

Potential and Constraints: Energy Scenario in Pakistan

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ABSTRACT

The energy industry is among the vital industries for the development of global infrastructure. Therefore, regardless of the size of a country, the energy sector will always play a vital role for the development of each and every country of the world.

Consumption in the power system in Pakistan has grown steadily during the last decade by 4.3 per cent.

Generation capability of hydropower stations fluctuates with the seasonal variations in river flows, reservoir heads, and the closure of canals for maintenance. As a result of freezing snow, hydropower generation output drops by an average of 40 - 45 per cent of installed hydropower capacity during the period from mid-December to mid-February and then again during mid-May, after that the monsoon rains improve the situation. The thermal generation capacity is not adequate to offset this deficit. Therefore, recently the emphasis has been laid to utilize the huge coal reservoirs of the country for power generation. Chinese help has been sought to exploit the huge coal reservoirs present in Sind Province.

1. PROJECTED DEMAND AND SUPPLY -

The demand forecast for the 8th, 9th and 10th Five-Year Plans, developed by the Planning Division of the Government of Pakistan is based on the projected physical sector outputs, projected growth rates, and ever increasing expected number of consumers.

2. PRIVATE SECTOR PARTICIPATION

Recognizing the inadequacy of public sector resources to meet the expansion in power generation, the Government of Pakistan pursued a restructuring and privatization program for the power sector. As a response to this invitation, the first project with the capacity of 1292MW was installed by Hub Power Company.

The 1992 approved a Strategic Plan for the power sector envisaged a gradual transformation of the power system from integrated, state owned utilities to a decentralized system with substantial private ownership and management thus reflecting a commercial and competitive operating environment.

The potential benefits of using renewable energy systems have also been realized. These resources fit well into a modern environmentally sound and cost-competitive energy system.

On global scenario progress of the Kyoto Protocol is an important step towards securing environmentally clean energy industry, that could become helpful in providing a

flexible long-term framework resulting liberalization of energy market in Pakistan. Environmental security for energy infrastructure can no longer be ignored and shall always remain crucial for future energy generation plans. After reviewing the Energy Sector, let us have a short look on Geothermal Resources of Pakistan.

3, GEOTHERMAL RESOURCES:

Generally, in the light of structural studies, Geologists agree that Pakistan is situated over the junctions of the tectonic plates of the sub-continents and is quite rich in geothermal resources. Three parts of Pakistan shown in Figure 1, i.e. Kashmir, NWFP and Baluchistan are the potential zones where geothermal resources are located.

Country's North, South and South Western and coastal belts, where the igneous & metamorphic rocks are situated, are considered rich in hot reservoirs beneath ground. The nature's proof of such hot reservoirs is initiated through the presence of hot springs that are scattered in these regions.

Despite the efforts have been made to create awareness for exploring the geothermal resources of the country, so far, no official response seems to be in horizon by Governmental Sector, for the exploitation of these resources for power generation purpose. Therefore developing **MAGES** (Man-Made Geothermal Energy Systems) is expected to remain a dream for Geothermics of this country for an unforeseen period. A high government official responsible to develop Alternate Energy Resources had even passed the private remarks to the author of this paper that it may take 25 years to develop the Geothermal Energy in Pakistan.

As there is neither any plan exist, to this date (while this paper was being written) for the development of geothermal energy, nor any development is taking place, therefore, no report can be presented in front of the Geothermal Congress 2005 for Pakistan.

Awareness: The author of this paper is among those early people, who had got the awareness of first successful man-made American Geothermal Experiment in New Mexico by Los-Almos (USA) during 1976, and since then is continuously studying the developments taking place in this field. By the start of new millennium, there was not a single word written by any one in Pakistan to pursue the Geothermal Energy. Therefore the author wrote a small hand-book "**Geothermal Energy for all**" and tried to publicize it. Chairman of WAPDA (Water & Power Development Authority) took the notice of book and interviewed the author, and referred it to the concerned Ministry. Some clarifications were further made to WAPDA through **IGA** in Pisa, Italy. But WAPDA's letter was lost as usual in the bureaucratic set-up of the Ministry. It is a grave situation for the geothermics of this country.

More than 100 copies of the above book have been distributed free of cost within the country so that people could get awareness about Earth Energy. The authors have also written articles in Urdu language and now many people have got awareness with this wonderful source of energy.

Being an active geothermic, I ask you to support my call to Pakistan government that:

1.) They should solve the problems of policy and perception on priority basis.

2.) Should identify technical issues as soon as possible to influence geothermal developments.

GROWTH PATTERN OF INSTALLED CAPACITY IN PAKISTAN

Category	Power Station	Capacity (MW)
A-WAPDA		
i) Hydropower:	Tarbela (1-14 Units)	3,478
	Mangla (1-10 Units)	1,000
	Warsak (1-6 Units)	240
	Malakand	20
	Dargai	20
	Rasul	22
	Small Hydropower Stations (5 Nos.)	47
	Hydropower Sub-Total	4,827
ii) Thermal/ Gas/ Combined-Cycle	GTPS Sarha	85
	SPS Faisalabad	132
	GTPS Faisalabad	244
	NGPS Multan	260
	TPS Muntan Cantt	20
	TPS Muzzafer Garh (1-6 Units)	1,370
	TPS Guddu (1-13 Units)	1,655
	TPS Sukkur	50
	GTPS Kotri	174
	TPS Jamshoro (1-4 Units)	880
	FBC Lakhra (1-3 Units)	150
	TPS Quetta	94
	TPS Pasni	17
	Thermal Sub-Total	5,131
iii) Thermal - Private (IPPs)	AES Lalpir	362
	AES Pak Gen	365
	HUBCO	1,292
	Kot Addu (KAPCO)	1,466
	Kohinoor Energy	131
	Southern Energy	115
	Japan Power	120
	Rousch Power	412
	Habibullah Coastal	140
	Uch Power (*)	586
	IPPs Sub-Total	4,989

iv) Nuclear Plant:	Chasma Power (CHASNUPP)	300
	Nuclear Sub-Power	300
	Total WAPDA's Installed Capacity (A)	15,247
B-KESC		
i) Thermal/ Gas/ Combined-Cycle	Bin Qasim Thermal Station (Unit 1-5)	1,260
	Korangi Thermal Station	250
	SITE Gas Turbine	100
	Korangi Town Gas Turbine	80
	Thermal Sub-Total	1,690
ii) Thermal (Private) IPPs	Tapal Energy	120
	Gul Ahmed Energy	125
	IPPs Sub-Total	245
iii) Nuclear	KANUPP	137
	Nuclear Sub-Total	137
Total Installed Capacity of WAPDA & KESC (A+B)		17,319

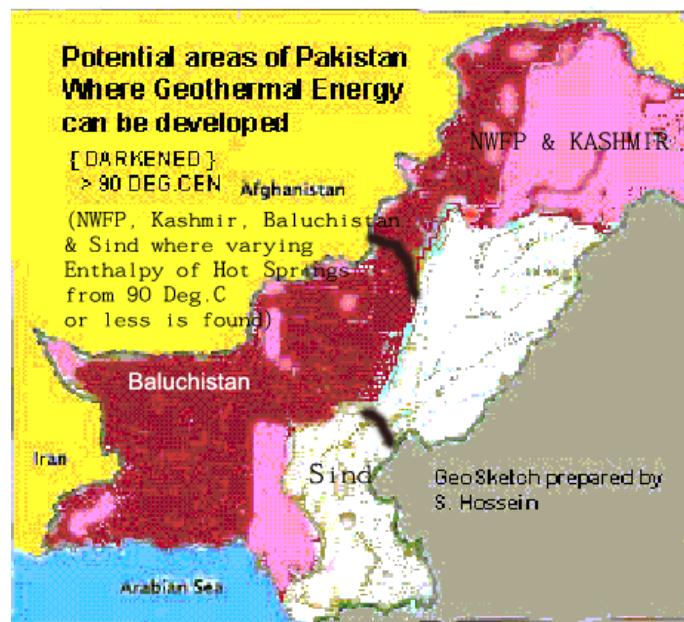


Figure 1: Potential areas of Pakistan where geothermal energy can be developed