

## SIGNIFICANCE OF COAL UTILIZATION FOR DOMESTIC AND INDUSTRIAL PURPOSES

Commerce

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### ABSTRACT

*In the prevailing energy shortage the vast coal reserves (existing in all provinces) of Pakistan become very important. Its utilization for energy generation will be very helpful to overcome this energy shortage. It will also save foreign exchange by replacing use of imported oil and natural gas. This paper discusses the importance of coal utilization as an industrial and domestic fuel. The industries which are presently main market of local coal such as Brick Kilns and the industries which have potential for coal consumption are also reviewed. The author has analyzed the domestic and industrial use of coal from 2003 to 2009.*

### INTRODUCTION:

Pakistan is blessed with enormous coal reserves of almost 186,007 million tons and is the sixth richest country of the world in respect of coal reserves. The coal reserves are found in all provinces of Pakistan and AJK (Azad Jammu and Kashmir) but the most important and huge coal reserves are found in Sindh at Thar District which are almost 175,506 million tons.

Abu Mohammad Izhar-ul-Haque (1986) highlighted the correlation ship of the growth of economy with the development of coal sector during 1973-83. According to him coal can be used for power generation in substitution of furnace oil, in cement plants and in the other industries. The author suggests that for self-sufficiency in energy sector modern plants and equipments should be manufactured locally. Dr Ahmad Shah Nawaz (1986) has discussed the potential for utilization of Pakistani coal in industry. The Pakistani coal mostly have high amount of sulphur and high variable ash contents. It can be used as a fuel if it is blended either with imported coal or with low sulphur furnace oil. However it can not be used as a raw

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material in fertilizer industry due to the reason that plant required for that purpose is 20-25% more expensive. G.A.Qureshi and Z.H Rizvi (1986) have discussed the status of converting cement plants to coal firing. The Makharwal coal of Punjab and Balochistan coal have the required calorific value for use in the cement industry. Some measures are also essential to be taken to reduce the cost of local coal as the cost of Makharwal coal is almost equal to the cost of imported coal.

Coal can make a significant contribution in the economic development of Pakistan if the market for coal consumption has been diversified and use of local coal is increased in cement, fertilizer and sugar industries. The proper utilization of massive coal reserves of Pakistan (which are unfortunately still kept idle) as a fuel will greatly contribute in speeding up its economic development as it will save our foreign exchange earnings due to less dependence on imported oil for energy production. The use of local coal will also result in an industrial growth of our country. It will enable us to export finished products at a competitive price in international market because the use of less priced local coal will reduce the total manufacturing cost. Job opportunities to the growing population of our country will also be available.

Coal can also be used effectively for electricity generation at lower cost as compared to the other energy resources which is the current need of Pakistan to overcome the present severe energy crisis. Coal is considered as the best choice for energy production worldwide. China fulfills its almost 80% of energy requirements by coal but unfortunately Pakistan even in the presence of massive coal reserves still meets only 7.6% of its energy requirements and 1% of its electricity requirements with coal.

Still numerous impediments are present in adopting coal use as a fuel but Government considerable attention to this cheap source of energy and drastic measures taken for the growth of coal industry will be very helpful to overcome those hurdles.

The present study was designed to investigate the significance of coal utilization for domestic and industrial purposes and to highlight the existing industries using coal and the industries having potential for coal consumption to give suggestion and recommendations for enhancing the use of local coal as a fuel for domestic and industrial purposes.

#### **A BRIEF LOOK OF COAL RESERVES OF PAKISTAN:**

Coal has been found in all provinces of Pakistan and the total estimated coal reserves are 186,007 million tons. In Balochistan the total estimated coal reserves are 217 million tons and the important coal fields are

Barkan-chamalang, Duki, Mach-Abegum, Sor Range-Degari, Pir ismail Ziarat, Khost-sharig-Haranai.

In Punjab the total coal reserves are 235 million tons and the important coal fields are Makarwal and salt range. In Sindh the total coal reserves are 185,457 million tons and the important coal fields are Lakhra , Sonda , Thatta , Jherruk , Ongar ,Indus east ,meting-Jhimper ,Badin and Thar.( Detail can be seen in table 1).

### **COAL PRODUCTION:**

The production of coal in Balochistan in the year 2003-04 was 1,645,748 tons which increased in the upcoming years and in 2008-09 the production was increased to 2,057,309 tons. The annual compound growth rate was 4.6%.

In Sindh the production of coal was 911,099 million tons in 2003-04 but in the year 2008-09 the coal production was decreased to 840,526 tonns with -1.6% ACGR( annual compound growth rate). Coal production of all provinces can be seen in table 2.

The overall annual growth rate of coal production is -9.35% in 2008-09 which is not satisfactory in the presence of huge coal reserves and it is mainly due to limited market size for coal consumption. (Table2).

### **IMPORT OF COAL:**

Pakistan import coal for energy generation each year as the quality of local coal is low. In some cases the imported coal is mixed with local coal then it is used but in most of the processes it is used solely.2789, 238 tons of coal was imported in 2003-04 of 8,245 million Rs. The import of coal has been increasing each year. In 2008-09 almost 4,651,751 tons of coal was imported. (Table 3).

Government should promote the use of local coal for energy generation. For that purpose the availability of modern technologies, latest equipment and machinery to use low quality coal in industries is mandatory. Therefore credit facilities should be provided to the industries for replacing the old power plants using imported coal with such latest power plants which can use low quality coal efficiently. The result will be the reduction in the import of coal and finally we will save our foreign exchange.

### **USE OF COAL AS DOMESTIC FUEL:**

Due to present day energy shortage the Government has to promote the coal utilization to meet the domestic energy requirements and industrial energy needs. In 2003-04 almost 1047 tons of coal was used for domestic

purpose. From 2004 to 2006 the use of coal for domestic purpose was extremely low. In 2008-09 nearly 813 tons of coal was used. The annual compound growth rate was -4.9%. (Table 4).

Immediate Government attention is essential for increasing the domestic use of coal as a fuel. The rural and the urban areas where natural gas is not available for domestic use, kerosene oil is used. The local production of kerosene oil is not sufficient to meet the local demand and each year the import kerosene oil deprived us from valuable foreign exchange earnings. Therefore “coal briquetting” is considered helpful for effective use of coal. Coal briquetting is the process of producing fine size of coal that can be more easily ignited and handled. By coal briquetting the coal briquettes of required size and shape can be produced as demanded by consumers.

The coal briquettes can abolish the domestic use of kerosene oil, natural gas and for achieving that goal the Government has to support the coal briquetting program by providing subsidy in order to make able the coal briquettes to penetrate in the local market.

#### **INDUSTRIAL USE OF COAL:**

After oil coal is the main source of energy all over the world but in Pakistan its role in energy generation has become negligible mainly after the discovery of gas reserves but now due to depleting gas reserves and increasing oil prices Government has to focus on coal utilization for energy generation. Pakistan has low quality coal which is lignite A to sub Bituminous B with high ash and Sulphur contents. The perception that our local coal cannot be used as a fuel conveniently, is not valid as lignite is successfully used for energy production internationally.

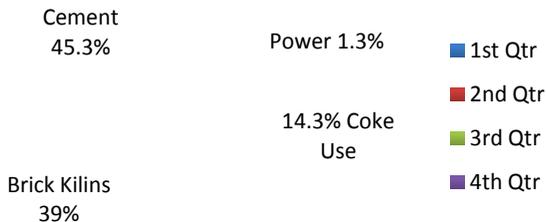
Currently the biggest market for coal consumption is brick kilns. The other industries where coal is used are cement, sugar, fertilizer and steel industry. Some industries where coal can be used are briefly discussed as follows.

#### **BRICK KILNS INDUSTRY:**

The biggest market for the local coal is the brick kiln industry where about half of the entire coal produced per year is consumed. In brick kilns mostly circular and tunnel kilns are used and both of these are fired with coal. In 2003-04 brick kiln industry consumed 2589445 tons of coal. In 2005-06 use of coal reached to its peak up to 4221825 tons. (Table 4). In 2006-07 coal use was slightly decreased to 3277472 tons and finally 3274789 tons of coal consumed in 2008-09 which shows that still up to 2009 brick kiln industry is the biggest market for local coal. During 2008-09 brick kiln industry

consumed 39.0% coal out of 8.4 million tons of coal solely (figure 1). In 2003-04 brick kiln industry consumed 42.7% coal of 6.06 million tons of coal. (Figure 1).

## **CAOL CONSUMPTION BY SECTOR 2003-04 Total: 6.06 Million tonnes**



### **CEMENT INDUSTRY:**

Cement industry is another important market for local coal consumption. In Pakistan cement industry is consumers of fuel energy. Before the rise in oil prices this industry was using oil but now for reducing the manufacturing cost of cement, the industry has a tendency toward using low priced local coal in cement plants. The factors which are necessary to be considered before utilization of coal in cement kilns are ash contents, Sulphur contents and volatile matter. Normally anthracite is more suitable as a fuel in cement plants but now the latest technologies have made it possible to use low quality fuel in cement burning system. With the help of these technologies not only low quality coal can be used even tires can be used in cement plants for heat production.

In 2003-04 cement industries/other industries used almost (imported coal is also included) 2508238 tons of coal. The use of coal had been increased to 5720,972 tons but in 2008-09 its use decreased to 380175 tons (detail can be seen in table 4) but still more than 2003-04. During 2003-04

cement industry/other industry consumed 41.4% coal out of 6.06 million tons of coal. In the year 2008-09 cement/other industries consumed 45.3% coal out of 8.4 million tons of coal. (Figure 1). This shows a positive sign for the development of coal industry as the use of coal in cement and other industries will diversify the local coal market.

#### **STEEL INDUSTRY:**

Pakistani coal is not suitable for making metallurgical coal. Local coal has low fixed carbons which cannot be used in steel making process therefore steel industry in Pakistan mainly uses imported coal. Coal is used as a coke in steel making process. The only coal with some coking characteristics is the Shahrug coal of Balochistan. In the year 2003-04 Pakistan steel imported 184992 tons of coal and in 2008-09 almost 112520 tons of coal is imported (table 4).

#### **SUGAR INDUSTRY:**

Coal can be used in sugar industry but only in CML (coal liquid mixture) form. CML is a new technology and its use is in initial stage in Pakistan. Up to some extent the low quality of local coal is creating problems but these problems can be solved with modern technologies. The existing sugar plants can be converted into coal based plants; consequently the sugar industry will also prove to be significant market for local coal.

#### **FERTILIZER INDUSTRY:**

In fertilizer industry coal can be used in steam rising in fertilizer plants. The powdered coal and coal liquid mixture can be used in present plants without much difficulty. If the new fertilizer plants are based on coal then this industry also has a potential for coal consumption but the chief problem with coal based plants is their high operating cost and this problem is demanding immediate attention for its solution before any progress has been made in using coal in plants at large scale. However if proper research studies are carried for reducing the operating cost then this industry will be good market for coal use.

#### **VARIOUS INDUSTRIES USING BOILERS:**

In Pakistan various industries like petroleum, refineries, petrochemicals, industrial chemicals, pharmaceuticals, sugar, textile, food and synthetic fiber industries established boilers to produce steam for utilizing in the heating process. These industrial boilers can be designed to use coal as a fuel. The establishing of such boilers will also increase the coal consumption for energy production.

## **CONCLUSION:**

Pakistan has a vast coal reserves which can be used as a fuel for domestic and industrial purpose. In the past coal was used in the railways engines, cement and brick kiln industry but with the discovery of gas its use has become limited to brick kilns only. Our country is energy deficient and the only viable strategy to fulfill its energy needs at a lower cost is the use of coal in place of oil and natural gas but unfortunately use of coal for energy generation is negligible. Presently domestic consumption of coal is almost zero. The market for coal utilization is mandatory to be diversified and it should not be limited to brick kilns. Cement, fertilizer, sugar and steel industry has a potential for coal consumption. The use of coal for domestic and industrial purpose at a large scale needs Government's clear cut energy policy for introducing coal as a fuel in cement, sugar ,fertilizer industry, in introducing coal briquettes for domestic use and for making possible the use of coal in steel industry by mixing with imported coal and steel re-rolling. Reliable data should be collected about the total coal reserves for sustainable supply to various industries and for making future energy policies. Public and private sector partnership is also essential for the development of coal industry and for increasing the coal production to meet the fuel needs of various industries in future.

## **RECOMMENDATIONS:**

- Realizing the importance of switching over in cement factories from natural gas / furnace oil to coal, it is recommended that the Government should consider offering a package of monetary concession and price incentives to those plants which start using coal as fuel.
- The government should provide all necessary incentives and regulatory support to encourage the use of local coal. Manufacturing smokeless coal Briquettes in Pakistan should be undertaken on a priority basis. Reservation of the consumers to the use of low quality indigenous coal should be reversed through exposure to technologies with which such coal is being economically utilized elsewhere. Regulatory measures may also be adopted as done in many other countries to ensure utilization of local coal.
- Market diversification of coal is necessary especially in the areas of cement, sugar production and power generation. If necessary laws should be made to reduce market constraints.

- Negotiation should begin with foreign firms engaged in research on coal-water mixture technology with the purpose of studying & setting up of demonstration units in Pakistan.
- Policy decisions are needed to introduce local coal in existing cement plants along with arrangements to sustain steady supply of coal at stabilized prices.
- The Government should encourage the private & public sector cement industry to switch from fuel oil to indigenous coal, thereby increasing the coal demand. Public, sector coal mining should be able to co-exist with the private sector, especially with the advantages of Government financing, foreign aid and self loans. Healthy competition from the private sector will promote better efficiency in public sector organization.
- Immediate steps should be taken to encourage coal use by the cement industry for the establishment of small thermal power plants. WAPDA should examine the feasibility of converting existing thermal power station to coal.
- Bank should come forward and provide loaning facilities on lesser interest rates for mine development. The Government should provide tax exemptions on mining industry machinery and coal industry to ensure profit incentives for large mine owners.

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