



Government of Pakistan

Ministry of Petroleum & Natural Resources



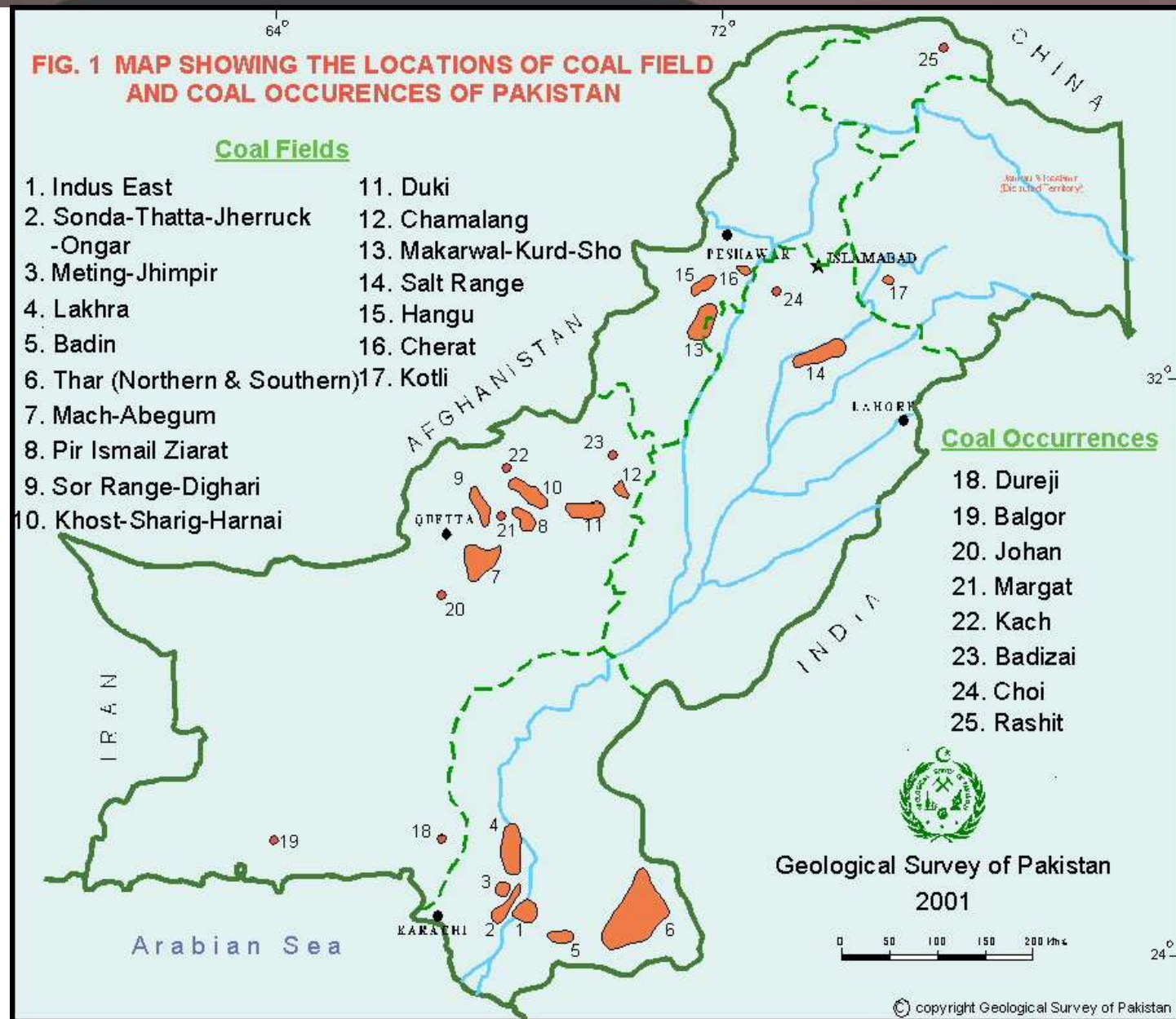
Coal Resources of Pakistan – An Overview

Presentation at SAARC Training Workshop
New Delhi – India, November 26, 2015

Overview

- Pakistan's coal potential estimated at **186** billion tons, more than known indigenous oil and gas reserves figures.
- Annual coal consumption (2013-14) is around **6.56** million tons.
- Domestic coal production is about **3.34** million tons per annum.
- Market price of domestic coal ranges from **USD40-120/ton**, depending upon quality and demand.
- Coal contributes around **5.4%** in the primary energy supplies mix.
- Coal based power generation is about **0.2%**.

Coal Field Locations



Coal Fields Quality

Coal Field	Resources (Million tons)	Moist. %	V.M %	F.C%	Ash %	Sulphur %	H.V (Btu/lb)	Status
Thar	175,000	29.6- 55.5	23.1- 36.6	14.2- 34	2.9- 11.5	0.4-2.9	6,244- 11,045	Under development
Sondha	3,700	22.6- 48	16.1- 36.9	8.9- 31.6	2.7- 52	0.2-15	8,878- 13,555	Non-Developed
Jherruck	1,823	9-39.5	20- 44.2	15- 58.8	5-39	0.4-7.7	8,800- 12,846	-do-
Lakhra	1,328	9.7- 38.1	18.3- 38.6	9.8- 38.2	4.3- 49	1.2-14.8	5,503- 9,158	Developed
Sorange- Degari	50	3.9- 18.9	20.7- 37.5	41- 50.8	4.9- 17.2	0.6-5.5	11,245- 13,900	-do-
Salt Range	213	3.2- 10.8	21.5- 38.8	25.7- 44.8	12.3- 44.2	2.6-10.7	9,472- 15,801	-do-
Hangu- Orakzai	82	0.2-2.5	16.2- 33.4	21.8- 49.8	5.3- 43.3	1.5-9.5	10,500- 14149	-do-
Kotli	9	0.2-6	5.1- 32	26.3- 69.5	3.3- 50	0.3-4.8	9,386- 14,171	-do-

Mineral Policies/Laws

- National Mineral Policy -2013;
- Regulation of Mines & Oilfields and Mineral Development (Government Control) Act, 1948 and Mining Concession Rules framed there under by the provinces;
- The Sindh Coal Act, 2012;
- Mines Act 1923;
- Consolidated Mines Rules, 1952;
- Coal Mines Regulations, 1926;
- Excise Duty on Minerals (Labour Welfare) Act, 1967.

Environmental Laws

Pakistan is signatory to number of international environmental agreements, therefore, local legislations and laws are legal binding to all investors. Few are listed below:

- International Plant Protection Convention, Rome, 1951.
- Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia (as amended), Rome, 1963.
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971 and its amending Protocol, Paris, 1982.
- Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention), 1972.
- Convention on International Trade in Endangered Species of Wild Funa and Flora (CITES), Washington, 1973.
- Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.
- Convention on the Law of the Sea, Montego Bay, 1982.
- Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985.
- Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987.
- Convention on Biological Diversity, Rio de Janeiro, 1992.
- United Nations Framework Convention on Climate Change, Rio De Janeiro, 1992.

Mineral Titles

Mining Concession Rules provides the following mineral titles:

- **Reconnaissance License** - for one year not renewable
- **Exploration License** - for 3 years and extendable for 3 years
- **Mineral Deposit Retention License** – for 2 years extendable for 1 year on solid grounds
- **Mining Lease** – for 30 years extendable for next 10 years or life of mine

For Thar coal resources, Government of Sindh invites Expression of Interest from potential investors through International Competitive Bidding. Successful applicant is granted Exploration License for one year (extendable for 3 years) for preparation of bankable feasibility.

Why Coal is Essential?

- ❑ Pakistan is energy deficit country.

Power Outage per day : **6 – 12 hours / day**
Supply Shortfall : **1100 – 6000 MW**
Electrification Rate : **91.4%**

- ❑ Rapid depletion of oil and gas reservoirs and rising oil import bill necessitates greater reliance on indigenous coal resources.

Thar Coal

- **Huge lignite resource:**

Measured Reserves:	7,025 Million Tons
Indicated Resources:	17,130 Million Tons
Inferred Resources:	38,650 Million Tons
Hypothetical Resource:	112,700 Million Ton



- **Thar resources have the capacity to provide 100,000 MW electricity generation for centuries period.**
- **Special fiscal incentives & protections.**
- **GoP guarantees obligations of power purchaser.**
- **Most safe area of Pakistan.**

Salient Features:

Area of the field:	9000 sq. km.
Distance from Karachi:	380 Km.
Coal seam thickness:	0.2 -22.8m
Coal seam depth:	114-203m

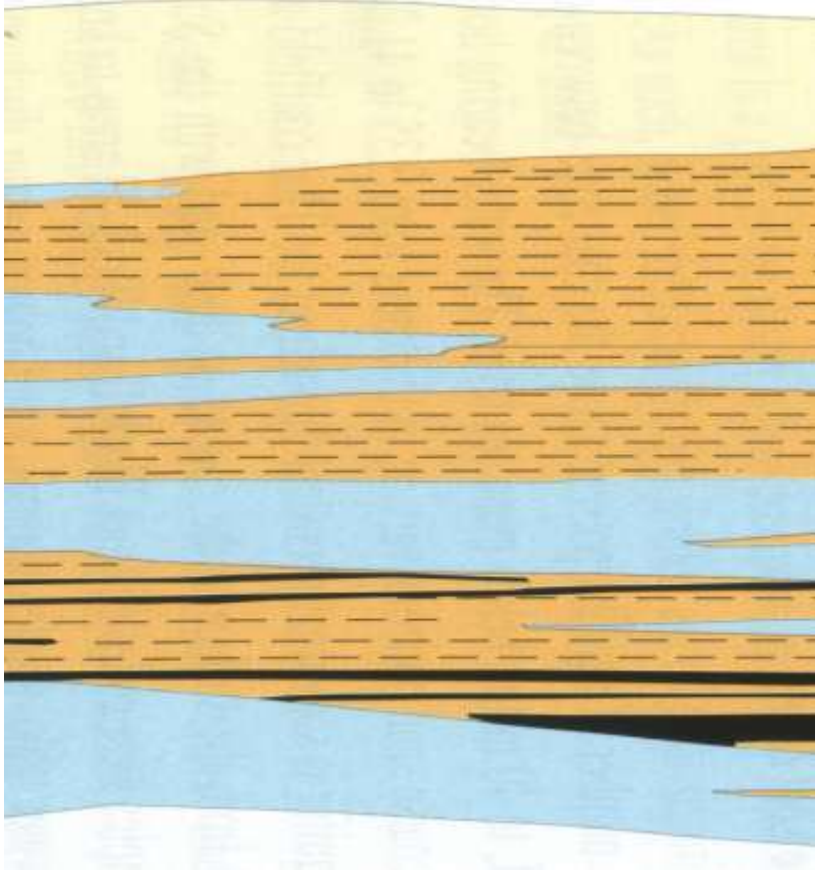
Global Lignite Qualities

Country	Moisture %	Ash %	Volatile Matter %	Sulphur %
Australia	65.5	0.6	17.6	0.1
Bosnia	51	2.0	30.3	0.05
Germany	55	10	19.2	0.2
Greece	52	15.1	18.8	0.2
India	48	6.1	25.6	0.6
Kosovo	51	15	20.8	<1.0
Pakistan (Thar)	46	7.0	28.0	0.7 - 1.1
Poland	52.8	9.8	20.0	0.6
Serbia	45.5	17.0	22.5	0.49
Thailand	30-35	10-28	32	0.8-1.5
Turkey	50	16	22.8	1.7

Stripping Ratio

Country	Stripping Ratio (m3:t)	Heating Value (Btu/lb)	Electricity Gen. (MW)
Neyvelli lignite, India	7:1	5200	2,740
Rhineland lignite Germany	4.9:1	4,514 - 11054	10,289
Hungary lignite	52	9:1	3,035
Pakistan (Thar)	6:1	6200 - 11,000	0

General Geology of Thar



Dune Sand

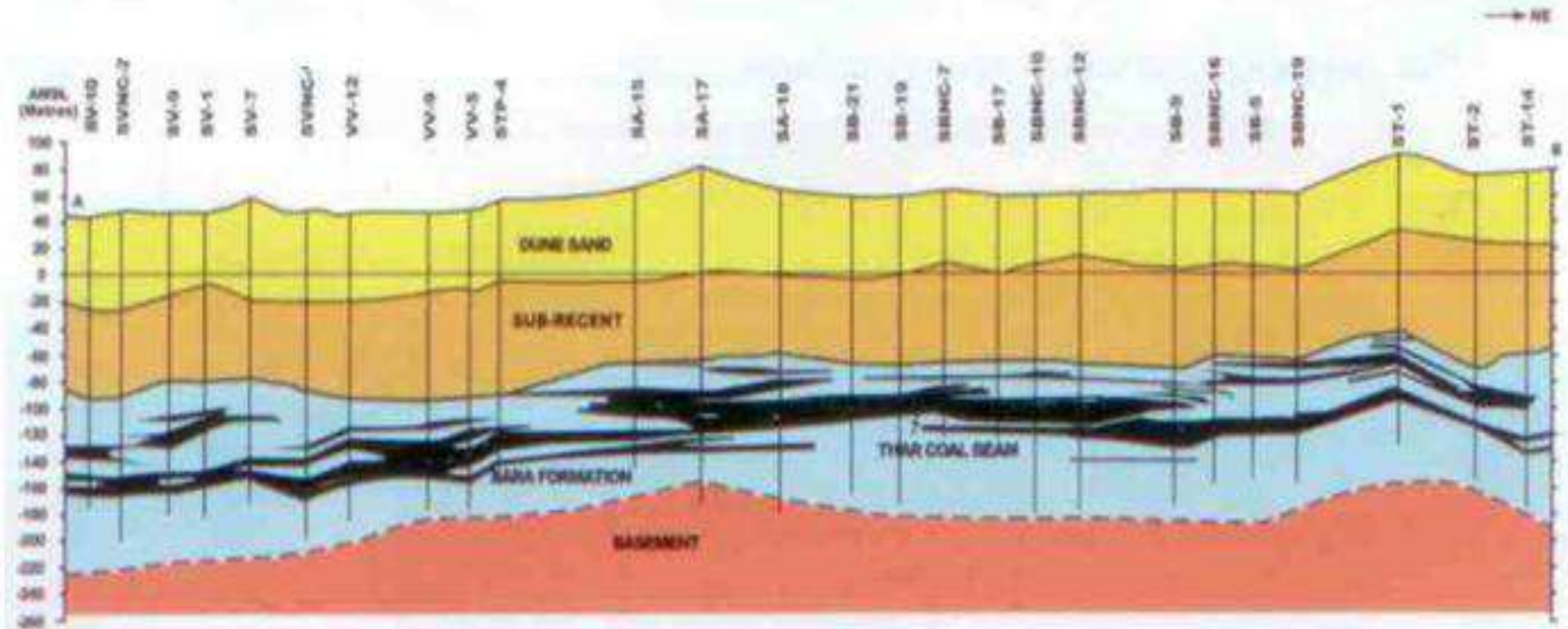
Upper Aquifers & Silt Stone

Middle Aquifers

Lignite Bands &
Main Lignite Seam

Lower Aquifer

Cont:



**GENERALISED CROSS-SECTION
THAR COALFIELD,**

Technical Studies

Reserves Credibility:

USGS;

GSP;

SCA

All studies confirmed presence of huge coal reserves.

Mining Feasibility:

- John T. Boyd
- RWE of Germany
- M/s Shenhua, China
- Sindh Engro Coal Mining Company
- Oracle Coalfields (UK)
- Sino-Sindh Resources (Pvt.) Ltd, China

Gasification Study:

Sasol Lurgi of South Africa proved that Thar coal can be gasified.

Development Challenges

Technical:

- i) Multiple aquifers; and
- ii) Lack of local expertise.

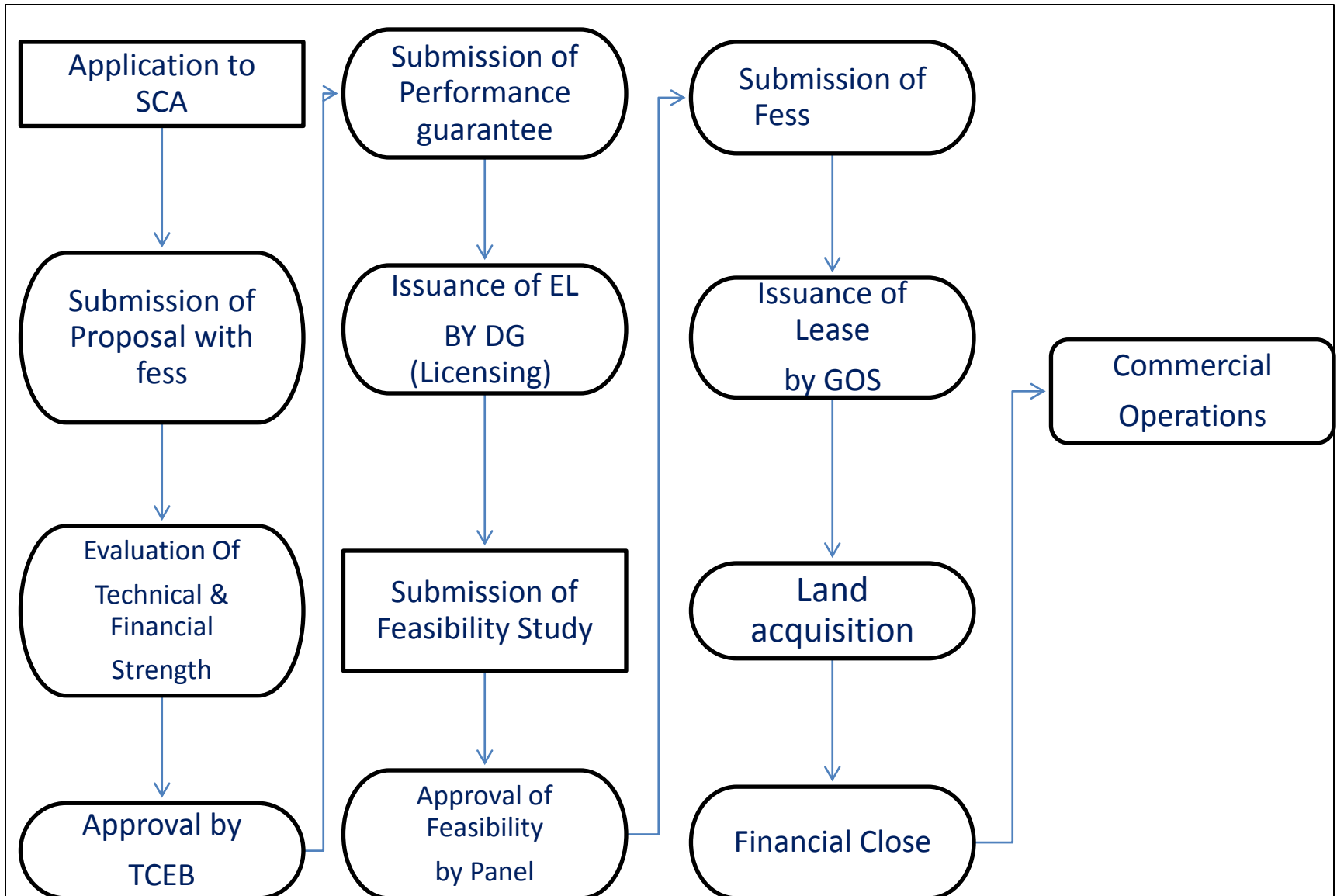
Financial:

- i. Capital investment of about US\$1.5 billion is required for coal mining project of 6 million tons/Year; and
- ii. Absence of financial capability to develop large-scale mine.

Fiscal Incentives

- Thar coalfield declared as Special Economic Zone, and the projects declared as “Project of National Security”.
- 20% (\$ based) IRR to firms which achieve Financial close before 31st December 2015 for Mining & Power Projects based on Indigenous coal.
- Zero % customs duties on import of coal mining equipment and machinery.
- Exemption on withholding tax to shareholders on dividend for initial 30 years.
- Exemption on withholding tax on procurement of goods and services during project construction and operations.
- Exemption for 30 years on other levies including special Excise Duty, Federal Excise Duty, WPPF and WWF.

Allocation of Coal Block in Thar



INFRASTRUCTURE

ROAD NETWORK: 70 tons load carrying capacity metaled road up to Coal field area.

COMMUNICATION : Telephone & Internet communication through Optic fiber cable is available up to Thar Coalfield area.

DRINKING WATER :Reverse Osmosis Plants in Thar are available.

RESCUE STATION: Rescue Station at Thar coalfield has been constructed.

LIBRARY: A Coal library is situated at office of Sindh Coal Authority.

THAR LODGE: Thar Lodge at Islamkot with 20-bedded accommodation to facilitate investors has been constructed.

- Construction of transmission line, airport, heavy duty road, railway link and water for power plants are at different stages.



Coal Based Power Generation

<i>Sponsor/Company Name</i>	<i>Location</i>	<i>Fuel</i>	<i>Gen. Capacity (MW)</i>	<i>Status</i>
Lakhra Power Plant, WAPDA	Khanote.	Lakhra Coal	150	Only one unit is operative and generating 30 MW.
Grange Power Limited	Arifwala.	Coal	163	Commissioned in 2019
Shanghai Electric	Thar Block-I.	Thar Coal	1320	LOI issued
Engro Powergen Thar Limited (EPL)	Thar Block-II.	Thar Coal	660	IA and PPA Signed on 4th May 2015
China Machinery Engineering Corporation	Salt Range, Punjab	Salt Range, Coal	300	LOI validity extended till 19-August-2015. NEPRA determined tariff
Sinohydro Resources Limited, China / Al Mirqab Capital, Qatar	Port Qasim, Karachi	Imported Coal	1,320	LOS Issued. IA, PPA Signed on 18th April 2015
	Pakistan Power Park, Gadani	Imported Coal	6,600	
Hub Power Company	HUB, Balochistan	Imported Coal	1320	LOI issued
Lucky Electric Power Company Limited	Port Qasim Karachi	Imported Coal	660	LOS Issued on 08-Jun-2015
Siddiqsons Limited	Port Qasim Karachi	Imported Coal	350	LOS Issued
Huaneng Shandong Ruyi (Pakistan) Energy (Pvt) Limited	Sahiwal	Imported Coal	1320	LOS Issued on 17th April 2015. IA, PPA signed

Source: Private Power & Infrastructure Board, Pakistan

LOI: Letter of Intent. **LOS:** Letter of Support. **IA:** Implementation Agreement **PPA:** Power Purchase Agreement 19

Investment Opportunities

- **Coal Mining in Thar,**
- **Mine-mouth Power generation,**
- **Local manufacturing/assembling of coal mine machinery.**

Major Coal Companies

Company	Coalfield	Status
Pakistan Mineral Development Corporation	Lakhra, Sharig and Degari coalfields	Producing around 0.55 tons annually.
Punjab Mineral Development Corporation	Makerwall and Salt Range coalfields	Producing around 0.10 tons annually.
Lakhra Coal Development Company	Lakhra coalfield	Producing around 0.25 tons annually.
Sindh-Engro Mining Company	Thar (Block-II)	Overburden removal started.
Sindh Carbon Energy Limited	Thar (Block-VI)	Feasibility study and mine planning completed. Company is in litigation process.
Sino-Sindh Resources (Pvt.) Ltd. of China	Thar (Block-I)	Feasibility study completed. Planning for development.
Government of Pakistan, Planning Division	That (Block-V)	Pilot project for UCG. Procurement of gas purification and power generation plant are under process.

CBM Prospects in Pakistan

- Pakistan appears to be at the margin of possible CBM occurrences
- Most of the coalfields have apparently not reached the thermal gas generation threshold.
- Recent changes in the concept of CBM occurrences in low rank coal, similar to those in Pakistan indicate that the possibility of commercial CBM accumulation in Pakistan do exist, although potential is modest by global standard.
- There are three target area that warrant investigation for CBM
- Western Thar, the thrust and fold belt of Balochistan, Punjab, KP and Sindh and Indus Basin & adjoining areas.
- To date, the only desorption measurement were made on drill holes in Thar & Lakhra under joint GSP-USGS programme in 1992. However the results were not encouraging for CBM.

Contacts

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Government of Azad Jammu & Kashmir. Muzaffarabad

Sindh Engro Mining Company
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Engro Corporation Limited, 8th Floor, Harbor Front Building, Block 4,
Clifton, Karachi

Pakistan Mineral Development Corporation
Tel: (92 51) 9258701-02
Address: PMDC 13-H/9, Islamabad
URL: www.pmdc.gov.pk

Lakhra Coal Development Company
Address: LCDL Bungalow No.C6-A, Block-F, Gulshan-e-Jamal, Rashid
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Tel: (92 21) 99245232, 99245235-39

Punjab Mineral Development Corporation
2nd Floor, Alflah Building, Mall Raod Lahore.
Tel: (92 42) 99205181 [http:// punjmin.com](http://punjmin.com)

Sindh Carbon Energy Limited
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Sino-Sindh Resources (Pvt.) Ltd. of China

THANK YOU