

Thar Coal – Energy Security for Pakistan

(By: Mohammad Younus Dagha)

The Thar Lignite Coal resource is a bounty of nature and is the only viable answer to our energy related problems – whether it is the cost of producing electricity or finding a source of reliable load supplies all year round or filling the gaps in supply and the ever-expanding demand for a growing economy without putting any pressure on our foreign exchange reserves.

Discovered accidentally in the year 1989, during an exploration project of defunct SAZDA (Sindh Arid Zone Development Authority) to find drinkable water in the desert, Thar Coal has remained a matter of active national debate. The size and the quality of Thar Coal reserves were known to a great extent since 1993 after a study by John T Boyd Company, well-known US Mining consultants, only to be reinforced in subsequent studies by other international experts. However, there have always been conflicting views which at times create confusion about technical viability and commercial feasibility of mining and power generation on Thar Coal. The factually unfounded and technically poor arguments about the unviability of Thar Coal continue to get attention of media due to the fact that we do not have much local expertise in the Coal sector and any person claiming to be an expert gets a field day even with the most obnoxious of the arguments or so-called “expert opinions”.

Size of Resource:

Thar Lignite Coal resource was initially estimated to be around 135 billion tons which was subsequently enhanced to 175 billion tons after review of data by USGS (United States Geological Survey) and GSP (Geological Survey of Pakistan). This estimate was based on distanced bore holes over an area of 9000 sq kms which meant a source estimate of around 194 million tons of lignite per sq km. This initial estimates continue to be proven correct by more intense explorations of digging 40-45 bore holes per 100 sq kms and proving the resource by conducting tests according to international standards. The results of these explorations carried over an area of around 1200 sq kms so far have provided even higher figures of proven reserves of being around 200 to 350 million tons of lignite per sq km than the earlier estimates, than the earlier estimates of around 194 million tons of lignite per sq km. Hence it can now be said with certainty that these resources will ultimately come out to be of much greater size than the earlier estimates.

According to the standard conversion rates, the Thar Lignite Coal resources are equivalent to around 50 billion tons of oil, which is more than the combined oil resources of Saudi Arabia and Iran. In terms of gas reserves, these are around 68 times the present resources of natural gas in Pakistan.

The exploration of 13 blocks (some 1200 sq kms or 13% of the total reserve) gives us the following picture:

Block	Cumulative Coal Seam Meters		Estimated reserves
	Min	Max	million ton
I	8.08	36	3566.91
II	7.52	30.89	2000.00
III A	7.15	24.58	2008.04
III B	3.78	30.78	1453.00
IV	10.74	33.45	2471.51
V	7.55	24.60	1394.00
VI	4.25	27.00	1655.00
VII	6.82	24.44	2175.95
VIII	1.45	42.60	3035.86
IX	11.99	31.45	2862..25
X	10.55	34.91	2947.80
XI & XII	Expected reserves		5600
Total Proven reserves	In 13% of Thar Coalfield area		31.169 billion tons

Early developments:

The location of this resource in the desert of Thar posed a sort of challenge for its early exploitation. The government in 1993, initiated work on infrastructure development and formed Sindh Coal Authority to streamline the efforts and facilitate investment. ----- of the famous Mr. Gordon Wu came up with the proposal to develop Thar Coal mining project. Later

on, after the change of the government and the perceived abundance of electricity due to IPPs induction of some 6000 MWs of load in the system, the government did not feel the urgency to develop this national resource. We continued to pay our precious foreign exchange on the imported oil needed to fuel our power generation, the cost of which kept on rising with the surge in oil prices.

Shenhua – an opportunity missed:

In 2002 the President of China, on such request from the Pakistani counterpart, sent a team of 136 Coal Mining Engineers, Geologist, Hydro-geologists and Power Plant specialists with M/s Shenhua Group, one of China's leading coal mining and power company to open up Thar coal resources for commercial use. The company with its decades of experience and world class expertise established a field camp in the desert and worked on Thar Coalfield for a period of two years. In 2004, they prepared a comprehensive feasibility report which found the Thar lignite resource suitable for commercial mining and proposed open cast mining with mine-mouth power generation of 600 MW in the first phase to be scaled upto 3000 MWs based on the lignite reserves in Block II, with an area of 55 sq kms (0.6% of Thar coalfield area of 9000 sq kms).

Shenhua Group asked for a tariff of 5.6 US cents per KWH for the electricity generated by its proposed power project. They asked for only a Transmission line by the Federal Government. At that time we were buying electricity from IPPs based on imported oil @ 6.5 US cents per KWH. However, WAPDA authorities, without any expertise or background of coal based power plants, insisted on a tariff of 5.3 US cents per KWH. Despite advice from our mission in Beijing and urging by the Government of Sindh as well as the Ministry of Water and Power, the WAPDA authorities stuck to their view and the negotiations broke down. The Chinese withdrew in 2005, costing a real breakthrough for Pakistan's energy sector to tap in its indigenous energy resources. A subsequent feasibility report by Germany's RWE Company funded by the Federal and Sindh Governments proved that the real commercial cost for power generation in first power project on Thar Coal, as per European standards could be upto 7.6 US cents per KWH. Thus the Chinese were offering us a real good deal but we missed that golden opportunity. The cost we all paid and are still paying in the form of higher tariffs for oil based power (now upto 22 US cents per KWH), the loss of billions of dollars of foreign exchange on oil imports, the resultant circular debt, the energy crisis and the lost economic growth. The volatility of oil prices in 2007 made our economy near bankrupt forcing us to seek finances on tough conditions.

The revival in 2008:

The withdrawal of the Chinese firm in 2005 sent a negative signal to investors and mining firms internationally about our seriousness in utilizing our natural resources. No local or international firm of any mentionable repute offered any project for Thar Coalfield upto 2008.

In May 2008, the Government of Sindh through the Mines and Mineral Development Department (the predecessor of Coal and Energy Department) offered a joint venture, a public private partnership, to the private sector with a 60:40 (Private : GOS) equity participation and management control with the private partner. A serious marketing effort resulted in rekindling the interest of some big local and foreign private groups. A joint venture company with the name of Sindh Engro Coal Mining Company was formed and it started working on the work left unfinished by the Chinese in Block II. The Federal and Provincial governments established Thar Coal and Energy Board with Chief Minister Sindh as its Chairman and Federal Minister for Water and Power as the Vice Chairman with all the relevant Federal and Provincial Ministers as the Board members. It is now providing one- window to the investors in mining and power generation in Thar Coalfield.

From then onwards, the interest of investors both locally and internationally has continued to grow and now we have following projects at different stages of development / evaluation:

Area	Name of the Company	Coal Mining	Power Generation	Status
Block I	Global Mining Company of China	5.0 million tons per annum – open cast mining	900 MW initially to be scaled upto 3000 MW	Bankable Feasibility by March 2012. Mining by June 2012
Block II	Sindh Engro Coal Mining Company	6.5 million tons per annum – open cast mining	1200 MW initially to be scaled upto 2400 MW	Bankable Feasibility completed. Financial close expected by June 2012. Mining by end of 2012
Block IV	Proposal from a	Will prepare	1500 MW to be	Expected to

	large Chinese conglomerate* under consideration	feasibility		scaled up to 3000 MW	begin work on study in March 2012
Block V	Under Gasification Project by GOP/GOS	Coal	No mining involved	100 MW pilot project	Test burn done.
Block VI	Oracle of Kingdom	Coalfield United	5 million tons per annum – open cast mining	300 MW mine and supplies power plants in other parts of the province	Bankable Feasibility completed. Financial close expected in 2012. Mining expected to begin by end of 2012.
Block VIII	Proposal from European consortium* under consideration	Will	prepare feasibility	300 MW to be scaled up to 1000 MW	Expected to begin work on study in March 2012
Block IX	Proposal from a US consortium* under consideration	Will	prepare feasibility	1500 MW to be scaled up to 3000 MW	Expected to begin work on study in March 2012

** Names not given as the proposals are yet to be finalised by Thar Coal & Energy Board*

It may be seen that several companies are spending their time and capital on preparation of studies on Thar Coalfield and are working actively on bringing their projects to execution. They have at their disposal the world best expertise and finest technology to assess the worth and potential of Thar Lignite resources. They are not chasing any “pipedream” or trying to mine an “un-minable resource” as some of our self styled Thar coal experts would like us to believe.

Thar coal is a real treasure, a world class resource which will provide us, InshaAllah, the energy security and economic prosperity that our nation deserves.

List of International coal firms and project consulting firms who have worked on / studied Thar Coal and agreed on its potential as a world class energy resource

1. United States Geological Survey and Geological Survey of Pakistan
2. John T Boyd Company - USA
3. Sino Coal International - China
4. Shenhua Group - China
5. North East Coal Bureau – China
6. RWE of Germany
7. Oracle Coalfields - UK
8. Dargo Associates Ltd. – Coal Mining and Coal Technology Consultants - UK
9. SRK Consultants - UK
10. Sindh Engro Coal Mining Company
11. TCC (China Tianchien Chemical Engineering Company)
12. Deep Rock Drilling – Pakistan
13. Carsurien Coal Laboratory – Indonesia
14. Hebei Coalfield Research Laboratory China
15. SGS Laboratory – Switzerland
16. Bahria University of Pakistan
17. Dr Leontidis Marcos – a coal mining expert from Greece
18. Global Mining Company of China
19. CCTEG (China Coal Engineering and Technology Group)

There is a host of data and reports available with the Coal and Energy development department based on hundreds of exploration exercises and samplings providing basis for various reports of the above firms / groups.

International Coal Conference – ICC 2011

ICC 2011 was held on 22nd October 2011 which was attended by 800 participants.

Its main theme was to bring on table all the misconceptions, myths and doubts about the Thar coal and its viability as a source of energy security for Pakistan. It sought answers from international experts on these misconceptions. Their views were:

Myth / Misconception / Concern	Expert Opinion	Experts / Investors (Presentations available on www.sindhcoal.gos.pk)
It is buried too deep under the sand that it is not feasible to mine it.	“The stripping ratio in Thar is around 6.6:1, much better than many lignite mines in the world including Greece where it is 10:1”	1. Dr Marcos Leontidis From Greece International Mining Expert 2. Dr Larry Thomas From United Kingdom Coal Expert of Dargo Associates of UK 3. Mr. Nigel Pickett, Principal From United Kingdom Consultant for Due Diligence SRK Consulting
It has a very high Sulphur content, unacceptable for use as per international standards.	“Sulphur content in Thar is acceptable being at around 1%, which is lower than found in many other lignite resources already being used in the world”	
It has a very high moisture content, making it unfeasible for commercial use	“Similar moisture levels are found in almost all the lignite mines in the world”	
It cannot be transported to a distance for utilization in other parts of the country	“It may not be exportable to other countries but can be transported to be used in other parts of the province after drying”	Five project developers / sponsors: 1. CEO – Oracle Coalfields of United Kingdom 2. CEO – Sindh Engro Coal Mining

<p>It is generally of a very poor quality not commercially feasible for power generation</p> <p>Due to multiple issues with Thar coal, its mining is too costly and the electricity generated will be as costly as that using imported oil</p>	<p>All their feasibility studies prove Thar as commercially viable and technically feasible energy resource</p>	<p>Co.</p> <p>3. Rep – UCG Project in Thar</p> <p>4. MD – AustalAsian Continental Energy Pty Ltd</p> <p>5. Rep – CMC / Three Gorges of China</p> <p>(Project sponsors with projects worth billions of dollars and thousands of MWs of planned electricity generation)</p>
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The established facts:

The work of hundreds of coal experts, project designers and investors with solid scientific evidence and data helped us establish the following facts about our Thar Lignite Coal resources:

1. **Thar Lignite coal is a world class energy resource comparable to any other lignite resource in the world.**
2. **It is the largest lignite resource at one location anywhere in the world.**
3. **It can last for centuries and meet all our energy needs.**
4. **It can be commercially mined and used for power generation and for producing other petrochemical derivatives.**
5. **It is the most cost effective energy option which will bring cheaper electricity to our people.**
6. **It is the most reliable energy source available all year round and is not dependent on weather conditions or river flows.**
7. **It can provide us the energy security that we badly need and will protect our economy from the cost volatility of oil prices.**
8. **It can bring us the savings in foreign exchange reducing our dependence on loans.**

Any view, opinion or comments contrary to the above facts can only be termed as unfounded and ill informed and deserve no attention.

We, as a nation, owe a responsibility towards this national asset in our own interest, in bringing prosperity to our future generations through timely utilization of this resource for our energy needs without which no economic growth can be achieved. We as planners and economic managers, should divert all the resources needed to create an enabling infrastructure; as experts and engineers, should ensure be more accurate in our publicly announced “expert opinions” and as media managers, should be cautious in publicizing material that distort facts and may damage the perceptions about Thar Coal resources especially those of the investors community which are now taking keen interest in projects on development of this internationally verified energy resource. We need perseverance of a few more years to achieve the energy security we are striving for.

Coal Used in Electricity Generation & Lignite Reserves

	% age of Electricity Generated from Coal	Lignite Reserves Billion tonnes
South Africa	94	30.15*
Poland	93	1.37
China	81	18.6
Australia	76	37.2
Israel	71	-
Kazakhstan	70	12.1
India	68	4.5
Czech Republic	62	0.98
Morocco	57	-
Greece	55	3.02
USA	49	30.16
Germany	49	40.6
World Average	41	195.38
Pakistan	0.1	186.2**

* Sub bituminous & Anthracite reserves only

** Thar Coal Resources are estimated to be around 175 billion tonnes. Proven Reserve in 13 explored Blocks alone is more than 31 billion tonnes

Source: Coal Resources of Pakistan, Ministry of Energy

** World Coal Resources are 1.2 trillion tonnes. Proven Reserves are 1.2 trillion tonnes. Pakistan has 186.2 billion tonnes