

Impact of Energy Crisis upon Korean Economy

Sang-Lak Oh

The Korean economy has grown an annual average rate of 9.7% from 1962 to 1979, thanks to successful implementation of the Government-led economic planning. In 1960's Korean investment policy was to develop the light industry as a means to reduce imported consumption goods. But from early 1970's, Korea has shifted its policy and pushed forward the investment in heavy industry, thereby resulting in improvement of the industrial structure. Heavy industry goods⁽¹⁾ increased their share of the manufacturing industries from 24.7% to 57.6% during 1962~1979.

The reason for this policy shift was that the heavy industry accelerates economic growth by raising productivity through roundabout production, although it is more capital and technology-intensive. Furthermore, the heavy industry is energy-intensive as well. It consumes large amount of energy resources as materials and fuel. As results, the consumption of energy resources, mainly oil, has sharply increased during the same period. The amount of oil consumption in 1979 jumped to over 200 million barrels, from only 8 million in 1962 resulting in 25-fold increase in 17 years.⁽²⁾

Let alone the volume increase, the price of oil has skyrocketed from less than 2 dollars to over 30 dollars per barrel in the same period. The payment for oil was about 2 billion dollars in 1978 and 3 billion dollars in 1979. This year (1980) it is expected to reach 6 billion dollars, which will constitute over one fourth of all Korean imports.

Unfortunately, Korea is not endowed with oil at all. It must be dependent

Author: Research Member of the Institute of Management Research, Professor, School of Management, Seoul National University.

(1) Various publications by the Economic Planning Board, Republic of Korea.

(2) Dong-Sung Cho, *International Resource Management—With a Main Focus on Oil*, Bagyoung Publishing Company, Ltd., 1981, p.186.

659
Se 67M
V. 15
c. 6

upon importation. But oil has seriously darkened the world economy since the first energy crisis in 1974. OPEC's oil weaponization policy has weakened Korea as well as other unfortunate countries more and more. Korea even experienced difficulties in purchasing oil.

What's worse in 1979, the Korean economy was challenged by the second energy crisis, which penalized the economy in two respects. First, the payment for imported oil deteriorated the balance of payment significantly. Second, exports to world markets dwindled substantially due to weakened competitiveness of the Korean manufacturers.

Then, what shall we do in order to get over with such a downturn? Do we have new strategies in order to grow further? Before discussing strategies, let us analyze the Korean industrial structure which has become energy-intensive.

As mentioned above, the energy demand in Korea has risen abruptly, along with the rapid economic growth. The main energy source has been changed from coal to oil intentionally by the Korean government on account that oil was cheaper and could be handled more easily. As a result, oil's share of energy grew to over 60% in 1979 from 9.5% in 1962. Especially the ratio of oil stands at 98.6% of the energy consumption by the industrial sector, which verifies oil-intensity of the Korean industry.⁽³⁾

Indeed, this energy-intensive structure fostered the economic growth successfully. But oil itself is now an impediment to a further growth, with its higher price and difficulties in procurement.

Next let us analyse energy consumption structure of the Korean manufacturing industries. As a measurement, let us use energy-input-rate which means "the portion of energy within the total production costs except labor cost." According to Economic Planning Board's statistics, the rates are as follows: oil products industry 72%, cement and ceramics 26%, chemicals 13%, steel industry 10%, and nonmetals 9%, which we may call energy-intensive

(3) The Korea Development Bank, "World Energy Situations and Strategies to Cope with Them", *Monthly Economic Review*, No. 289, December 1979, p.33.

industries.

On the other hand, machinery industry's rate is only 2%, leather and footwear 3%, textiles 4%, lumber and plywood 8%. We may call these nonenergy-intensive industries.⁽⁴⁾

When we compare these numbers with those of USA and Japan, the average rate of all the Korean industries is 9.9%, against Japan's 6.1% and USA's 3.5%. It explains high energy-intensity and ineffective energy use of the Korean industries. Especially in cement and ceramics industry the difference is big: with the Korean rate as 100, Japan's rate is 35, USA's only 18. In metal and machinery industry, the numbers are about the same.⁽⁵⁾ Therefore, unless these big gaps are narrowed further growth is unlikely.

The strategies for the energy conservation and the structural change into nonenergy-intensive industries have been two important issues after the energy crises. Particularly, under the limitations of oil supply, efficient use of oil is considered critical.

What does energy conservation mean? It is defined as the reduction of energy consumption to get the same utilities, that is, cutdown of the energy consumption units in industries. Energy costs are made up of both direct costs in the production process and indirect costs in facility, constructions and others. Thus energy conservation can be also defined as minimization of energy costs.

Then how do we measure energy conservation? We may use the added-value-productivity index. If we are to maintain high added values, the following conditions must be met.

First, the improvement of industrial structure must be attained. It means the conversion from the first-step production to higher assembly, or to know-how-intensive industries. For example, produce aluminium products rather than aluminium ingot, cement products rather than cement powder.

(4) Ibid., p. 45.

(5) Ibid., p. 45.

Second, energy-intensive industry goods such as iron, aluminium, and pulp, would rather be imported as a semi-finished form rather than as raw material.

Third, technological development in energy industry must be well studied and followed up for higher efficiency and optimal allocation.

Fourth, through heat control and facility substitutions, direct energy inputs must be reduced.

The next topic is on the structural change into nonenergy-intensive industries. Until the energy crises we could get cheap oil stably on which the world economy grew smoothly. At that time, we did not have much to say about oil in the economic analysis. After energy crises, oil issue has become the most important factor in the world economy, because the crises magnified the unbalance of payments, accelerated the inflation, lessened production and employment, and made so many troubles in countries without sufficient oil.

In the Korean economy, the energy problem was not significant before the energy crises. After the crises, it has suffered economic disorder seriously, and it is not likely that this disorder will come to an end soon. Therefore, some measures which are hoped to alleviate this problem should be taken into consideration.

As mentioned before, heavy industry made it possible for Korea to establish a self-supporting economy. But it can not be pushed forward without prerequisites in cheap energy resources and steady supply. At this point, I suggest the Korean economy should be reconstructed toward energy-efficient and technology- and skilled labor-intensive industries.

These strategies may be explained in detail as follows:

First, petrochemical, steel, nonmetal and cement industries are heavily influenced by oil price change, and also they need considerable capitals. Especially, petrochemical industry is sure to be most energy-intensive, and it is still under-developed in Korea. Thus, as far as situations do not change, it

(6) Dong-Sung Cho, *op. cit.*, p. 335.

is desirable to satisfy only domestic demand for petrochemical products without further new investments in this industry. In steel industry, Korea now has competitiveness in technology and facilities. Therefore, it is advisable to foster steel industry for domestic and export demand. Nonmetal industry needs much electric power for refining. And also Korea is little equipped with raw materials for it. So it is better to import nonmetal products, if necessary, without further investments. In cement industry, Korea has superiority in raw materials and facilities. But in terms of quality and price, Korea cannot compete with other countries. So only the domestic needs should be domestically manufactured. Ceramics industry is backward in technology, although Korea can take advantage of raw materials and labor. Therefore Korea should promote ceramics industry for export purpose.

Second, industrial machinery, vehicles, and electric machinery industries are less sensitive to energy, generate high added-values and contribute greatly to the growth of other industries. But Korea has only trifling technologies and facilities in these industries. I suggest that these machinery industries should be fostered intensively as heart of heavy industries, with quick improvement in technologies and facilities.

Third, textile, footwear, necessities, household electronics industries are also not much influenced by energy, and presently contribute to Korean exports very much. Though Korea is now challenged by many other developing countries, it can strengthen competitiveness by improving the quality of their products.

Fourth, plywood, leather, rubber industries are somewhat energy-intensive, but they have high international demand now and are exported by Korea considerably. Though other countries with sufficient raw materials are expected to increase their shares in these products, Korea can sustain its competitive position through improvement of their qualities.

In conclusion, I suggest the Government put a major emphasis upon the machinery industry which is not energy-intensive, but skilled labor-intensive,

and generates high value-added. Other attractive industries are textile, leather and footwear, necessities, ceramics, electronics. To foster these industries above their present levels needs upgradation of product qualities and brand image. Cement, petrochemicals, steel, nonmetal industries should not be invested further. Their present capacities are sufficient to satisfy domestic demands for the time being.

References

- The Korea Development Bank, *Monthly Economic Review*, various issues.
- Korea Petroleum Development Corporation, *Weekly Petroleum News*, various issues.
- Korea Energy Research Institute, *Energy*, various issues.
- Dong-Sung Cho, *International Resource Management—With a Main Focus on Oil*, Bagyoung Publishing Company, Ltd., 1981.
- Young-Sun Lee, *Analysis and Perspective: Comparative Advantage of Korean Export Goods*, Korea International Economic Institute, 1980.