A Study on LNG Supply and Demand Estimate in Asia Pacific Region

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1. Preface

When we look at the energy situation of our country recent years, we notice that energy self-supply ratio of Japan, there is a low level as still, and in spite that a lot of diversification efforts of crude oil supply have been paid for avoiding from too much dependence on Middle East, there is a high level as still.

In addition, the dependence on oil of Middle Eastern region by Asian countries is high as still. Asian countries are unable to get out of insecurity of energy supply and demand structure. This way, economic activities of our country have been standing on fragile energy structure as still. Therefore, the fact that energy stable supply should be guaranteed is the basis of energy policy of our country, and is one of important issues even from viewpoint in regard to national security.

Natural gas is one of the best energy sources whose supply quantity has recently extended, and it has the environment capability, because the impurity matters are included in very small amount. When it is burned, sulfur dioxide is not generated, and the emission of nitrogen dioxide is quite small. In addition, regarding the utilization aspect, the heat value of natural gas is so high that it is superior in economical efficiency and it is also superior in safety, because it is lighter than the air. Furthermore, because natural gas resources have not been unevenly distributed regionally, natural gas has the superiority of supply

stability.

On December, 1997 in Kyoto, the 3rd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) was held. In the conference of COP3, the goal which is directed to the reduction of green house gas emissions between the advanced nations which include Japan was set. What it is expected that big role to reduction of greenhouse gas emissions, is the development of the clean energy which is substituted to from the fossil fuel of petroleum, coal, and natural gas etc.

In various new energy fields such as wind power generation of electricity, solar power generation of electricity and biomass generation of electricity, it has been advancing that the technological innovation which is directed to utilization and penetration with the government and enterprises united. But, we hold several issues in spread of new energy concerning economical efficiency such as generating cost and production stability; it is difficult to think the demand structure of energy will change at a stroke from the petroleum and the natural gas to new energy.

Concerning this point, as mentioned earlier, we can call that natural gas is the most appropriate energy source which it can contribute to global warming problem, because the CO_2 emission quantity of natural gas is smallest when it is burnt. This way as for the natural gas, it is regarded as one of petroleum alternative sources and it is also regarded as one of powerful energy to resolve environmental issue, because it is necessary to assure effective use and penetration in energy consumption sectors.

2. Stable supply of natural gas in Asia Pacific region

The point of this essay is to prospect stable supply of natural gas in Asia Pacific region. 97% of natural gas consumption of our country depends on

importation from the foreign countries, and 80 % of natural gas importation depends on the Asia Pacific region. Therefore it is important to grasp quantitative demand forecasting of LNG in the same region, because energy supply system of our country is basically fragile, whether or not, also in the future it will or can be guaranteed the stable supply of LNG from the same area. Figure 1 shows the relation of the position of natural gas in the Japanese energy structure.

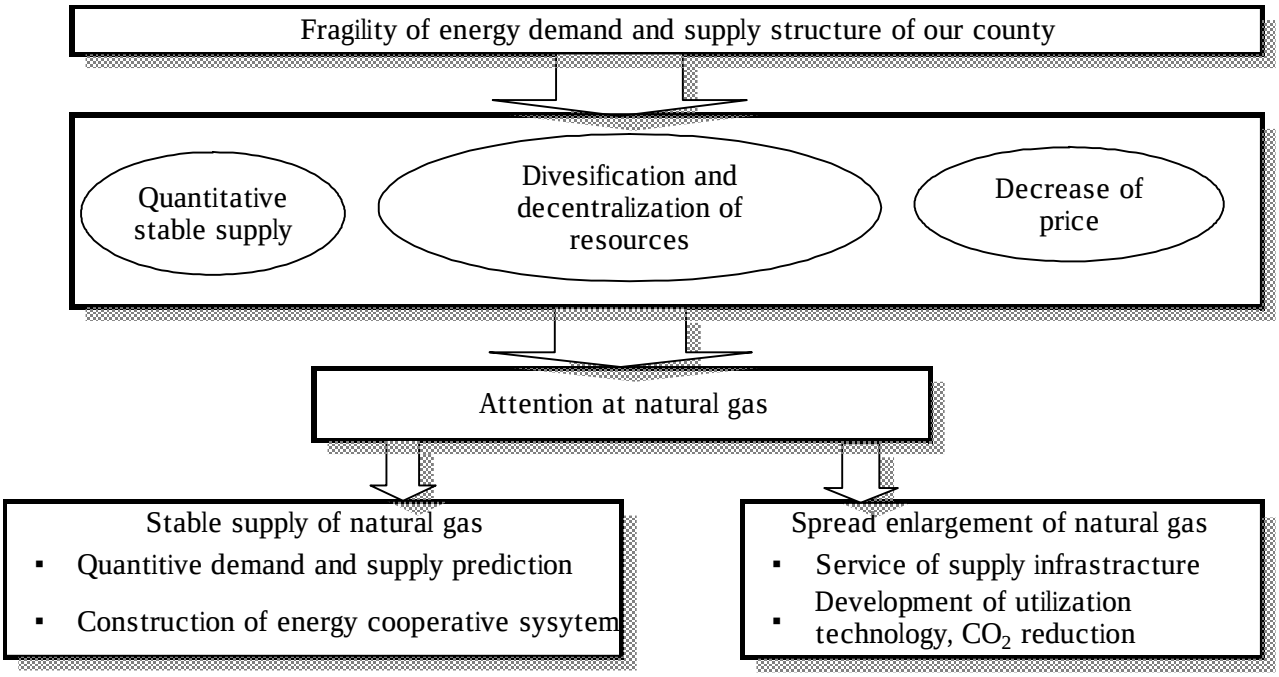

Figure 1 Fragile structure of energy supply in Japan

Japanese Government announced that the future LNG supply and demand prospect of the Asia Pacific region in the 5th supply and demand sectional meeting of the energy resource committee which was held in March of 2004. Table 1 shows the contents.

Table 1 The LNG supply and demand prospect in the Asia Pacific region announced by the government

(unit：10 thousand ton/year)

		2002year	2010year	2015year
demand	high demand case	7,787	12,400	16,300
	low demand case	7,787	10,000	12,000
supply	existing projects	8,370	8,370	7,450
	projects under construction	※	3,544	3,544
	planned projects	※	10,765	10,765
	total	8,370	22,679	21,759

(source：the 5th supply and demand sectional meeting data, March 2004)

According to table 1, the LNG demand quantity 2010 of Asia Pacific area is from 100million tons at low demand case to 124million tons at high demand case, in 2015 has anticipated from 120million tons to163million tons. In regard to the supply quantity, when 2010, it has anticipated 227 million tons and when 2015, it has anticipated 218 million tons. Because it is viewed that supply estimate exceeds apparently to demand estimate, the Japanese Government has relatively optimistic viewpoint of LNG supply and demand structure in the Asia Pacific region.

LNG demand quantitative estimate to 2010 and 2015 which the government announced is indicated in 1 million units. This can clearly presume that it is the estimate with the trend system which refers the past growth rate at the time of demand quantity estimate of 2010 and 2015.

On the other hand, LNG supply quantitative estimate is indicated in 10 thousand units, dividing into 3 stages of projects, those are projects in operation, projects under contraction and projects under planned. Supply quantity estimate of LNG must be clearly made by calculation of each existing project,

each extended project and each newly planned project individually.

3. LNG demand estimate method by calculating individual project

LNG demand quantities of every project are not shown in the LNG supply and demand prospect in table 1 that the government announced. It is something hardly to believe the reliability of LNG demand estimate in Asia Pacific region, because the details of each LNG project are not shown in the table 1. These demand prospects have been made by the prospect derived with past trend system, and the computation foundation of increasing rate for LNG demand estimating is indefinite. Then, we will try the computation of demand forecasting of LNG to stack in every existing LNG project and newly designed LNG projects from India, China, the US West Coast and Philippine.

At the time of the LNG demand forecasting of the Asia Pacific region, we will derive the stack system by computing the demand of each LNG project. Four prerequisites or estimate methods are provided.

The 1st, the designated estimate year is 2010 and 2015. The reason is because the years of LNG supply and demand prospect of the Asia Pacific region which the government announced is 2010and 2015, so that we can compare with the predicted value which we draw up.

The 2nd is the determination of LNG importing countries in 2010 and 2015. LNG demand countries of the Asia Pacific region are not only Japan, Korea and Taiwan which have already imported LNG, but also India, China, US West Coast and Philippine will be the countries as a new LNG transportation entry.

Whether or not India should be included in the Asia Pacific region, is about to have argument however, India is located within a geographical region which can sufficiently import LNG from Malaysia, Indonesia, Australia and so on and is enough to affect on LNG supply and demand of Asia Pacific region. Therefore,

India should be included in the same region.

When we consider of the American LNG demand and supply prediction, we have to divide 3 areas of the whole United States that is the East Coast, the Mexican Gulf and West Coast. Because LNG supply countries of the East Coast and the Mexican Gulf become Nigeria and Algeria etc. On the other hand, LNG supply countries of West Coast are supposed to be Indonesia, Australia and Sakhalin. Therefore, LNG supply countries are different from the region in the United States. We think of LNG supply and demand prospect of the United States, we have to divide regionally.

The 3rd is the estimate method of the LNG demand quantity. The table 2 displays the number of LNG projects in Asian Pacific region which enterprises are now importing LNG. We can check each LNG project when it faces contract expiration, whether it can be continued or cancelled. We calculate the total of those which are extended.

Table 2 LNG importing enterprises and numberof LNG projects

countyy	enterprizes	numbers of existing LNG projects	numbers of new entry LNG progects
Japan	electric co.(6)	32	6
	gas co.(8)	25	5
	others(2)	2	0
sub total		59	11
Korea	KOGAS	9	3
Taiwan	CPC	3	1
India	Petronet etc.	1	3
China	CNOOC etc.	2	2
US West Coast	Sempra etc.	0	3
Phillipine	—	0	1
total		74	24

The judgment whether the current contract will be extended or cancelled, depends on ①whether the reserves exist sufficiently to meet the contracted amount or not, ②whether the transaction quantity of LNG has been so far stable and smooth or not, ③the business relationship between the seller and buyer has been satisfactory or not. For example, like Alaska LNG and Brunei LNG、those projects have been working so smoothly for more than 30 years and repeated contract period extension. Generally speaking, if the project has sufficient reserves and good relationship between sellers and buyers, most of projects will be successfully extended.

LNG quantity and period of new contract after the contract is extended, is usually the same that the former contract used to have the quantity and the period. On the one hand, there is Indonesia Arun Project as an example of contract discontinuance. This project is reported that the production volume of LNG has been recently reducing and we have judged the project to be changed for utilization of domestic use, not for exportation in the near future. This kind of jobs to forecast the LNG demand of existing contracts can be done the projects in Japan, Korea, Taiwan and India.

The 4th is the method of new LNG projects to count in. The judgment how to include new LNG projects which will be in operation after 2006 , depends on the four factors of the projects which are clarified ①the terms and condition of the sales purchase contract between the seller and the buyer, ②the certification of reserves, ③the transaction of LNG quantity, ④starting year of the project. Those new projects which four factors have been decided or clarified will be counted on.

Therefore, the calculation method of the LNG demand quantity in Asia Pacific region, can express as follows:

LNG demand quantity in 2010 and 2015=previous contract amounts ＋contract

extended amounts ＋new contract amounts

Table 3 shows the LNG demand estimate method in Asia Pacific region by the calculation of individual project.

Table 3 LNG demand estimate method in Asia Pacific region by the calculation of individual project

(1)estimate year		2010, 2015
(2)import country	existing country	Japan, Korea, Taiwan,India
	new entry county	China,US West Coast, Philiphne
(3)LNG demand estimate measurment		previous contract amount+contract extended amount+new contract amount
(4)new project	inclusion matters	・sales and purchase contracted confirmed
		・resources,exporting partoner,year to start confirmed
	actual project	India (Dahle,Coach)
		China（NWS extenrd,Tangguh,Iran,Gorgon）
		US West Coast（Sakhalin Ⅱ,Tangguh）
		Phillipine（NWS）

4. Conclusion

Table 4 shows the LNG demand prospect in the Asia Pacific region in 2010 and 2015 by the calculation on the basis of collected four prerequisites and estimate method.

According to table4, LNG demand for the Asia Pacific region is estimated 139million tons per year in 2010 and 2015. It is found that my estimates are approximate near the range of estimate which the Japanese government announced from 100 million tons to 124 million tons per year in 2010 and from 120 million tons to 163 million tons in 2015. Demand forecasting value obtained by the calculation of each project, is highly reliable, compared with the

government estimate which was simply calculated by the trend method. Therefore, we can conclude that the LNG supply and demand forecast can be viewed relatively optimistic in 2010 and 2015, if any other international dispute or disorder does not occur in Asia Pacific region. And as for our theme, energy cooperation between the exporting countries and importing countries should be continued by the mutual understanding.

Table 4 LNGsupply and demand prospect in Asia Pcific region

(unit :10 thusand ton/year)

year		2004	2005	2010	2015
existing contracts	Japan	5,801	5,821	5,528	3,159
	Korear	1,936	1,936	1,456	1,186
	Taiwan	566	566	566	184
	India	500	500	500	500
	China	0	0	0	0
	US West Coast	0	0	0	0
	Philippine	0	0	0	0
	sub total	8,803	8,823	8,050	5,029
extened contracts	Japan	0	0	856	3,226
	Korear	0	0	480	550
	Taiwan	0	0	0	225
	India	0	0	0	0
	China	0	0	0	0
	US West Coast	0	0	0	0
	Philippine	0	0	0	0
	sub total	0	0	1,336	4,001
new contracts	Japan	0	0	63	63
	Korear	0	0	285	285
	Taiwan	0	0	300	300
	India	0	0	1,500	1,500
	China	0	0	1,380	1,630
	US West Coast	0	0	960	960
	Philippine	0	0	100	150
	sub total	0	0	4,588	4,888
total		8,803	8,823	13,974	13,918