Electricity, Politics and Regional Economic Imbalance in Madras Presidency, 1900-1947

YENDA SRINIVASA RAO

In this paper, an attempt is made to understand various dimensions of the relationship between the electricity system and politics in colonial Madras presidency between 1900 and 1947. The colonial government, which introduced new technological systems such as electricity, had its own economic and political priorities. These interests came in conflict with the functions which the Indians wanted the electricity system to perform. This disjunction influenced the trajectory of development of the electricity system. There was a further interesting internal conflict. Local politicians, technologists and visionaries grounded their economic advocacy on their own ideologies and tried to allocate their own functions to electricity. The second part of the article deals with the relationship between regional politics and electricity. In Madras presidency, the electricity system was divided into two separate grids. This resulted in widening the economic gap between the southern and northern parts of the presidency, leading also to political tensions which, combined with linguistic regionalism, contributed to the split of the presidency and the emergence of linguistic states.

Yenda Srinivasa Rao (*hisrisri@gmail.com*) is at the department of history, Bharathidasan University, Thiruchirapalli, Tamil Nadu.

It is widely accepted that the adoption of technology is influenced by political ideologies and objectives. In colonial India, most scientific and technological innovations such as guns, cannons, warships, railways, communications, road network and shipping were introduced to sub-serve larger colonial interests. Equally, resistance from the Indians to the imposition of inappropriate technologies was also based on the ideology of the Congress and other political parties. There were three dimensions to the political conflict. First, there was the conflict between the political ideologies of the colonial state and Indian politicians. Second, there was a deep divide between those who admired western large-scale industrialisation and those who favoured the modernisation of small industries and industrial decentralisation. While the first group consisted of engineers and political leaders who had studied abroad and had complete confidence in western technology and colonial officials, the latter group consisted of some local engineers and political leaders. Third, there were conflicts between those who were representing the interests of different regions and communities.

In a large country like India with a diversity of social and religious communities, there was also diversity in political perceptions. Political representations made on behalf of these units were significant. Since minority communities such as the Muslims and depressed castes had very little space in the overall politics, their representations did not have a decisive impact on the development of the electricity system. Nevertheless, leaders of these communities did not take much time to realise the significance of electricity as a tool for social and economic emancipation. On the other hand, the educationally advanced, economically well-established and politically dominant upper caste groups had appropriated and maximised the benefits from electricity. Thus these political forces provided particular trajectories for the development of electricity. The model for the development of electricity in Madras presidency was basically designed keeping in mind the interests of the colonial government. Nonetheless, the trajectory was continuously shaped and reshaped in the course of time based on the changing political circumstances. Every political force added new dimensions to the trajectory. Therefore, at the outset, colonial political and economic ideology appears to be the major determining force of the development of electricity. Nevertheless, the local political context played an equally significant role in determining the trajectory of electricity development.

This paper, apart from briefly discussing the relationship between the development of electricity and the political context, mainly concentrates on how political differences between leaders

from the northern and southern parts of the presidency influenced the development of the electricity network. This would help us to understand the relationship between politics and technology as well as the role played by technology in creating new states in Madras presidency.

1 Politics and Development of Electricity

The course of development of technology was influenced not only by political ideologies of various groups; even individuals who were at the helm of affairs and who had played a constructive role in building nation states had contributed to a significant degree. As Thomas P Hughes argued, in England, for example, Joseph Chamberlain's municipal socialism which guarded the public from exploitation by private agency was cited as the main reason for the backwardness of the electricity system. Similarly, in Madras presidency, the strong political position of individuals like C P Ramaswami Aiyar, who was a great admirer and pioneer of modern technological projects, influenced the initiation and development of the electricity system. Jawaharlal Nehru, Mokshagundam Visvesvaraya and others advocated building the economy of the new nation through the introduction of large industries. Nehru's socialist model of development based on the Soviet model determined the pattern of economic growth in India after independence. Gandhi's ideals expressed through the charkha (spinning wheel) and swadeshi also had an enormous impact on the formation of technology policy. In Madras presidency, Congress politicians like C Rajagopalachari and Tanguturi Prakasam Pantulu supported and promoted Gandhian ideology. There were also a few local electrical engineers who subscribed to Gandhian ideas. K V Karantha, who was a local electrical inspector in the electricity department and a strong believer in Gandhian philosophy, had kept these ideas alive in Madras presidency. In a way, he influenced Congress politicians during the last decade before independence. The Gandhian influence could be seen clearly in the Congress-led interim government's policies on the promotion of cottage industries in the presidency. In other words, his advocacy of a Gandhian approach resulted in the allocation of new economic functions to electricity.

Debates on Electrification

Muraleedharan has traced the history of electrification of Madras city.[1] He has observed that there was considerable dissent against the electrification of Madras city during the last decade of the 19th century and early years of the 20th century. When the Madras Municipal Corporation considered electric lighting for the city, one of the members of the corporation, Musheeruddin Sahib objected that electricity was a costly, luxurious and unwanted thing for Madras city. According to him, what Madras city needed was "more dust bins, more sewage and rubbish carts".[2] At the same time, there were also a few members who welcomed electric lighting. For instance, assistant surgeon Mitland argued that "though so much money is required for sanitation, I do not see why one thing should interfere with another".[3] V C Desikachariar, a member who supported and welcomed electric lighting, argued that "we must try the experiment some time or other and we ought not to wait because there is warfare between gas and electricity. If we are to wait till that battle is fought out elsewhere, I am afraid we may have to wait for a long time to come".[4] All these individual arguments were based on sound grounds. Those who opposed electric lighting considered it unnecessary in view of the expense. Those who supported it believed that Madras had to adopt electricity if it wanted to join the process of urban development which was happening around the world, especially in western countries.

Electricity remained a luxury and failed to convince some local politicians, engineers and the general public even after the establishment of the centralised power generation station at Basin Bridge in Madras city in 1909 and the commencement of gigantic hydroelectric power generation stations in the western Ghats. The implementers of the projects who shouldered the responsibility of popularising this technology in India also failed to be sufficiently convincing. Despite their strategic and continued rhetoric on the economic potential of electricity not all industrialists and farmers were in favour of electricity.

In the initial stages of the development of power systems there was opposition from political circles to the implementation of gigantic power generation stations. Those who argued against electricity projects questioned the justifiability of these projects on economic grounds. Towards the end of the 1930s, another kind of opposition began to emerge among political, business and educated elite communities. This was against the domination of British electrical corporations which had monopolised the electricity business in the presidency. In the case of Madras presidency, given the economic situation, opting for such big money projects was a questionable endeavour. But as hydroelectric technology had already proved its economic viability to the world, far-sighted politicians could visualise its advantages. Sivasamudram was the first big hydroelectric project in India initiated in 1902 by the Mysore government for industrial, agricultural and domestic necessities and had proved its economic value. Convinced by the role of electricity in the development of the economy of Mysore state, C P Ramaswami Aiyar believed that the presidency's revenue deficit could be covered by the revenue from hydroelectric projects. In 1925, when Rai Bahadur Narasimhacharlu, member of the Legislative Council questioned the profitability of the Pykara Project, C P Ramaswami Aiyar clarified that "the Mysore government hopes to cover their revenue deficits by means of the profits from hydroelectric schemes."[5] Further, he asked, when the Mysore government could cover its revenue deficits from the revenue of hydroelectric stations "why not we"? The Mysore experience provided a valid rationale and economic justification for Ramaswami Aiyar to pursue large-scale power generation projects in spite of the unfavourable economic conditions. He had unshakable confidence in modern technology and technology-induced industrial and agricultural transformation. He believed that not only would hydroelectric projects contribute to the economic development of the presidency but also to the development of a grid system that would connect all parts of the presidency.

Hydroelectric Power Projects

Prior to the formation of the Hydro-Electric Development Branch in 1927, C P Ramaswami Aiyar was involved in designs for the planned development of power systems. He was also responsible

for choosing one of the best British electrical engineers – Henry George Howard – for executing his plans. He hoped that within five years from 1926 the Pykara project would supply 37,200 kilowatts (kw) and that it would be connected to the Mysore Scheme to produce an additional 10,560 kw electricity; the Pinjakavi Scheme with the Kunmbur connection would produce 18,000 kw and Papanasam would produce another 21,000 kw.[6] In addition to such long-term plans for the future, he had played an important role in pursuing the South Indian Railway (SIR) authorities as a potential customer of the Pykara Hydro-electric System. At the same time, he also explored non-railway demand for the electricity generated at Pykara.

The question of control and financing of hydroelectric projects gained paramount importance once their profitability was demonstrated by private firms. "The progress of the private companies which utilised the falls", writes *The Hindu*, "was looked upon with jealous eyes by municipalities which suspected that power would not be equally distributed by such bodies and they would be at their mercy."[7] Another newspaper, *Justice*, opposed the idea of foreign investments in the hydroelectric schemes: "It is no doubt true that the province will stand to gain much by way of increased facilities for industrial development by the execution of hydroelectric projects, but the feeling is strong and almost unanimous that such projects should be carried out by the aid of finance raised in the country itself." Further, the newspaper pointed out the position of members of the Legislative Council on policy. Some of the moderates seemed to agree to foreign investment, but only if it was found absolutely impossible to raise necessary capital within the country. Others speculated about the dangers of domination by foreign capital and rejected the notion of foreign investment. They suggested that if it was eventually found that Indian capital by itself was unable to finance the projects, it would be better to drop the idea altogether than to invite foreign financial assistance.[8] The government, which had no definite financial policy for the development of electricity, kept private investment as an alternative method of financing such huge hydroelectric projects.[9]

The Raja of Ramnad and J A Saldanha, members of the legislative council, apart from criticising the indifferent attitude of the government on the transfer of technology, suggested the importation of "better and cheap" electrical technology from Germany, US and Switzerland. A few other political leaders also strongly opposed the importation of the economically less viable technology from England. This strong opposition from the political leaders in the presidency placed emphasis on developing indigenous capital, proper importation of electrical technology and public ownership over private.

Engineers and the Politics of Electricity

Technical personnel like electrical engineers also had their own ideological bias. British engineers were loyal employees of the British government and, in all likelihood, they implicitly subscribed to imperial ideology. Indian engineers were not seriously political and till the 1940s there is no evidence to indicate that their political views influenced the development of electricity. From the 1940s, as the number of electrical engineers from upper class and castes increased, they were inspired by the rising tide of nationalism. Their ideas of nationalism and nation-building forced them to invent new socio-economic functions for electricity. K V Karantha, Electrical Inspector with the government of Madras, outlined his views on cooperation between technologists and politicians in his booklet, *Our Industrial Problems: An Engineer's Views* (1947). As an engineer and technologist, he believed that the two ought to cooperate each other in the endeavour of building an economically prosperous society.

Despite different advocacies and perceptions, there was noticeable cooperation between Indian politicians and foreign engineers. C P Ramaswami Aiyar, M Krishnan Nayar and H G Howard admired and shared each other's ideas in devising plans for developing electricity in the presidency. However, the kind of cooperation that was needed from Indian politicians and engineers (both foreign and Indian) for developing electricity and solving "Indian" industrial problems was different from that of non-colonial countries. There were conflicting views on using electricity for industrial development. Indian engineers trained abroad were in favour of using electricity for centralised industrialisation but engineers trained in India were in favour of using electricity for small scale industrialisation and for rejuvenating traditional industries. K V Karantha's larger complaint was that the Indian electrical engineers ignored the "whole concept of Khaddar and hand-made paper". He further complained that these engineers who studied mostly nothing but books of western technology had always admired western industrial development and only opted for the culture of copying science and technology. He argued that this uncritical admiration for the western model on the part of the Indian electrical engineering community was improper. Their ideas and perceptions had to be reshaped. Plans and schemes for industrial advancement had to be redrawn on "National lines". There were a few large industries such as textiles, sugar and cement in which India had achieved self-sufficiency. But they had failed to provide employment to the growing population. For instance, in 1940-41, only 7.3% of the textile requirements of the country was imported; the rest was produced in India by the textile industry which was the single largest organised industry in the country. Only 30,000 tonnes of sugar were imported into India, and in 1938-39, the cement industry manufactured 11,69,000 tonnes and 32,000 tonnes were imported. Despite substantial industrialisation, all the registered industries and mines and railway works were able to provide employment to only 2.75 millions or 1.7% of the working population. In 1940-41, 64.7% of the cloth was produced by mills and 28% by handlooms. Yet the mills employed only 4,60,000 workers as against 2.4 million main and three million auxiliary workers and about seven million dependents, totalling 10 million, who were supported by handlooms.[10] For a populous country like India, industrial development had to be remodelled to provide more employment instead of reducing it.

Karantha was of the opinion that, to redesign "Indian" industrial development (industrial decentralisation), cooperation was necessary between the new boss (Indian politicians) and the technologists (Indian engineers). Politicians like C P Ramaswami Aiyar, M Krishnan Nayar and engineers or technologists like

H G Howard, Col Platts, and G Sundaram, worked very hard to accomplish the objective of constructing a huge electricity network in Madras presidency. Bureaucrats decided the ways of utilisation of electricity and implementation of the electricity system; businessmen and manufacturers, decided what was to be manufactured and marketed; and the local educated class decided what technology was appropriate to society – they all shaped the trajectory for the development of electricity with different ideas.

Based on Gandhian ideology, Karantha strongly opposed the establishment of huge production centres. Instead he suggested establishing small factories in villages and towns. According to Gandhi, as quoted by Deepak Kumar, "it is machinery that has impoverished India. Machinery is like a great snake-hole which may contain from one to a hundred snakes. Where there is machinery there are large cities, there are tram-cars and railways… honest physicians will tell you that where means of artificial locomotion have increased, the health of the people has suffered."[11] Thus, Gandhi not only objected to centralisation of production with the help of electricity but he also did not like the idea of a centralised electricity generation and distribution system. The above quote clearly explains that Gandhi was never in favour of utilising electricity for the establishment of large-scale production. Rather, he wanted the distribution of power equally to all villages with a small power generation station in every village. This might have been practically impossible. However, his views on ruralisation of electricity and rural industrialisation were valuable. Gandhi did not oppose electricity as a technology. But his main objective was that it should serve the needs of villages more than the urban areas.[12] Gandhi's struggle against colonialism was not just limited to political ideas, but extended to culture, science and technology. He compared large-scale industries with imperialism and small-scale industries with Swadeshi.

Karantha, as a staunch follower of Gandhi, strongly believed that the obsession of technologists and scientists with the creation of large-scale technologies could only be countered by politicians who were concerned with man. Gandhi's ideas of industrial decentralisation might have seemed impractical when the centralisation was gathering strength. Influenced by Gandhi, politicians like Rajagopalachari and electrical engineers like Karantha projected the development of indigenous industries as an alternative model.

Thus various political groups subscribed to different political ideologies. Although all of them did not have an equal influence on the development of the electricity system, it is an undeniable fact that all of them influenced the trajectory of development in one way or another.

2 Unconnected Network

Two separate electricity networks emerged in Madras presidency – thermal electricity generation and distribution in the northern parts of the presidency and the hydroelectric system in the southern parts; this, to some extent, reflected the existing regional politics. Since the regional economic imbalance induced by electricity aggravated the political differences between the north and the south, these regional politics worked as a tool to strike a balance or at least to bridge the economic gap to some extent. In the case of electricity, regional politics based on linguistic differences played a more significant role than the general political ideological battles. Madras presidency was comprised of many linguistic regions, most prominently the Telugu-speaking areas of coastal Andhra and the Ceded districts and the Tamil-speaking areas further south. Though it is very hard to attribute the rise of regional politics to regional economic imbalances, it would not be wrong to argue that economic growth accelerating technologies such as electricity and the resulting economic transformation increased the divide, which ultimately resulted in dividing the presidency into four linguistic states. Electricity, as an agent of the acceleration of production and industrial modernisation restructured the economy of the presidency and brought many positive transformations in agriculture and industry. Concomitantly, the electrification of industries and agriculture also created economic inequality across regions, between castes and communities and classes, and between the rural and urban areas. Of all of these, regional economic imbalance played a decisive role in the reorganisation of the presidency.

System builders who were responsible for the networking of the presidency often tried to come up with valid justifications for the existing economic imbalance between the Telugu and Tamil-speaking regions. The asymmetrical distribution of natural resources such as waterfalls and coal depositories (rather, lack of coal sources) was the main reason for the uneven distribution of electricity generation technology between the two regions. Imbalance in resource endowments between the two regions was certainly an indisputable factor. The abundance of water sources in the southern parts was a positive factor in the development of the three huge hydroelectric stations. But when the regional economic imbalance in electricity generation was quite visible and increasing, colonial authorities, local engineers and policymakers believed that these differences should be lessened by at least establishing thermal power stations in important urban pockets in the northern parts. They believed that the supply of cheap electricity would result in improving the standard of living all over the presidency. This could only be achieved through connecting the entire presidency with an electricity generation and supply network. For this reason, they proposed to network the whole presidency.

The idea of a grid system had originated in United States but it did not become popular in the United Kingdom till the first world war. Electrical engineers and politicians in India had thought of the possibility of a single grid since the inception of the Hydroelectric Development Branch in 1927. However, the presidency's electricity network remained unconnected till the end of the 1950s. The government made a few attempts to explore the possibility of supplying power to the deprived areas such as Andhra and the Ceded districts by extending the distribution lines from Pykara and Mettur. Fresh power demand surveys were conducted to enhance the capacity of thermal power stations. Another possibility for supplying power to non-hydroelectricity areas was buying power from neighbours such as Mysore state and Orissa province. While the Mysore government provided power to the border areas of the Ceded districts, the Madras government

sought the cooperation of Orissa province for providing power to the northern districts. Both governments agreed to utilise the waterfalls at Machkund along the border of the two presidencies. However, due to administrative problems, this site was not utilised till independence.

The government was unsuccessful in interconnecting the thermal and hydroelectric grids and towards the end of 1947, the presidency's electricity generation system developed into two separate grids: the hydroelectric grid consisting of three big hydroelectric power stations – Pykara, Mettur and Papanasam; the Andhra Power Systems or thermal grid consisting of thermal stations at Vizagapatam (Visakhapatnam), Bezawada (Vijayawada), Coconada (Kakinada) and Kurnool. With an installed capacity of 1,10,000 KW, investment on these separate grids crossed Rs 8 crore. Another 80 electric supply licensees, comprising local bodies and private companies, invested Rs 5 crore. These three agencies together generated 413.88 million units of which 79% was generated by the government's "Madras Grid". Thus, the government, in limited partnership with private agencies, developed one of the important large-scale technology systems in British south India.[13]

The emergence of the thermal gird in the northern part (Telugu-speaking area) and the hydroelectric grid in the south (Tamil-speaking area) of the presidency led to regional political and economic differences between the two regions. Though engineers and policymakers explained that these were due to geographical reasons (the uneven distribution of power resources), this failed to convince the politicians of the north. Moreover, the visible difference in the power generation capacity of these grids worsened political differences.

Table 1: Name of Power Stations Which Were Part of 'Madras Grid'

I Hydro-Electric Schemes	Installed Capacity in KW
1 Pykara Hydro-electric Schemes (PHES-1932)	43,000
2 Mettur Hydro-electric Scheme (MHES-1937)	40,000
3 Papanasam Hydro-electric Scheme (PHES-1942)	28,000
Total	1, 11,000
II Thermal Electric Schemes	
1 Madras Electricity Supply Corporation (MESC-1905)	48,000
2 Vizagapatam Thermal Scheme (VTS-1937)	3,750
3 Bezawada Thermal Scheme (BTS-1938)	6,000
4 Coconada Thermal Scheme (CTS-1938)	5,350
5 Kurnool Thermal Scheme (KTS)	5, 000
Total	68,100

These figures indicate that the thermal grid in the northern region was capable of producing only 20,100 kw (excluding MESC's 48,000 kw) which was mainly responsible for the industrial underdevelopment of both Andhra and the Ceded districts.

The emergence of two different networks worked against the much publicised plan of networking the entire presidency. Yet, engineers and politicians believed that networking the presidency would be a practical programme and consequently set it as an ultimate goal. To achieve the objective of a single grid, it was believed that the northern region should have at least one hydroelectric station. But Machkund, the only one potential hydroelectric station, was not executed till Independence because of inter-provincial administrative reasons.[14]

European engineers who conducted surveys at Kolab on Machkund river found that this scheme would certainly be economically viable. Even in 1930 the engineers had suggested that though the demand for power was not enough for developing the project, large-scale industries could be developed in the neighbouring areas with the available natural resources such as mineral and timber if power from the Kolab scheme was made available.[15] The new railway line between Bengal and Nagpur and the port coming up at Vizagapatam were also projected as potential pockets of power demand. Yet, this scheme did not receive the attention of the Madras government. The Europeans themselves complained that this scheme was not given enough consideration. A W Roberts, executive engineer, hydroelectric surveys argued that:

> As I see little or no importance seems to have been attached to the Kolab scheme. This scheme might prove a gold mine if the bauxite deposits reported to exist in the neighbourhood are actually to be found in sufficient quantity. This point certainly requires early investigation as it pays to bring the ore from great distances to factories, it can be easily imagined that 1,30,000 continuous horse power available in the Kolab and the Machkund following close to it could be developed.[16]

This was the post-war reconstruction scheme. It was proposed to utilise the Dum Dum waterfall of Machkund river, located in Vizagapatam and sharing a border with Orissa, and to develop the scheme in association with the Orissa government. Both governments had agreed to share the capital cost in the ratio of 70:30. Yet, this scheme was stalled due to political troubles, and the chance of construction of the only hydroelectric power generation station in the north was lost. The main aim of this inter-provincial collaborative scheme was to supply power to Vizagapatam, Guntur, East and West Godavari and Krishna.[17] This remained a distant dream. If the Madras government had been serious about executing this scheme, it would have lessened the economic imbalance to some extent.

Thermal Power in the North – 1930s

Thus, the only viable option left to the Madras government was the installation of thermal stations. The development of the electricity system (Andhra Power Systems – VTS, BTS, CTS, ATS) in Telugu-speaking areas began almost a decade late compared to the southern parts of the presidency. While the Pykara power generation station commenced operations in 1932, it was only during the 1930s that plans were proposed for the installation of thermal power stations in the Telugu-speaking areas. The crux of the issue was the amount of power that was to be generated by these stations. To the colonial government which was interested in utilising readily available sources, the northern parts of the presidency seemed economically less attractive as they did not have sufficient water resources. In 1934, the Madras government outlined a tentative five-year plan for the development of an electricity system in which Vizagapatam, Bezawada and Anantapur were identified as potential sites for the establishment of thermal power stations.[18] Thermal stations could not provide sufficient power for the economic development of the northern parts of the presidency. Since the Kolab hydroelectric scheme did not materialise due to inter-provincial problems, thermal stations were the

only viable alternative. They were intended to initiate the mechanisation of industry and agriculture which was already making headway in the southern parts of the presidency, to reduce political tensions between north and south based on economic inequalities, to fulfil the obligation of the colonial government and at least to start the process of bringing economic balance between the two regions. Coconada, Bezawada and Vizagapatam were three important and economically viable projects. Because of their sound financial viability, state ownership was proposed by council member like P V Krishnayya Chowdary.[19] The Vizagapatam Thermal Power Station and the Bezawada Thermal Power Stations were two important power stations intended for the northern part of the presidency, and were sanctioned by the government in 1936.

At the most, these thermals stations located in towns and big municipalities were only capable of serving urban needs and supporting small agro-industries within these towns. They did not support any big industrial development in the region. Realising this fact, Howard felt that the industrial development of this region could not be postponed indefinitely and also that industrial development would not be possible in the northern region unless and until cheap-hydropower was generated. However, he was left with no choice except to concentrate on thermal power.

Though the government realised that this area had less potential for demand for power, it did not conduct adequate propaganda programmes as it had done in hydroelectric areas to improve the consumer base. Neither the Vizagapatam nor the Bezawada plants had a large power load. The Vizagapatam plant depended upon non-industrial users – the harbour, Anakapalli licensee, Machilipatam municipality, Bobbili licensee, Kodur and Garbham Mines and Vizianagaram municipality. The Bezawada plant had some demand from industry. It was a paddy growing area with many rice mills. The larger rice mills with an average capacity between 70 and 100 hp were using steam engines, burning paddy husk for fuel. The government's efforts to persuade these mills to shift to electricity were quite inadequate. Conversion funds were not applied to this region at all. Commenting on the existing situation, Howard reported that, "the standard of living of the majority of people is so low that anything like the standard of electrification prevailing in say the Coimbatore district is not to be expected but it is hoped that it will be possible to encourage small industries, electrically operated, which in turn by increasing employment and general prosperity will lead to the greater utilisation of electricity."[20] The establishment of industrial units like the Vizianagaram Mining Company and Andhra Cements in 1937, in addition to the potential demand from urban municipalities and agro-industries provided the rationale for the thermal stations at Vizagapatam and Bezawada, respectively.[21]

The Ceded districts did not even attract the government because of poverty and lack of power load. The government had not entertained any ideas of exploring power resources until 1936 when the map of the Madras Grid was modified based on future construction possibilities in the Ceded districts, but these plans were tentative and preliminary.[22] For instance, a small pumping scheme worth Rs 20,000 was sanctioned to check or to survey the possibilities of underground water resources.[23] Pinto, known as the "water diviner" of the Department of Industries conducted rough hydro-geological surveys on groundwater resources in Cudappah (Kadapa). In the Ceded districts the approach was that demand for power had to be created before entertaining any idea of establishing power generation stations.

By 1937, in the southern parts of the presidency, the two big hydroelectric power stations with their large power generation capacity were pushing the boundaries of development of industries such as textiles, cement, fertilisers, tea estates and agroindustries in rural and urban areas. In addition, four thermal power stations located in the growing towns of Dindugal, Theni, Palni and Virudunagar had become operational and fuelled the growth of the commercial activities. But in the northern parts of the presidency, Vizagapatam and Bezawada were still under construction. Power load and demand were considered the main factors for the rationalisation of the establishment of power stations. Commencing its operations at the end of March 1938, by 1939 the VTS was generating 1.78 million units with maximum peak of 820 kw and provided power to both domestic and industrial consumers.[24] With a projected power load of 1,500 kw, the BTS started commercial operations in March 1939, and was poised to provide power for the developing urban pockets and the Andhra Cement works at Tenali. The BTS had better prospects for rural demand for power than VTS. Nevertheless, the higher unit cost of power produced by the BTS retarded rural development. Programmes such as conversion funds to encourage oil engine users to convert to electricity which were mainly designed for the promotion of electricity in the southern parts of the presidency were also extended to northern parts. Yet, the growth of power load was quite slow. In the same year a thermal station was also established in the town of Coconada. Its main power load base was Coconada Municipality and supply was later extended to surrounding towns.[25]

Thermal Power in the North – 1940s

In the early 1940s, there was a visible sign of the development of power load for the two big thermal schemes of the north. During this decade the Andhra Power System made some progress despite war time restrictions which diverted coal to war related industries and imposed restrictions on the public use of power. In the case of VTS, there was a visible growth in output (2.289 million units against 1.783 the previous year). In the rural areas of the districts, agricultural pumps, mines and rice mills were becoming potential consumers.[26] For the BTS, the power load which was the main reason for the development of the system showed positive signals. The Andhra Cement Company continued to support the station with 805 kw connected power load. Rice hullers and other smaller industries were connected with a load aggregating 95 hp; 23 agricultural electric pumps were connected with 82 hp load. Power was extended to Nuzivid Town, Patamata, Pedana and Gollapalli.

As more land was being brought under irrigation, the simultaneous programmes to promote electricity such as demonstrations conducted by the electricity department were poised to offer more load. The department was aiming at replacing the more commonly used steam engines burning rice husk with machinery

working with electricity. For this purpose, in 1940 the department conducted a 50 hp motor demonstration at Pedana in the district.[27] While the anticipated opening of the ship-building industry was the biggest boost to the VTS, the extension of power to six more villages which resulted in connecting agricultural pumps totalling 88,159 domestic services and two industrial services in 1942 was an indication of the positive power demand for the both schemes. The hire-purchase system, devised in the hydroelectric areas to persuade users to convert to electricity, was extended to the thermal powers areas. But the number of loans offered was small in this year.[28] The Coconada Thermal Scheme which was purely an urban system was supplying power to Coconada Municipality, its biggest consumer and also 380 domestic connections and 78 hp industrial load. The connected load was increased to 1,054 kw from 722 kw.[29] The West Godavari Electrification Scheme sanctioned by the government in 1942 which was to be established at Attili to provide power to seven towns was abandoned due to lack of demand.[30] Had it been executed, the Andhra Power System would have become stronger with another station and the development of West Godavari due to electricity would have started earlier. Further, during the war, restrictions on power production and supply of coal had seriously hindered the development of industrial and agricultural power load in the thermal electricity region compared to the hydroelectric region. Rise in the prices of oil and coal had a visible impact on the operational expenses of the Andhra Power System during the war.

There was a slight growth in the amount of power load in the thermal electricity region from 1945 onwards. Yet, it was not sufficient to promote industrial development in the region. In 1945, the total power load of the Andhra Power Systems was 12,600 kws. In the subsequent three years only 3,000 kws more could be added. In contrast, the power load development in the hydroelectricity region was enormous. In 1945, the total connected power load of the three major hydroelectric systems was 1,50,745 kws. This had shot up to 2,18,088 kws in 1948[31] an addition of about 70,000 kws power load in three years. This was closely related to the development of industry and agriculture. As compared to the north where most of the industries using electricity were very small (with the exception of Andhra Cements), in the southern parts of the presidency, power consumption amounted to 35,182 kws and textiles was the major industry, in addition to a wide range of other industries. The case of agriculture in the northern region was worse. This imbalance in the development of agriculture and industry between the two regions was undeniably one of the main reasons for the regional separatism.

Single Grid for the Presidency

As early as 1920 engineers had conceived the idea of single grid to strike a balance between the two regions in power production. Though the construction of hydroelectric stations in the thermal electricity region had never been considered possible, the extension of high tension power lines from the Mettur hydroelectric station to thermal areas was deemed possible, and the process was intensified after the commencement of the Pykara Station in 1935. The electricity committee that was commissioned to enquire into the working of the electricity system recommended that bulk supply by an efficient agency, viz, government to distant areas would yield greater revenue. This paved the way for the state to participate in distribution and for the development of a huge hydroelectric network in the southern parts of the presidency. In 1937 the government outlined its policy of covering every district of the presidency except south Kanara to implement the national power facility scheme (the term "national" indicated only the presidency) for which the government committed itself to some expenditure. Annual estimates of expansion and extensions were planned from 1938 till 1945.[32]

Table 2: Annual Expenditure (in lakhs) on Electricity Projects

Year	Hydro	Thermal	Total
1938-39	80.00	40.00	120.00
1939-40	70.00	20.00	90.00
1940-41	102.00	15.00	117.00
1941-42	20.00	10.00	21.00
1942-43	18.00	9.00	27.00
1943-44	17.00	9.00	26.00
1944-45	26.00	3.00	29.00
Total	333.00	97.00	430.00

Source: G O, No 2679, dated 23 December 1937, Note on National Electrical Development in the Presidency.

Though there were fluctuations in the allocation of capital for the development of electricity, there was continuity. Because of the political pressure from the northern parts of the presidency and to satisfy the genuine growing demand for power from industry and agriculture, the government made capital allotments for the extension of supply lines and enhancement of power production. This was very closely linked with the larger project of connecting the whole presidency with the power network. Figures in Table 2 indicate that there was a downward trend in allocation after the initial investment. After the commencement, capital allocations were made to enhance the generation capacity of the schemes and for the extension of high and low tension distribution extensions. Lower capital allocations during the war (1939-45) which was the phase of development for Andhra Power Systems arrested the development of thermal systems and consequently the development of industrial and agricultural power load.

Electricity and Regional Political Divisions

The introduction of electricity not only improved socio-economic conditions in the presidency but also created an unbridgeable economic divide between the northern and southern regions. It also fuelled regional, caste and communal political tensions. Promoters of electricity projects (like H G Howard and C P Ramaswami Aiyar) who tried to resolve these political tensions cited the uneven distribution of resources as the main reason for the regional imbalance in the electricity system. But these explanations could not convince politicians of the north and the issue was debated extensively in the Madras Legislative Council and Assembly.

Initially, the house was divided into two groups. The first had a holistic approach which was concerned about the electrification of the whole presidency but ignored the imbalance in distribution. The second, with a stronger regional perspective, neither

questioned the lopsided distribution nor further hindered the development of the system with their opposition, but asked for extending the supply system, at least in the future. The industrial and agricultural development that was taking place in areas such as Coimbatore, Tirunelveli and adjacent areas where cheap hydroelectric power was generated, intensified the debate. Political leaders from non-hydroelectric areas (the entire northern part of the presidency, Malabar and other Tamil-speaking areas – Dindugal and Virudunagar), demanded both the installation of cheap power generating facilities and the extension of distribution lines. For instance, MLCs such as P M Thangal, who was from Malabar, appealed for conducting investigations at Vigittiri for a hydroelectric scheme.[33] Similarly, P V Krishnayya Choudary, who was from the Telugu-speaking area, demanded the exploration of hydroelectric stations in the Telugu areas at Kolab and Krishna Reservoir. Apart from his regional interests, Choudary also expressed concern over the electrification of the whole presidency. At the same time, he criticised the unrealistic propaganda on electricity.[34] Since not many big industries were coming up in the northern parts of the presidency, the rhetoric on large-scale industrial development seemed unrealistic to him and other politicians of this region.

Howard too recognised the imbalance between the south and the north in terms of the distribution of power generation facilities. In fact, it was due to the political pressure from the north that he started to concentrate on sites such as Kolab (hydroelectric power site) and oil engine stations at Bezawada, Vizagapatam and Anantapur. Though he was well aware of the debate, he was very careful not to take sides, but he did try to explain that the regional imbalance was an unfortunate development for which nobody was responsible. Nonetheless, directors of industries (who had seen the possibility of industrial demand for electricity) pressurised the government to establish some power generation facilities in the north. Besides, strong dissent had been building up among political leaders representing Andhra and Ceded districts in the legislative council. Despite the convincing arguments put forward by the government, the shifting of some factories to the southern areas, the way thermal stations in Telugu-speaking areas were treated and the objection raised by southern political leaders to the starting of any thermal power generation stations in Telugu-speaking areas worsened the political situation. The migration of industrialists from the north to the south was a point of serious concern. For example, an industrialist had planned to start a cement factory at Bezawada where coal from Singareni Collaries was available in sufficient quantities at cheap rates. Yet he shifted the unit to Coimbatore. Referring to this problem, during the budget sessions in 1936, P V Krishnayya Choudary argued that the management of the factory shifted to Coimbatore because of the availability of cheap power. Hence, he pleaded that the Telugu-speaking areas also should be provided with cheap electricity.

Linguistic identity was not the only reason for the separatist movement to gain momentum in Andhra. Economic reasons such as the industrial and agricultural underdevelopment of the region and regional economic imbalances within the presidency were also contributory factors. The development of the hydroelectric system in the southern parts of the presidency actually intensified the separatist movement in Andhra. Politicians from this region, quite often, justified their demand for a separate state by referring to the regional economic imbalance. Citing the same reason, Mehaboob Bahadur believed that it was this circumstance that was responsible for the demand for a separate state by the Andhra people. He argued "because they (Andhra people) feel that as along as they were attached to the apron-strings of the Madras presidency, their position will continue to be so. They would rather say, we will have self-government instead of better government."[35]

Often, colonial officials cited lack of water resources as the reason for the underdevelopment of electricity generation facilities in the northern parts of the presidency. However, many politicians from northern parts believed that the region failed to get an equal share in the development resulting from electricity because of the lack of strong political representation. According to Choudary, the lack of personalities like C P Ramaswami Aiyar in the Telugu-speaking areas was one of the main reasons.[36]

On the whole, the continuous clash between politicians, on the one hand, slowed down the progress of electricity. On the other hand, these political battles were also one of the main reasons for the spread of electricity into the Ceded and some Andhra districts. If politicians of the north had not pressurised the colonial government, the Telugu-speaking areas would not have been provided even with three small thermal stations.

NOTES

1 V R Muraleedharan (1991), "The Electrification of Madras City 1905-14", Paper presented at the Third World Economic History and Development Conference held at the University of Manchester, 13-15 September. (Re-published in Hindi as "Madras Shahar ka Widyutikaran, 1905 se 1914" in Deepak Kumar and Roy Macleod (ed.), (2003), *Praudyaugiki aur Bharat men Angrezi Raj*, Trans Ashok Kumar (Grantha Shilpi, Delhi), pp 221-52.
2 Ibid, 4.
3 Ibid, 4.
4 Ibid, 4.
5 Government Order (GO) No 432W, PWD, 20 April 1926.
6 Ibid.
7 GO No 119W, PWD, 28 June 1926.
8 Ibid.
9 Madras Legislative Council Proceedings (MLCP), Vol XXIII, Madras 1925, 469. Financing the projects and the question of private and public ownership was debated extensively in the Madras Legislative Council.
10 Ibid, 13.
11 Deepak Kumar (1997): "Gandhi and Technology", Gandhi Marg January-March, 429.
12 M Vinaik (1957): *Sarvodaya and Electricity* (Published by J C Kumarappa, T Kalluantti and Tirumangalam, NMA Press, Madras), 5.
13 GO No 2438W, 12 August 1947. Budget Debates of Madras Legislative Assembly, Madras, 1947.
14 GO No 2438W, dated 12 August 1947. Budget Debates of Madras Legislative Assembly, Madras, 1947, 2.
15 Administration Report of the Department of Hydro-Electric Development, 1930-31. 13.
16 GO No 106W, PWD, 21 January 1926.
17 GO No 2438W, PWD, 12 August 1947.
18 Administration Report of the Department of Electricity (ARDE), 1934-35, 10.
19 Madras Legislative Council Proceedings, Vol L XXVII, Nos 1-6, 1935.
20 ARDE, 1936-37, 29.
21 ARDE, 1936-37, 7.
22 ARDE, 1935-36, 10.
23 ARDE, 1935-36, 11.
24 ARDE, 1938-39, 10.
24 Ibid, 11.
25 ARDE, 1939-40, 31.
26 Ibid: 32.
27 ARDE, 1940-42, 14.
28 Ibid, 15.
29 Ibid, 15.
30 ARDE from 1945-48.
31 GO No 2679, 23 December 1937.
32 GO No 1480W, 11 July 1934.
34 GO No 69W, 9 July 1935.
35 Legislative Assembly Debates, 1939, 529.
36 Ibid.