


Market Structure of the Petroleum Industry
in South Korea



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1 Introduction

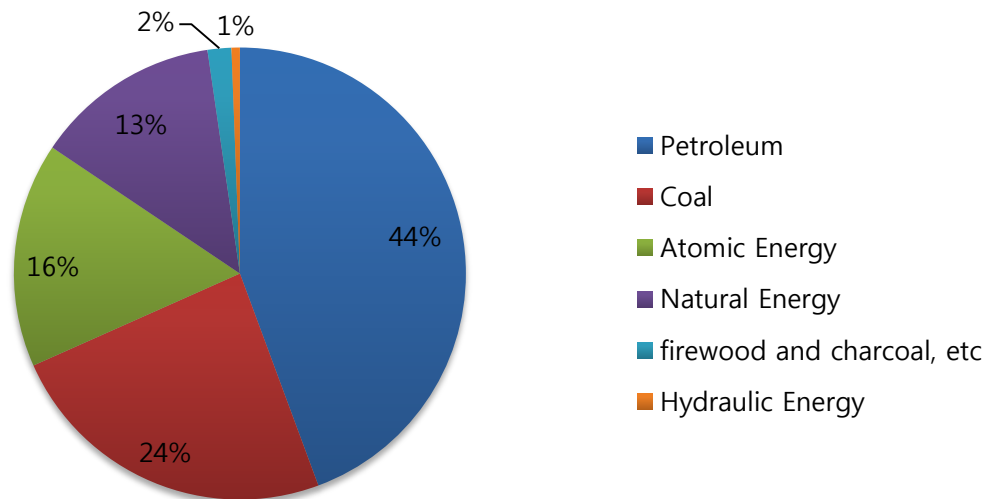
The petroleum industry includes the global processes of exploration, extraction, refining, transporting (often by oil tankers and pipelines), and marketing petroleum products. It is one of the main businesses which supports the nation's economic activities and provides sources of energy. Since South Korean petroleum industry cannot help depending on import, it has been developed under the strict government intervention, especially in terms of energy security. Energy security is a term for an association between national security and the availability of natural resources for energy consumption. According to a recent article in the Energy Business Daily (2008), access to cheap energy has become essential to the functioning of modern economies. However, the uneven distribution of energy supplies among countries has led to significant vulnerabilities. Threats to energy security include the political instability of several energy producing countries, the manipulation of energy supplies, the competition over energy sources, attacks on supply infrastructure, as well as accidents, natural disasters, the funding to foreign dictators, rising terrorism, and dominant countries reliance to the foreign oil supply. The limited supplies, uneven distribution, and rising costs of fossil fuels, such as oil and gas, create a need to change to more sustainable energy sources in the foreseeable future. South Korean government has made a lot of effort in order to have a viable marketplace while achieving the stability of oil supply and price.

In 1970s, South Korean government mainly stressed on stable oil supply and price regulation in order to overcome the oil crisis. In 1980s, international oil price decreased radically and kept very stable after the price drop. Since then, South Korea has maintained a stable and mature petroleum industry. Economically, excessive government intervention causes inefficiency by interrupting perfect competition. Likewise, as the scale of petroleum industry gets bigger, government intervention started bringing negative effect in South Korea. Thus, in the mid-1990s, South Korean government decided to encourage perfect competition and strengthen the competitiveness on international markets. In 1997, the government claimed the liberalization of petroleum industry. Since then, Korean petroleum industry has kept a mixed reputation. Petroleum companies insist that petroleum market is under perfect competition. On the other hand, people argue that Korean petroleum industry is full of collusions to keep the market shares and to increase the selling price.

As figure 1 shows, petroleum has a very important role in South Korean industries. In other words, South Korean industries highly depend on petroleum. Therefore, this term paper

analyses characteristics and the market structure of petroleum industry in South Korea, and especially, after the liberalization in 1997. Among many kinds of oils in petroleum industry, this paper focuses on volatile oil and light oil since those are used for transports and therefore, those oils have a lot of influence on people's daily lives.

Figure 1 : Energy Sources of South Korea (2005)



2 Present State of Petroleum Industry in South Korea

2.1 Characteristics of petroleum industry

Petroleum industry is important as it provides energy to most of industries and it is the basis of the petro-chemistry industry. Thus, it is very close to the nation's economic activities and therefore, it has been developed under government regulations. South Korea selected 'refining in consuming areas', thus, after import of crude oil, it is refined in South Korea prior to sales. As South Korea needs to fully depend on import, energy security is very weak. In the beginning of 1980s, 90% of import was from the Middle East. After the oil crisis, the government enforced diversification policy in order to lower import dependence on the Middle East. Thanks to the effort, it decreased up to 57% in 1985. Afterward, it increased

again as government support was reduced and since 1990, it maintains around 70%.

Based on the tendency of supply and demand in petroleum industry in South Korea, 75% of volatile oil and 60% of light oil are used for domestic consumption. Thus, petroleum industry in South Korea highly focuses on import and it has characteristics of domestic consumption market. There are several differences between domestic consumption market and export market. For domestic consumption market, differentiation concerning quality of oil, and price doesn't exist. Therefore, the market share of petroleum industry relies on how many gas stations each petroleum company has. In the case of South Korea, there are 4 major petroleum companies and those companies refrain from excessive competitions and keep constant market shares. Petroleum industry requires a very large scale of investment. Therefore, according to Grossman (2003), it is unlikely that a potential competitor would be willing to make the capital investment needed to enter the market since building the utility is very expensive. And this kind of industrial structure causes oligopoly in petroleum industry.

On the other hand, export market is created because of surplus after meeting domestic demand. There are more competitors in export market compared to domestic consumption market, and it has almost perfect competition in the market. This sufficient supply is thanks to a large amount of utility investment by petroleum companies until the mid-1990s and it allowed a bigger production capacity. In South Korea, the demand of petroleum has been decreasing because of the decline in economic growth and emergence of alternative energy sources. Therefore, it is predicted that the surplus will last for a long period. Moreover, petroleum industry depends on joint product process and it produces same amount of volatile oil, light oil and lamp oil and so on regardless of market demand. It causes imbalance in supply and demand in the market.

2.2 Present State of Petroleum Industry after Liberalization

In the end of 1990s, government claimed liberalization in petroleum industry to accelerate competitions in market and strengthen international competitive power. Thus, government reformed and abolished unreasonable systems in order to accomplish supply security and market efficiency.

Liberalization has been achieved gradually and step by step in terms of import, export, pricing, refinement and distribution. In this section, I mainly focus on petroleum industry in South Korea after the liberalization in 1997.

Several aspects were changed since the liberalization. First of all, imported petroleum has become a new competition factor in the market. Traditionally, petroleum industry was based on oligopoly, but since the new competition factor enter the market, pricing trend was

reconstructed. Moreover, it started threatening existing petroleum companies. However, those new importers had been lack of financing compared to the main petroleum companies and eventually, they lost competitiveness and market share.

Secondly, inefficiency under government regulation and intervention has been improved. Since there is a free and competitive market for petroleum, the structure of entire petroleum industry has been reformed as well. Furthermore, the competitiveness in international markets is under better condition now. That is, South Korean petroleum industry became more transparent after the liberalization while changing the structure of the industry.

Thirdly, after the liberalization, the number of gas station in South Korea has increased. Consequently, it brought competitions in distribution and therefore, consumers have larger choice of price, quality and service. The sources of supply and channels of supply have been also more diverse.

Fourthly, petroleum industry is not only import industry anymore but also export industry after the liberalization. As I mentioned before, South Korean petroleum industry has a basis of 'refining in consuming areas', and the refinement capacity has been increased a lot from 1,818,000 b/d in 1995 to 2,808,000 b/d in 2006. Due to such an increase in refinement capacity, the output of petroleum increased as well and export has become a profitable business.

As you can see in table 1, refinement capacity of each petroleum company has increased constantly. However, in 1990s, domestic consumption of petroleum decreased due to financial crisis and it caused imbalance in supply and demand. Therefore, export was necessary in order to get rid of the excess stock even though export pricing back then was very low. In 2004, oil price increased radically in the world so that South Korean petroleum companies made large profits by refinement and export. In other words, South Korean petroleum companies improved the refinement capacity, hence, achieved sufficient output. Therefore, they are able to be active and independent in the international market by having export power.

Unit : 1,000b/d (Barrels Per Day)

	SK	SK Incheon	GS Cartex	Hyundai Oil	S-Oil	Total
1995	610	110	380	443	275	1,818
1996	810	310	600	443	275	2,438
1997	810	310	600	443	275	2,438
2004	840	275	650	390	580	2,735
2005	840	275	650	390	580	2,735
2006	840	275	723	390	580	2,808

Table 1 : Refinement capacity of each petroleum company

So far, I just listed positive effects from the liberalization, however, there are several negative issues as well concerning petroleum industry. Above all, petroleum industry is reputed to be an unfair industry as it is known that it makes unfair profit from consumers by collusions. It is criticized that main petroleum companies keep constant market share by controlling competitions with each other. Fortunately, the collusion issue has been improved steadily. Secondly, petroleum industry has a bad reputation since it is not an eco-friendly industry. Nowadays, many people prefer alternative energy for the environmental reason. In other words, petroleum industry needs to deal with not just economic issues but also social, political and environmental issues.

3. Market Structure

Currently, there are 4 main petroleum companies and 72 petroleum importers in South Korea. Anyone is allowed to enter the market as long as several legal duties are fulfilled. However, as it is mentioned above, petroleum industry requires a lot of capital and utility investment so that entering the market is not as simple as it sounds.

Table 2 shows some of figures concerning petroleum consumption. Transport leads the increase in total petroleum consumption as its annual increase rate is 3.1%. Consumption in household & commerce has decreased by 2.2% and consumption in industry has also decreased by 1.4%. Thus, the overall annual increase rate in petroleum demand is only 1~2% so we can conclude that it has reached a stable stage.

Unit: 1,000 barrel, %

	Year				Annual increase rate	
	1987	1997	1998	2005	87~97	98~05
Transport	65,646	219,626	187,734	254,599	12.8	3.1
Household	32,623	140,977	100,640	80,610	15.8	-2.2
Power Generation	7,591	65,480	21,772	27,159	24.0	2.2
Industry	90,037	348,501	345,804	388,140	14.5	1.2
Gas Production	832	9,173	5,746	1,210	27.1	-14.4
Etc	13,782	10,142	8,582	9,693	-3.0	1.2
Total	210,511	793,899	670,278	761,411	14.2	1.3

Table 2: Change in petroleum consumption

3.1 Present State of Petroleum Market

The market capacity of light crude oil, volatile oil and light oil, in South Korea is 2,300,000 b/d and it has been in a stable stage since 1997. Based on the record of 2006, 75% of volatile oil and 60% of light oil are used for domestic consumption. It suggests that the rates of volatile oil export and light oil export are rather high as 25% and 38% respectively. However, the overall petroleum industry of South Korea highly depends on domestic consumption.

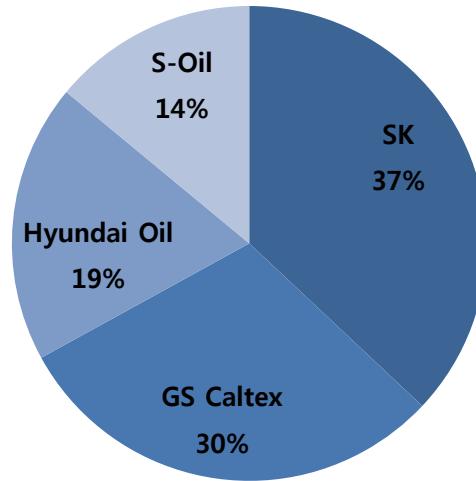
Unit : 1,000 b/d

	Capacity		Output		Domestic demand		Export	
	amount	%	amount	%	amount	%	amount	%
SK	840	31.57	801	32.99	562	27.27	243	30.13
SK Incheon	200	7.52	116	4.76	92	4.45	38	4.76
GS Caltex	650	24.43	637	26.23	493	23.90	165	20.49
Hyundai Oil	390	14.66	297	12.21	228	11.04	73	9.02
S-Oil	580	21.80	560	23.06	243	11.80	283	35.10
Etc			18	0.75	444	21.53	4	0.51
Total	1,660	100.0	1,429	100.0	2,061	100.0	805	100.0

Table 3 : Market structure in petroleum industry

As mentioned earlier, although after the liberalization, the number of petroleum importers increased for a while, because of their lack of financing, only 4 main petroleum companies currently occupy the market. In the case of light crude oil, SK accounts for 37% of the domestic market and GS Caltex, Hyundai Oil Bank and S-Oil are found to be 30%, 19% and 14% respectively. However, there is a remarkable finding that the market shares of Hyundai Oil Bank and S-Oil have been increasing for the last 3 years but the market share of GS Caltex has been decreasing for the last 2 years.

Figure 2 : market share of 4 major companies(2006)



3.2 Distribution Structure

Distribution Structure of light crude oil is divided into several options. A petroleum company could provide oil to agencies which is wholesale, and the agencies supply oil for gas stations or stores. Another option would be that a petroleum company directly supply for gas stations or stores without the mediation of agencies.

There are two types of agencies. One deals with only one particular petroleum company under exclusive contracts, the other deals with different kinds of petroleum companies. Gas stations are also divided into two kinds. One sells only one brand of oil and the other sells oil from various brands and importers.

For the case of volatile oil, light oil and lamp oil, 98.3% of entire domestic demand is covered by the 4 major petroleum companies.

3.3 Pricing

Since the liberalization in 1997, petroleum companies are in charge of pricing instead of government. Since then, petroleum companies decide consumer's price based on international oil price. Petroleum companies decide selling price based on market price, competitors' movements, and EPP of the previous day. The factors which affect consumer's

price are costs of import, tariff, tax, refinement cost, transportation cost, and tax and so on. In addition to those factors, distribution cost is added and those factors all together decide consumer's price. Thus, the consumer's price includes price before tax, tax, the amount imposed on sales and distribution margin. Above all, tax and amount imposed on sales account for 68% consumer's price. Especially, for volatile oil, government levies very high tax in order to prevent overconsumption and traffic congestions.

As mentioned earlier, collusions between petroleum companies have been at issue since the liberalization in 1997. Therefore, government periodically monitors selling price and offer price information to customers. It encourages consumers' reasonable purchases and the monitored information is used to frame a policy concerning petroleum industry. Furthermore, government imposed a duty of price indication upon gas stations and stores in order to help consumers get the exact selling price. Consumers can report unfair deals and inconvenience to the Consumer Protection Board of petroleum industry.

4. Future Scenario & Suggestion

Petroleum industry will keep on performing its role as the main source of energy. It is because a lot of existing systems are based on petroleum industry, and to change the whole system, it will require a great deal of time and investment. However, the dependency on petroleum industry will be weakened gradually as coal died out in the past. It is predicted that the energy source of future will be poly energy which is mixture of fossil energy, renewable energy, atomic energy and hydraulic energy.

Since more and more people are aware of climate change and environmental issues, petroleum industry is condemned by the society. The reputation of petroleum industry is rather bad because of oligopoly and collusions. Therefore, those political, environmental and social interventions will accelerate, thus, the petroleum industry will eventually lost its position as the main energy source of South Korea.

As mentioned above, the future of petroleum industry is not that promising. Therefore, petroleum industry needs to prepare measures in order to prepare for the uncertain future and to refurbish its bad image. First of all, cost saving in petroleum industry should focus on sustainable developments. Sustainability is one of the main concerns in most of business fields at the moment. Petroleum industry also needs to keep up with this trend in order to survive. Secondly, petroleum industry needs to develop measures against the Climatic Change Convention. South Korea is the world's 9th largest green-house gases emitter. Petroleum is also responsible for the huge amount of emissions, thus, petroleum industry is somehow obliged to improve its whole process in order to lower emissions. Therefore,

petroleum industry should design new ways of exploration, extraction, refining, transporting, and marketing petroleum products to solve the problem concerning green-house gases.

5. Conclusion

Petroleum industry has been regarded as the basis of South Korean industry as it is very important to provide sources of energy which are necessary for the nation's economic activities. However, South Korea fully relies on import because of the lack of petroleum resource. Petroleum industry has been developed under government interventions and regulations. As the scale of petroleum industry was enlarged, government regulation started causing negative effects such as inefficiency. Therefore, the liberalization of petroleum industry was enforced to strengthen the competitiveness.

So far, I have presented the characteristics and market structure of South Korean petroleum industry after 1997. Moreover, I predicted the future of petroleum industry in South Korea and proposed some suggestions. The future of petroleum industry is not that bright as it is not eco-friendly and sustainable. However, petroleum is still one of the most important energy sources existing. Therefore, continuous research into petroleum industry is required in order to keep up with the eco-friendly trend and survive in industries.

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