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FOREWORD

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ON WAYS TO SOLVE FUEL PROBLEMS IN NORTH KOREA

Following is a translation of an article by Kim Yang-nyul in the North Korean-language periodical Kyongje Konsol (Economic Construction), P'yongyang, No. 9, September 1959, pages 10-13.⁷

As the people's economy progresses rapidly, more and various kinds of fuel are required to support it. Without solving the problem of fuel, which is the food of industry, the people's economy cannot be advanced.

Each year we have been spending an enormous amount of foreign currency in importing various kinds of fuel, such as coking coal, gas coal, and volatile oil. However, to guarantee the future development of our People's economy, we should not continuously import fuel from foreign nations.

The problem of meeting the increased demand of fuel must be solved first for the development of a self-sufficient people's economy, which has important significance in strengthening the independent foundation of our nation's industry.

The success of the Party's platform in the next 6 to 7 years is closely tied to the solution of the fuel problem. Therefore, it is most important to formulate a decisive policy in an effort to meet the fuel demand with our domestic fuel.

Earlier, our Party indicated concrete ways to develop our industry using only our domestic fuel. At the Plenary Conference of our Party in September 1958, it was suggested that we use our abundant domestic brown coal and anthracite to produce coke and gas which, in turn, will be used in the production of pig iron, steel, and cast iron. This way, the metal industry of our nation can be developed by using domestic fuel only. It was also suggested that we turn anthracite into briquettes to meet the coal demand in transportation without relying upon the imported coal and fuel oil.

Last June 25, the Republic's Cabinet adopted Cabinet Decision No. 49 for the purpose of emphasizing the use of domestic fuel rather than imported fuel. Consequently, all the laborers supported the Party's appeal to use domestic fuel instead of imported fuel in all the fields of the people's economy. Some achievements have been actually made in this regard. To mention a few, they are coke production with domestic coal, gasification of anthracite, creative idea of anthracite combustion method by preheating room, solution of coagulation problem in producing various kinds of briquette, and certain gas devices for the automobiles which should use substitute fuel. Thus, providing industrial fuel with domestic coal instead of imported coal has become feasible.

In consuming domestic fuel instead of imported fuel, the first important problem is to substitute domestic coal for metallurgic coke. Since the technical feasibility of substituting the domestic coal for coking coal has been found, our next important task is to apply actively our findings in production and to complete the industrial experimentations within a short period.

The Cabinet Decision No. 49 suggested a realistic task of mixing more than 10% of either anthracite or brown coal in the process of producing coke and urged the scientific institutions and other related organs to produce pig iron in the blast furnace with the coke made from the mixture of 30-50% of half-done coke and thermo-diffusion brown coal and instructed them to complete this industrial experimentation by the end of September of this year.

Next important problem is to use other types of domestic fuel in place of coke in metallurgy, thereby reducing the consumption of imported coking coal. In solving this problem, the anthracite combustion method by preheating room has great significance. Our domestic anthracite does not burn well by the normal combustion method because our anthracite has less combustion reaction though it has more heat producing capacity compared with the bituminous coal. Therefore, in order to burn properly and, at the same time, produce high heat, the anthracite should be given the preliminary combustion reaction before it is put in the furnace. This is the characteristic of combustion method by preheating room. This method has been already applied and shown successful results in the cases of cupola furnace, small size blast furnace, locomotive, boiler, cement furnace, etc.

In the past, we believed that only either coke or massive coal B of good quality could be used in melting iron. However, according to the results of the combustion method of coal dust and the combustion method of anthracite briquette, and according to the recent new study, it has been proved that anthracite massive coal A, which used to be considered to be useless, can be used in cupola processing. Therefore, if massive coal A, produced in our country, could be utilized even in ordinary casting cupola processing, annual coke consumption can be drastically reduced.

As mentioned above, our country produces plenty of pyrogenetic coal dust and anthracite massive coal whereas it produces no coking coal. Therefore, the problem of substituting other types of fuel for coke has very important economic significance. For that purpose, the Cabinet Decision No. 49 suggested that the anthracite coal dust combustion method by preheating room be applied both in the electric and cupola furnace works of the Whang-hae Iron Foundry and Kang-sun Steel Mill and other large and small scale cupola furnaces. This is important in increasing iron production. The Cabinet Decision No. 49 also pointed out that, for the above purpose, not only massive coal B but also massive coal A should be collected and supplied to the consumer if they are massive coal larger than 25mm.

Steelwork of producing cast iron without consuming cokes is the most profitable work in view of our country's reality. This means that, using anthracite and brown coal for fuel, metallurgic work is carried out to produce steel from ore continuously. Research has proved that the mixture of cast iron and shraku produces enough heat as expected and the actually obtained rate of steel is more than 10%.

The first experimentation shows that the steelwork may be possible through the use of domestic anthracite coal dust. If we are successful in our research to produce steel directly from ore by using abundant domestic briquettes as fuel without using coking coal, gas coal, electric power, and domestic pyrogenetic brown coal, it would mean a great revolution in the metallurgic industry.

Another important task in trying to substitute domestic coal for coking coal is to produce magnesia and clinker by using the briquette and anthracite coal dust combustion method. This year alone, 40,000 tons of large massive cokes have been consumed in producing magnesia and this amount is equivalent to about 60,000 tons of imported coal. But due to the insufficient amount of coke, we are unable to increase the magnesia production though the magnesia is the source of earning the foreign currency. Therefore, production of magnesia is economically significant not only in an effort to reduce the coal importation but also in earning foreign currency.

It is important to replace the imported coal with the domestic coal for gas production. Earlier, our Party suggested the completion of the task of gasifying anthracite; and, at the Third Party Conference, it was pointed out that the fuel experts and technicians must try to solve the problem of gas for industrial and urban uses by carrying out research in gasification of anthracite. Consequently, as the whole world already knows, the gasification of anthracite by briquettes has succeeded and has been applied at the Nampo Glass Factory, where an enormous amount of imported coal is spared. This new method has also been applied to automobiles, thereby saving volatile oil.

Briquettes, made from the mixture of 8% of pulp waste fluid (specific gravity 1.27) and Shinchang anthracite, which has the lowest gas producing capacity, has been gasified in the Werman and Gabery style gas producing furnaces. The following is the technical and economic aspects of such results:

Comparisons of Economic Indexes

<u>Indexes</u>	<u>Anthracite Gas</u>	<u>Imported Coal Gas</u>
Gas production per 1kg coal (1200 K cal/kg)	3.88 M ³	3.64 M ³
Coal consumption per 1000 M ³ gas	242 kg	286 kg

The prime cost of the anthracite gas is only 60% compared with that of the imported coal gas.

It has been proved in our experiences that the anthracite gas can raise the temperature of the furnace up to about 1500°C under the condition that the heat storage room is provided. It has also been proved that there is a possibility of using the anthracite gas as steel making fuel if mixed with coke gas.

According to the experimentation carried out in the gas producing furnaces of the metallurgic factories, there is not much difference in the gas producing capacity between the imported coal and domestic Ko-gun coal although our Ko-gun coal has the tendency of easy breaking. The quality of gas produced from domestic coal is equally good.

In the task of sparing the imported gas coal, the anthracite coal dust combustion method by preheating room is used in addition to the above-mentioned method of gasifying the domestic coal. There is a possibility that when the anthracite dust combustion method by preheating room is applied to the heat furnaces for which gas is used as fuel, temperature of 1200-1600°C, high enough heat for metal, can be obtained. Thus, if this method can be applied to all the furnaces, which used to require gas as their fuel, we will be able to save thousands of tons of imported gas coal this year alone.

Therefore, we are faced with the task of providing the facilities for anthracite combustion by preheating room in the heating furnaces of the metallurgic factories and the task of spreading the use of such a method gradually.

Next problem is to convert the consumption of domestic pyrogenetic brown coal into the use of anthracite or low heat producing brown coal. This problem is related to the problem of using pyrogenetic coal, produced at such mines as Kogunwon, Hamyun, and Aochi, partly in place of coke, and it is also significant in sparing the imported coal.

According to the experiences of the cement factories, if preheating rooms are installed in the furnaces for cement clinker production and if anthracite dust is used for combustion as fuel, the amount of clinkers produced is larger, on the basis of time unit spent, than when the domestic pyrogenetic brown coal is used as fuel. It has also been proved that clinkers produced through the use of anthracite dust as fuel has just as good quality as when the imported coal is used as fuel.

This same method (installing the preheating rooms and using anthracite dust as fuel) can be applied to the cupola furnaces for cast iron, bituminous coal boiler, etc. Then, we will be able to substitute anthracite and brown coal for pyrogenetic coal and the domestic pyrogenetic coal can in part be used in place of coke. Therefore, in order to use domestic coal instead of imported coal, we should concentrate on introducing the preheating room combustion method as soon as possible.

We have also accomplished a great deal in using substitute fuel in automobiles and tractors. It has been proved that briquettes, made from the mixture of 8% of pulp waste fluid and the high heat producing coal such as kang-dong, sam-sin, sa-dong anthracites, Anchoo brown coal, charcoal, half-done cokes, and other kinds of fuel can be used as substitute fuel for automobiles.

Several creative ideas on the structure of gas producing furnace has been reported, and research work is being conducted in trying to modify the engines of tractors to enable the use of substitute fuel. It has been found in our experimentation that the ADC (A Dai Chae) or U-2 (u) types of tractors which use petroleum can be operated with substitute fuel without hindering their power capacity. If 1000 freight cars can consume the substitute fuel, we can save about 6,000,000 won annually.

Our present problem is how to produce good quality fuel, namely, briquettes. To produce briquettes of good quality, pulp waste fluid, which is coagulation, must be sufficiently supplied. However, the supply of the pulp waste fluid is not satisfactory at present. Therefore, unless light industry can provide pulp waste fluid, every field of the people's economy will be faced with the fuel problem.

As our people's economy is rapidly developing, fuel demand is also increasing. Therefore, if we depend only upon the importation of fuel, the development of our industry will be hindered.

Comrade Kim Il-sung once said that machinery is important in order to carry out the revolutionary task for the technical development. Thus, fuel should be produced to operate the machines, iron should be produced to manufacture such machines, and a large quantity of coke should be provided for iron production. He continued to say that, however, we cannot establish our industry if we depend upon the foreign coke; thus he emphasized the importance of substituting the domestic fuel for imported fuel.

Of course, it is not an easy task to try to substitute the domestic coal for the imported fuel because of their different quality and forms. This task will require such work as supplementing certain facilities, remodelling work, technical construction progress, change in working methods, research work, and other difficult and complicated tasks. If we organize carefully and carry out actively, all the tasks suggested by our Party will be easily accomplished.

Some of the organs lack the active support and creative activities to make those tasks possible. They only seem to be waiting for others to provide all the necessary conditions. For example, under the pretext of the various difficult factors, some of the organs do not actively support the Party's instruction to convert the automobiles in such a way that the substitute fuel can be used.

Due to the negligence in carrying out the plan of converting automobiles for substitute fuel, thousands of tons of volatile oil was wasted in the first half of the year. In some places, they only exaggerate the fact that the conversion of substitute fuel automobiles was achieved but actually the transportation efficiency has dropped. In this case, even if the plan of conversion to the substitute fuel automobiles is achieved, it does not offer the nation any benefit.

We must fight against such passive and formal attitudes toward the Party's fuel policy. It is urgent that the related organs must work with the scientific technical workers for the implementation of the Party policy of encouraging the use of domestic fuel instead of imported fuel.

In developing scientific and technical fields in our country, we should not blindly copy the other advanced countries. In solving the fuel problem, the solution must be based upon the fuel production capacity of our country and our research should be also conducted accordingly. For example, we must exert our energy in how to produce pig iron and steel from ores by using only the domestic coal as fuel without the imported coal. This will strengthen the independent foundation of industry of our nation.

A special metallurgic method suitable to our domestic fuel must be boldly sought and carried out.

The next important problem in the scientific and technical tasks is that we should not be complacent with what we have accomplished but endeavor to increase the benefits in the people's economy by utilizing the achievements in production and stabilizing the scientific theories.

Once a theory and a method are established, people tend to think the technical task is over. However, unless such theory and method can be utilized in production and offer benefits for the people's economy, the job is not complete. There is another tendency that some of the students who are now receiving the technical instructions from the scientific research organs depend upon the technical ability of others and try to do their job without their own efforts.

One of the reasons for such a tendency is that their mysticism toward techniques has not yet been discarded and they lack the intention of doing things independently. Another reason is that they are reluctant to take the full responsibility when their work fails.

We need the revolutionary fighters who pursue the technical revolution aggressively. Let us mobilize ourselves in supporting the Party's appeal for the use of domestic fuel instead of imported fuel. Let us fight to the end for its success.

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