

Hundred Years of Electricity in Calcutta

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Electricity is the wizard of the modern world. CESC can proudly claim that it brought this wonder energy to Calcutta, just a few years after it was first used to light up London - the then undisputed capital of the world. This was in 1899 - a hundred years ago that India saw commercial generation of electricity for the first time in its history.

The Beginning

The year 1895 marks an important landmark in the history of Calcutta. The Bengal Act, IX, popularly known as the "Calcutta Electric Lighting Act" was passed. It authorized the local government to grant licences to companies to provide electricity to the 'town' of Calcutta. In January, 1897, M/s. Kilburn and Co. were granted a licence, as agents of The Indian Electric Co. Ltd. This was registered in London in January, 1897. In February, the name was changed to the Calcutta Electric Supply Corporation Ltd. The Company went public in May, 1897.

In 1898, electricity was being supplied on a trial basis to the Bank of Bengal (present State Bank of India), the Bengal Club on Chowringhee and several private residences.

The First Stations

The Calcutta Electric Supply Corporation went into thermal generation for commercial purposes by commissioning its first generating station at Emambaugh Lane near Prinsep Street on April 17, 1899. It used Crompton dynamos, Willans reciprocating steam engines and Babcock and Wilcox boilers. The three wire or Edison system of distribution, supplying Direct Current to consumers at 450 and 225 volts was adopted, in keeping with the latest technical innovations in London.

Newspapers reported that the Calcutta Electric Supply Corporation is "*spending 100,000 pound sterling*" for the electric lighting of the town. "*Mains have been laid for the supply of 60,000 lamps, which can be increased to 200,000. The supply will be continuous throughout the twenty-four hours and each day, and is well-adapted for working punkahs.*"

The plant in Emambaugh Lane "*consists of three boilers of 500 horse-power which can be extended to 800 horse-power, if desired, with eight dynamos and a storage battery..... The chimney will be the highest in Calcutta, being 40 ft. higher than the water works chimney which is close by.*"

The initial price of power in Calcutta was Rupee 1 per unit, the price being the same as in London.

As the demand grew, additional D.C. generating stations were established - at Alipore in March, 1902 (750 KW), Howrah in May, 1906 (165 KW) and Ultadanga in September, 1906 (1200 KW). The jute industry was thriving at this time and to maintain steady power supply to their presses and mills the company installed an Alternating Current plant at the Ultadanga station in 1910.

The Early Years

Electric light for Lord Curzon

A month after the commissioning of the Emambaugh Lane power house, a decision was taken on 19 May, 1899 to have electric connection at the Government House, with the stipulation that the job must be complete before the Viceroy Lord Curzon returns to Calcutta from his official tour of north India.

Electric fans take Calcutta by storm

When power supply started, it was thought that electric energy might be used for ventilating, powering purposes and lighting. But no one imagined that the days of hand-pulled punkah were over. The popularity of the electric fan ensured immediate success for Calcutta Electric Supply and provided the 'day load', essential to the economic working of an electric supply station. Kilburn & Co. on behalf of The Calcutta Electric Supply Corporation released an advertisement on 6 May, 1899, quoting Rs.18 for hiring of one electric fan '*used day and night*' and the supply of electricity.

Judges opt for the fan

The Calcutta High Court decided on 19 August 1899 to opt for electric fans instead of punkahs with the hope that the job should be complete next year. The Government sanctioned Rs. 15,000 to replace punkahs at Fort Williams on 28 May, 1902. A month earlier, the Government-owned Army Clothing Factory at Alipore decided to bring electricity at a cost of Rs.19,000.

Electric trams benefit health

Calcutta Tramways switched to electricity from horse drawn carriages in 1902. A medical man went on record saying that '*electric trams are of great benefit to the health of a great city ... Electric trams cause ozone to be generated in small quantities from morning to night, so that the air is being purified all the time.*'

Cossipore

By now the advantages of having a large central station were felt. The river Hooghly, the lifeline of Calcutta, on both banks of which industrial units had sprung up, could provide the water necessary to run a large power plant. Cossipore was ideally situated on the east bank of the river. Cossipore Generating Station - the first central thermal generating station was commissioned in 1910, with an initial installed capacity of 15 MW, generating Alternating Current at 6000 volts. Oerlikon Steam turbine sets, Babcock & Wilcox and Stirling boilers and British Thomson Houston switchboards were installed initially. Subsequently larger turbo-alternator sets manufactured by Metropolitan Vickers and English Electric Company were installed at this station.

Cossipore indeed marks the beginning of a new era in the history of CESC. A central power station, generating at 6000 volts called for step-down and conversion facilities before it could be supplied to consumers. Sub-stations using Bruce Peebles motor converters were set up. Jackson Lane, the business quarter, Wellesly Street, the European section and Prinsep Street housed such new sub-stations in Central Calcutta. Grey Street, Strand and Simla housed sub-stations around the densely populated residential districts of North Calcutta. The old D.C. generating stations at Howrah, Ultadanga and Alipore were also converted into D.C. sub-stations. A new sub-station was built entirely on piles on the river Hooghly and was appropriately called The Bank Sub-Station.

It is interesting that some of the old "Bruce Peebles" motor converters installed as early as 1912 and used for converting A.C. to D.C. were in operation till recently, progressively giving way to mercury arc rectifiers and lately to silicon rectifiers.

Southern

If the river Hooghly was Calcutta's lifeline, the Calcutta Docks was the city's very heart. The Port Commissioners had their own generators for lighting up the docks but later found it more convenient to rely on CESC for the rapidly developing load. *"The Company with characteristic courage has moved in advance of the times and erected another major generating station. From the engineering point of view alone the new station is eloquent of the progressive methods of the Company"* - said an editorial in the magazine Property. CESC had responded to the need of the hour by commissioning the Southern Generating Station at Garden Reach in 1926 with an initial capacity of 22.5 MW. The capacity of the station was subsequently augmented to 110 MW. Eight turbo-generator sets and 15 boilers were installed in the station, with pressure of 200 psi and temperature 600°F.

Growing Demand

Advertisements were issued to popularise electricity.

**Electricity was likened to a friendly
and obedient genie !**

**So refreshing -
electricity is so cheap !**

Canvassers went from door to door trying to sell electricity to consumers.

Popularisation of electric fans increased demand for electricity. It improved base-load for more economic operation of generating stations.

Old Faithfuls

Mulajore

Demand of the growing industrial complexes on both sides of the river in the north of Calcutta prompted the Company to set up Mulajore Generating Station in 1939.

Mulajore is presently the oldest CESC power plant. It still rises superbly to the occasion. Proper upkeep has enabled the station to generate about 60 MW - its derated capacity.

There are 5 turbo-generators (Parsons) and 18 boilers (16 - B&W, 2 - AVB) with a pressure of 350 psi and temperature of 700°F.

New Cossipore

New Cossipore Generating Station was commissioned in 1949 within the grounds of Cossipore Generating Station. Its ultimate capacity rose upto 160 MW with four turbo-generators (Parsons) and eight boilers (B&W). Steam pressure and temperature was 600 psi and 800°F .

The station is still generating satisfactorily.

Post Independence Scenario

After Independence there was a dramatic change in the national policy concerning electricity. The national grid system was conceived. The Electricity (Supply) Act, 1948 visualized the creation of the State Electricity Boards and it was decided that all further generation would be in the Public Sector and Private undertakings would also be linked to the national grids. DVC, the first public sector undertaking in the country, was created in 1948 and together with CESC formed the nucleus of the Eastern Grid. The West Bengal State Electricity Board was set up in 1955.

The national grid system favoured pithead generation for reasons of economy. Both WBSEB and DVC set up their generating plants at points conveniently located near collieries. In keeping with the national policy, CESC was obliged to shelve its plans for adding to generating capacity. Instead it commissioned a series of Receiving Stations for import of bulk power from DVC and WBSEB : the Howrah Receiving Station from DVC in 1957, the Southern (1964), Belur (1965), Kasba (1971) and Prinsep Street Receiving Stations (1977) from WBSEB.

The Change

A highly urbanised and sensitive area like Calcutta cannot afford to be totally dependent for its power requirements on external source. That is why pithead generation, favoured for reasons of economy, need to be supplemented in urban areas by load-centre generation in the interest of reliability. The generating capability of the power stations close to the city having naturally eroded over the years, a programme of regeneration had to be launched.

The New Stations

Titagarh

The State Government, sensing this need and in the backdrop of an acute power famine in the region, encouraged CESC to proceed with their programme of building a new generating station at Titagarh. In the corridors of progress, it was a major turning point.

Work on the project started in 1979 and commercial operation began on March 16, 1983. It was first pulverised fuel fired station, built by the Company. The four power stations set up earlier between 1910 and 1950 had all been designed, built and commissioned for the Company by overseas consulting firms. The Titagarh Project was the first of its kind to be conceived and implemented entirely by CESC with the support of

Indian consultants. It was then the largest project undertaken by the Company, both in terms of capital outlay and size.

Four 60 MW units were installed with pressure of 91 kg/cm² and temperature of 515°C (Turbo-generator - Parsons, Boiler - ABC). There were many problems. Land, for one was limited and there was simply not enough space either for storage of coal or ash disposal. Upward thrust of sub-soil water and subterranean river passages in the area posed a major threat. However, each problem was met and overcome with determination and technical ingenuity. Environment management occupied a key area with installation of latest Electro Static Precipitators.

Southern

Southern was the next new station. 2x 67.5 MW Southern Replacement Project came up in the place of the old Southern Station, which had been decommissioned. Both Boiler and Turbo-generator were supplied by BHEL. As with Titagarh, the new Southern Project faced a number of problems including space constraints. But ingenuity and tireless efforts have overcome all difficulties and the first unit commenced commercial generation in September, 1990 and the second in May 1991. From environmental point of view, the station was the first to install a zero effluent system apart from very high efficiency ESPs.

Budge Budge

Looking beyond the Southern, CESC took the decision to add 500 MW to its generating capacity. The Company was supported by international lending agencies like Asian Development Bank and International Finance Corporation. This is the largest ever private industrial investment in West Bengal. The station, equipped with Parsons Turbo-generator and ABL Boilers, uses latest control and environment protection system. The boiler of the first unit was lighted up on 30 March 1997. The second unit was synchronised on 6 March 1999. The 275 metre high chimney is as high as a 90 storey building.

With the two units of Budge Budge becoming operational, the Company's installed capacity has now reached 1065 MW.

From 6,000 consumers to 1.6 million

CESC's responsibility to consumers has grown over these hundred years. 6,000 consumers used 12 million units of power in 1912. In 1925 the quantity sold exceeded 100 million units. In 1998-99, the figure exceeded 5 thousand million units. The peak load so far handled is 1,200 MW. The number of CESC consumers has already crossed 1.6 million.

In a Hundred Years.....

Over the last hundred years, the Company's thermal generation has grown in scale keeping pace with the international developments.

Following is a summary of transition :

	<i>Initial</i>	<i>Now</i>
	1899	1999
Station Size	1000 KW	500,000 KW
Type	DC Generation	AC Generation
Voltage	450 / 225 V	16,500 V
Chimney height	About 70 ft.	900 ft
Technology	Fixed Grate	Pulverised Fuel
Peak Load	700 KW	1200,000 KW
Steam Pressure	24.5 kg/cm ² (Mulajore-1939)	146 kg/ cm ² (Budge Budge-Current)
Steam Temperature	370°C (Mulajore-1939)	540°C (Budge Budge-Current)

CESC may justly take pride, not only in being connected with a successful business undertaking, but also in being instrumental in ushering a new form of clean energy in the country, that has revolutionised the quality of life.