flow Concept has generally been welcomed in the region, since coal suppliers, including Australia, can better understand and influence future market development and importer policies, minimising market risk. The expansion of coal markets and the reduction of market barriers which will be argued in the next chapter lead to less competition from subsidised production elsewhere. Indeed, the Australian government and industry have welcomed "the initiative and the opportunity" of expanding coal demand in the region.<sup>20</sup> An Australian Coal Trade and Technology Committee (ACTT) was established in 1988 in order to promote Australia's interest in the Asia-Pacific concerning "all types of coal-related development", including cooperation with bodies like JAPAC.<sup>21</sup> The Canadian Coal Flow Committee (similar to JAPAC) was formed in 1989<sup>22</sup>, and it is

probable that the Coal Association may function as a promoter in the United States.<sup>23</sup> These organisational developments in developed countries in the Asia-Pacific can be seen as progress in the Concept, because these bodies basically support the Concept and can play an important role in helping to coordinate government policies and corporate activities for promoting this Concept. In addition, these institutions could be helpful in exchanging information on the coal market and policies, reducing the uncertainty in the future coal market.

However, it should be pointed out that different situations in countries from the viewpoints of politics, economy, resource endowment, and historical background sometimes lead to different views on the Concept. For example, resource poor countries like Japan are attempting to secure a greater supply capacity of coal than resource rich countries like Australia. Thus, it must be noted that there still remains the question of how to adjust different national interests and perceptions concerning the promotion of the Concept. This comprises a key question in this paper.

In sum, the Coal Flow Concept is gradually being realised, carrying out financial and technological cooperation as seen above. It is said that the Concept is now entering into the "practical stage" where specific projects are being implemented.<sup>24</sup> However, this Concept

still remains in its infancy, because it envisages at least a decade as its time span and the results of cooperation based on the Concept are still limited. In addition, concerns from coal suppliers, as mentioned in the Introduction, based on different national interests and perceptions still await complete solutions. Accordingly, this paper focuses on the future potential for the successful implementation of the Concept.

### 3.2 Nature of the Coal Flow Concept

The Coal Flow Concept is based on a non-political, non-intrusive, and open relationship. Such a relationship was described by Yasuhiro Nakasone, the then Prime Minister of Japan, in Canberra in 1985, as one which rejects "the establishment of an exclusive regional bloc or the pursuit of narrow regional interests".<sup>25</sup> The Concept includes the following four basic principles:

- (1) the concept focuses on both economic and technological aspects;
- (2) the leading role is played by the private sectors;
- (3) the cooperation it promotes is open rather than exclusive; and



(4) it respects the initiative of relevant ASEAN and other countries in the region.<sup>26</sup>

These principles address the fears of developing countries including ASEAN that "regional cooperation would lead to undue dominance by the United States and Japan".<sup>27</sup>

As these principles and the above mentioned outline of the plan shows, the Coal Flow Concept involves following three important tenets of Asia-Pacific economic cooperation. First, this Concept attempts to develop markets, particularly coal markets, though including other markets to a lesser degree, by the expansion of trade through the development of industry in developing countries. For this purpose the Concept expects to be supported by the private sectors, enhancing economic and technological cooperation.

Second, this Concept recognises the importance of mutual gains from cooperation. There has been criticism that economic aid, especially Japan's aid, focuses mostly on its own interests.<sup>28</sup> In order to allay such fears from developing countries, the initiatives of ASEAN and other developing countries will be respected, as the above mentioned basic principle (4) shows.

Third, this plan advocates regional cooperation and not the creation of an exclusive regional bloc. This is contrasted with the fact that economic cooperation or

economic aid in such fields as construction of power plants and developing coal mines has usually been carried out bilaterally. The reason why this Concept is carried out regionally was stated briefly earlier but can now be elaborated more fully in the following three points. First, coal produced in the Asia-Pacific is mainly traded and consumed within its own region, largely because of its bulkiness. Second, due to developing economic integration, one country's economic development or stagnation affects other countries in the region. Third, since environmental impacts, especially acid rain, have strong regional effects, there is a distinct need to solve the problem of such impacts through regional cooperation. In addition, although the greenhouse effect is global, addressing the problem and helping to alleviate the effect through improving efficiency in coal use can be more effectively implemented based on developed economic and assistance relationships within the region.

However, it is necessary to point out that the Japanese concept of economic cooperation in general differs considerably from that of the west. Although the west views economic cooperation as a part of the neo-classical economic model, Japan sees it more in terms of specific "economic aid". MITI emphasises in the "Economic Cooperation White Paper" issued in 1988 that Japan as the world largest creditor should play an important role in

encouraging the smooth cyclical movement of capital and products through an expansion of investments and imports. This paper emphasises the following three points as the most important in Japan's "economic cooperation": first, the "trinity" concept, consisting of economic aid, direct foreign investment, and expanded imports from developing countries; second, expansion of capital flow to developing countries in the middle and long term; and third, expansion in the amount and improvement in the quality of ODA.<sup>29</sup>

The Coal Flow Concept is in concurrence with this MITI policy. If economic aid works by complementing the insufficiency of the market or positively promoting the development of a potentially efficient market, it overlaps the concept of "economic cooperation" in this paper. Most measures for realising the Coal Flow Concept seem to be encompassed in this category. However, if the aid goes beyond the simple need for reinforcing markets, for example large subsidies to develop inefficient coal mines, it may appear as a factor of economic inefficiency in the market and cause concerns from other economic actors, as will be discussed in chapter 5.

Thus the Coal Flow Concept attempts to encourage the economic interests of countries in the Asia-Pacific in developing markets through regional economic cooperation, largely corresponding to the idea of Asia-Pacific economic cooperation as defined in this paper. The

underlying principles and plans to promote the Concept show considerable effort to implement it without significant opposition from other countries, especially developing countries. However, whether countries in the region would be willing to cooperate with the plan, positively acting to promote it or refraining from acting against the initiative, requires a more careful consideration of the roles and benefits the plan engenders, as mentioned in the first part of this chapter. The first topic, covering the roles and benefits of the Coal Flow Concept, will be discussed in detail in the following chapter.

## Chapter 4    ROLES AND BENEFITS OF THE COAL FLOW CONCEPT                   IN THE ASIA-PACIFIC REGION

The Coal Flow Concept has considerable potential for generating economic benefits in the region. The roles and benefits of the Concept will be argued from the standpoints of three categories, as mentioned in Chapter 2, namely, (i) improved information exchange, (ii) reduction or removal of market barriers, and (iii) joint investment. This chapter attempts to show how the Coal Flow Concept can develop markets by complementing and positively expanding markets while nurturing the individual interests of each country in the heterogeneous nature of the Asia-Pacific.

### 4.1 Information Exchange

As stated in the previous chapter, the Concept attempts to provide comprehensive information on the present and future coal market. Reliable and detailed information on the coal market and coal policies is the basic starting point in the smooth expansion of the coal market in the Asia-Pacific. More reliable information along these lines can demonstrate business opportunities more clearly and contribute to reducing uncertainty about the stability and efficiency of the coal market. As the development of coal mines requires a long period and large investments, it is useful for market players to obtain more detailed

information on the coal market in the future, including the establishment of coal-fired thermal power plants and development of other coal mines. Such information can give market players a clearer idea of long term demand and supply conditions, thus reducing uncertainties of the future coal market. Stability in terms of supply can lead to stability in terms of price. Both producers and consumers can gain from increased efficiency by supplying at a lower price, and sharing such mutual benefits.

From basic information, the Concept initially forecast a large potential for the further development in the coal market in the Asia-Pacific, in the following statistic. Demand for energy coal was projected to rapidly rise from 62.8 mt in 1985 to 133.2 mt in 1995, while domestic energy coal production in East Asian economies (except China and Japan) and ASEAN countries would increase marginally from 17.4 mt in 1985 to 22.3 mt in 1995.<sup>1</sup> Such a gap between demand and domestic supply of coal would need a considerable increase in coal imports, especially from countries in the Asia-Pacific. It was estimated that coal exports from Australia, Canada, the United States and China to the Asia-Pacific region would increase from 24.6 mt in 1984 to 98 mt in 1995.<sup>2</sup> This might consist of an increase of coal imports both by East Asian economies from 24 mt to 92 mt, and by ASEAN countries from 0.6 mt to 6 mt.<sup>3</sup>

## 4.2 Reduction or Removal of Market Barriers

Although an improved information exchange brings about opportunities for coal trading and investments in the field of coal use and production, there may be barriers to realising these opportunities. Such barriers include market imperfections which encompass market barriers by protectionism and monopolies on technology.

First, it is obvious that market barriers such as tariffs, quotas, and considerable subsidies to protect a domestic coal industry have negative effects on a more efficient coal market. Enhanced energy security may decrease the incentive to protect more costly domestic coal production. The role of the Coal Flow Concept to expand a reliable coal market could enhance energy security from two viewpoints: securing the procurement of coal itself and of energy in general. A stable (in terms of supply and price) and efficient coal market is the vital condition for reducing protectionism among coal importing countries. Japan's eighth coal policy, a milestone in its liberalisation in the coal trade field, emphasises the importance of procuring seaborne coal stably in the long term and contributing to the expansion of energy supply capacity through developing coal mines. It is also true that the Coal Flow Concept itself is promoted partly by such motivation.<sup>4</sup> In addition, as stated in the section 3.2, expansion of a reliable coal

market in the Asia-Pacific region can promote energy security, though the definition of the best energy mix differs depending on the political, economic, and natural resource situations of each country. Thus, a more stable and efficient coal market together with energy security could reduce an important incentive to protect inefficient domestic coal mines.

Second, technology transfer has another important role in reducing and removing market barriers from the viewpoint of grappling with environmental issues. Technology is becoming more important in expanding coal use due to people's increasing concerns about environmental issues. Less diffused technology for environmental protection may constitute a large difficulty in enhancing coal use. The Coal Flow Concept envisages financial and technological aid to developing countries for the operation of plant and environmental protection, if necessary.

Technology concerned with measures to cope with environmental issues is increasing its importance. Recently, the two outstanding issues of acid rain and the greenhouse effect have been attracting attention. Coal is highlighted as an important contributor to both these problems. For this reason, the expansion of coal use raises a dilemma between the benefits which the Concept can bring about, and undesirable effects such as a deteriorating environment. To address this dilemma, it is



essential for increased coal use to be seen as environmentally viable. The Coal Flow Concept has considerable potential for contributing to the answer of such questions through financial and technological cooperation in the region. This is argued in relation to acid rain here, while concerns about the greenhouse effect and measures to alleviate it will be argued in the following chapter. Although technologies are being established to cope with the problem of acid rain concerning emissions from power plants, the CO<sub>2</sub> problem directly impinges on the question as to whether coal use should be expanded at all.

Acid rain is mainly caused by the production of acid through the oxidation and deposition of sulphur oxides (SO<sub>x</sub>) and nitrogen oxides (NO<sub>x</sub>) from combustion of fossil fuels like oil and coal.<sup>5</sup> Much damage by acid precipitation has been reported: a sharp decrease of fish in lakes and damage to forests in Sweden and Norway; the plight of the Black Forest in Germany and forests in eastern North America are prime examples. In East Asia, the effects of acid rain are less obvious, but the incidence of rain with strong acidity and the increase of acidity in some lakes have been reported in Japan.

Technology to reduce the SO<sub>x</sub> and NO<sub>x</sub> content of emissions is being developed. The electric power industry in Japan has established that SO<sub>x</sub> and NO<sub>x</sub> can be controlled to very low levels without substantial loss

of energy efficiency.<sup>6</sup> Japan is now further improving both low pollution and highly efficient technology in coal-fired boilers in power plants and other uses, developing Fluidised Bed Combustion (FBC) and FBC with coal gasification combined-cycle power generation. Some European countries are very interested in such technologies, and are seeking Japan's technology in the field of coal burning.<sup>7</sup>

In order to diffuse such technology in developing countries in the Asia-Pacific, technological and financial cooperation is of fundamental importance. In developing countries, demand for a clean environment is not so high.<sup>8</sup> In such a situation, companies and governments there may put more priority on lower costs rather than taking costly measures to reduce the emission of NO<sub>x</sub> and SO<sub>x</sub>. Even though they attempt to take such measures, there is another problem of insufficient technology and capital. As plants become more complex with facilities of de-SO<sub>x</sub> and de-NO<sub>x</sub>, operation and maintenance need higher technology. Developed countries, including Japan, have a reasonable incentive to provide technology and financial aid to encourage developing countries in East Asia to take measures against acid rain, because the impact extends beyond national borders. The Concept emphasises the importance of "information on environmental pollution control technology of coal combustion".<sup>9</sup> The Coal Flow Concept includes an idea of

promoting technological cooperation by sending experts and accepting trainees<sup>10</sup> through organisations like JICA, AOTS, and JODC. Financial support will be argued in the next section on joint investment.

#### 4.3 Joint Investment

Joint investment is needed from both financial and technological viewpoints. Capital is another important barrier to overcome for enhancing coal use. The Concept forecast that total investments in Republic of Korea, Taiwan, Hong Kong and ASEAN countries (excluding Brunei) in the field of coal-fired thermal power plants, coal use facilities in cement industry and coal mine developments between 1985 and 1995 could amount to US\$ 27.9 billion at 1984 prices.<sup>11</sup> To procure such huge amounts of money is not easy, especially for developing countries like Indonesia and the Philippines. Indonesia's investments are estimated at US\$ 8 billion for the decade, but its total external debt is US\$ 53 billion, and the current account deficit was US\$ 2 billion in 1987.<sup>12</sup> Accordingly, the demand for capital to realise proposed coal investments, faces serious constraints, as seen in the postponement of four large scale petroleum and petrochemical projects in 1991 partly due to such huge deficits.

In addition, facilities like power plants and mines are becoming more sophisticated largely to improve efficiency and reduce the impact on the environment. In order to implement such projects successfully and effectively, providing not only capital but also management and technical skills by participating in the plan is vitally important.

Joint investments by developed countries and countries where investments are implemented in order to develop coal-fired power stations can contribute to the development of industry in the latter countries by broadening their energy base. As economies in the Asian Pacific region are rapidly increasing their demand for energy in the manufacturing and residential sectors, improving the energy bases in NIEs and developing countries becomes a vital element in their economic development.

Such joint investment may be beneficial both for investors and for countries which receive investment. Expanding coal use may assist some developing countries by saving foreign currency.<sup>13</sup> Countries with available coal resources can save foreign currency by replacing some of their imported oil with indigenous coal. Even coal-resource poor countries can conserve foreign currency by substituting cheaper imported coal for more expensive imported oil. As the availability of foreign currency and capital has been a critical constraint on

economic growth in developing countries, economisation of foreign currency on energy imports can allow greater access to imported capital goods and contribute to development by expanding their production capacity. For example, Thailand has adopted a strategy of increased use of indigenous coal as an alternative to oil. It thereby reduced its imported oil dependence from 94 per cent in 1973 to 65 per cent in 1987 and increased the share of coal (mostly domestic coal production) from 2 percent in 1973 to 10 percent in 1987.<sup>14</sup> It is believed that without such a strategy it would not have been possible to achieve the rapid growth of its domestic product per capita from \$US 267 in 1973 to \$US 850 in 1987.<sup>15</sup>

On the other hand, joint investments in power plants and coal mines encourage imports of capital goods. To establish power plants requires a huge battery of equipment including boilers, generators, and transmission facilities. To open or enlarge coal mines also needs a large supply of capital goods. Most of these are capital- and technology- intensive goods, needing to be imported from developed countries like the United States, Australia and Japan. This would provide a great incentive to carry out such joint investment for companies producing and selling these goods. Indeed, a high proportion of JAPAC membership is made up of such companies.

Such expansion of markets may encourage industrial adjustments through a more developed complementarity among countries in the Pacific. As difficulty in industrial adjustment mainly consists of inflexibility in the country's industrial structure and its difficulty in finding alternative jobs for workers, such complementarity may provide people with new opportunities in business and jobs. Especially, as industrial adjustment is a significant issue in developed countries, development of demand for capital and technology intensive goods from developing countries may promote a smoother transition to higher technology industry. At the same time, development of industry in the Pacific increases demand for raw materials including coal and iron ore, pointing towards developed and resource-rich countries like Australia, Canada, and the United States. Thus the Coal Flow Concept can contribute significantly to indirect industrial adjustments in developed countries.

For investors, realising the Concept can produce various opportunities for investment. Increase in demand for coal provides increased potential for investment in coal mines. As developing countries do not have sufficient infrastructure for developing their economies and sometimes "the excess demand for infrastructure capacity" emerges as a new problem in the rapid increase of Japan's direct investments,<sup>16</sup> improved infrastructure

would provide better opportunities for investment for production in developing countries.

The central effect of the above mentioned financial and technological cooperation along the lines of the Coal Flow Concept is potentially to expand a coal market, encouraging it to become more efficient and stable. Expansion of a coal market by joint investment in such facilities as power plants and coal mines, and improved information exchange could contribute to stabilisation in the market. Energy markets are often considered imperfect when compared with the high levels of competitiveness in other commodity markets.<sup>17</sup> It is important to gain greater efficiency in the energy market including coal, to develop exchanges sufficiently to promote an expansion of the market, including trade on a large scale, easy transportation and multiple suppliers and consumers.<sup>18</sup> Such conditions can be promoted as a result of "the smooth expansion of coal trade in the Pacific region"<sup>19</sup> which is one of the main objectives of the Coal Flow Concept through improved information exchange, joint investment, and including foreign aid if necessary.

Enhanced efficiency and stability in the coal market is beneficial for both consumers and suppliers. On the one hand, energy coal consumers like Japan have a considerable interest, in order to ensure adequate supplies of energy coal at reasonable cost in the long term.<sup>20</sup> On the other hand, efficient coal producers have

"a natural interest in the stabilisation of the energy coal trade".<sup>21</sup> In addition, such producers can obtain more opportunities for coal exports through the expansion of the coal market. Accordingly, further development of the market in coal, maintaining the balance between demand and supply will generate more interest among both consumers and suppliers. However, it is also true that some concerns still remain from the opposing viewpoints of coal suppliers and environmental issues. These issues will be discussed in the following chapter.



## Chapter 5 CONCERNS AND COSTS OF THE CONCEPT

Concerns and costs surrounding the Coal Flow Concept have been pointed out, especially the possibility of coal mines being developed "out of step", and the greenhouse effect. They appear to be fundamental problems which question the viability of the plan. These concerns may be alleviated to some extent through the process of realisation of the Concept, with large benefits which would be brought about to countries involved in the Concept from such market development as an increase in exports of coal and capital goods for power plants. However, it is also true that if concerns and costs are left without appropriate investigation and proper countermeasures, scepticism might grow among some countries bearing such concerns and costs, making the plan less viable. This chapter attempts to show that these problems can be alleviated to uncritical levels through increased communication among countries in the region on the coal market, technology for coal use, coal and energy policy, and through appropriate financial and technological measures.

### 5.1 The Development of Coal Mines

To increase coal supply capacity by developing substantial new coal mines would alert coal suppliers'

attention, due to the potential imbalance between supply and demand. The Australian government is reasonably concerned about the balance between the demand and supply of coal. "A National Energy Policy Paper" published by the Australian government describes both opportunities and problems in the Coal Flow Concept as follows:

New coal-fired power generation capacity may increase demand, but new coal production capacity, if developed out of step with this demand, could add to export competition.<sup>1</sup>

Some coal suppliers have suggested that "the attention given to increased utilisation of coal is designed to ensure further investment in supply facilities, maintain the over-supply of capacity in the industry and suppress prices for energy coal".<sup>2</sup> Concern about Indonesian coal exports has been raised by Australian coal exporters because of its "competitive advantage" such as lower cost of transport and handling facilities.<sup>3</sup> Further cooperative investment in developing new coal exporters with large grant elements may also raise doubt in the camp of traditional coal exporters.

The central issue of these concerns about the Coal Flow Concept relates principally to Japan's policy on the procurement of coal, developing coal mines overseas and the coal trade. Investment by the private sector with minimal subsidies is usually carried out for the purpose of obtaining benefits from the investment. In this sense,

the private sector members usually share common interests in the maintenance of reasonable price levels with coal exporting countries. Although some Japanese coal users like the power industry invest in developing coal mines, the proportion of such investments is still small<sup>4</sup> and their purpose is mainly to achieve the stable supply of coal at a reasonable price. Government policy has a far greater influence on the issue, especially as one of the largest aid giving countries, Japan's coal policy combined with foreign aid could have a considerable influence on the coal market in the Asia-Pacific region.

The concerns about exploitation of coal mines may be seen as a policy friction between coal supplying countries and Japan, even though both sides have common interests in promoting coal use. Although coal supplying countries have different policies based on their own interests and concerns according to their economic and resource situations, Australian views on this issue will be presented here. As Australia has been the world's largest coal exporter since 1984 and is among the most competitive coal exporters,<sup>5</sup> Australia's view largely represents the interests of coal suppliers, and is thus very influential in the successful implementation of the Concept. A first step for the resolution of the potential friction of policies is to review both countries' policies and their respective backgrounds.

There is a certain incentive for Japan to encourage expansion of an international coal market. This expansion is important for the country's energy security and to bridge the expanding gap between its increasing demand for coal and the decreasing coal supply capacity. Japan has actively developed domestic coal use since the first oil crisis in 1973 and intends to expand coal use in the future as an oil-alternative and cheaper energy source. Demand for energy and coking coal increased from 82 mt in FY1973 to 114 mt in FY1990. It is also estimated in "Long-Term Energy Supply and Demand Outlook" issued in 1990 that Japan's energy and coking coal consumption will increase to 142 mt in FY2000 from 114 mt in FY1990 mainly by an increase in coal-fired power generation, and be maintained at this level for the next decade.<sup>6</sup> As for the procurement of coal, Japan intends to reduce its domestic coal production based on the eighth coal policy issued in 1986 in order to reduce its trade surplus<sup>7</sup> and replace its more expensive indigenous coal with much cheaper imported coal<sup>8</sup>. This policy indicates that Japan's coal production level should be reduced gradually down to approximately 10 mt in FY1991 from 16 or 17 mt in the first half of the 1980s. Coking coal production was expected to decline drastically from 4 mt in FY1985 to zero in FY1991. The reduction of energy coal production was expected to be rather moderate from 12.5 mt in FY1985 to approximately 10 mt in FY1991, supported by 8.5 mt

consumption of the power industry. In fact, Japan's coking and energy coal production was 0.3 mt and 9 mt respectively in FY1990.

Facing increasing demand for coal on the one hand, and reduction of domestic coal production on the other, this policy states the importance of both securing stable coal imports in the long run, as well as diversification of the supply sources of coal.<sup>9</sup> For these purposes, this policy emphasises the promotion of participation in overseas coal mines, new long term contracts, and developing the infrastructure for receiving seaborne coal. The Japanese government has made recommendations to improve its support of these efforts to secure a supply of seaborne coal. As well as contributing to domestic energy security, this policy presents the need to contribute to increasing the world's energy supply ability, because NIEs and developing countries are also attempting to increase coal use. In more concrete terms, this policy insists on the desirability of the development of coal mines and use of coal in the Pacific region in order to stabilise energy supply and demand in the region. This is expressed in an objective of the Coal Flow Concept.

Thus, the Coal Flow Concept fits within Japanese coal policy. For its part, its three objectives can be summarized as: first, enhancing its energy security through expansion of coal use and development of coal

mines overseas as an important source of oil alternative energy; second, reducing or avoiding any rapid increase in its energy costs; third, reduction of its trade barriers, though this depends on the international energy situation and Japan's trade surplus.

On the Australian side, coal is a key commodity in both its exports and its industry. Coal accounts for 15 per cent of export income (\$5.4 billion, 86/87), 2.2 per cent of GDP, and 40 per cent of Australia's total primary energy demand. Australia has been the world largest coal exporter since 1984, sharing 28 per cent of the world's trade in coal.<sup>10</sup>

However, Australia's overall trade deficit is large, amounting to \$80 billion in mid-87 "threatening future employment levels and living standards".<sup>11</sup> This huge deficit was largely contributed by the collapse of world commodity prices including that of coal, though they have recovered significantly since 1989. In such an accounting situation, the Australian government's emphasis has been on the manufacturing and service sectors in order to encourage the development of a more balanced economy.<sup>12</sup> For this purpose, coal is a vital source for Australia's economic transformation, obtaining foreign currency for importing capital goods. At the same time coal is and will remain a major foreign exchange earner in its own right.

There are three main objectives of Australian policy in relation to the international coal market and energy supply at large. First, promotion of efficiency for improving competitiveness of its export commodities including coal is emphasised as an immediate priority, in order to improve its balance of payments and make a "breathing space" for Australia's restructuring industries.<sup>13</sup> Second, Australia is attempting to reduce or remove trade barriers in the energy sector overseas, asserting that such obstacles lead to economic inefficiency and pose greater burdens to more efficient energy exporters like Australia.<sup>14</sup> Third, in the medium term, this policy predicts that the security issue especially the procurement of oil, will be more important, because of decreasing domestic oil production.<sup>15</sup>

There is a considerable overlap between both countries' policies towards expansion of the coal market and coal supply capacity in the broad sense. First, enhanced coal use would contribute to energy security through developing an oil-alternative energy source, if it is met by appropriate coal supplies. Energy security is a very important objective of Japan's energy policy and even resource-rich Australia will increase the importance of this objective in terms of oil supply in the medium term (towards the year 2000). Second, as for reduction of market barriers, Australia and Japan are

now moving in the same direction. Japan is moving towards liberalisation in its coal market, though its eighth coal policy has not achieved an entire removal of market barriers. The expanded and reliable coal market is an important condition of Japan's further trade liberalisation in the field of coal.

In addition, the possibility of Japan's deliberate investment to develop coal mines to a disproportionate level in competition with coal demand is very small. Although some coal suppliers might argue that Japan's investments in developing coal mines led to the low prices of the mid 1980s, Japan's most important task at that time was to ensure supply of energy to the country after the disruptive experience of the two previous oil crises. In addition, there are several reasons which show that the plan does not intend to expand the supply ability to an excessive level. First, it is not useful for Japan to suppress the coal price by encouraging the development of coal mines. This might lead to reluctance of coal suppliers in keeping or expanding coal supply capacity and could cause shortages in coal supply and price increases. As exploitation of coal mines requires a long time, such negative effects would be serious and could not be alleviated easily. Second, too low a price for coal would not be conducive to increasing investment from the private sector, including Japanese investors, in coal mines in the Asia-Pacific region, simply because



they could not gain enough return from the investment. Third, narrowing the gap between demand and supply of coal in the mid 1980s, was an important motive in the advocacy of the Coal Flow Concept.<sup>16</sup>

The problem of adjusting different perceptions among nations and the question of who pays the cost for the risk of imbalance between supply and demand for coal are key issues for making a successful accommodation. Resource-poor countries like Japan tend to attempt to secure a greater supply capacity than resource-rich countries like Australia. On the other hand, Australia pays strong attention to development of other coal suppliers. Different circumstances in terms of natural resources and economy lead to different perceptions of their optimum economic interest.

This issue also relates to the risk of a possible imbalance between the demand and supply of coal. Even if parties involved in the Concept agree with a certain level of demand and supply in the future, this may not be achieved due to various factors including stagnation of the economy, the development of new technology, and changes in energy prices. Preparation for such eventualities, for example through expansion of storage capacity and long term contracts, will be unavoidable. As these actions always involve some cost, the distribution of cost among parties must be examined carefully. How to adjust the above mentioned perception

gaps and distribution of costs will be argued later in this section.

Another important problem concerns how Japan assists in developing coal mines. The Australian government and industry shows natural concern that "the concept could lead to development of non-commercial coal capacity".<sup>17</sup> There have already been the following projects in order to develop coal supply capacity under the Coal Flow Concept: Lignite Development in North-East Thailand for power generation; development of a coal mine in Semirara and development of Iguig low grade coal in the Philippines.<sup>18</sup> If Japan's subsidies help to develop potentially inefficient coal mines, such non-commercial mines might reduce the efficiency of the coal market in the Asia-Pacific region to the cost of efficient coal suppliers. Considering Japan's becoming the world largest ODA donor and its concept of economic cooperation focusing rather on "economic aid" as seen chapter 3, this issue needs careful consideration.

It is unlikely that Japan would give a large set of grants for the development of coal mines, judging from its policy and record of giving aid. Japan's basic principles for economic aid are : contribution to economic and social developments in developing countries and emphasis on their initiative and efforts to achieve development, contrasted with Japan's supportive role for such efforts.<sup>19</sup> Although the former shows the same

objective with the Development Assistance Committee (DAC), the latter includes certain different characters from economic aid as conceived in the western countries. Such a way of thinking is evident in Japan's preference for loans rather than grants, because it is thought in Japan that obligation of return might encourage efforts for economic development in developing countries.<sup>20</sup> According to Japan's record of ODA, which includes more than 25 per cent grant element, from 1984 to 1988, no ODA was used to develop coal mines themselves in the Asia-Pacific region. If Japan maintains this attitude towards aid to develop industries, there will not be much probability of giving large subsidies to exploit coal mines.

However, large amounts of ODA have been used in order to support the creation or improvement of infrastructure in developing countries. For example, Qinhuangdao Port, which is the largest coal export port in China, increased its shipping capacity from 45 mt to 75 mt in 1989,<sup>21</sup> using Japan's ODA (Yen Loan). There is also a plan for the development of coal-related infrastructure in Shenmu in China. These examples of Japan's economic cooperation or economic aid lead to potential concerns from traditional coal suppliers.

An important question on aid for developing coal mines and related infrastructure is the extent to which the grant element of aid is acceptable for other coal

exporters. Since developing countries are generally short of capital and it is not easy to introduce sufficient capital on a commercial basis, the official flow of money is indispensable in order to supplement the shortage. Indeed, ODA for financing the infrastructure for coal transportation has been actually implemented, and increased the competitiveness of coal exports. In this sense, the possibility of concerns about non-commercial mines still remains.

It is very difficult to make a general rule for this issue, because such factors as potential efficiency of the coal mines and economic circumstances of the country differ considerably. In order to argue whether some aid is appropriate or not, the following points need to be considered. First, to assess potential efficiency of the coal mines is essential, because the central objective of economic cooperation is to improve market efficiency. Cooperation under the Coal Flow Concept would be required to contribute to the promotion of efficiency in the coal market following development or making infrastructure using loans with some grant element. Second, such a grant element needs to be assessed in terms of its importance for the country, for example according to its natural resource environment, and its economic development. Since the development of coal mines has different effects on countries, and the concept of aid and development differs according to the countries' economic, political and

historical situation, multilateral discussion and forming a consensus on the issue raised is very important.

In addition to this claim, the need to adjust different perceptions on sufficient supply capacity and on the distribution of cost for reducing the risk of imbalance in the demand and supply of coal, strongly requires mutual understanding and exchanges of information. Communications among political and business leaders will at the same time increase mutual understanding, and reduce the possibility of misunderstanding. These communications may nurture mutual reliance, narrowing the perception gap between consumers and suppliers for a sufficient supply capacity and acceptable level of assistance for an expanded coal supply capacity in developing countries. The risk of instability in the coal market also can be reduced through close information exchanges. More information on plans for future development of the coal market including construction of coal-fired thermal power plants and exploitation of coal mines, each country's policy towards coal and energy policy at large, makes the forecast for energy demand and supply more reliable. Established, reliable relationships between consumers and suppliers make accommodation in the distribution of costs for the risk of demand-supply imbalance more likely, because such adjustments essentially need consideration over the long term on a basis of trust.

Thus, there is considerable room for the accommodation of concerns about implementation of the Coal Flow Concept including the development of coal supply capacity and aid which might be controversial among countries in the region. This potential still depends on the development of information exchange, mutual understanding, and forming a consensus on such matters as the proper capacity of coal supply and the appropriate degree of economic aid among countries in the region. For this purpose forums can play a vital role, so that the development of forums in the Asia-Pacific region will be discussed in the next chapter.

## 5.2 The Greenhouse Effect

The greenhouse effect is the most intensively discussed issue concerning whether coal should be used more or not. Although the many contributing factors to the effect cannot be clearly separated, there is little dispute that this effect is now real.<sup>22</sup> This problem is caused largely by emissions of gases including carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>), with potential for warming the atmosphere around the earth. Actually, CO<sub>2</sub> has increased from 316 parts per million (ppm) in 1960 to about 345 ppm in 1987.<sup>23</sup> Scientists of Working Group I on the International Panel on Climate Change (IPCC) predict in 1990 that if "greenhouse gas" emissions increase at their

present pace, it would be most likely that the atmosphere on the earth would be warmed by 0.3 degrees centigrade per 10 years, increasing 1 degree by the year 2025. Increase in temperature could cause various phenomena: raising of the sea level, shifting storm track patterns, decreasing soil moisture levels in the grain-producing areas,<sup>24</sup> and the spread of diseases which are now peculiar to the tropics. Accordingly, two major international scientific conferences appealed to world leaders in 1988 to cut carbon emission by at least 20 percent.<sup>25</sup> In the same year, the European Community set "an official goal of reducing the energy-intensity of its members by 20 percent by the year 1995",<sup>26</sup> and IPCC was established as a formal forum consisting of representatives from 30 countries such as the United States, the Soviet Union, China, and Japan in order to cope with the climate change caused by anthropogenic activity.

The question of coping with the greenhouse effect is controversial. One of the key issues in this dispute is whether coal use should be intensively reduced or not. As Drysdale has noted, some commentators emphasise the curtailment of consumption in coal, "[putting] the burden of adjustment in coal use to cut back CO<sub>2</sub> emission entirely upon internationally traded coal rather than fossil fuel burning more generally".<sup>27</sup> On the other hand, other commentators oppose this solution from the broader

viewpoint of energy use. It is also claimed that "the curtailment of fossil fuel or coal burning for electricity generation should not be directed at the efficient supply of coal internationally".<sup>28</sup> An important problem from the point of view of burning fossil fuels is that reduction of CO<sub>2</sub> emission may be possible but creates disproportionate costs in this process given present technology. It may be natural that some people insist on the reduction of coal use as the most effective measure to relieve the greenhouse effect, because coal produces more CO<sub>2</sub> than other fossil fuels like oil and natural gas on the same calorie basis due to its chemical structure.

However, social and economic costs caused by the reduction of coal use are serious. First, if consumption of coal were maintained or decreased from the present level, it is very probable that the international oil market would become tight in the absence of adequate oil-alternative energy sources, increasing the price of oil. Second, proven recoverable reserves of coal are 7 times larger than that of oil and 9 times more than that of natural gas in terms of tonnes-oil equivalent, and supply years at current production levels are 240 years for coal, 45 years for oil and 55 years for natural gas.<sup>29</sup> From the standpoint of both the situation of coal development in the region and the balanced use of energy resources, the need for expanded use of coal remains



important. A reduction in coal consumption would be contrary to a balanced use of energy resources: it would lead to price rises of other energy fuels. Third, coal is a very important energy source for NIEs and developing countries. For countries like Korea, coal is a key energy source for developing oil-alternative energy, and countries like China need to use their own domestic coal for developing their economies. It is likely to be extremely difficult to persuade China, NIEs, and ASEAN countries to reduce their coal consumption.<sup>30</sup> Last but not least, a global ban on coal might result in large loss of income in world terms, while atmospheric concentration of CO<sub>2</sub> might be more readily alleviated. One researcher demonstrated that income loss in a country like China might be as high as \$US 1,800 in per capita GDP in the year 2075 compared with the case where a 1 percent annual rate of energy efficiency improvement in the world is assumed (in this case, per capita GDP might be \$US 7,236).<sup>31</sup> Banning or reducing coal use produces various disadvantages such as oil price increases, unstable energy supply structure, a slow down in economic growth and decrease in personal or national income. Such effects are likely to be unacceptable unless there is another effective way of coping with the greenhouse effect.

At the same time, developing other energy sources as a substitute for coal does not seem promising. Although

nuclear power is theoretically free from greenhouse gases, certain constraints still remain. After the Chernobyl accident, the intensity of political movements against nuclear power plants has increased. In addition, the delivered price of nuclear power in the United States is 10 percent more than for coal-fired electricity.<sup>32</sup>

Natural gas produces only about half as much CO<sub>2</sub> per unit of energy as coal,<sup>33</sup> and the increased use of natural gas is also less opposed than nuclear power. There is a global trend to increase natural gas use in the developed countries including the United States, as revealed in the report of Department of Energy (DOE) in January 1989. However, electricity generated from natural gas costs \$US 0.011 per kwh more than that generated from coal based on US electricity prices, lifting the cost of power supply about 10 percent.<sup>34</sup> If natural gas is transported and stored as liquefied natural gas (LNG), highly sophisticated technology, which is not widely available, is required to handle it. The earth's known reserves of natural gas are also quite limited. Thus, although natural gas may contribute to a moderation of the greenhouse effect, it is difficult to displace the large role of coal which occupied 27 per cent of the world energy supply in 1990.

Non-fossil renewable energy sources also suffer constraints. Costs for both hydro power and solar power generation are commonly higher than that of thermal power

generation. As hydro-power plants need suitable geographical features, the number of such places is naturally limited. In addition, both environmental change caused by the siting and construction of dams and roads as well as the need for moving people away from the dam-construction sites to new homes, unavoidably arouses a reaction against hydro-power construction. The development of alternative energy sources to coal confronts various constraints such as cost increases, opposition to constructing nuclear and hydro-power plants, and the need for new high technology for operating LNG plants and nuclear plants.

Narrowly focusing on the technological aspects of reducing CO<sub>2</sub> emission as the means to grapple with the greenhouse effect seems to miss the crux of the issue. Large scale energy projects like thermal, nuclear, and hydro-electric generation need to be evaluated in terms of their "cost to society".<sup>35</sup> This cost should be considered in terms of both the losses and benefits that would be brought about if such projects were not realised. In addition, the effects of the greenhouse effect, and their assessment must be spread over several decades. Environmental issues need to be assessed in terms of environmental, social, economic, and probably political costs and benefits that the energy supply system would generate in the long run.

The improvement of energy efficiency is thus of prime importance in alleviating the conflict between the social and economic benefits and environmental costs involved in the expansion of coal use. A reliable case study presented in the SPEC III in 1989 shows that if world-wide energy efficiency were improved at an average 2 percent annually, permitting the world as a whole to reach "current Japanese or Danish levels of energy efficiency" by the year 2025, CO<sub>2</sub> concentrations in 2075 would be 473 ppm.<sup>36</sup> This level is far below 600 ppm, above which most scientists agree that climatic change would be inevitable.<sup>37</sup> An important point in this forecast is that such levels of CO<sub>2</sub> emission can be achieved on the basis of the present technology level, though certain policy initiatives are needed to achieve such energy efficiency in each country.

Other measures can also contribute to reducing concentrations of CO<sub>2</sub>. Non-commercial energy forms like burning wood doubly exacerbate the greenhouse effect, both by cutting down trees<sup>38</sup> and producing CO<sub>2</sub>. If commercial energy, including electricity, were dominant, less CO<sub>2</sub> would be produced because of better efficiency of commercial energy and less deforestation.<sup>39</sup> Protection of forests, paper recycling and positive planting of vegetation also help to reduce the CO<sub>2</sub> content in the air. Technologies which easily decompose or convert CO<sub>2</sub>

into other innocuous material, including biotechnology, could be developed more intensively.<sup>40</sup>

On balance, a subtle accommodation on this issue among the environmental, social, economic and political interests lies somewhere in the direction of expanding more highly efficient coal use. On the one hand, the greenhouse effect will have crucial and global effects on human beings in the long run, in the absence of adequate policy initiatives, requiring drastic measures to combat it. On the other hand, developing the use of coal is very important for maintaining a stable relation between demand and supply of energy at reasonable price levels. Furthermore, coal is a vital energy source for social and economic advancement in developing countries. Such a range of needs can be harmonised by expanding coal use, establishing highly efficient power plants, or re-conditioning conventional power plants in order to reduce CO<sub>2</sub> emission per unit. In other words, expansion of the efficient use of coal implies a substantial potential for the contribution to the alleviation of the greenhouse effect and the improvement of economic efficiency.

Consequently the greenhouse effect and the acid rain problem can both be alleviated through the application of appropriate technology in order to reduce such effects. This conclusion inevitably needs economic cooperation for a variety of reasons. Because of the global nature of the

issues, every country needs to grapple with these problems, otherwise it is not possible to cope with them successfully worldwide. This is clearly shown in the recent trends and forecasts for energy use. Carbon emissions have increased sharply, especially in developing countries, although they have remained relatively flat in the OECD countries since the first oil shock.<sup>41</sup> Indeed, some scholars predict that energy demand in the former countries could double global carbon emissions by the year 2020 in the absence of major policy initiatives.<sup>42</sup> Such global initiatives to solve environmental issues, involving developing countries, cannot be easily achieved. Developing countries have neither enough technology nor capital to handle these environmental issues. What is more, poorer countries tend to focus more on economic growth rather than using human and financial resources to solve environmental problems.

It is necessary that developed countries cooperate with less developed countries technologically and financially, when we consider both the effects caused by some developing countries not dealing with environmental issues properly and the fact that considerable parts of these environmental problems have been caused by industrialised countries while enjoying economic prosperity. Such cooperation could involve: improving efficiency of boiler and electric generation; developing energy sources, including electricity, alternative to

non-commercial energy. The Coal Flow Concept encompasses these examples of cooperation offering various financial and technological assistance as seen in chapter 3, and might therefore play a key role in improving energy efficiency in the use of coal.

## Chapter 6 THE POTENTIAL FOR THE COAL FLOW CONCEPT

There are considerable benefits to be derived from the implementation of the Coal Flow Concept, while its offsetting costs could be reduced to an uncritical level through proper financial and technological cooperation. Although this equation between potential benefit and likely cost seems to satisfy a primary condition for successfully implementing the Concept, genuine concerns remain. Among these concerns is the possibility of a developing scepticism to the Concept, pointing to the need to provide solutions to the concerns expressed. As seen in the previous chapter, the alleviation of these concerns largely depends on improved communication among countries in the Asia-Pacific region. This chapter therefore addresses the question of how the evolving forums in the region could contribute to improved communication and the forming of a consensus about such concerns including the limitations in forming such a consensus. Then, after demonstrating the potential for the Coal Flow Concept, it will be argued that the Concept is an important example of Asia-Pacific economic cooperation. This chapter will attempt to show the substantial potential for and limits of the Coal Flow Concept as a vital example of the viability of Asia-Pacific economic cooperation at large.



## 6.1 The Potential for the Coal Flow Concept

Several important forums for Asia-Pacific economic cooperation including PECC, the Forum on Minerals and Energy (MEF), SPEC, and APEC are still evolving. These forums can be expected to play a very important role in alleviating the concerns in question. PECC emphasises in its official statement that:

[Realisation] of the full potential of the Pacific Basin depends on enhanced economic cooperation based on free and open economic exchanges and in a spirit of partnership, fairness and mutual respect.<sup>1</sup>

In order to realise such potential the premises of PECC demonstrate the importance of increased cooperation in the development of natural resources like minerals and energy, trade, joint ventures, mutual aid and other forms of linkage in a spirit of partnership, fairness, respect and genuine cooperation.<sup>2</sup> The MEF is one of the specialist task forces of the PECC on minerals and energy, established in 1985. The MEF emphasises "providing a forum for discussing projections of the market situation and outlook for minerals and energy", and it has also recently initiated discussion on environmental issues recently.<sup>3</sup> SPEC, started in 1986, focuses on cooperation in the field of energy. This symposium has been sponsored by the Japanese government and institutions, and has provided an important forum for

the discussion on the Coal Flow Concept since its advocacy in the first symposium.

These three forums are "informal" in their character, because they consist of members from public and private sectors as well as from academic circles. They provide useful opportunities to discuss the issues at stake and solve them multilaterally through the initiatives taken by the private sector. PECC would provide a forum for discussing issues on energy, trade, and economic aid concerning the Concept from a larger perspective. In this sense, a broader consensus might be nurtured in this forum on the issue of a reasonable degree of economic aid to develop economies in developing countries in harmony with the need for improving market efficiency. MEF would be helpful in exchanging information on the present and future coal market as well as on environmental issues, and could offer a forum for discussion on the essential issues for both coal suppliers and consumers, including a proper level of coal supply capacity compared with its demand level, and how to share the risk of a potential mismatch in coal supply and demand. Indeed, the second PECC/MEF conference held in Seoul, Korea in 1987 decided to provide "a forum for further exchanges of views" on such matters as plans for coal-fired thermal power plants and means to prevent a coal glut,<sup>4</sup> which closely relates to the issues raised concerning the implementation of the Coal Flow Concept.

Although SPEC may also be helpful in nurturing consensus in similar areas with MEF's potential contribution, this forum is probably more suitable for discussion of specific cases of concern relating to the Concept, because the Concept has specifically focused on "energy cooperation" and has been discussed in close detail in the series of SPECs.

APEC is an evolving official forum. This conference was set up in 1989, consisting of ministers from 12 countries in the region. Its first conference reaffirmed their "commitment to freeing-up world trade",<sup>5</sup> but also provided a forum for discussing concerns raised by less developed countries. These concerns related to "their ability to develop their industrial base without some protection from foreign competition", but were alleviated in the process of discussion in the meeting.<sup>6</sup> This example shows the potential role of APEC in accommodating areas of friction within the Concept, between the need for economic development using foreign economic aid and the principle of market liberalisation which Asia-Pacific economic cooperation attempts to promote. These forums are expected to play a crucial role in adjusting concerns about the Concept raised by some partners in the Asia-Pacific region.

Coordinating plans and policies on the following areas are key elements in the useful realisation of the Coal Flow Concept : energy and economic aid to less

developed countries by developed countries including governments and private sectors ; increased exchanges of information and views among coal suppliers, and concerns on the present and future coal market as well as sufficient coal supply capacity ; and sharing the costs of the risk of potential imbalance in the demand and supply of coal.

As for the process of reaching an accommodation, evolving forums like PECC, MEF, SPEC, and APEC are expected to play crucial roles. Differences in perspective due to lack of information could be reduced in such forums, which would be helpful for narrowing perception gaps and reducing misunderstandings about the Concept and the coal market among countries in the region through increased information exchange. Since these forums do not emulate the extent of regional economic cooperation in Europe, and their function is still limited, the continuing evolution of these forums is of vital importance.

However, it is still important to recognise the limits of the adjusting process in these forums. Some fundamental differences in perspectives between sellers and buyers can not be avoided completely. Basically, sellers attempt to maximise their benefits, while buyers try to purchase at the cheapest price. Thus, there may remain some fundamental differences in their perspectives.

Consequently, when we consider the large potential benefits to be elicited from the implementation of the Concept, it is probable that adjustments for different perspectives could be achieved to a large extent, significantly assisted by the enhanced exchange of reliable and detailed information and discussions in all these forums. This points to further evolution of such forums. Yet, there is still a chance that countries or private sectors involved in the Concept would not come to an accommodation over some issues. As the Concept would be realised through individual projects including transfers of technology and capital as well as economic aid, fully-implemented examples of the Concept might not be actualised due to concerns from countries in the region. Such negative possibilities do not deny the entire potential for the Concept. Thus, the Coal Flow Concept has considerable potential for being realised, but one should bear its limits in mind.

## **6.2 The Concept as an Important Example of Potential Asia-Pacific Economic Cooperation**

The distinct possibility of implementing the Coal Flow Concept is an important example of the potential for Asia-Pacific economic cooperation. This proposition can be argued along the following lines: first, to demonstrate how the Concept coincides with the purpose and mechanism of Asia-Pacific economic cooperation;

second, to show that the Concept directly or indirectly attempts to grapple with major problems for further economic development of the region.

First, as mentioned in chapter 2, the crux of Asia-Pacific economic cooperation is how to develop the region's complementarity further, improving international exchange and positively developing the region's economy and markets with adjustments of each country's diverging interests. The Coal Flow Concept also focuses on both complementing insufficiency of the coal market and positively developing the market as discussed in previous chapters.

On the one hand, the Concept clearly shows how economic cooperation works in the heterogeneous setting of the region for the above mentioned purpose. The starting point is, that despite the great potential of the development of the coal market with large estimated demand especially in NIEs and developing countries in the future, the former do not have sufficient technology for coping with environmental issues, and the latter do not have sufficient capital or technology for full realisation of the potential. More intimate information exchange demonstrably shows such potential demand for coal, and capital and technology to increase consumption and production of coal in the region. Technology transfer for coping with environmental issues could reduce or remove market barriers from the environmental

viewpoint. Developed countries could provide capital and technology to develop coal use and coal mines as joint investments. This is beneficial for coal suppliers by increasing demand for coal, and for developing countries by creating an industrial base, while developed countries could sell capital goods like power plants and expect returns from such investment, if the investment were on a commercial basis.

These benefits come from enhanced economic exchange in the region and the divergent economic and natural resources situation of the countries involved. Although this would be at the cost of a decreased degree of autonomy for some countries by the reduction or removal of market barriers, this cost could be reduced or replaced by the development of a stable and efficient international coal market and increased job opportunities through expansion of demand for technology- and capital-intensive goods including power plants. Such a mechanism of economic development of the region assisted by the Concept well corresponds to a "happy combination of factors" which has enabled rapid economic growth in the Asia-Pacific as explained in section 2.3.

On the other hand it is necessary to point out that negative aspects of the Concept arise from that heterogeneity. Because of divergence in the economic and natural resources situation, and in the historical background of the countries in the Asia-Pacific region,

the two sides (i.e. sellers and buyers) may have different ideas about a stable and efficient coal market, and the assistance required to develop coal mines. As seen in section 6.1, these concerns could be alleviated through involvement in the emerging forums in the region to a large extent. But fundamental differences between sellers and buyers might persist as inherent limits of Asia-Pacific economic cooperation, displaying a negative aspect of the region's heterogeneity. This shows a typical example of how different perceptions and understandings could be adjusted or not adjusted in the region.

Thus the purpose and working mechanism of the Concept properly fits the above mentioned crux of Asia-Pacific economic cooperation. In this sense, the Concept composes a typical example of Asia-Pacific economic cooperation.

From the second viewpoint, the Coal Flow Concept attempts to grapple with key problems for the Asia-Pacific economy as listed in the Introduction. First, it could promote the reduction or removal of market barriers including tariffs, quotas and huge subsidies to support domestic coal industries though these effects are indirect and this Concept does not contribute to enhancing the global liberal trade regime directly. Reliable and cheaper coal supply reduces the incentive to protect the domestic coal industry in such countries.



Second, this Concept could enhance the energy infrastructure in developing countries, setting up power plants and exploiting coal mines. Third, it could help alleviate environmental issues including acid rain problems and the greenhouse effect, providing technology and capital for de-SOx and de-NOx as well as improving the thermal efficiency of the plant.

The Possibility for realising the Coal Flow Concept is thus a vital example of the viability of Asia-Pacific economic cooperation as well as its inherent limits. At the same time, as the Concept shows common important features and mechanisms of Asia-Pacific economic cooperation and general influences on the regional economy, the clear viability of the cooperation can be foreseen. This point will be further discussed in the concluding chapter.

## Chapter 7 CONCLUSION: IMPLICATIONS FOR ASIA-PACIFIC ECONOMIC COOPERATION

This sub-thesis has examined the possibility of the successful implementation of the Coal Flow Concept as a case study of potential Asia-Pacific economic cooperation. According to the case study, the Concept has considerable viability largely due to the abundant benefits offered by the Concept and assisted by developing forums, though inherent limits for its full realisation cannot be denied. In addition, the study emphasises the importance of evolving forums including PECC, MEF, SPEC, and APEC. As the original purpose of this paper is to discuss the potential for Asia-Pacific economic cooperation, the implication of the case study for the potential Asia-Pacific economic cooperation at large should be argued before concluding this paper.

The considerable potential for the Concept indicates the essential viability and limits of Asia-Pacific economic cooperation at large. The Concept substantially increases the viability of Asia-Pacific economic cooperation, because the Concept deals with central issues of these problems as argued in section 6.2. Although the Coal Flow Concept does not solve all the problems which are obstacles for full realisation of potential for Asia-Pacific economic cooperation, it does help to reduce them. Thus, implementation of the Concept

could widely affect the economic activities in the region.

Furthermore, it may be said that Asia-Pacific economic cooperation as seen in many other products or economic activities would also gain without detailed study by exploring the Concept example, because it demonstrates a typical example of Asia-Pacific economic cooperation. The working mechanism of the Concept includes the primary mechanism of Asia-Pacific economic cooperation as discussed in section 6.2. Such a mechanism demonstrates the following important principles: Asia-Pacific economic cooperation could bring about considerable benefits to the region; some concerns may arise from such cooperation, but they can be mostly allayed by more intimate exchanges of information, proper transfer of capital and technology, and coordination at evolving forums; although there still remain inherent limits of the cooperation due to fundamental differences in their positions such as sellers and buyers, this does not deny the potential of the cooperation. There is no reason to think that these principles could not apply to other economic activities in the region generally. Needless to say, according to the necessity of the case study as explained in Introduction, a greater accumulation of case studies in this field would be indispensable to argue the potential for the Asia-Pacific economic cooperation fully.

Consequently, one may see considerable potential in the successful realisation of Asia-Pacific economic cooperation based on the large benefits involved, though its inherent limits should be acknowledged. At the same time for the full realisation of this cooperation, it should be accepted that evolution of the forums for the promotion of communication among players in the area is imperative.

## NOTES

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2. ibid., p.15
3. Ross Garnaut (1989), Australia and the Northeast Asian Ascendancy, Australian Government Publishing Service, Canberra, p.36. Although average GDP growth of Newly Industrialising Economies in 1990 was 6.6 per cent, the growth rate is still considerably high.
4. Paul Kennedy (1988), The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000, Unwin Hyman, London, p.441
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6. Nihon Keizai Shinbun, 18/3/1991. As for electrification in Indonesia see: Tokio Kano (1988), "Energy Cooperation in the Pacific --- Aiming at Enhanced Public Welfare and Energy Security ---", Review on Pacific Cooperation Activities, The Japan Institute of International Affairs, Tokyo, p.84
7. Lawrence B. Krause (1978), "The Pacific Economy in an Interdependent World: A New Institution for the Pacific Basin", Pacific Economic Co-operation: Suggestions for Action, Heinemann Educational Books (Asia) Ltd., Malaysia, p.128
8. Peter Drysdale (1988), op.cit., p.62
9. Regionalism here means "the formation of interstate associations or groupings on the basis of regions", according to Joseph S. Nye's definition. Cited from: Joseph S. Nye (1968), "Introduction", International Regionalism Readings, Joseph Nye (ed.), Little, Brown and Company, Boston, p.vii
10. According to Paul Parker (1990), "Energy and Environmental Policies Create Trade Opportunities: Japan and the Pacific Coal Flow Expansion Initiative", Geoforum, Vol.21, No.3, p.382, Energy coal is explained as follows: "[energy] coal (or steam coal) is distinguished from metallurgical coal (or coking coal) by its use. Energy coal is burned as a source of heat and is principally used in boilers in power stations or other industry.

Metallurgical coal is used to form coke and is principally used for the manufacture of pig iron."

11. Department of Primary Industry and Energy (1988), Energy 2000: A National Energy Policy Paper, Canberra, p.9.12
12. This sub-thesis does not deal with the following concern as a major issue. Suppliers of coal technology argued that the Coal Flow Concept gives Japanese suppliers of technology "an unfair advantage", because the latter already have advanced technology especially for environmental protection. However, this is not a prevailing concern and fundamentally, competition among suppliers will determine who provides the technology and capital for particular projects. As for this problem, see: Paul Parker (1990), op.cit.
13. Stuart Harris (1989), "Regional Economic Cooperation, Trading Blocs and Australian Interests", Australian Outlook, pp.16-7.
14. ibid.
15. ibid.
16. Peter Drysdale (1988), op.cit., p.27
17. A market here refers to: "the whole of any region in which buyers and sellers are in such free intercourse with one another that the prices of the same goods tend to equality easily and quickly." Cited from: August Cournot's definition, cited in: Richard N. Cooper, "Economic Interdependence and Coordination of Economic Policies", Handbook of International Economics vol II, Ronald W. Jones and Peter B. Kenen (eds), Elsevier Science Publishers, Amsterdam, p.1199.
18. Anthony Payne (1980), The Politics of the Caribbean Community, 1961-1979 : Regional Integration amongst New States, Manchester University Press, Manchester, p.vii
19. A.J.R.Groom and Alexis Heraclides (1985), "Integration and Disintegration", International Relations: A Handbook of Current Theory, Margot Light and A.J.R. Groom (eds) Frances Pinter (Publishers), London, p.178
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3. Richard N. Cooper (1968), op.cit., p.4
4. ibid.
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8. Richard N. Cooper (1968), op.cit., p.5
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12. Peter Drysdale (1988), op.cit., p.23
13. See examples: ibid., p.240
14. Stuart Harris (1989), op.cit., p.17-18
15. Peter Drysdale (1988), op.cit., p.18
16. ibid., p.67
17. ibid., p.68
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18. ibid.
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4. Hayden Lesbirel (1988), "The Political Economy of Industrial Policy Adjustment in Japan : The Case of Coal", paper presented to workshop on "Australia, Japan and Pacific Energy Coal Markets", 11 August 1988, Canberra, p.7
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8. Even in Korea, one of the NIEs, concerns on environmental issue are not so intense. See: Sang-Gon Lee (1988), "Perspective and Issues of Coal Use in Korea", paper presented to workshop on "Australia, Japan and Pacific Energy Coal Markets", 11 August 1988, Canberra, p.10
9. Michinao Takahashi (1987), op.cit., p.153
10. Japan accepted 764 trainees in the field of energy from East and Southeast Asian countries between FY1952 and 1988. See: Gaimu-sho (Ministry of Foreign Affairs, Japan, 1989), Waga Kunino Seifu Kaihatsu Enjyo (Japan's Official Development Assistance), vol 2, p.9
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14. Masami Kadota (1990), "About the Actual Condition and Outlook of Japan's Coal Cooperation with the Asian and Pacific Area", The Fourth Symposium on Pacific Energy Cooperation, Proceedings, Tokyo, p.S3.1.17; Rufino B. Bomasang (1989), "Role of Coal Development and Utilization for the Economic Development and Improvement of Living Standards", The Third Symposium on Pacific Energy Cooperation, Proceedings, Tokyo, p.2.2-3

15. ibid.; The World Bank (1989), op.cit., p.164
16. Makoto Sakurai (1988), "The Pacific Economic Basin and Direct Foreign Investment - A Review of the Problems and the Present Situation -" Review on Pacific Cooperation Activities, The Japan Institute of International Affairs, Tokyo, p.60
17. Paul Parker (1988), "Pacific and World Energy Coal Markets", p.18
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2. Peter Drysdale (1989), op.cit., p.12
3. The Australian, 17/10/1988
4. Although the Japanese power industry invested in Blair Athol Colliery in Queensland, its equity holding in the colliery is only 11 per cent.
5. Department of Primary Industries and Energy (1988), op.cit., p.9.1
6. Asahi Shinbun, 6/6/1990
7. The Advisory Group on Economic Structural Adjustment for International Harmony made the recommendation to Prime Minister Nakasone in 1986, in the so called Maekawa Report, to curtail annual domestic coal production to 10 mt mainly to counter Japan's enormous current account surplus (3.6 % of its GNP in 1985)
8. For example, energy coal in FY1988: domestic coal 20,355 yen/t; imported coal 5,660 yen/t
9. The eighth coal policy
10. Department of Primary Industries and Energy (1988), op.cit., pp.9.1-2
11. ibid., p.2.13
12. ibid., p.1.2
13. ibid., p.15.6
14. ibid., p.9.13
15. ibid., p.1.9
16. Ippei Yamazawa (1988), "The Future of Pacific Cooperation - A Summary of Evaluation and An Overview -", Review on Pacific Cooperation Activities, The Japan Institute of International Affairs, Tokyo, p.7
17. Peter Drysdale (1989), op.cit., p.12
18. Masami Kadota (1990), op.cit., p.S3.1.37
19. Gaimu-sho (Ministry of Foreign Affairs, Japan, 1989), Waga Kunino Kaihatsu Enjyo (Japan's Official Development Assistance), vol.1, p.18

20. ibid., p.19
21. New Energy and Industrial Technology Development Organisation (NEDO, 1989), Coal in Asia-Pacific, vol.1, No.2, May 1989, Tokyo, p.28
22. William U. Chandler (1989), "The Greenhouse Effect and Increasing Energy Use", The Third Symposium on Pacific Energy Cooperation, Proceedings, Tokyo, p.5.4.3
23. ibid.
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29. Oil and Gas Journal, 1991, etc.

	Coal	Oil	Natural Gas
World proven reserves	1079 (10 <sup>9</sup> tonnes)	999 (10 <sup>9</sup> barrels)	4.208 (10 <sup>12</sup> CF)
production (per year)	4.5 (10 <sup>9</sup> tonnes)	22 (10. <sup>9</sup> barrels)	76 (10 <sup>12</sup> 12CF)
possible supply years	240	45	55

30. Toru Kimura (1988), op.cit., p.5
31. William U. Chandler (1989), op.cit., pp.5.4.6-9
32. ibid., p.14. Needless to say, circumstances governing the production of nuclear power are different. For example, Japan's energy policy, according to "Long-Term Energy Supply and Demand Outlook" issued in 1990, aims at developing nuclear power capacity actively from the following viewpoints: first, the cheapest way of generation; second, enhancing national energy security; third, coping with the greenhouse effect.
33. ibid., pp.5.4.13-14
34. ibid., p.5.4.14
35. Paul Parker (1988), op.cit., p.15

36. William U. Chandler (1989), op.cit., p.21
37. ibid., p.3
38. "More than 80% of the tropical timber felled in Asia is used for domestic energy consumption as wood fuel". See: Koichiro Matsuura (1990), "Japan's ODA and Pacific Energy Cooperation", The Fourth Symposium on Pacific Energy Cooperation Proceedings, Tokyo, p.P.S.2-10
39. Tokio Kanoh (1988), op.cit., p.89
40. The Japanese power industry and companies manufacturing power plants have commenced research on the technology of separating CO<sub>2</sub> from power generation emission and reconstituting CO<sub>2</sub> into innocuous or useful material: reported in Nihon Keizai Shinbun, 23/6/1990.
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## PACIFIC COAL FLOW CONCEPT

### 1. OUTLINE OF THE CONCEPT

The Pacific Coal Flow Concept aims, by combining potential coal demand and abundant coal resources in the Pacific region through technical and economic cooperation, at following items;

- (1) Stabilization of energy demand and supply through reducing oil-dependency in Pacific region.
- (2) Development of industry and society in Pacific region through electrification by constructing coal-fired power plants.
- (3) Expansion of smooth coal trade in Pacific region.

### 2. ECONOMIC AND TECHNICAL COOPERATION IN EXPANDING COAL FLOW IN THE PACIFIC REGION

#### (1) COOPERATION IN THE EXPANSION OF COAL DEMAND

##### i) Construction of Coal-Fired Thermal Power Plants

Financial and technical cooperation relating to existing and planned coal-fired thermal power plants (technologies concerning construction, operation, security and environmental protection)

##### ii) Expansion of the Industrial and Residential/ Commercial Utilization of Coal

Financial and technical cooperation to promote a shift to coal in the cement, paper and pulp and other industries, and for the utilization of unused coal resources as a residential energy resource

#### (2) COOPERATION IN INTEGRATED COAL PROJECTS

Cooperation in the planning and implementation of integrated coal projects consisting of coal utilization, coal development, infrastructure construction and other related projects, in the combination with various existing cooperation systems. [Source: JAPAC Brochure]

## Appendix 2

### JAPANESE COMMITTEE FOR PACIFIC COAL FLOW

#### (1) About the Committee

- i) A public organization for the promotion of the Pacific Coal Flow Concept.
- ii) Established as a private, voluntary organization.
- iii) Expenses to be paid through membership dues.

#### (2) Main Business

- i) Sub-committee activities (project-specific committee, technical cooperation committee, financial cooperation committee).
- ii) Information exchange (Dispatch of "Coal Flow Executive Mission", bilateral committee, etc.)
- iii) Campaign (Coal Flow Seminar, International Symposium, bulletin, etc.)

#### (3) Board Member

- President: Mr. M. Kadota, President, Japan Electric Information Center
- Vice-President: Mr. T. Ikuta, President, The Institute of Energy Economics, Japan
- Vice-President: Mr. I. Takase, Vice-President, Japan Coal Association
- Vice-President: Mr. S. Murai, Senior Executive Managing Director, Electric Power Development Company, Ltd.

#### (4) Adviser

- Mr. Keiichi Konaga, Special Adviser, The Industrial Bank of Japan
- Mr. Takashi Nonouchi, Adviser, The Sanwa Bank Limited
- Mr. Toshihiko Koga, Executive Director, Japan International Cooperation Agency
- Mr. Katsuhisa Yamada, Vice President, Member of the Board, Overseas Economic Cooperation Fund
- Mr. Hiroo Kinoshita, Executive Director, The Import-Export Bank of Japan
- Mr. Hiroaki Hiyama, Executive Director, New Energy Development Organization

## Appendix 3

### Major Institutions involved in the Pacific Coal Flow Concept

#### A. Economic Cooperation

(1) Overseas Economic Cooperation Fund (OECF)

Government aid in the form of direct yen loans for development projects

(2) Export-Import Bank (EXIM)

Direct loans to private sector, export by deferred payment method, loans, refinance

#### B. Technological Cooperation

(1) Japan International Cooperation Agency (JICA)

Government-sponsored development projects, dispatch of experts, acceptance of trainees

(2) Association for Overseas Technical Scholarship (AOTS)

Acceptance of trainees in private sector

(3) Japan Overseas Development Cooperation (JODC)

Dispatch of experts to private sector.

#### C. Other Relevant Institution

New Energy Development Organization (NEDO)

Exploration of resources, new energy development, etc.

#### D. Government

(1) Ministry of Foreign Affairs

Economic Affairs Bureau, Energy Resources Division

(2) Ministry of International Trade and Industry, Agency of Natural Resources and Energy

Coal Mining Dept., International Coal Planning Office

[Source: JAPAC Brochure]