

Growth of Power Sector in United Provinces (Undivided Uttar Pradesh) during the British rule- Issues and Shortcomings

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Abstract - Electricity which forms the life blood of any industry was introduced in the then United Province (U.P.) quite late. A plant having a capacity of 855 KW was setup and made operational in Kanpur on December 23, 1906. This was the first power plant established in the United Provinces. But this sector witnessed a very slow progress in the Province and till 1926-27 only nine towns could be energised. But the British for running their own establishments in India needed supply of electricity. The growth and development in this sector witnessed two distinct phases between 1906-27 and 1928-1947. In the first phase coal based thermal power stations were established and secondly after the digging of the Ganga canals switching over to the generation hydro electricity became possible along the banks of the river Ganga and Yamuna. The motive behind establishment of these power stations was not general public welfare. Low potential supply with limited coverage area left the state power starved till the Independence of India in 1947.

Key Words - Hydro electricity, Ganga Canal Hydro Electric Grid, Steam Power Houses, KW, Electricity Act, Electric Inspectors.

I. INTRODUCTION

The technological revolution which took place in the west during the 18th and the 19th century has brought electricity to the forefront. Production of electricity on a large scale became possible with the development of electro-mechanical devices like generators and transformers, turbines etc. Distribution lines were erected and dream of lighting home became a reality.

Six years after electricity was introduced in the USA and UK, in India it was in 1899 generation of power and distribution for the first time begun in Calcutta. Calcutta Electricity Supply Company (CESC- Originally known as Kilburn & Co) became pioneer in bringing electricity to Calcutta. The company obtained a license on January 7, 1897 to supply electricity in the city of Calcutta. Hydro-electricity generation become possible in next year when hydro based power plants were established in 1898 at Darjeeling and in 1902 at Shimsha in Karnatka . These two were first Asiatic plants of this type.

Likewise the Railways, the British Indian administration left the task of generation and distribution of electricity in India in the hands of the private agencies. In Uttar Pradesh electricity was introduced quite late. It was late in 1903 licenses were granted for the generation and supply of electricity under the Electricity Act of 1903(Majumdar,1986). A plant having a capacity of 855 KW was setup and made operational in Kanpur on December 23, 1906. This was the first power plant established in the United Provinces. But this sector witnessed a very slow progress and till 1926-27 only nine towns could be energised.

TABLE I
FIRST SET OF PLANTS AND THEIR NOMINAL CAPACITIES

Towns	Capacity	Date of Commission	Plant Capacity added
Kanpur	855 KW	23.12.1906	18000 KW
Lucknow	250 KW	30.9.1917	1730 KW
Allahabad	250 KW	30.9.1917	1410 KW
Agra	645 KW	May 1925	955 KW
Saharanpur	133*2 KW	June 1926	266 KW
Haridwar	-	Dec 1926	Supply from Bhadrabad
Musourie and Dehradun	450 KW	May 1909	1650 KW +150 KW reserve
Nainital	450 KW	8.8.1922	450 KW

First phase which ran between 1906 to 1927 thus had a modest beginning with coverage of 9 towns with no consumer supply system. Till this time it was primarily coal based thermal power which was costly and severely conditioned the rural extensions for agriculture and industrial purposes. U.P. was handicapped by lack of coal resources and all the coal requirements for its power stations have been met by the Bengal and Bihar collieries involving haulage of coal over 600 miles. On the other hand, U.P. is rich economic and attractive hydro potential which in the future will bring in rapid and all round economic development of the state.(Techno Economic Survey of U.P..1965)

II. DEVELOPMENT GANGA CANAL HYDRO ELECTRIC GRID

By 1928-29 a definitive change was witnessed in the British policies towards electricity generation and its distribution.

Musourie, Dehradun and Haridwar were already fed with hydro electricity. By 1929 the Government decided to extend supply to smaller towns with population base of 5000 and above. It resulted in the development of Ganga Grid. 7 falls were constructed between Haridwar and Aligarh in the Upper Ganga Canal for this purpose. The towns which became electrified were Muzffarnagar, Meerut, Saharanpur, Aligarh and Bulandshar. Projects in Kalindi and Sumera, Paltro and Bhola(Bhila) were undertaken where pumping stations and feeders were constructed to connect the Ganga Canal. Two bays of the fall at Bhola were constructed with draft tubes and a power station. By 1930 the Ganga Canal Grid was completed with 59 transformer stations. 85 towns and villages were targeted to be brought under this grid system. Few factories and irrigation pumps were added as consumers.

A. Laying of Transmission Lines and Construction of Sub Stations

TABLE II
TRANSMISSION LINES LAID UNDER GANGA CANAL HYDRO GRID

From - To	Miles covered	Capacity of the line
Bhloa(Bhila) to Dasna Dasna to Ghaziabad Dasna to Moradabad Bhola to Meerut	840 miles	66 KW
Bhadrabad to Bhola	80 miles	66KW
Chandausi and around	56.5 miles	37 KW
Rural branch lines	168 miles	-
Salawa to Chitura	17 miles	66 KW
Bilari to Moradabad	14 miles	37 KW
Chandausi to Badaun	43 miles	44 KW
Anola to Badaun	-	66KW
Sumera to Chandausi	56 miles	-
Nagina to Saharanpur	-	37 KW
Salwa to Sumera	97 miles	97 KW
Chitura to Nirgajni	1060 miles	66 KW
Rural branch lines	965 miles 95 miles	11000 volts Low tension lines
Ram Ganga scheme	72 miles	-

On completion of the scheme by March, 1939 industrial load increased by 65%.Rural lines increased from 138 to 168 miles and load increased from 1367 HP to 2960 HP. But heavy monsoon and war time situation hampered the growth in this sector further.

TABLE III
PLANT CAPACITY AND INDUSTRIAL SUPPLY BY 1939-40

Scheme	Produced electricity	Industrial supply
Ganga Canal Hydro Electricity	28900 KW (from 7 falls) 9000 KW from Chandausi steam station 1000 KW from oil engines at different locations	10712 KW to small industrial units in 88 urban centers
Sohwal Govt. Thermal Station	2*1250 KW	3000 KW

B. Grid failure and Trouble with Chandausi Steam Station

Total capacity of Chandausi steam station was 9000 KW but during monsoon of 1939 Ganga Canal had to be closed. Hence load increased in Chandausi. The station actually produced 6000 KW with standby of 3000 KW. With peak load the station had to work overtime with standby capacity. It proved dangerous with little dislocation. Besides, Chandausi was situated far off from places like Muzffarnagar and Saharanpur and hence transmission to those places resulted in low voltage problem. To combat these problems additional turbines with 6000 KW capacity had to be installed and a new substation at Dasna had to be built.

During the war years between 1940-46 additional power houses were built at Moradabad with the capacity of 1200 KW, Harduaganj (Aligarh) 9800 KW and Mohammadpur Asaf Nagar 9300KW. But civil restriction on imposed on consumption of electricity and supply was predominantly diverted to factories dealing with the production of war materials.

III. NEGLECTED EASTERN PART OF THE STATE

It is interesting to note that electricity was first developed in the west and north western part of U.P. So long eastern U.P was totally neglected more likely due to plain terrain of the territory where no fall could be constructed along the Ganges or no industrial potential was found. Till 1946 no civil population were given electricity connection in this part of the state. Thus post war reconstruction showed some impact in this part of the state.

TABLE IV
NEW PROJECTS DEVELOPED EASTERN PART OF THE STATE

Project	Situated at	Capacity	Beneficiary
Sarda Hydro Power	Khatima (Banbasa)	22000 KW firm+ 20000 secondary from June to November, Capacity of Kanpur Electric plant was increased by 15000 additional KW to revamp Sarda project	Nainital, Bareilly, Kheri, Sahajahanpur, Rampur
Nayar Dam	On Nayar River	46000 KW +70000 KW	Garhwal, Dehradun, towns covered

Scheme		during lean period	by Sarda project
Rihand Dam Scheme	On River Sone at Mirzapur	15000 KW	Eastern and southern districts of U.P. and part of Bihar.
Sahganj Pilot Scheme	Jaunpur	12000KW steam power	Gorakhpur Azamgarh.Faizabad, Sultanpur.Ballia, Gazipur
Patheri Project	Patheri at Ranipur	20000 KW	Added to Ganga Canal Hydrel Grid

IV. OVERALL POWER SCENARIO

At the time of the independence of India in 1947 the main source of electric power in U.P. was Ganga Hydro Electric Grid.

TABLE V
OVERALL SCENARIO OF LOAD, DEMAND, SALES AND CONSUMPTION

Schemes	Connected load (KW)	Maximum demand (KW)	KW hour generate (million hours)	KW hour sold (million hours)	Consumption
Ganga Canal Grid	49870000	32900000	160.6	126.6	Irrigation- 51.2% Industrial 30% Light fan municipal 18.8%
Govt. Steam station (Sohwal)	1944361	1200	4.3	3.9	Irrigation 67.79% Others(water supply, MES) 32.21%

A. Issues involved

- The government policy regulated grant procedures, execution of works, making supplies of energy and balancing relations between the consumer and licenses(Bharucha,N,1948)
- Reorganisation and regulation to meet the growing demand was not seriously attempted.
- Like Railways the British Government left the task of developing this vital sector in the private hands. Generation and distribution of electricity was given in the hands of the private agencies while retaining planning, monitoring and control in its hands through the electric inspectors.
- Local authorities were not given autonomy and they had to look towards centre for sanctioning of plans.(Indian Electricity Act,1910).

- Local authorities were only entrusted to issuing of licenses for supply of electricity and installation of transmission lines. Even in matters of supply the centre retained its statutory control. Head of the Public Works Department, Chief Engineer, was made in charge of the department.
- Coal supply was not available in the state and it had to depend on supplies from Bengal and Bihar Collieries around 600 miles away.
- Eastern part of the state was utterly neglected and distribution net work was unequal.

B. Role of the Inspectors:

Electrical inspectors were appointed under section 56 of the Act of 1910(Majumdar. S, 1986) and were entrusted with the job of

- Prepare and execute all works, minor and major,
- Inspect and test all installations
- Maintain all installations under the Public Works Department,
- Inspection of all licensed power plants at least once in a year
- Settling disputes between the consumer and the license.

Inspectors control and day to day interferences resulted in failure of the agencies to carry out the sanctioned schemes with in time. Tenders were floated by the Municipal authorities of Lucknow, Allahabad and Bareilly to invite venture capitalists to take licenses but attempts failed to bring out any response. Hence the central government had to start negotiation with the tendering companies directly to ensure the works of energizing these townships. These inspectors and thereby the Government was not interested in supplying electricity to the general benefit of the residents but for the government buildings and installations e.g, Lucknow medical college, Canning college, Judicial Commissioner's residence and new post office at Agra. Public supply was available in Musorie in a small way with extra load for Dehradun to energise the aerial rope way. It is strange to know that the Secretary of State himself had to give special permission for supply of electricity to Kanpur Memorial Church for light and fans only in the year 1914-15.

B. Demographic Impact

The impact of mercantile economy was so profound that due to less or no encouragement of the nascent indigenous industries this sector witnessed continual decadence. While the population grew to the tune of 31% from 1911 to 1951, the growth of employment generated decreased from 6.36% to 3.47%. It is largely due to no energy supply to the small and cottage industries or to the industries engaged other than manufacture of war materials.

TABLE VI
CENSUS POPULATION AND WORKERS ENGAGED IN PRODUCTIONS

Year	Total Population of UP according to Census	Total No. of Workers engaged in Production
1911	48014080	3055853
1921	46510668	2658501
1931	49614833	2604998
1951	63215742	2192832

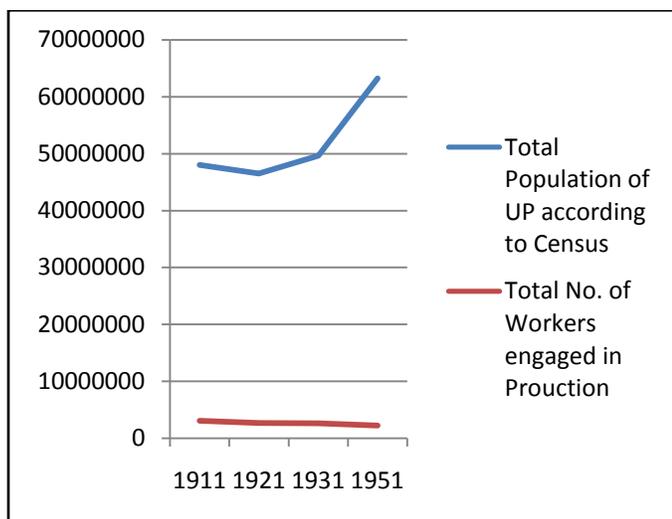


Fig. 1 Graphical representation of employment generated in industries

Fig is a graphical representation of Census data ranging between 1911 to 1951 and the corresponding numbers of workers engaged in production (other than agriculture). It is evident from the graph above that the ratio at which population increased between 1911 to 1951 had a very unmatched relation to the ratio of employment generated and thereby dis-industrialization. The British policies led to consistent drain of wealth from India to their England leading

to decrease in India’s International trade balance from 23% when they came to India to a mere 4% when they left.

V. CONCLUSION

To sum up, electricity forms an integral part of life today. But development of this technology in erstwhile United Provinces and now Uttar Pradesh was not steady one. If we take case of Kolkata when electricity was introduced in 1889, not before 1906 a 855 KW power station could be established in Kanpur. Upto 1926 only 9 cities were energised. No attention was paid towards development of hydro electricity in the state until the Ganga Canal was made operational. The work of establishing power stations for generation of electricity, its transmission and distribution was left to the private hands. Most of the time the private developers failed to achieves their target as installation were too expensive and often external developments like war situation, monsoon and heavy rainfall besides day to day interference of the electrical inspectors slowed down the progress. More interesting was the fact, whatever growth was made was limited to the districts of western Uttar Pradesh and very little was done to cater the need of eastern districts. It was only with the development of Sharda Hydro Electric Project, Rihand Dam Project, Nayar Dam Project, Shahganj and Pathri Projects towards the end of the British rule that some care was taken for the so long neglected eastern parts of the state.

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