

Potential of Thar Coal for Energy Generation: Problems & Mitigation Measures

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Energy Scenario in Pakistan

- Import of Furnace Oil is leading to increasing import bill.
- Exploring Alternate/Renewable Energy
- Developing Hydel Projects
- Exploit indigenous resources, such as Thar Coal which has a generation potential of 100,000 MW consuming 536 million tonnes/year.
 - Total reserve is equivalent to 50 billion tone of oil (more than Iran and Saudi Arabia combined oil reserves) or over 2000 TCF of Gas (42 times greater than total gas reserves discovered in Pakistan so far)

Pakistan's Coal Reserves

Sindh
185,457 million tonnes

Punjab
235 million tonnes

Balochistan
217 million tonnes

NWFP
90 million tonnes

Azad Kashmir
9 million tonnes



- Thar coal field has total lignite reserves of 175 Billion tons which can be utilized to produce 100,000 MW for over 200 years.
- The reliability of this energy resource and the potential of the project make it one of the most suitable and sustainable growth propositions to end the energy crisis and bring energy security to the country.

OPENPIT OR UNDERGROUND

Stripping Ratio

- **Is the governing parameter**
- **Decision is made to exploit the coal either by an open pit mine or an underground operation**

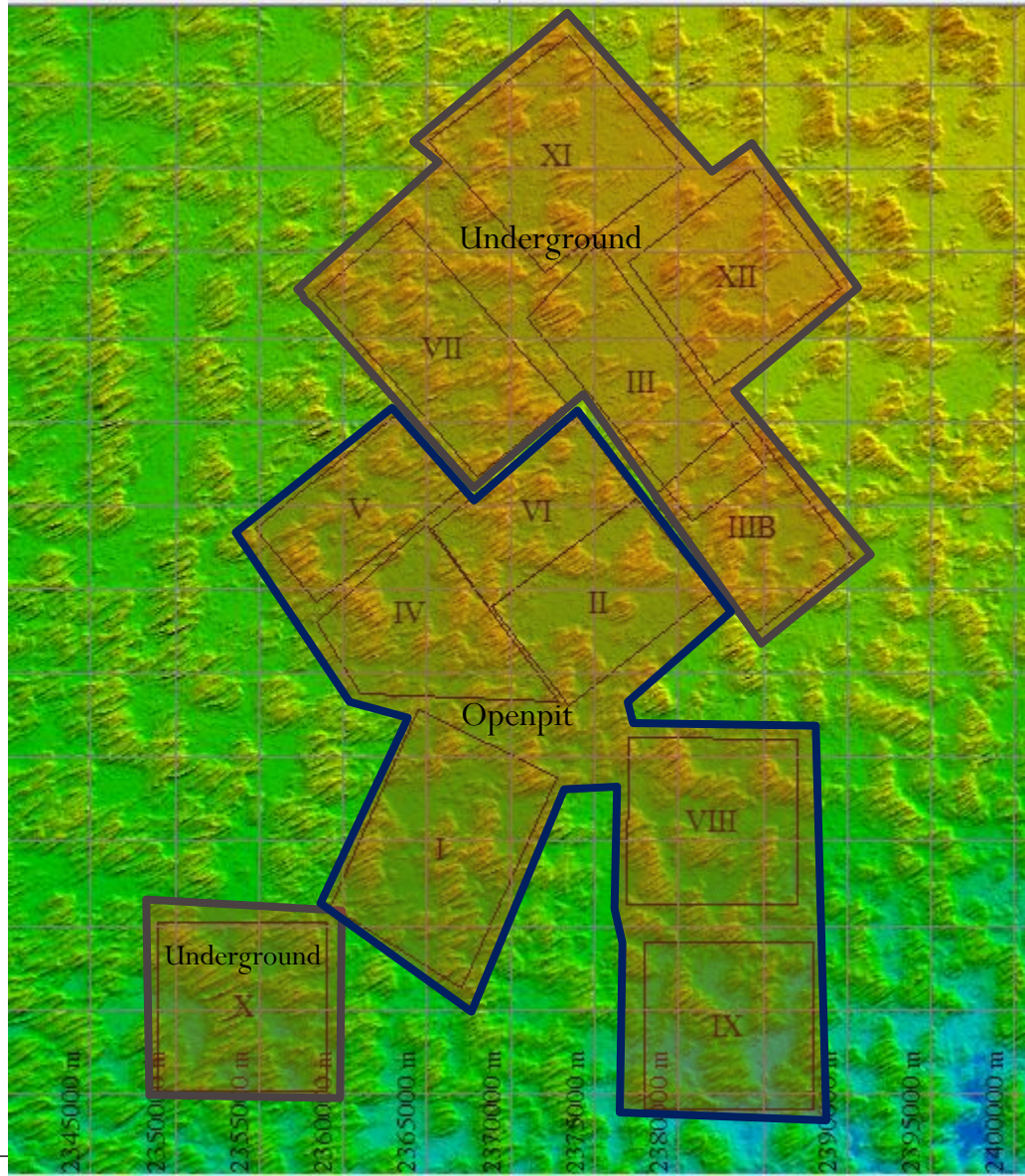
Stripping Ratio at Thar

- Minimum Stripping ratio = 4:1 (m:m)
- Maximum Stripping ratio = 88:1 (m:m)
- Average Stripping ratio = 13:1 (m:m)
- Cutoff stripping ratio is assumed as 10:1 (m:m)
- 47.74% of the coalfield area has the stripping ratio $\leq 10:1$ (m:m),
- which means, 47.74% of the coal resource is feasible through open pit operation
- While 52.26% of the resource is feasible through underground mining.

Block-wise Stripping Ratio

Block #	Min: S.R	Max: S.R	Av: S.R	S.R ≤ 10 (%)	S.R > 10 (%)
I	5	24.7	9.58	60.47	39.53
II	5.2	22.5	8.95	74.42	25.58
III	6.6	26	13.05	19.51	80.49
IIIB	3.7	50.33	19.16	36.36	63.64
IV	5.3	15.5	7.97	84.62	15.38
VI	5.23	24.48	9.49	80	20
VII	7.19	32.46	13.46	17.5	82.5
VIII	4	88.1	25.26	76.19	23.81
IX	6.96	17.36	10.06	52.38	47.62
X	6.88	15.65	10.68	47.62	52.38
XI	13.14	57.15	23.26	00	100
XII	5.36	23.75	13.64	23.81	76.19
Overall	4	88.1	12.85	47.74	52.26

Thar Coalfield Blocks



Advantages and Disadvantages of U/G Mining

Advantages

- Effect on climatic conditions is minimised. During hot, stormy and rainy seasons production is not affected
- Aquifers can be managed better in comparison to surface mining.
- Less pumping of ground water

Disadvantages

- Low productivity
- Extraction ratio is lower. Thin sections cannot be produced by u/g mining

Advantages and Disadvantages of Surface Mining

Advantages

- Higher Productivity
- Lower operating costs per ton
- Thin seams can be mined

Disadvantages

- Large proportion of waste to ore.
- High level of environmental impact.
- Affected by climatic conditions.
- Complete dewatering of the ground aquifers
- Depth limit





Problems

Environmental Impacts during:

- Construction phase
- Operational phase

Environmental

- **Air:** Deterioration of ambient air quality due to mining activities & Power plant operation
- **Water:** The sole source of drinking water fetched from deep wells would be affected
- **Soil:** The soil fertility would be affected
- **Waste Disposal:** Overburden, fly ash, pathways
- **Health & Safety:** Impaired air, polluted water

Ecological

- Flora:
 - Loss of vegetation
 - Loss of Tree cover
- Fauna:
 - Habitat Loss
 - Wild animals loss
 - Birds loss

- **Socio-economic**
- Villagers are not in favor of physical displacement as the area is peaceful and holds cultural significance for the villagers. Their ancestors have been living in the area for centuries.
- Displacement would deprive the villagers of their agriculture land and livelihoods. People of the area depend on agriculture and livestock for the livelihood.
- The villagers fear they will not benefit from electricity generated by the Project. The generated electricity will be provided to cities.

- Villagers cannot survive in cities or urbanized areas, as they are uneducated and will not get jobs in these areas, which will affect their livelihoods. The villagers have access to the necessities free of cost in the village.
- The villagers expect adequate compensation for their dug wells, agricultural land in case of relocation and rightful share in employment opportunities.
- Local settlers have concerns over their accommodation status in new area because they are all relatives living in large settlements.

- The villagers will not get jobs, as more than 80% of the people are unskilled and depend on agricultural land and livestock.
- Mining activities & presence of outsiders will adversely affect the movement of women who fetch water from wells, chop wood for cooking food, and take care of the crops and livestock.
- Women of Thar observe veil (pardah) very strictly. The privacy of women and children and social set up of the area will be disturbed because of the presence of outsiders.
- The goats, camels, cows and sheep roam freely in large grazing areas. An influx of outsiders will hamper the movement of these animals affecting their productivity.

Mitigation

- Best Management Practices
 - Environmental Management Plans
 - Environmental Monitoring Plans
- Technological Solutions
- Polluters pay principle

Thank you very much