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The Pakistan Engineering Congress as a body does not hold itself responsible for the opinions expressed in this volume.

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TABLE OF CONTENTS

<i>Sr. No.</i>	<i>Paper No.</i>	<i>SUBJECT</i>	<i>Page No.</i>
1.	147	Energy Conservation — <i>Engr. Sadeqat Hassan Mir</i>	... 1—18
2.	148	Development of Thermal Power — <i>Engr. Ch. Arshad Zaman</i>	... 19—30
3.	149	Medium Term Strategy of Hydroelectric Development in Pakistan — <i>Engr. Saeed Akhtar Niazi</i>	... 31—44
4.	150	Mini Hydro Power Development in Pakistan — <i>Engr. M. R. Chaudhry</i>	... 45—50
5.	151	Energy Loss Reduction in WAPDA Power Distribution System. — <i>Engr. Daud Beg</i>	... 51—68
6.	152	An Overview of Energy Position in Pakistan — <i>Engr. Muhammad Irfan Akhtar</i>	... 69—94
7.	153	Energy Conservation in Airconditioning — <i>Engr. Qamar Raza Naqvi</i>	... 95—104
8.	154	Renewable Energy Options to Overcome Energy Crisis in Pakistan — <i>Engr. Mushtaq Ahmad Bhatti</i>	... 105—122
9.	155	Necessity of Nuclear Energy for Pakistan — <i>Dr. Arshad Muhammad Khan</i>	... 123—128
10.	156	Research Programme for Solar Energy — <i>Dr. Syed Wajahat Ali</i>	... 129—134

Symposium on Energy Crisis

KEY NOTE ADDRESS

By

Engr. M. R. Chaudhry

Convener

SYMPOSIUM ON ENERGY CRISIS KEY NOTE

There cannot be two opinions about the assumption that energy supply and economic growth are inextricably linked to each other. It is clearly borne out by the oil price hike of recent years which unleashed a virulent wave of global recession.

One of the major hurdles in the way of Pakistan's accelerated economic growth is acute shortage of energy supply. This is attributable mainly to rapidly increasing energy demand but limited production capability of its energy resource base and heavy costs of imported oil.

On 14th August 1947, the day Pakistan emerged on the world map as an independent country, our power generating capacity comprised of only one Hydel power station Jabban in NWFP of 9.6 MW capacity and private electric supply undertakings catering partial needs of few cities. The areas of Lahore and Faisalabad connected to 66 KV transmission lines from Mandi Hydro-electric were at the mercy of power allowed to flow across the border. Thus Punjab had to depend mainly on the power supply from India.

Rasul Hydel of 22 MW was the first power station to be commissioned in 1952 with transmission lines extending upto Sargodha. This was followed by Steam Station Sahiwal of 6 MW, Faisalabad of 8 MW, Jabban Hydel Extension of 10 MW, Dargai Hydel of 20 MW capacity. The Power Transmission and Distribution System was extended according to the generating capacity.

In 1959 when Wapda took over the management of West Pakistan Electricity Deptt: the total hydel and thermal generating capacity was 119 MW. Besides small power stations, major thermal stations at Multan, Faisalabad, Guddu and hydel stations at Warsak, Mangla, Tarbela contributed largely to the present generating capacity of 4977 MW with Pakistan National Grid extension to all the four provinces of Pakistan.

The resultant power demands were kept within the generating capacity limits till the distribution loads were allowed to increase. The non-installation of nuclear power stations created a demand supply gap. The gap kept widening developing eventually into the present power crisis.

The Govt. has now given a directive to bridge this demand supply gap and to end load shedding by 1990. The plans are quite ambitious but may not be possible to achieve without Nation's full participation. The present projections indicate a deficit 1439 MW in January 1989 with firm capacity of 4891 (1266 MW Hydel and 3625 MW thermal) and peak demand of 6330 MW. It is expected that by the year 2000 we may be able to generate about 18000 MW firm against the minimum demand at that time of 17000 MW with the planned power programme.

The Govt. have launched a National Energy Conservation Programme which can yield 600 MW in six years by full contribution of all electricity consumers reducing waste and optimum utilization of available energy.

It is therefore essential that alternate source of energy are fully exploited.

Located in the latitudinal range of 25 to 37 degrees north, Pakistan has an unlimited source of

Solar energy which cannot only contribute in partly solving the energy crisis but also provide energy even to the remote and isolated areas where the National Grid cannot reach in the foreseeable future.

Biogas, Biomass, Wind, Mini hydel and tidal energy have also a sizeable potential worth exploration for remote and isolated areas where extension of National Power grid will be uneconomical. The tidal energy can be exploited along the Sea Coast of Baluchistan and Indus delta.

The present symposium arranged by the Pakistan Engineering Congress is also a step in identifying the supply demand gap with its causes and solutions. Efforts have been made to make the symposium deliberations as comprehensive as possible by covering all important aspects to provoke thought of the professional engineers and experts participating in it. The authors contributing papers have tackled the problems and causes of the present crisis and proposed solutions and the Pakistan Engineering Congress would welcome proposals and suggestions from even non-members.

The symposium offers the following topics for considerations and proposing recommendations for implementation:—

1. An Overview of Energy in Pakistan by Mr. Muhammad Irfan Akhtar.

Fossil fuels cannot meet our ever-increasing demand. Nuclear and hydel energy are important future contributions. Solar Energy is expensive at present, Biogas will be advantageous at present but Energy Conservation is important.

2. Development of Thermal Power by Ch. Arahad Zaman

This paper traces history of thermal power generation in Pakistan and presents its various aspects covering steam turbo and gas turbo generators.

3. Medium Term Strategy of Hydro-electric Development in Pakistan by Mr. Saeed Akhtar Niazi. Reduce dependence on thermal generation and increase hydel generation as large hydel projects require longer periods, hence medium size projects be implemented.

4. Mini hydro power development in Pakistan by Mr. M. R. Chaudhry.

Affordable energy projects, Maximise local resources utilization, minimum foreign exchange component, Limited experience, hence technical support is essential. Government should set up Autonomous Mini Hydel Development Organisation.

5. Energy loss Reduction in Wapda Power Distribution System by Mr. Daud Beg.

Excessive losses in Wapda System. A 5% reduction in losses means a saving of about Rs. 780 millions. Currently losses are 9.35% in transmission and 15.6% in distribution. Proposes rationalisation of power tariff and better management.

6. Energy Conservation by Mr. Sadaqat Hassan Mir.

Present various aspects of Energy Conservation and the National Energy Conservation Programme in association with U.S Aid.

7. Energy Conservation in Air Conditioning by Mr. S.Q. N Naqvi.

Presents various aspects of architecture, building design and construction for air conditioning energy requirements and possible reduction/savings.

8. Renewable Energy Options to overcome Energy crisis in Pakistan by Mr. Mushtaq Ahmad Bhatti.

Different Technology options based on renewable energy resources of Pakistan – Biomass, Wind, Solar and Mini Hydel, Energy deficit upto 1990 and the power generation expansion programme from 1986–92.

9. Research Programme for Solar Energy by Syed Wajahat Ali

Presents the work of Solar Energy Centre, Hyderabad, Solar Water Heater, Desalination Plant, Crop Dehydrator, Cooker, Bowl for power generation, electrolytic debacterification, photo-voltaic devices.

10. Necessity of Nuclear Energy in Pakistan by Dr. Arshad M. Khan.

Nuclear power plants essential to bridge the supply demand gap and the only solution to prevent energy crisis.

Based on these submissions of the authors and deliberations on the symposium we propose to compile recommendations on the following topics.

1. Renewable Energy Resource utilisations.
2. Nuclear Energy Contribution
3. Mini/small/major Hydropower Development Programme.
4. Conservation of Energy Programme.
5. Solar Energy Exploitation Programme.
6. Wind Energy Utilisation in Southern parts of Pakistan.
7. Tidal Energy for coastal areas of Baluchistan.
8. Proposals for loss Reduction in power system.
9. Local Manufacture of turbines, generators etc. for mini hydel schemes.
10. Set up an autonomous corporation for Mini/small Hydropower Development.