



435

GOVERNMENT OF MADRAS

ELECTRICITY DEPARTMENT

ADMINISTRATION REPORT

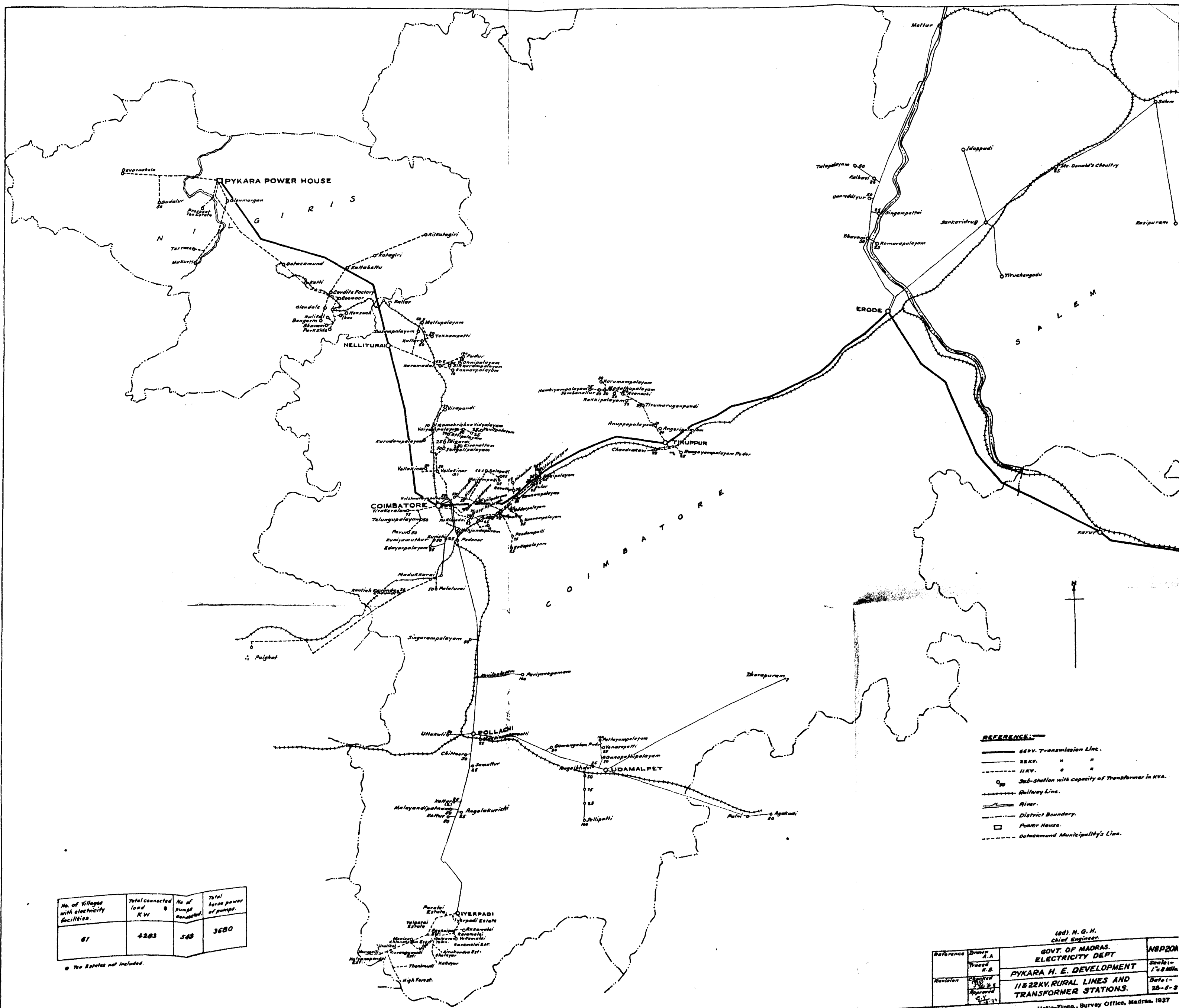
FOR THE YEAR

1936-37

MADRAS

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1937



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GOVERNMENT OF MADRAS.
ELECTRICITY DEPARTMENT.

ADMINISTRATION REPORT FOR THE YEAR 1936-37.

SECTION I—GENERAL REVIEW.

INTRODUCTORY.

Satisfactory progress was made during the year both in the operation and construction activities of the department. The outstanding features were :—

- (a) The Pykara System peak demand rose to 14,900 K.W. reaching almost the maximum capacity of the station.

The revenue earned was Rs. 25.64 lakhs, an increase of 59 per cent over the previous year's.

The energy generated was 76 millions of units recording 50 per cent increase in the year.

- (b) The rate of growth in power demand indicated a need for immediate extension of the Pykara plant. A scheme costing Rs. 45 lakhs and providing for additional 25,000 K.W. capacity was prepared, and sanction of Government obtained. Work has commenced.

- (c) Construction work at a cost of Rs. 72 lakhs was done in the year. Major items were Mettur Power House and Transmission System—where substantial progress was made. The first generating unit is expected to operate in June 1937.

- (d) Vizagapatam and Bezwada Thermo-Electric Schemes for meeting the power needs of the Andhra districts and costing Rs. 36 lakhs were sanctioned. Construction is proceeding.

- (e) Power supply by generating licensees in the Presidency amounted to 59 million units, an increase of 35 per cent over the previous year.

PYKARA HYDRO-ELECTRIC SYSTEM.

2. The system has completed its fourth year of operation and has earned the confidence of the consuming public. It is thus of the highest importance that no order should be passed or new

policy embarked upon which would tend to undermine that confidence. The growth of demand has been most satisfactory and the actual load during the year was double that anticipated and the revenue realized was over three times the forecast in the Project Report. The demand has exceeded the normal generating capacity of the present installation. The situation caused considerable anxiety towards the close of the year and it was found necessary to restrict load development to a certain extent. The first generator at Mettur was programmed originally to be in service by the end of March but, due to numerous delays in erection and delivery of plant, this was not possible. Every endeavour was however made to bring one unit into operation as early as possible so that it might take a part of the load and thus give relief to the Pykara plant. The construction of the Mettur Hydro-Electric Scheme had therefore been taken up not a moment too soon. When regular operation begins at Mettur about October 1937 the demand of the Erode-Trichinopoly-Negapatam areas now met by Pykara will be transferred to the Mettur system. This transfer would not however give more than temporary relief to the Pykara system as by the end of 1937 the Coimbatore-Madurai transmission line, now under construction, should have been completed and the demands of the Madurai area supplied by Pykara. A careful examination was made of the power needs of the areas covered by the Pykara system and its projected extensions and it was found that the existing generating plant even after relief from Mettur, would have to be added to and that such additional units must be brought into commission by the end of 1938. A scheme was accordingly prepared providing for a third penstock line and two 12,500 K.V.A. generating units and costing Rs. 45 lakhs. In view of the urgency and the complications involved in making additions to a plant already in commercial operation, little time was available to prepare the scheme and obtain the necessary sanction. Government were convinced of the necessity of the extension and no time was lost in sanctioning the scheme. Preliminary work is now in progress and orders for the penstock and generating plant have been placed.

8. *Project estimate and actuals.*—The progress made by the Pykara Project may be seen by an examination of Charts I and II and the financial position given below.

Chart No. I shows the growth of the system Peak Demand and of the units generated from the beginning and Chart No. II gives similar curves for the energy distributed and revenue realized. As already pointed out, the demand for the year was over double and the revenue over three times the original forecast.

It may also be noted that the demand in the 4th year, i.e., 1936-37, exceeded what was forecasted for the 10th year by 30 per cent and that the revenue was 60 per cent in excess of that forecast for the 10th year.

CHART I.

Peak load in kilo-watts.

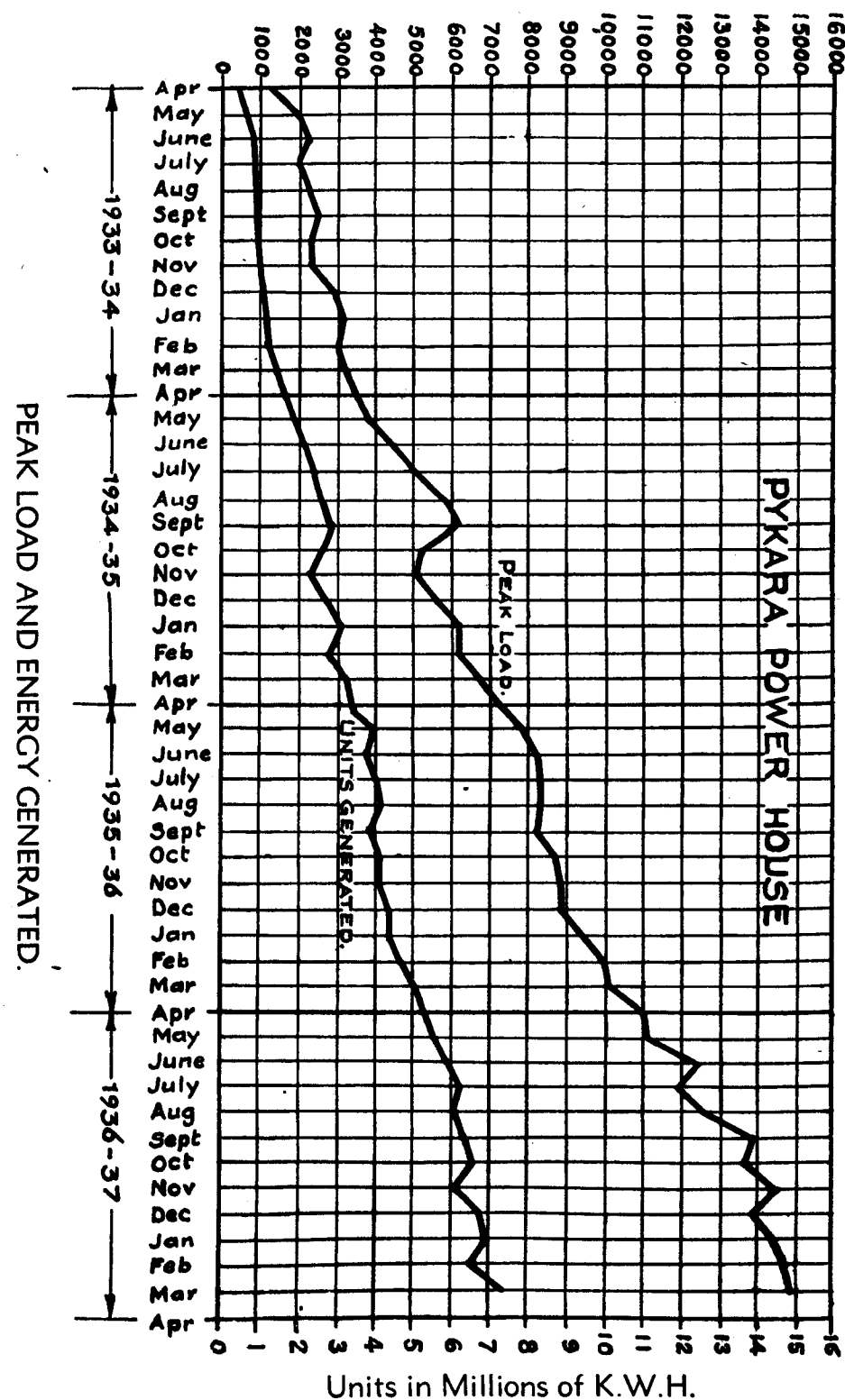
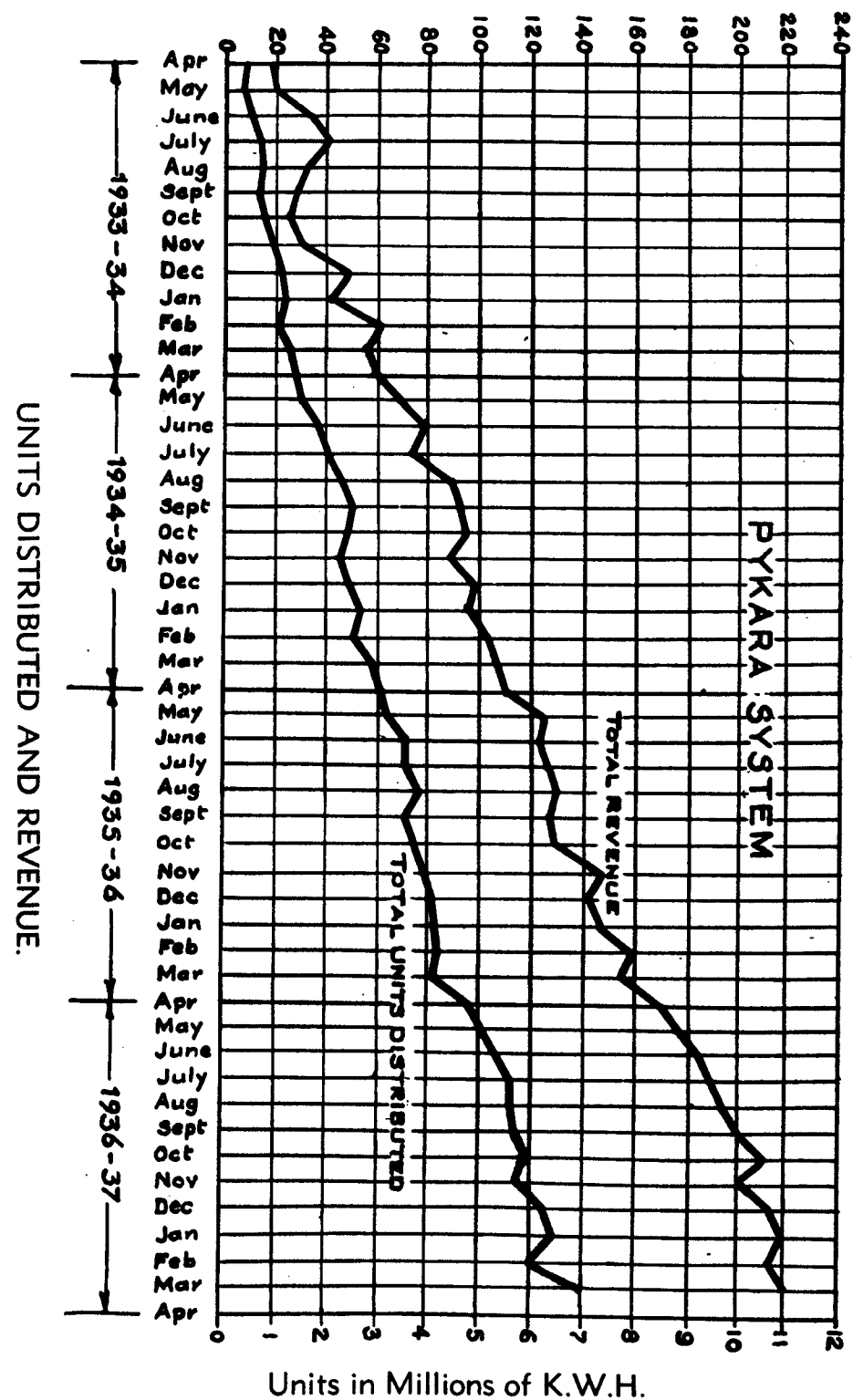


CHART II.

Revenue in Thousands of Rupees.



4. *Financial return.*—The financial position of the Pykara system from a commercial standpoint may be shown as follows :—

Pykara System, 1936-37.

RS.

(1) Capital outlay (including interest during construction)	2,10,80,789
(2) Gross revenue	25,63,929
(3) Operation and maintenance	5,73,434
(4) Balance	19,90,495
(5) Interest	9,36,282
(6) Contribution to depreciation	8,43,405
(7) Contribution to special reserve fund	2,10,808
(8) Accumulated depreciation reserve to date	8,74,879

The system became self-supporting the previous year but no depreciation allocation on the usual scale was possible. In accordance with accepted practice, the greater part of the surplus this year is to be devoted to the building up of a depreciation reserve, making good to the extent possible the absence of normal contributions in previous years. A special reserve of 1 per cent of capital is also proposed to be set aside to meet extraordinary repairs.

5. *Tariffs.*—The financial success of the system is, as had been acknowledged in the last year's report, due mainly to the enterprise of the Coimbatore industrialists and to the working of double shifts in the textile mills. To the extent that double shifts are possibly temporary the surplus revenues derived may not be considered altogether permanent. Every effort must therefore be made to build up reasonable reserves while business conditions are favourable. As a result of careful study, the department recommended and Government sanctioned reductions in tariffs with effect from the 1st March 1937. It is hoped these will result in increased use of electric power for all purposes. It is also to be observed that while prices are generally increasing everywhere Government power tariffs are decreasing—a condition which cannot be expected reasonably to continue.

6. *Utilization of power.*—The uses to which Pykara power was put might be classified as follows :—

Type of demand.

	PER CENT.
(a) Textile industry	55.5
(b) Cement works	11.1
(c) Rolling mills and workshops	3.5
(d) Licensees	19.8
(e) Tea factories	4.8
(f) Agricultural and miscellaneous	5.3
Total	100

Items (a), (b) and (c) might be classified as essentially industrial and they were responsible for 70.1 per cent of the whole output, a significant fact illustrating the role of Pykara in the industrialization of the country.

Items (e) and (f) indicate agricultural and rural demands and they totalled 10.1 per cent, a figure which is expected to show improvement in the coming years.

The licensees representing to a great extent, urban lighting and small power needs consumed the rest of the output, i.e., 19.8 per cent showing an increase of nearly 4 per cent over the previous year's figure.

The more important consumers connected to the system during the year were—

The Kumbakonam licensees—May 1936.

The Tanjore Municipality—May 1936.

South Indian Railway Workshops—Golden Rock—June 1936.

7. *Textile mills.*—All mills in the Pykara area are now being driven by electric power. There were 17 mills connected to the system at the beginning of the year and 11 more were added during the year. Three mills are under construction and one has recently been registered.

8. *Cement works.*—The Coimbatore Cement Works continue to be the biggest individual consumer in the system, the demand on the factory having been recently increased to 1,500 K.V.A. The department is greatly indebted to this large and important consumer for adjusting the method of working at the factory in order to reduce the demand during peak hours and thus afford relief to the Power system during the recent period of power-shortage.

9. *Rolling mills.*—The Indian Steel Rolling Mills at Negapatnam came into full operation during the year with a peak load up to 550 K.W., but unfortunately only one shift was worked due to price cutting among steel producers. At present the economic feasibility of installing an electric furnace at the mills is being studied.

10. *Rural electrification.*—Agricultural load continues to develop steadily. The extent to which electric power has been carried to villages may be seen from the map serving as Frontispiece. Distribution and supply is by Government direct and nearly 90 villages and hamlets are now receiving this benefit. Several villages in the Trichinopoly and Tanjore districts and a few in the Salem district have also an electric supply but the distribution is through the licensees.

During the year, 274 pumping sets aggregating 1,800 h.p. have been installed, making a total of 543 sets and 3,680 h.p. connected to the system.

A few cottage industries for laundry, sugarcane crushing, etc., have been started.

Considering the economic limitations inherent in distributing electric power in rural areas the progress made should be deemed encouraging. Electricity is slowly beginning to become part of the routine life of the villager and, under present conditions, can be distributed without ultimate loss to Government.

11. *Tea estates.*—Only two additional factories took power during the year making a total of 27 connected to the system. The increased heating load anticipated last year was not realized principally on account of the tea restrictions in force.

12. *Connected load on the system.*—The statement below shows the load connected to the system on 31st March 1937, compared with that on 31st March 1936.

Type of load.	On 31st March 1936.	On 31st March 1937.
	K.W.	K.W.
Textile	8,900	12,500
Cement and other industries	2,000	3,950
Licensees	6,200	9,100
Tea factories	2,600	2,750
Agriculture	1,400	2,750
Miscellaneous	1,300	3,000
Total ..	22,400	34,050

METTUR HYDRO-ELECTRIC SCHEME.

13. While substantial progress was made in the construction of this scheme both at the Power House and on the transmission system, the erection of the plant was behind schedule by about three months. At the beginning of the year, the excavation for the Power House foundations was nearly complete. The foundation stone was laid by His Excellency Sir K. V. Reddi Nayudu, Acting Governor of Madras, on 5th September 1936. The steel framework of the Power House building weighing about 600 tons was erected and the 100-ton travelling crane installed. The walls of the Power House were all completed by the end of the year and erection of generating machinery and switchgear was in progress and the outdoor transformer station completed. In spite of delay in the delivery and erection of machinery, it is hoped that the first generating unit will be in operation by June 1937.

The transmission lines under construction were practically completed except for small sections and finishing up work.

The expenditure incurred during the year amounted to Rs. 48.25 lakhs.

14. *Load prospects.*—Power agreements were concluded with the Mettur Industries, Limited, the Vellore Electric Supply Corporation and the authorities of some of the smaller towns and villages, also the South Arcot, the Carnatic, and the Chittoor Supply Corporations. Delay is being experienced in negotiating the agreement with the Gudiyatham licensee, but no serious trouble is anticipated in obtaining their signature ultimately to the agreement.

Due largely to the efforts of the Director of Industries a Textile Mill is being erected at Mettur, while an electro-chemical factory is projected. The possible establishment of other industries is being examined and discussed.

An extension of Mettur Power to Villupuram was originally not contemplated in the initial stage but was programmed for the first year of operation. Due to load development in the South Arcot area and the desirability of not permitting further oil engine installations there, proposals to extend lines to Villupuram were approved by Government in October 1936 and it is expected the area will receive supply early in 1938.

Similarly the demand for power at Ranipet and Conjeeveram was so insistent that an extension scheme costing Rs. 40 lakhs was submitted to Government and sanctioned.

Load prospects in the Mettur Power Area may thus be considered as favourable. Revenue forecasts should be reached easily.

THERMAL SCHEMES.

15. *Southern area.*—The thermal stations at Virudunagar and Dindigul continued to function satisfactorily. A healthy improvement in load was registered at each place but further and rapid development can only occur on the advent of hydro power. Palni was not so satisfactory due to the old and comparatively inefficient plant, and its limited capacity. The three stations will be closed before the end of 1937-38 when the extension schemes conveying Pykara power to Madura, Virudunagar and Rajapalayam are completed.

The Theni scheme for supplying the towns of Periyakulam and Bodinayakkanur as well as Theni village commenced operation during the year but the results were disappointing. The situation is being studied.

16. *Northern area.*—The schemes prepared last year for the electrification of the Andhra districts with two thermal stations, one at Vizagapatam and the other at Bezwada, costing Rs. 18.7 lakhs and 17.35 lakhs respectively of initial expenditure were sanctioned by Government in the course of the year. Specifications and designs for the plant were prepared and issued and contracts have been let for the Power House equipment and the transmission system. Vizagapatam will have a 750 K.W. and a 1,500 K.W. turbo alternator sets while Bezwada where a larger initial load is likely, will have two 1,500 K.W. sets. The general design of these plants and steam conditions was fixed by the Chief Engineer while in England in 1935, after obtaining ideas and information on modern practice and visiting a few up-to-date plants. Construction work on the Vizagapatam power house and on transmission lines in both areas is in progress.

17. *Load prospects.*—Load prospects are more encouraging at present in the Bezwada area than in the Vizagapatam district. Power agreements have already been signed by the Vizianagram Mining Company and the distributing licensees for Vizagapatam and Anakapalle.

In the Bezwada area agreements have been signed with the Municipal Councils of Bezwada and Masulipatam, the Andhra Cement Company, while the Gudivada licensee is expected to sign up in the near future. Negotiations are still proceeding with the Ellore and Guntur licensees and it is hoped that both will be persuaded shortly to co-operate with Government and take a bulk supply.

GOVERNMENT MANAGED MUNICIPAL UNDERTAKINGS.

18. The following ten municipal electrical distribution undertakings were under Government management during the year:—

Pykara power area.

- (1) Coimbatore.
- (2) Tiruppur.
- (3) Pollachi.
- (4) Udamalpet.
- (5) Karur.

Thermal area.

- (6) Virudunagar.
- (7) Dindigul.
- (8) Palni.
- (9) Bodinayakkanur.
- (10) Periyakulam.

Power development during the year was much more noticeable in the towns in the hydro area than in the thermal. This was only to be expected as the tariffs were definitely lower in the hydro area.

The Coimbatore and Tiruppur undertakings having reached the profit-earning stage, Government decided to transfer them to the municipal councils concerned from 1st April 1937 and the transfer of management has since taken place. On page 23 a financial statement of these two undertakings will be found. Coimbatore has not only paid its way but built up in the four years reserves to the value of Rs. 2,22,510 which have either been deposited in the Council's treasury or invested in the undertaking. Tiruppur although not quite so prosperous is promising.

The Virudunagar and Dindigul undertakings have also reached the profit-earning stage and their transfer to the municipal councils is likely to be effected at the end of the year.

Pollachi continues to be somewhat disappointing in spite of efforts at improvement. It is principally due to the comparative high unit cost of the distribution system. The undertaking is however paying its way.

Palni as already mentioned is handicapped by the incapacity of the engines installed to cope with any increase in load. An extension line from Udamalpet to Palni has been built and is ready for supplying Pykara power to the place. Rapid development of load is then possible but only if Government will advance the necessary working capital. This has been found a great obstruction to the electrical development of many towns, and is discussed below.

Progress in other towns is fair considering their initial stage of operation.

19. In the last administration report mention was made of the difficulty experienced by some of these municipal undertakings in obtaining loans from Government for providing capital for extension schemes and working. The loans are being granted on the credit of the general municipal revenue balance rather than on the inherent earning power of the electrical undertaking or of the extensions concerned, with the result that electrical development is seriously handicapped, potential consumers having to be refused connexion for want of funds. Udamalpet, Virudunagar, Palni and Karur experienced difficulty this year in obtaining funds for extensions and service connexions, while the Dharapuram distribution scheme as a whole was held up for the same reason. In the latter case the delay will involve loss of revenue to Government as the Udamalpet-Dharapuram line was erected and ready but could not be used until the town distribution scheme was constructed with the help of a Government loan. The town distribution scheme itself will be much more costly now in view of the recent rise in price of steel and copper. The public are also complaining of the inability of the department to give them service connexions on demand. It is well known that the first three years from the development period and are usually the most difficult to finance. The quicker development proceeds the better will be the financial situation. Government's policy of granting a licence and then refusing working capital to the undertaking is resulting in a financial handicap to some of these small undertakings which it will take years to overcome. I venture to state that all this loss in capital and profit could have been easily avoided if the more reasonable and essentially commercial policy of financing loans on the credit of the electrical undertakings had been pursued as already recommended.

In this connexion I desire to record the co-operation and support which the department continued to get from the several Chairmen and Commissioners of the municipalities concerned.

CONSTRUCTION WORK.

20. Expenditure on construction work handled by the department totalled Rs. 71,57,229. Important among these may be mentioned—

	RUPES IN LAKHS.
<i>Pykara System—</i>	
(a) Extension of plant and lines and distribution system	10.04
(b) Mukurti Dam	5.68
(c) Coimbatore-Madura Extension	3.15
<i>Mettur Hydro-Electric Scheme</i>	48.25

Detailed accounts of the progress made in the several works are given in section II.

During the past year the work of the department has been the heaviest since it was formed and this year promises to be even heavier. It has been physically impossible for the Superintending Engineer in charge of the Construction Branch to devote as much supervision to some of the works as considered necessary, although such supervision has been supplemented by inspections of the Chief Engineer. Consequently the standard of work and economy achieved during the Pykara construction period has not, in some cases, been attained of late.

INVESTIGATIONS AND DESIGNS.

21. The policy of the department has always been to plan well ahead and investigate further schemes and extensions and it was steadily pursued. The objective of a Madras Grid was kept in view so that a rational and co-ordinated scheme of power development would eventually result. The Grid map accompanying last year's report has been brought up to date for future guidance.

22. *Papanasam Hydro-Electric Scheme.*—Among the more important investigations in hand during the year were the Papanasam and Lammasingi hydro-electric schemes. The former provides for developing the power resources of the Tambraparni river in the Tinnevely district with a view to supply the needs of the Tinnevely, Ramnad and Madura districts. Field investigations were practically over at the end of the year and the designs and report are under preparation. The Papanasam power area is at present being partially developed south of Madura by means of Pykara power, as the Trichinopoly and Tanjore districts were developed in advance for the Mettur Power Scheme. It is therefore of the highest importance that the Papanasam scheme be sanctioned in the near future.

23. *Lammasingi Hydro-Electric Scheme.*—The Lammasingi scheme is for developing a site in the Vizagapatam Agencies on the Gurupreo river. The scheme is expected to be economically feasible only when sufficient demand for power is created in a few years' time with the help of the Vizagapatam and Bezwada Thermal stations under construction. There is thus no immediate necessity to commence the construction of this scheme, in fact it would form an appeal work during the next economic depression.

CEDED DISTRICTS.

24. Owing to the low load density and poverty of these districts, it has not been found economically feasible at present to project the construction of large central stations. A scheme is, however, under preparation which will ensure a minimum number of small stations to supply the area with a gradual reduction in their number as development proceeds, by concentrating on larger units.

25. *Bore-wells.*—The work on experimental bore-wells in the Ceded districts has proceeded slowly and intermittently as the necessary experienced supervision for the work was not available.

A rough hydro-geological survey based upon existing records and a field inspection was prepared and preliminary sites selected near Cuddapah. These sites were examined by Mr. Pinto, a professional "water diviner" of the Department of Industries who reported favourably on three of them. The sites are on Government waste land, fit for cultivation, and near an electric power supply. Small holdings commanded by each bore hole and approximately of 200 acres each have been surveyed. It is now intended to bore for water on these holdings. If these experiments are successful it is proposed to ask Government for permission to carry out similar experiments in other parts of the Presidency.

TECHNICAL WORK.

26. The technical sections have been exceptionally busy during the past year and a fair idea of the amount of work undertaken may be gathered from page 36. It included the specifications and designs of two complete thermal electric stations and a 35,000 h.p. addition to the Pykara Power Plant which the technical reader will appreciate was a particularly good effort for the small staff employed.

The 280-mile transmission at 66 K.V. from Pykara to Nega-patam has been satisfactory. The synchronous condensers, specially designed for the purpose, in conjunction with the regulators and compensators at Pykara, have given good voltage regulation and stability. Similar, but larger, synchronous condensers are to be installed at Madura. A study is being made to determine the practicability of an electric furnace load of 4,000 K.V.A. at the end of the transmission system.

Owing to the heavy work now being undertaken and the small number of engineers with the requisite experience in the department sufficient time is, in my opinion, not always spent on technical study and resort has to be made too often to designs which have already stood the test of time. To develop original ideas requires considerable time and study. If the department is to be progressive and keep ahead of the times more attention must be paid to broader technical training and experience. The deputation of selected and promising officers in the department for special technical training abroad which cannot, at present, be obtained in India has not been encouraged by Government although two proposals were submitted during the past year, indicating that the great economy of high technical standards is perhaps not appreciated. It is hoped that official opinions on this subject will undergo a change.

27. A paper on the Pykara system by Lieut.-Col. M. G. Platts, Superintending Engineer, Construction Branch, was read before the Institution of Civil Engineers during the year and received the Telford Premium. For reasons already advanced the paper could only be prepared while Colonel Platts was on leave. Such papers and contributions to the technical press ought to be encouraged as it directly conduces to a higher technical standard in the department.

PURCHASING.

28. In the past important purchases of the department have been undertaken by the Central office. This has tended towards standardization and economy through buying in bulk. No special staff has been allowed for such work. Due to the rapid extension of the department and the large amount of construction work in progress, it was found impossible for the Madras office to manage the purchasing for the whole department. Except for important and technical orders, the Superintending Engineer, Construction Branch, now undertakes the purchasing for his works, while the Superintending Engineers in charge of operation in power areas are given powers up to Rs. 5,000. It is proposed, however, to centralize the stores and repair shops of the department at Mettur under a storekeeper of gazetted rank. The main stores of each power area under a chief storekeeper will draw all material from the central store.

Purchases for the central store will be done at Mettur and Madras according to the importance of the order.

The system should tend further towards standardization, economy in purchase and result in a smaller stock in each power area.

Proposals for the necessary staff are to be submitted to Government during the year.

The total purchases made by the department in India during the year were—

	Rs.
Central office	3,57,000
Pykara	2,82,360
Mettur	5,05,000
Total ..	11,45,360

LICENCES.

29. The number of licensees giving electric supply in the Presidency was 50, the same as in the previous year—as no new licensees commenced supply during the year. Twenty-five of these were local bodies and 25 were companies. Nineteen licensees were yet to start supply and 12 applications for licence were under consideration—vide Appendix F.

30. The total installed generating plant in service in the whole Presidency amounted approximately to 98,500 K.V.A., and the total energy output was 136 million units during the year, made up as follows:—

	Installed capacity.		Energy output.	
	K.V.A.	Percentage of total.	K.W.H. Millions.	Percentage of total.
Government Pykara Power Station ..	23,400	24	77*	56
Madras Electric Supply Corporation ..	53,750	54	47	34
All other generating licensees together.	21,350	22	12	10
Total ..	98,500	100	136	100

* Includes one million units generated from the department's small thermal stations.

It will be seen that the installed capacity does not convey a correct and complete idea of the relative importance of the Madras Electric Supply Corporation and of Pykara among power producers in the Presidency. For example the Pykara plant though representing only 24 per cent of the total, produced during the year 76 million units whereas the rest of the plant including the Madras Electric Supply Corporation's and representing 76 per cent of the total produced only 59 million units. This situation, in itself, is a potent economic argument for a national generation policy. The figures of energy output given in the last two columns are more significant. It is worth noting that if the Madras Electric Supply Corporation is excluded all the other licensees put together produce only 10 per cent of the total output.

INDIAN ELECTRICITY ACT AND INSPECTIONS.

31. *Inspections.*—The number of inspections of licensees' and non-licensees' works made during the year were 995 and tests carried out were 496.

32. *Accidents.*—The number of accidents reported was 77 of which 32 proved fatal. These would compare with 60 and 24, respectively for 1935-36. Eighteen of the 32 fatal accidents occurred on the main transmission lines of the Pykara system, the towers being climbed in spite of danger boards and repeated warnings by tom-tom. Shepherds and cowboys were the principal miscreants, their curiosity accounting for 14 deaths. Of the rest some are suspected to be suicides, electrocution being apparently the chosen method.

ELECTRIFICATION OF PUBLIC BUILDINGS.

33. Since every important town in the province has or would have shortly electric supply, a large number of proposals for electrification of the Government buildings in the several places were studied and some carried out. The outlay on new works during the year was Rs. 1.71 lakhs bringing the total capital cost of the Government installations in the Presidency to Rs. 44.87 lakhs. Important among the installations completed may be mentioned the new Engineering College Electrical Laboratory at Guindy, the Madras Legislative Assembly Hall at the Senate House, the hospitals at Mangalore, Virudhunagar and Dindigul, and the quarters of several district officers at various places. The volume of work handled by the Electrical Engineer (General) who is in charge is increasing rapidly.

ORGANIZATION.

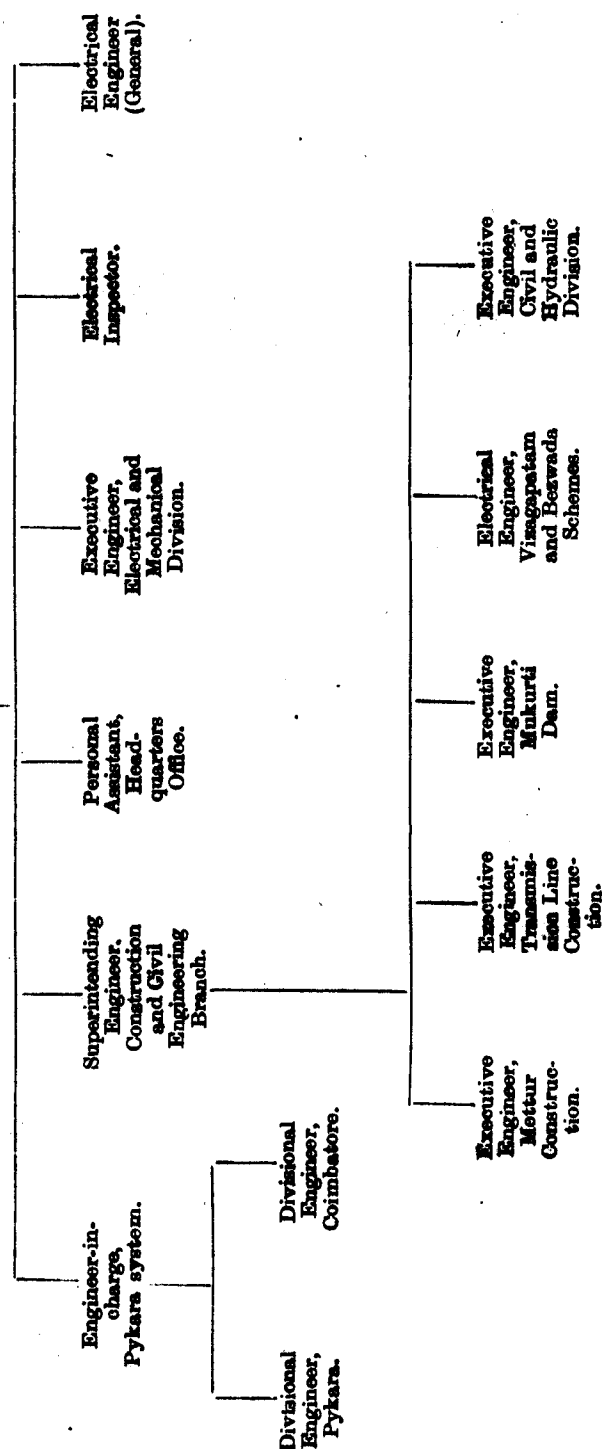
34. The widening of the activities of the department called for increased staff and a certain amount of reorganization. Proposals for headquarters reorganization providing among others for a

CHART III.

ORGANIZATION OF THE DEPARTMENT.

SUPERIOR STAFF.

Chief Engineer.



new division to be in technical charge of all the Civil and Hydraulic works of the department and for a Manager for the Chief Engineer's office were approved by Government.

Sanction was also accorded to an operating organization for the Mettur system with a Superintending Engineer and two divisions to start with and a division later to be added.

Proposals for the expansion of the Pykara system operating staff providing among others for a division for the Madura-Virudhunagar-Rajapalayam area to be formed when power reaches it, were submitted to Government.

Two new construction divisions were formed during the year, one for the charge of the Mettur Transmission System and Madura line construction and the other for the Vizagapatam and Bezwada thermal schemes. A third division for the Pykara plant extensions was also sanctioned.

The framework of the organization of the department at the end of the year is indicated in Chart III.

The more important changes in the superior staff of the department are given at the end of this report.

ADMINISTRATION.

35. Recruitment for the Electrical Subordinate Services was from this year made by the Chief Engineer and not as before by the Services Commission and the difficulties previously experienced in providing without delay adequate and competent staff for handling the increasing work of the department were to a large extent removed.

That administration of a commercial department, such as this one, supplying a vital and highly competitive commodity like power for industries and lighting and in intimate touch with a vast body of the public, is in many respects different from the administration of other public departments, is being appreciated by Government and has helped the Chief Engineer in the discharge of his responsibilities.

The question of adequate return from productive schemes raised last year would bear reiteration. The rule requiring 6 per cent return is, I am afraid, unduly restricting expansion. Reduction to 4 per cent or even 5 per cent is recommended.

ELECTRICITY BOARD.

36. The committee appointed to examine and report on the proposals for a Statutory Electricity Board prepared and put forward by this department, sent in their report in June 1936. They did not recommend the creation of a Statutory Board at present, but agreed it might be desirable at a future date.

The Chief Engineer believes the need for a Board for the administration of this department would be increasingly felt as the number of undertakings increases and it is hoped to submit proposals again to Government at a future date.

The following further recommendations of the committee were accepted by Government :—

- (i) that a policy of steady expansion of electric supply undertakings should be pursued by Government and promising large schemes taken up especially if they exploit natural resources as they will provide a cheaper and more flexible and therefore more reliable supply of power than small and uneconomic stations;
- (ii) that the generation of electricity and its transmission and supply in bulk should be by State agency throughout the Presidency so far as that is economically possible from a series of large central stations, hydro-electric or thermal.
- (iii) that provided Government are satisfied that local bodies are able to finance and are fit to manage electric supply undertakings, local bodies should be preferred to private companies as licensees for the distribution of electrical energy and for the generation of power also in areas which are not likely to be served by central stations belonging to Government and in areas to which a Government service can only be extended at some time in the future, and
- (iv) that where there is no licensee in a position to supply rural loads satisfactorily Government should undertake retail distribution of electric supply in rural areas, provided the formula adopted for small rural schemes in the Coimbatore district is satisfied.

Generally speaking, the policy hitherto pursued by Government was similar to the recommendations. The enunciation of it in specific terms and formal acceptance by Government is the advantage gained.

Government have not accepted the recommendation of the Committee regarding taking power to enforce closing down of uneconomic generating stations when bulk-supply becomes available. It is hoped that such powers may not prove necessary.

The closer regulation of private licensees in accordance with modern ideas so consistently advocated by the department has also not been accepted by Government.

PROGRAMME OF WORK FOR 1937-38.

87. The programme of work for 1937-38 can be summarized as follows :—

- (i) *Pykara System*.—The third penstock pipe and additional generating plant ordered, will have been received at site before the end of the year and erection begun.

Mukurti dam will be completed and full design storage made possible.

Changeover of the Pykara Power-house and Coimbatore sub-station Plant to 110 KV. will be carried through a further stage. Final changeover will be effected when the additional units come into operation.

Coimbatore-Madura and Madura-Virudunagar-Rajapalayam-Koilpatti lines will be completed and supply of Pykara power to the Madura and Ramnad areas given. It is, however, to be particularly noted that although Messrs. Sassoon's have signed an agreement for an electricity supply to their Koilpatti Mills, Government have not yet sanctioned the construction of the necessary lines from Virudunagar. This is rather serious, as the department cannot afford to inconvenience such an influential consumer. The thermal stations at Palni, Dindigul and Virudunagar will in consequence be shut down.

- (ii) *Mettur System*.—First generating unit is expected to be in commission in June 1937 and the whole system should commence regular operation in October 1937.

The extension to Villupuram and the Conjeeveram-Arkonam extension should be nearing completion.

- (iii) *Vizagapatam and Bezwada Schemes*.—Construction work will be in full swing during the whole of the year. Supply of power from Vizagapatam station may be possible about March 1938 and from Bezwada three months later.

- (iv) *New schemes*.—(a) The Papanasam scheme report is expected to be submitted to Government in the middle of the year and if the scheme is sanctioned, work may commence in January 1938.

- (b) Report on the Lammasingi scheme should be submitted to Government at about the end of the year but no immediate decision on the scheme is necessary.

- (c) Thermal electric schemes for the Ceded districts and for the Cocanada area will be prepared and work put in hand if sanctioned by Government.

- (d) Extension of Pykara power to the West Coast will be further investigated and a scheme prepared if considered practicable.

Capital expenditure on construction work during the year is expected to be around Rs. 120 lakhs.

Generally speaking, the electricity supply of the whole Presidency may be considered as organized on a sound and economic basis, once the construction programme contemplated above for the coming year has been completed and the schemes visualized in items (iv) (a), (c) and (d) are well under way, always provided

however that no new policy is introduced which may tend to slow up progress and prejudice the commercial outlook of the department.

ACKNOWLEDGMENTS.

38. *Government of India Surveys.*—The Chief Engineer desires to take this opportunity to place on record the indebtedness of the department to the Government of India Survey contour maps in carrying out investigations and surveys. Their general accuracy and details have been of great use to the department in reducing considerably the time and money spent on field investigations of hydro-electric projects.

Telephone lines.—Another Government department to which the Chief Engineer would like to convey his appreciation is the Indian Telegraphs Department. The telephone lines required for the operation of the Pykara System to the extent of 270 route miles and costing nearly Rs. 3.5 lakhs were previously erected by them and about 170 miles of telephone lines required for the Mettur system are under construction. The telegraph authorities carried out the work with commendable expedition and it was done without trouble and a minimum of correspondence.

India Store Department, London.—The Chief Engineer would also like to acknowledge the continued and valuable assistance received from the Director-General, India Store Department, in connexion with the inspection of the Mettur plant and other departmental purchases of machinery in England, and from Messrs. Rendel, Palmer and Tritton, Consulting Engineers, for their inspections and co-ordination of the layout and designs of the Mettur Power Plant.

STAFF.

39. The year has been one of great activity and the Chief Engineer desires to record his warm appreciation of the services rendered by the staff of the whole department. Such general co-operation is rarely met with. It has been increasingly apparent that many of the more senior officers are overworked and it is almost inevitable that either development has to slow down or a reorganization effected. If a senior officer falls sick or takes leave the work suffers, as it has not been possible so far to replace him with the full-time services of another qualified officer.

40. A more detailed report of the work of the various sections of the department is contained in the following Section II.

SECTION II—DETAILED REPORT.

PYKARA HYDRO-ELECTRIC SYSTEM.

41. The system completed the fourth year of operation and the usual high standard of service was maintained. There was steady development of load during the year, the peak rising from 10,100 to 14,900 K.W. In spite of the fact that the working capacity of two generators at Pykara was exceeded, the load

requirements were fully met. This called and still calls for maximum efficiency in operation and maintenance and much thought was given to improvement of the already high load factor. Only thus can retardation of revenue development be avoided pending the servicing of the first unit at Mettur.

42. *Civil and Hydraulic works.*—All civil, hydraulic and electrical works were maintained in good order. The water conditions were slightly better than the previous year. The total rainfall during the year was 78.86 inches as against 68.24 inches in 1935. In spite of the considerably increased load there was never any anxiety on account of water shortage as the storage at Mukurti has been raised from 136 m.c. feet to 440 m.c. feet. The monthly average consumption of water in the power-house exceeded 48 cusecs in February as against an average of 33 cusecs last year. A programme of progressive improvement to the Pykara flume channel is being carried out. During the year about 1,000 feet of the bed was concreted and the pitched sides grouted. A similar length is proposed to be concreted during the coming year. The pipe line was maintained in good condition.

43. *Power station.*—The growth of output of the station since inception will be seen from the following figures:—

Year.	Peak demand.	Energy output.
1933-34	3,150 K.W.	10.9 million units.
1934-35	6,600 "	30.0 "
1935-36	10,100 "	50.3 "
1936-37	14,900 "	75.6 "

The load factor of the station for March 1937 was 66.7 per cent.

44. *Service interruptions.*—There was only one total interruption to service from the station during the year against two in the previous year. A rat caused a flashover on the main generator oil circuit breaker, causing stoppage of supply for 3 minutes on 17th August 1936. Supply was resumed in commendably short time.

Local interruptions of supply occurred at various places and every endeavour was made to restore service with minimum delay. Defects in material or in operating organization revealed by such stoppages were attended to. An interruption of an exceptional nature occurred on the 28th and 29th of June 1936 when supply to Ootacamund and Coonoor was cut off for 31½ hours. This was due to the cyclonic weather which prevailed over the area, the wind velocity exceeding 60 miles per hour and uprooting thousands of trees. The Pykara-Ootacamund line was damaged at several places. The local staff as well as the emergency staff which was rushed from Coimbatore worked strenuously under the most trying conditions and repaired the damage in minimum time.

45. (a) *Equipment.*—A 5,800 K.V.A. Transformer with on-load tap changing gear, was installed at Coimbatore.

With a view to raising the operating voltage of the main line from Pykara to Coimbatore to 110,000 volts in order to cope with the increased load expected in the coming years, a change-over programme was being put through in stages. The line insulation was reinforced and 110 K.V. O.C.Bs. for replacing the existing 66 K.V. O.C.Bs. were under erection. The 66 K.V. O.C.Bs. will go to the Mettur system. The third 1,000 K.V.A. Transformer at Trichinopoly was replaced by a 2,500 K.V.A. unit and has since been re-erected at Negapatam.

In view of the increase in Tiruppur load, 1,750 K.V.A. transformers were ordered to replace the existing 1,000 K.V.A. units, which will be moved to Virudhunagar.

The Erode sub-station was remodelled for taking supply from Mettur and functioning as a tie between the Pykara and Mettur systems for interchange of power when needed.

To improve voltage regulation in the Anamalai area, two automatic booster regulators rated for 2,500 K.V.A. each were installed at Pollachi and are giving satisfactory service. With the same object, insulation of the eastern area of the Anamalai distribution was being increased from 11 K.V. to 22 K.V.

(b) *Transmission and distribution lines.*—Forty-nine miles of 22 K.V. and 71 miles of 11 K.V. transmission and distribution lines were constructed and brought to service during the year. The total length of high-tension lines in operation on the system at the end of the year was 1,108 miles of equivalent single circuit and the connected transformer capacity amounted to 67,880 K.V.A. Details are given in Table No. 1.

Table No. 1.

Length of transmission lines and installed capacity of transformers in service — Pykara System including Trichinopoly extension.

Voltage.	Constructed during the year.				Total in service.			
	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity/ station transformer.	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity/ station transformer.
	MILES.		MILES.	K.V.A.	MILES.	MILES.	MILES.	K.V.A.
66,000 ..	..	..	..	8,500	50	223	496	61,180
33,000 ..	..	..	..	..	18	..	18	1,000
22,000 ..	49	..	49	..	196	61	318	5,700
11,000 ..	71	..	71	..	246	15	276	..
	120	..	120	8,500	510	299	1,108	67,880

Important among the new extensions may be mentioned the new 66/11 K.V. sub-station at Kattabettu for giving direct supply to the Cordite Factory, Kotagiri village, and the Tea Estates in the Nilgiris. A new 11 K.V. mill ring of 10 miles length was completed at Coimbatore. An extension from Salem

to Rasipuram involving 15 miles of 22 K.V. lines and a local distribution system was constructed and supply given to Rasipuram. 22 K.V. lines to Tiruchengode and Iddapadi villages were extended from the Erode-Salem line.

(c) *Rural electrification.*—Agricultural load continues to develop steadily and the villager who was till now hesitating between oil engine and electric power has on the whole settled the matter in favour of the latter. All new wells requiring pumps are taking electric power as a matter of course. During the year 274 pumping sets aggregating 1,800 H.P. have been installed making a total of 543 sets and 3,680 H.P. connected to the system. The load under village street and domestic lighting, and rural and cottage industries has also developed during the year. Cottage industries for laundry, sugarcane crushing, etc., have been started at Perur, Kannampalayam and Telungupalayam. The following extensions, mostly intended for rural loads were supplied with power during 1936-37 :—

- | | |
|--|---------------------------------|
| 1 Nambiampalayam Extension (Avanashi). | 10 Mailampatti. |
| 2 Ganapathipalayam (Udamalpet). | 11 Kanthia Goundan Chavadi. |
| 3 Angalakurichi. | 12 Iddigarai-Athipalayam. |
| 4 McDonald's Choultry. | 13 Sengalipalayam. |
| 5 Thekkampatti-Kallar. | 14 Raghalubavi. |
| 6 Kannampalayam. | 15 Makkinayakanpatti. |
| 7 Karumampalayam (Avanashi). | 16 Perianagamam (Pollachi). |
| 8 Rakkiapalayam (Avanashi). | 17 Portayampalayam (Udamalpet). |
| 9 Veerapandi. | 18 Chandrakavi (Tiruppur). |

The following schemes were sanctioned and are expected to be supplied shortly :—

- | | |
|---------------------|--------------------------------------|
| 1 Annur Extensions. | 10 Rasipuram. |
| 2 Keeranatham. | 11 Venasapatti. |
| 3 Vyampalayam. | 12 Karudampalayam. |
| 4 Arasoor. | 13 Singampatti. |
| 5 Sravanampatti. | 14 Tallapalayam Kalavi. |
| 6 Pulankinar. | 15 Peedampalli-Kallapalayam. |
| 7 Kottampatti. | 16 Velur Valavadi Extension. |
| 8 Velur Valavadi. | 17 Gomangalampudur. |
| 9 Kuniamuthur. | 18 Ayakudi Extension (beyond Palni). |

A number of rural extensions on the Palladam route and on Udamalpet-Palni-Dharapuram side and on the Tiruppur-Gobichettipalaiyam route are under investigation and it is anticipated that agricultural pumping load will show still further increase in 1937-38. A list of villages which have so far received electric supply in the Coimbatore district is given in Appendix "G."

A map showing the extent of rural electrification in the Coimbatore district serves as the frontispiece.

(d) *Electrification of tea factories.*—Two additional factories have taken power, one in the Nilgiris (Terrace Estate) and the other in the Anamalais (Kadalaparai Estate) during 1936-37, making up a total of 27 factories. Negotiations in respect of Tuttapalayam Tea Estate in Kotagiri area are now complete and work is being taken up. Extension to Kullakombai area will be taken up as soon as the factories, Sutton, Mailoor and Terramia sign the agreements. In the Anamalais, arrangements are being

made to give supply to Mukkottu Mudi. Further development at any appreciable rate cannot be expected whilst restriction is in force.

The total outlay on the new construction works and extensions dealt with in the sub-paragraphs (a), (b), (c) and (d) above was Rs. 10.04 lakhs.

(e) *Other major works.*—Apart from these but appertaining to the Pykara system were five major works under construction—

- (1) Mukurti Dam,
- (2) Coimbatore-Madura 66 K.V. extension,
- (3) Madura-Virudunagar-Rajapalayam 66/33 K.V. extensions,
- (4) Udamalpet-Dharapuram-Palni 22 K.V. extensions, and
- (5) Pykara Power plant extensions.

46. *Mukurti Dam.*—It will be re-called that the Mukurti Dam on the upper reaches of the Pykara was sanctioned in January 1935 with the object of providing adequate water storage for the increasing needs of the Pykara plant. The dam is to be 90 feet high providing a storage of 1,600 million cubic feet and costing Rs. 21 lakhs. At the beginning of the year, about half of the total quantity of dam masonry had been built and enough storage was available to tide over the dry period. Work on the foundations on the right and left flanks the rear portion of the spillway and the large earthen bund near the Krurmund stream were proceeded with. Construction was stopped for the monsoon on 20th June and resumed on 4th September. A heavy flood occurred in the last week of June 1936, a discharge of 8,500 cusecs passing over the temporary spillway with a depth of flow of 7 feet. Work was resumed after the monsoon and by the end of October the spillway had been raised to a level assuring 440 million cubic feet of storage for use during the 1937 dry weather. By the 5th of December 1936, the lake had filled to this level. Work on the flanks and at the rear of the spillway was continued in sections and by the end of March 1937, the non-overflow sections was raised practically to crest level. The spillway was built to a lower level and is being left there for the 1937 monsoon so that the dam structure is loaded very gradually. Progress is considerably ahead of schedule and the expenditure below estimates. The whole work is expected to be completed by the end of 1937. Value of work done during the year was Rs. 5.66 lakhs, the total outlay to the end of the year being Rs. 13.63 lakhs. During the working season the labour strength was about 1,100.

47. *Coimbatore-Madura 66 K.V. extension.*—This extension is to develop load in the Madura area with hydro-electric power from Pykara. Eventually the area would be transferred to the Papanasam Power system. The scheme involves a double circuit 66 K.V. line from Coimbatore to Madura, a distance of 125 miles with sub-stations at Udamalpet, Sembatti and Madura. The estimate is for Rs. 33.50 lakhs and sanction to proceed with



MUKURTI DAM.

the scheme was accorded in April 1936. Surveys were completed by July, and contract for the line was let to Messrs. Callenders Cable and Construction Company who started work in January 1937. The expenditure during the year was Rs. 3.15 lakhs. Power is expected to be supplied to Madura by the end of 1937.

48. *Madura-Virudunagar-Rajapalayam 66/33 K.V. extension.*—A study of the existing and immediately possible power demands in the Ramnad area indicated the desirability of extending Pykara hydro power further south from Madura. A textile mill of the standard Coimbatore size promised to come into being if electric power was available and the several towns in the area were keen on getting electric supply. A scheme was prepared for extending a 66 K.V. single circuit line from Madura to Virudunagar and a 33 K.V. branch therefrom to Rajapalayam. The cost was estimated to be Rs. 10.45 lakhs and the scheme was sanctioned in September 1936. Contracts for the lines have been let and work commenced. This area with Madura would later pass under the Papanasam Power system. Subsequent to the sanction, negotiations were put through for supplying the Kovilpatti Textile Mills a portion of their power requirements and a scheme for a further extension of the 66 K.V. line from Virudunagar to Kovilpatti has been submitted to Government for sanction.

49. *Udamalpet-Dharapuram-Palni 22 K.V. extensions.*—As the oil engines at Palni Thermal station were inefficient and uneconomical, extension of Pykara power to this station was undertaken. The 22 K.V. line from Udamalpet was completed by February 1937 but supply to Palni has been deferred so as not to add to the overload Pykara is carrying. It will be commenced as soon as the first unit at Mettur starts commercial operation.

The line to Dharapuram was completed in March 1937, but the town distribution system was not ready, in fact it had not even been started as Government loan to finance the Municipal distribution undertaking was pending consideration the whole year. The extension will therefore be unremunerative for the present and further in view of the rise in prices of copper and steel, the local distribution scheme will cost much more and the profit earning stage of the undertaking will be considerably postponed. As already suggested there is need for the adoption of a more commercial outlook and policy on the part of Government in financing loans to Municipal undertakings.

50. *Pykara power plant extensions.*—A review of the needs of the Pykara power area indicated that additional generating plant would be required before the end of 1938, even after allowing for the transfer of the Erode-Trichinopoly-Negapatam areas to the Mettur system. First of all there was the inherent growth of the Coimbatore district, and important additions to the cement company's plant and to the textile load were expected. The extensions to Madura, Virudunagar and Rajapalayam would have to be catered for and later an extension to the West Coast appeared inevitable.

A scheme providing for a third and bigger penstock pipe and two 12,500 K.V.A. generating units at the Pykara Power-house was prepared costing Rs. 45 lakhs. Government gave sanction to proceed with it in December 1936 and specifications for the plant were issued with minimum delay. Preliminary surveys and specifications for the realignment of the haulage track were completed. Contracts for additional quarters were let and construction was begun early in January 1937. A steel gantry with a 15-ton overhead travelling crane was purchased for handling the penstock pipes and heavy machinery and was under erection at the Ootacamund Railway station.

Specifications were completed, tenders invited, and orders placed as follows:—

- (1) Penstock line and valves—Messrs. Boving and Company, London—
 - (a) Pipes—Messrs. Ferrum, Poland.
 - (b) Valves—Glenfield and Kennedy, Scotland.
- (2) Power plant—Messrs. Metropolitan Vickers Company—
 - (a) Turbines—Messrs. Escher Wyss, Zurich.
 - (b) Generators—Messrs. Metropolitan Vickers Company.
- (3) Switchgear and transformers—Messrs. Associated Electrical Industries (India), Limited—
 - (a) Switchgear—Messrs. British Thomson Houston Company.
 - (b) Transformers—Messrs. Metropolitan Vickers Company.

Items (1) and (2) were placed through the Director-General, India Store Department, and item (3) locally.

51. *Municipal undertakings.*—The Government managed municipal distribution undertakings within the Pykara system were those at Coimbatore, Tiruppur, Pollachi, Karur and Udamalpet. A summary of the operating and financial results is given in Table No. 2.

The Coimbatore and Tiruppur distributions having reached the profit-earning stage, were, in accordance with agreement, handed over on 1st April 1937 to the municipal councils concerned for future management.

Progress at Pollachi continues to be slow in spite of special attention. Karur registered fair rise both in demand and revenue. Udamalpet was in its first year of operation and the surplus after meeting the operating expenses was not enough to meet interest charges. Development was considerably handicapped by the refusal of Government to sanction loan for extensions solely on the credit and prospects of the electrical undertaking irrespective of the condition of the general finances of the municipality.

Table No. 2.
Load and Revenue results of Municipal Electricity undertakings served by the Pykara System and managed by the department for the years 1935-36 and 1936-37.

Item No.		Coimbatore.		Tiruppur.		Pollachi.		Karur.		Udamalpet.	
		1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.
1	Peak load..	516	564	380	450	230	315	57.5 K.V.A.	90	..	71
2	Units generated or purchased..	1,323,988	1,537,330	876,820	1,145,905	686,205	761,368	97,614	178,412	..	169,988
3	Total units sold or distributed..	1,221,564	1,438,369	833,965	1,029,490	585,515	648,296	86,388	168,376	..	149,287
4	Total connected load..	1,072	2,045	976	1,136	897	945	808	279	..	149,177
5	Number of consumers..	1,882	2,332	531	1,659	519	568	327	406	..	211
6	Cost per unit purchased..	0.67	0.63	0.70	0.65	0.69	0.69	0.83	0.83	..	0.83
7	Cost per unit sold..	2.42	2.32	1.42	1.39	1.48	1.56	3.08	2.53	..	1.90
8	Total capital expenditure up to end of year..	5,10,910	5,55,976	1,68,736	1,93,397	1,80,989	1,87,602	76,806	86,560	..	64,061
9	Gross revenue..	1,94,686	2,25,261	75,647	93,172	59,252	65,985	17,771	28,560	..	18,533
10	Operating and maintenance expenses (including agency fees)..	94,712	1,07,368	54,450	63,678	44,920	50,829	10,873	20,796	..	18,176
11	Interest at 5½ per cent on capital..	27,779	30,579	9,087	10,637	9,814	10,318	5,056	4,761	..	3,523
12	Balance for sinking fund, depreciation, reserve, etc..	72,195	87,314	12,110	18,857	4,518	4,838	1,842	3,003	..	— 3,167

* Interest was calculated on deposit made and not on actual capital expenditure.

52. *Administration—Accounting and Stores.*—Efforts were made during the year to systematize the various checks on revenue and expenditure and standardize the statistical returns with a view to acceleration of commercial business. A report on the internal check of revenues was prepared and a guide to distribution Engineers based on a collection of the various orders on tariffs, etc., was under compilation. With a view to greater efficiency, the possibility of introducing mechanized accounting was examined, so far without success. Two audits were conducted during the year and the results found satisfactory.

Consequent on the expansion of work, the reserve limit of stores was raised from Rs. 3.6 lakhs to 5.5 lakhs.

Staff.—Side by side with the territorial organization, the duties and powers of the several grades of Engineers were defined and it has been observed during the year that there has been a more ready tendency to exercise such responsibilities. Steps were also taken to formulate rules and orders for the recruitment, promotion and punishment of the work-charged staff numbering about 500 in the system.

Testing branch.—The Meter-Testing section was taken over from the Electrical Inspector on 1st April 1936; this has been raised to a subdivision charge to cope with the increased work and responsibility and an Assistant Engineer was posted in the last week of March 1937. In addition to the testing of meters and relays in the Pykara system, the section looked after the testing in the Thermal areas in the south. During the year, all important service meters and their connexions were tested *in situ* and new power service connexions checked complaint meters were also tested at site where necessary. The following tests were carried out during the year :—

<i>New meters—</i>					
Single and polyphase	..	..	..	..	1,476
<i>Periodical test—</i>					
Single and polyphase	..	..	..	..	609
H.T. meters	..	..	..	..	140
Relays, protective series and others	..	..	..	..	340
Total	..				2,565

Conversion Fund.—The granting of loans to the industrialists was working very satisfactorily and the repayments were regular. The Textile Mills took full advantage of the fund most of them taking loans. The total amount of loans advanced to end of the year was Rs. 8,34,268 out of which a sum of Rs. 2,43,741 has so far been repaid. Details for each year are furnished below :—

Years.	Loans advanced.		Repayments.	
	Rs.		Rs.	
1933-34	..	2,01,295	..	17,805
1934-35	..	1,06,861	..	55,003
1935-36	..	2,53,487	..	52,739
1936-37	..	2,72,626	..	1,18,194
Total	..	8,34,269	..	2,43,741

Medical and sanitation.—The general condition of health in the camps was satisfactory throughout the year. Timely anti-malarial measures adopted during the year brought the incidence of malaria to a minimum. The staff at Attakatti and Iyerpadi camps have still to resort to Estate hospitals as the public hospital at Valparai has been permanently closed.

Accidents.—Printed notices and pictorial posters warning people against the dangers of meddling with electric supply wires were distributed throughout the length of the transmission lines with the co-operation of the Revenue authorities. There have been 21 fatal and 22 non-fatal accidents during the year, of which 2 fatal and 5 non-fatal occurred to employees of the department. The amount of compensation paid to the employees who met with accidents during the year 1936 was Rs. 117-2-0.

METTUR HYDRO-ELECTRIC DEVELOPMENT.

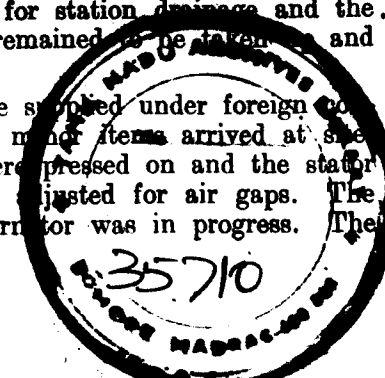
53. *Mettur Power-house construction—Civil.*—At the time of the last report, the excavation of the foundations for the power-house building was partially done and in full swing. The excavation was completed in April, the concrete foundations immediately started, and the beds prepared for the erection of the main steel structure of the station. The steel structures for the building weighing about 600 tons arrived at site about the end of May and erection was completed by the end of September. The 100-ton travelling crane was also erected immediately so that the heavy cases of machinery that commenced to arrive at site by about that time might be handled with ease. The civil works on the foundations relating to each unit were being completed progressively so that the erection of machinery on the No. 1 unit might go on side by side with the civil works in the other units. Thus the foundations for the erection of the No. 1 unit were ready in October 1936 and those for the No. 2 and No. 3 units in December and middle of February respectively. At the end of the year, the walls of the main building were all completed with the exception of a portion of the parapet wall on the top. Doors and windows were being fitted. Finishing works such as removal of the scaffolding, painting, glazing, etc., were in progress. The apron for the tail race was in progress and was finished by the middle of May. Gates and gantry arrived at site and the channel irons for the side grooves, rail bearers and track for the same were being finished. The stop logs necessary for raising the water level of the tail race just below the draft tubes were got ready. The pump house for station drainage and the reinforced concrete draining flume remained to be taken up and would be completed by July 1937.

Machinery.—All machinery to be supplied under foreign contracts with the exception of a few minor items arrived at site. The poles of the first alternator were pressed on and the stator halves were placed in position and adjusted for air gaps. The aligning of the shaft of No. 2 alternator was in progress. The



METTUR POWER HOUSE.

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bed plates of No. 3 unit were placed in rough position. The erection of the cables that had arrived at site was just being started. Most of the erection connected with the main control boards, 11 K.V. switchgear, industrial cubicles, reactors, lightning arrestors, battery, etc., was completed. The out-door transformer station including the two 12,500 K.V.A. transformers was ready for being charged. The designs for the oil house and distribution system were completed and materials were under order. Cooling water-supply system for the power-house machinery was being erected at site. The auxiliary unit was assembled, lined up, and grouted and two valves fitted in position. The runners for this unit were received in May 1937. According to the present estimates, it is expected that No. 1 unit will be in operating condition by early June.

The following were the main contractors for the supply of machinery :—

Turbines.—Messrs. The English Electric Company.

Generators.—Messrs. Metropolitan Vickers Electrical Export Company, Limited.

Switchgear and transformers.—Messrs. British Thomson Houston Company.

Hundred-ton crane.—Sir William Arrol and Company, Limited.

Power-house—Steel work.—Messrs. Motherwell Bridge and Engineering Company, Limited.

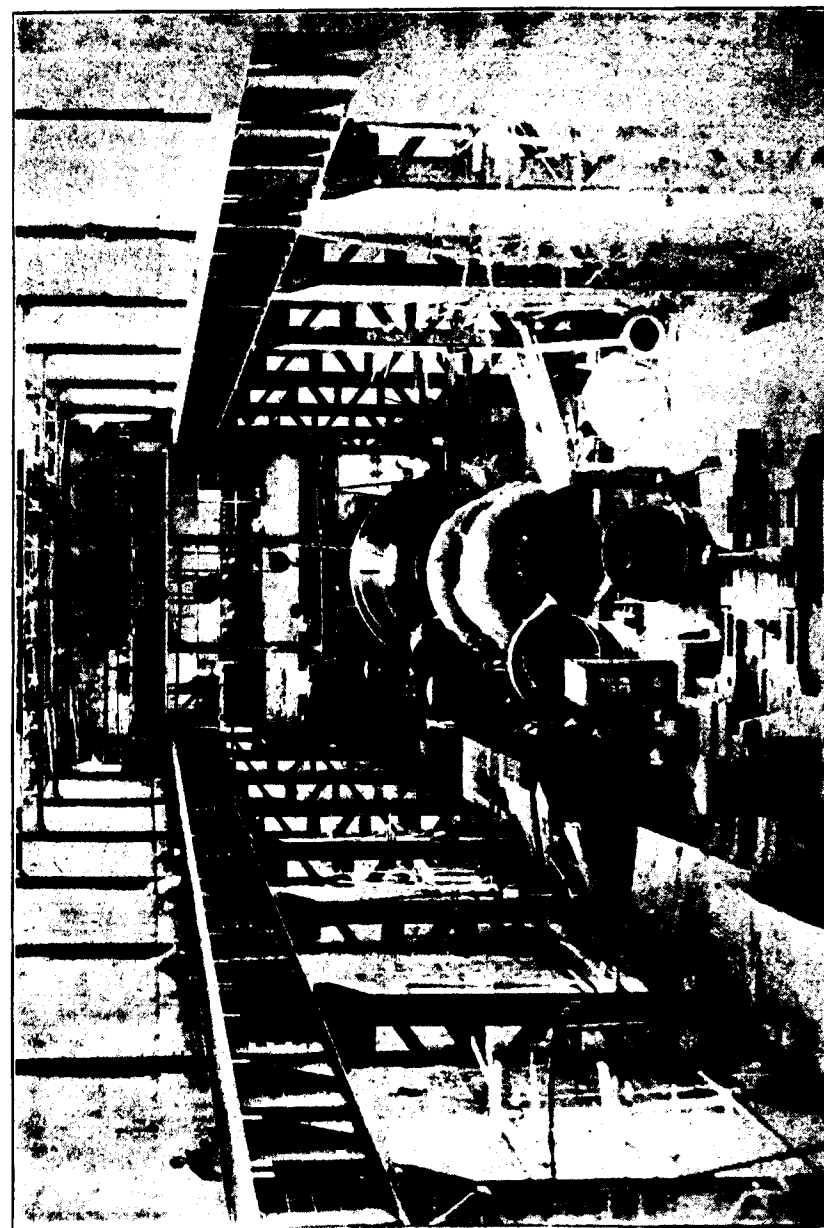
Transmission lines.—Messrs. The Callender's Cable and Construction Company, Limited.

The cost of work done during the year in the power-house and transformer station is Rs. 26,29,908 and the total cost of the work so far done is Rs. 27,03,934.

54. *Transmission lines—Main lines.*—It will be re-called that at the end of the last year, the survey of the main transmission lines was in progress. Contract for all the 66/110 and 66 K.V. lines was awarded to Messrs. Callender's Cable and Construction Company, Limited.

The survey was completed in April 1936 and the contractors entered on the work. The erection of the Mettur-Erode line—37 miles—was over in December 1936 except for the special towers for the Cauvery crossing at Mettur, the receipt of which was delayed. These special towers arrived early in March 1937 and the whole line was ready for test by the 15th of April.

Work on the Mettur-Singarappet 66/110 K.V. lines was commenced in May 1936. All the 325 towers except the terminal towers at the Mettur end have been erected and stringing conductors completed. This line which is 66 miles long will be ready for being put on commission in May 1937. Erection of towers on the Singarappet-Tiruppattur-Ambur-Vellore 66 K.V. transmission line which is 69.6 miles long was completed and



MACHINERY HALL—METTUR POWER HOUSE.



TRANSFORMER YARD—METTUR POWER HOUSE.

cable stringing almost so by the end of March. Stringing from Vellore to Vadakethipatti substation was completed in advance so that the Vellore Electric Supply Corporation might use this line for supply of power to Gudiyattam.

Branch lines.—Survey of the 22 miles long Vellore-Chittoor 33 K.V. line was started and completed in June 1936. The contract for the construction of this line was awarded to Messrs. General Electric Company, Limited, Madras. The Chittoor Electric Supply Corporation who felt the need for extra power to meet their increasing load demand entered into an agreement, Government acting as intermediary, with the Vellore Electric Supply Corporation for purchasing power in bulk until Mettur power could be made available to them. The Vellore Electric Supply Corporation are at present transmitting their power to Chittoor through the Government line which was completed on the 18th March 1937.

Line surveys.—Surveys were undertaken and completed during the year for the following important extensions :—

MILES.

(1) Singarappet-Tiruvannamalai-Villupuram ...	67
(2) Vellore-Conjeeveram	42

The total value of work done on the transmission lines during the year amounted to Rs. 18,69,096.

55. *Substations.*—Work at the following substations was in progress—Erode, Bommidi, Singarappet, Tiruppattur, Ambur, Vadakethipatti, Vellore and Chittoor. Quarters for the staff were also under construction at these places. In spite of delays in receipt of material, it is expected that the substations would be ready before Mettur power plant commences commercial operation. The outlay on substations for the year was Rs. 2,12,860.

56. *General.*—Owing to the insufficiency of departmental quarters for accommodating the increased staff at Mettur, additional buildings were rented from Public Works Department. The Mettur substation building from which the local distribution is at present controlled was also purchased from the Public Works Department and the departmental stores located therein.

The Mettur Workshops continued to be very busy during the year under report and the value of work turned out during the year was more than twice that of last year. Most of the cross-arms, 6-pole structures, gang-operated switches, etc., required for the Pykara System and its extensions were manufactured in the shops and supplied. Total value of work during the year is Rs. 1,48,000.

57. *Water Supply to Salem.*—The scheme for supply of water to Salem from Mettur having been generally approved, provision for a pump house for accommodating machinery to pump water from the tail race of the Power House, has been made in consultation with the Sanitary Engineer to Government. A sum of Rs. 14,000 expended in this connexion during the year has been paid by the Salem Municipality.

58. *Expenditure.*—The total expenditure on the Mettur Hydro-Electric Development during 1936-37 was Rs. 48,24,820 and the outlay so far was Rs. 97,49,098 made up as follows:—

	RS.	RS.
Mettur Hydro Electric Scheme (Main) ..	47,11,864	64,15,236
Erode-Trichinopoly extension ..	— 5,470	11,75,056
Trichinopoly-Negapatam extension ..	1,09,406	20,77,986
Karur Electric Supply Scheme ..	7,716	79,516
Vellore-Conjeeveram extensions ..	1,304	1,304
Total ..	48,24,820	97,49,098

THERMAL SCHEMES.

59. The department has the following thermal schemes under its management:

Northern area—

- (1) Vizagapatam } under construction.
(2) Bezwada.

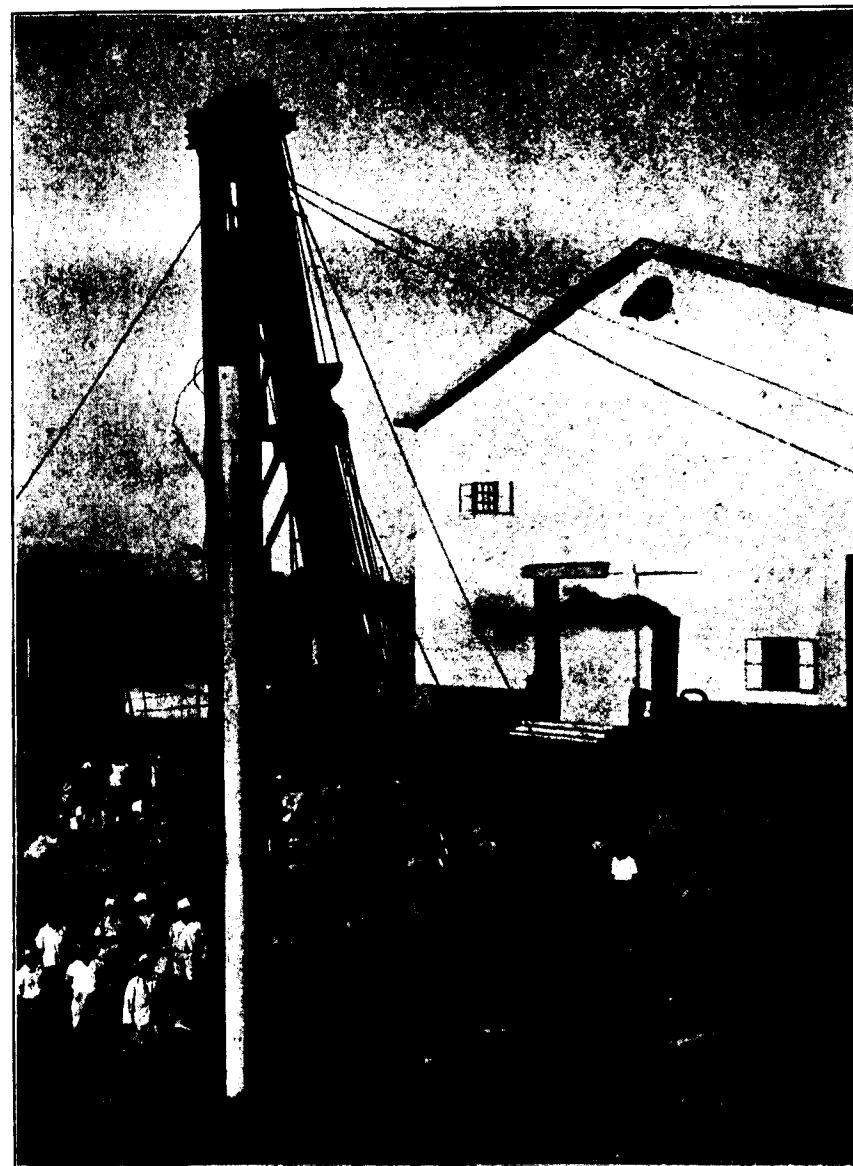
Southern area—

- (3) Dindigul
(4) Virudunagar } in operation.
(5) Palni
(6) Theni

60. *Northern area schemes.*—These schemes are meant to supply the immediate power needs of the Andhra districts. Such water power resources as are available in the Agency tracts of these districts are incapable of economic development unless a minimum load much above the present needs is forthcoming. The industrial development of the area cannot afford to wait indefinitely for these water power schemes to mature and will be retarded if cheap power is not made available immediately. Thermal stations offer the only practicable solution of the difficulty and these are now to be installed one at Vizagapatam and another at Bezwada. Initial outlay on these would be a minimum and their construction take little time. They would enable an early supply of power to be given and would also foster development of demand so that in time, the development of the natural water-power resources could without difficulty or risk be undertaken. The hydro-schemes would then either replace or supplement the thermal schemes.

61. *Vizagapatam scheme.*—This scheme was sanctioned by Government in July 1936 at an estimated cost of Rs. 18,70,000 initially and Rs. 31,60,000 eventually. Some additions were made later on account of the extensions to Bobbili and Anakapalle. The scheme as it now stands comprises—

- (i) The purchase of the existing power house and generating machinery of the Vizagapatam Harbour authority.
- (ii) Extension of the power house building to take two new steam turbo sets 1-750 K.W. and 1-1500 K.W. capacity. Later on two more sets will be installed in the space now occupied by the smaller units of the existing power station.



PILE-DRIVING—VIZAGAPATAM POWER HOUSE EXTENSION.

- (iii) Construction of 48.6 miles of 33 K.V. line and 31.3 miles of 11 K.V. line to supply Vizianagram, Bimlipatam, Chittivalasa (if and when required), Garbham and Kodur mines, Bobbili and Anakapalle, in addition to the supply to the harbour authority and the Vizagapatam Electric licensee.

The contract for the Power House building extension was awarded to Messrs. Gannon Dunkerley with Messrs. Simplex Pile Company, as sub-contractors for reinforced concrete piles in November 1936. The work on piles was commenced in January 1937 and completed in March 1937. The total number of piles driven was 122. Work was immediately put in hand on the pile caps and beams and concrete mattings. At the end of the year about a third of the work was completed. Steel work erection will commence immediately after this item is finished. The contract for the Power House plant was awarded in December 1936 to Messrs. Associated Electrical Industries Company for turbo sets of the manufacture of Messrs. B.T.H., boiler plant of Messrs. Babcox and Wilcox and switchgear of Messrs. Ferguson and Pailin. Preliminaries had been settled by the end of the year but no contract drawings were received or actual site work begun. According to the promised completion date, one set should be in service in February 1938 and the second in March 1938.

The whole length of line except 175.5 miles of 11 K.V. line to Anakapalle was surveyed and aligned. Contract for the supply and erection of the transmission lines was awarded to Messrs. Henleys in March 1937. The lines are expected to be ready about the time the new plant goes in commission.

Load prospects.—Load situation in the area is being watched with care. Use of electricity for general purposes is new to the people of this district and a certain amount of active propaganda will probably be necessary. 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 greater utilization of electricity. It is anticipated that as soon as the scheme starts functioning, or very soon after the loads of the Vizagapatam Electric Supply Company, Vizagapatam Harbour, Anakapalle licensee, Bimlipatam Municipal Council, Bobbili licensee, Kodur and Garbham Mines and Vizianagram Municipal Council will be connected up. Efforts are being made to negotiate for the further supply of part of the load of one of the larger industrial undertakings in the area.

62. *Bezwada scheme.*—This sister scheme was sanctioned in September 1936 at the estimated cost of Rs. 17,35,000 initially and Rs. 25,00,000 eventually. The present scheme consists of—

- (i) The purchase of the existing municipal power house site and building and the 300 K.W. oil engine set now in use there, extending the area, and building a new power house

to accommodate 2-1500 K.W. steam turbo sets initially. Two more sets will be installed later, size depending on the load development.

- (ii) Construction of 69.5 miles of 33 K.V. line to supply Masulipatam, Ellore and Gudivada in addition to local supply to Bezwada. It is anticipated that by the time the steam plant is ready to go in service a 11 K.V. line 13.5 miles will be constructed to Nuzvid town. Efforts are being made to interest the Guntur licensee and to bring him within the scope of the scheme.

Inasmuch as the oil engine plant installed in the municipal power station at Bezwada is larger than their immediate requirements, the transmission lines to Masulipatam via Gudivada and to Ellore are to be constructed in advance of the main plant, so that the surplus power available at Bezwada may be made available at other places, Government purchasing power from Bezwada Municipal Council and retailing it to the authorities requiring it. At present, the amount of this extra power is not more than 100 K.W. but it is sufficient to save the investment on a generating plant to the Gudivada licensee and to some extent to the Ellore licensee as well.

Contracts for the transmission lines were awarded in November 1936 to Messrs. Callender's Cable and Construction Company, Limited, for the Bezwada-Ellore section, 35.5 miles, and to Messrs. P. Natesan & Co., for the Sitarampuram-Masulipatam line, 34 miles. No erection work had actually commenced at the end of the year but material was gradually coming in. The lines are expected to go in service by about August 1937, and will in the first instance carry the Bezwada surplus power. The contract for the supply and erection of the Bezwada generating plant was awarded in March 1937 to Messrs. Burn & Co., Calcutta, for the supply of 2-1500 K.W. steam turbo sets of Messrs. Parsons Manufacturing, boiler plant, of Messrs. Babcox and Wilcox and switch-gear of Messrs. English Electric Company's manufacture. According to the promised delivery dates, the plant should be in commission by June 1938. Tenders for the power-house buildings were due early in April.

Load prospects.—Load situation in this area is rather peculiar. The normal domestic and industrial requirements are small. The districts, however, grow paddy and the country side is studded with rice-hulling mills of large capacity—unit size averaging between 70 and 100 h.p. installed,—steam engines, burning paddy husk which is a by-product of their operation of hulling. The power cost in these mills which offer the only important load at present is accordingly very low and a special industrial tariff has been devised to make it unattractive for any new mills to instal steam engines. Conversion of the existing mills is, however, more difficult and may take time and effort. It is anticipated that as soon as the main plant comes in service the whole of the load of the Bezwada, Masulipatam, Ellore and Gudivada licensees will be supplied. The

steel rolling mill in Bezwada is expected to be supplied through the Bezwada Municipal Council, and negotiations are in progress for supplying a new cement factory load and possibly the Guntur licensee as well.

63. Southern Area Schemes—Dindigul, Virudunagar and Palni.—These schemes, it will be re-called, were undertaken with the main purpose of developing load in the several towns with the help of the old oil engines discarded in the Coimbatore area on the advent of Pykara Power. This purpose has now been served and Palni station will be closed and the town connected to the Pykara system in July 1937. Dindigul and Virudunagar will likewise be closed during 1937-38 as soon as the extension lines to Madura and Rajapalaiyam are completed.

Theni.—The Theni thermal scheme will however continue to function for a year or two more and will be shut down as soon as a link line connecting it to Sembatti now under investigation, is constructed.

Fair progress was made by the above thermal schemes, but development of load was considerably handicapped by the higher rates for energy inevitable in oil engine schemes. Palni suffered further from inefficient engines. The towns will doubtless show considerable improvement once hydro-power reaches them.

Table No. 3 on page 32 summarizes the operating and financial results of the thermal undertakings and compares them with the previous year.

Table No. 3.
Thermal Schemes.

	Virudunagar.		Dindigul.		Palni.		Thevl.	
	1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.
1 Peak load...	145	165	128	142	55	57	...	...
2 Units generated ..	306,974	421,743	332,579	374,103	74,280	115,096	...	92
3 Units sold ..	316,890	381,428	277,258	314,069	67,694	108,051	...	174,684
4 Cost per unit generated ..	0.875	0.73	0.92	0.75	2.52	1.40	...	142,233
5 Cost per unit sold ..	1.16	1.17	1.22	1.21	1.91	1.80	...	1.04
6 Total capital expenditure ..	1,58,609	1,58,330	1,43,632	1,43,571	66,504	70,545	...	1,40
7 Gross revenue ..	22,926	29,813	21,040	27,154	8,095	12,478	...	1,61,282
8 Operation and maintenance ..	20,365	19,224	18,991	17,754	11,731	12,718	...	19,881
9 Balance ..	2,561	10,589	2,129	9,380	-3,636	-140	...	12,376
10 Interest at 5½ per cent on capital ..	8,071	8,708	7,297	7,896	3,489	3,880	...	7,506
11 Surplus ..	-5,510	1,831	-5,158	1,484	-7,125	-4,020	...	8,871

64. *Municipal undertakings in thermal areas.*—The Government-managed municipal distribution undertakings in the southern thermal area were those at Dindigul, Virudunagar, Palni, Periyakulam and Bodinayakanur. Table No. 4 shows the results of their working for 1935-36 and 1936-37.

It will be noticed that both Virudunagar and Dindigul have reached the profit-earning stage. The nil balance shown for Virudunagar after payments of operation expenses and interest for 1936-37 is due not to any diminution of profits but to adjustment during the year of Rs. 3,730 for arrears of establishment charges for 1934-35 and 1935-36 based on the average rates of pay instead of on the actuals. Load development at Virudunagar was to some extent retarded by the refusal of Government to sanction loans needed badly for extensions. This point has been commented on in previous pages. It is proposed to hand both Virudunagar and Dindigul undertakings to the respective municipal councils for future management as soon as Pykara power reaches the towns.

Palni continues to work in deficit and this is attributable to the restriction in development imposed by the condition of the engines and also to lack of working capital.

Table No. 4.

Load and revenue results of municipal undertakings served by Thermal stations and managed by the department for the years 1935-36 and 1936-37.

		Dindigul.		Virudunagar.		Palai.		Periyakulam.		Bodinayakkanur.	
		1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.
1	Peak load..	123	145	145	..	55	..	55	..	..	54 K.V.A.
2	Units purchased	..	..	..	..	..	..	..	..	..	50,804
3	Units sold	277,258	314,099	316,390	361,428	67,694	108,651	78,018	78,018	..	45,361
4	Cost per unit purchased.	243.543	276,598	273,567	314,718	61,425	97,483	69,970	69,970	..	3.08
5	Cost per unit sold	1.33	1.31	1.16	1.17	1.31	1.21	1.42	1.42	..	3.04
6	Total capital expenditure to end of year	3.33	3.04	3.70	3.33	3.35	3.77	3.13	3.13	..	43,364
7	Gross revenue	1,24,400	1,38,150	1,54,085	1,61,350	33,345	40,334	38,033	38,033	..	9,740
8	Operating and maintenance expenses (including managing agency fees)	48,960	50,200	43,970	49,700	12,500	14,650	11,698	11,698	..	19,513
9	Interest on capital at 5% per cent	33,533	37,980	35,717	41,868	13,438	17,390	16,504	16,504	..	2,397
10	Balance	6,443	6,579	8,300	8,740	3,300	3,098	2,144	2,144	..	—
		8,905	9,049	1,038	—	3,338	—	7,840	7,840	..	—

* This includes interest during construction period not shown with the figures submitted last year.

The Periyakulam and Bodinayakkanur undertakings completed their first year of operation and the trading results were not very satisfactory and the operating deficits comparatively large. The problem is being studied and it is hoped that next year may show an improvement.

INVESTIGATIONS.

65. *Hydro-metric work.*—Routine hydro-metric observations and rainfall and river flow recording were continued. An automatic gauge was installed in the Tambraparni region for obtaining records of intensity of rainfall.

66. *Lammasingi Hydro-Electric Scheme.*—Field investigation and hydro-metric work was started in April and is nearing completion. A permanent masonry weir was erected at dam-site for stream gauging, and necessary water stage recorder fixed to record the depth of flow over the measuring weir. Survey at the main dam-site and surplus saddle was completed and soil exploration work and calyx drill boring are in progress. Investigations are expected to close by the end of April 1937 and a report on the scheme will be submitted to Government as early as possible. Four automatic rain gauges were fixed and are being read from March 1936. Three more gauges will be installed in Budalegedda catchment and suitable sites were selected for fixing them. Owing to the malarial locality and difficulties in higher supervision, this work made disappointingly slow progress.

67. *Papanasm Hydro-Electric Scheme.*—The hydro-electric scheme which was being considered for the past nine years as a combined irrigation and hydro-electric project was taken up again. Orders of Government were received for proceeding with further investigations of the hydro-electric scheme alone leaving the contribution from irrigation to be dealt with later. Sanction for carrying out preliminary investigations for preparing estimates for the scheme was received in June 1936. Necessary staff was immediately posted but there were considerable delays before they reported for duty. The survey for roads, camps, power-house, pipe-line and diversion weir were taken up and plotted at time of report. Extensive borings at the sites of the dam, diversion weir and power-house for ascertaining the nature of soil below ground were undertaken and the results recorded. A design for the section of dam to be adopted has been tentatively fixed and estimates and plans are under preparation. A report on the scheme should be submitted to Government about July 1937.

68. *Bore-well irrigation in the Ceded districts.*—The establishment of a large thermal station in the Ceded districts has been engaging the attention of the Government and it is possible that a certain amount of agricultural load is also obtainable. Investigations for sinking bore-wells in these districts for irrigation and drinking purposes by making deep borings up to 300 feet below ground are to be undertaken. A preliminary report on the possibilities of agricultural load for an area covering about 220 square

miles south of the Pennar river has been prepared. Staffs for undertaking the investigation have been posted and the Deputy Director of Industries has been asked to inspect these areas and select the actual sites for bore-wells by water divining methods.

OTHER ACTIVITIES OF THE DEPARTMENT.

69. *Designs and estimates.*—The headquarters technical divisions continued to be very busy. Specifications were prepared and contracts were let for various schemes and extensions to the value of Rs. 59.76 lakhs. Among these may be mentioned—

	Rupees in lakhs.
1 Pykara additional generating plant and third pen-stock line ..	19.00
2 Madura extension comprising 66 KV. lines, substation equipment and synchronous condensers ..	19.52
3 Beawada Thermal plant lines and substation equipment ..	10.34
4 Vizagapatam Thermal plant and substation equipment ..	6.63
5 110 KV. O.C.B's. and transformers to replace the 66 KV. ones at Coimbatore ..	3.20
6 Virudunagar-Rajapalayam 33 KV. and 11 KV. lines ..	1.07

Technical reports and estimates were prepared and materials were ordered for 58 small distribution extensions costing in all Rs. 13.46 lakhs. The more important of these were—

	Rupees in lakhs.
1 Kotagiri Cordite factory and tea estates extension ..	2.18
2 Rasipuram electrification ..	1.05
3 Tiruchengode-Iddapady extension ..	0.75
4 Veluri, Velavadi and Jellipatti extension ..	0.60
5 Annur extension ..	0.44

Technical reports with preliminary estimates and financial forecasts were prepared for the following schemes :—

	Rupees in lakhs.
1 Singarapett-Villupuram and Polur—Arni extension ..	10.82
2 Virudunagar-Rajapalayam extension ..	10.45
3 Virudhunagar-Kolpatti extension ..	5.11
4 Vellore-Conjeeveram extension ..	4.00
5 Final changeover of Pykara-Coimbatore section to 110 KV. ..	2.84
6 Arkonam extension ..	1.85
7 Vizianagram distribution scheme ..	1.35
8 Tiruvannamalai distribution scheme ..	0.98
9 Aruppukkottai distribution scheme ..	0.97
10 Sivakasi distribution scheme ..	0.68
	39.05

70. *Purchase of materials.*—Materials for operation and maintenance up to individual item values of Rs. 5,000 were purchased by the field officers concerned. Requirements of a higher value as well as materials for all important extensions and schemes were

handled by the Electrical and Mechanical Division and orders placed during the year amounted to Rs. 43.44 lakhs and their distribution was as follows :—

	Rupees in lakhs.	Percentage of total.
Indian material ..	3.57	8.3
British ..	31.10	71.5
Foreign ..	8.77	20.2
Total ..	43.44	100

ADMINISTRATION OF THE INDIAN ELECTRICITY ACT AND RULES.

71. *Licences.*—The number of licensees giving supply in the Presidency is 50; of these 25 are local bodies and 25 are companies. Nineteen licensees had works under construction and not yet started supply and 12 applications for licence were under consideration—vide Appendices F. 1, 2 and 3 attached. During the year under review no licensee commenced supply.

Appendix 'E' gives details of the generating or receiving plant in the several licensees' undertakings in the Presidency. The total capacity is approximately 98,500 K.V.A. the two most important plants being that of the Madras Electric Supply Corporation with a capacity of 53,750 K.V.A. and the Madras Government's Pykara Power Station of 23,400 K.V.A.

An attempt was made in the previous years to collect and publish useful statistical information concerning the licensed undertakings. This year, the information is slightly more detailed and is given in Appendix D—Table of Electric Supply costs and records. Figures for capital, revenue, working costs and return are added. It is recognized that the information is by no means either complete or readily comparable especially as the data do not all refer to the same year. With increasing co-operation from the licensees it is hoped that the statistics would be more reliable and informative next year.

An idea of the relative importance of the principal agencies generating electric power in the Presidency may be gathered from the following statistics :—

Generating authority.	1929-30.	1934-35.	1935-36.	1936-37.
I Government—				
(a) Hydro ..	..	30,014,318	50,281,962	75,577,250
(b) Oil ..	..	409,315	773,833	1,085,626
Total ..	..	30,422,633	51,055,695	76,662,876
II Municipal councils—				
(a) Oil ..	928,621	4,254,614	4,696,765	4,713,691
Total ..	928,621	4,254,614	4,696,765	4,713,691
III Companies—				
(a) Steam ..	24,496,160	38,989,867	43,143,966	47,336,641
(b) Oil ..	965,872	6,908,721	5,633,025	7,457,108
Total ..	25,462,032	45,898,588	48,776,991	54,793,749
Grand total ..	26,390,653	80,575,835	104,529,451	136,170,316

Government is the foremost supplier generating 56 per cent of the total. Next in importance is the Madras Electric Supply Corporation who are responsible for 34 per cent. All the rest of the licensees put together generate the balance of 10 per cent.

72. Reductions in tariffs were effected during the year by the following 18 licensees:—

- | | |
|--------------------|---------------------------|
| (1) Bodinayakanur. | (10) Madras. |
| (2) Cochin. | (11) Madura. |
| (3) Cocanada. | (12) Masulipatam. |
| (4) Devakottai. | (13) Palni. |
| (5) Dindigul. | (14) Periyakulam. |
| (6) East Tanjore. | (15) Rajahmundry. |
| (7) Guntur. | (16) Salem-Erode. |
| (8) Karaikudi. | (17) Tinnevely-Tuticorin. |
| (9) Kurnool. | (18) Virudhunagar. |

Tariffs for lighting continue to be high in several instances. A list of the undertakings charging more than 6 annas for lighting or lighting and fans is given below:—

For lighting and fans.

- (1) Hindupur.
- (2) Hospet.
- (3) Kanadukathan.
- (4) Karaikudi.
- (5) Nattarasankottai.
- (6) Okkur.
- (7) Tirupati-Tirumalai.
- (8) Vellore.

For lighting only.

- (9) Chittoor.
- (10) Palni.
- (11) South Arcot.
- (12) Vizagapatam.

It is hoped that the licensees will endeavour to reduce their tariffs and come off this list as early as possible. Palni, which is managed by Government, will reduce the rate as soon as Pykara power reaches it in June 1937.

Owing to inadequacy of plant a prohibitory order was imposed on the Chittoor licensee from connecting further load. The orders imposed in the previous year on Kurnool, Masulipatam, Hindupur and a portion of Sembiam still exist.

73. *Inspection and tests.*—The number of inspections and tests made during the year was—

Inspections and tests of works notifiable under the Act	995
Tests of meters, instruments, fire extinguishers, voltage and the like	496

The increase in office work prevented a larger amount of inspection work. The total number of tests carried out in the Electrical Standards Laboratory at Madras was 496, made up as follows:—

Sub-standards	82
Meters and instruments	172
Oil tests	88
Voltage and earth	24
Fire extinguishers	135
Total	496

Of the 82 substandards 36 were from licensees, 35 from the Government Pykara System and the rest of the Laboratory. During the year all licensees except two Panchayat Boards sent their substandards for calibration and adjustment.

A selection of consumers' meters in the licensees' areas at Bezvada, Masulipatam and Vizagapatam were tested *in situ*; almost all the meters in the first two places were recording as much as 4 to 7 per cent slow. As the revenue of an undertaking depends entirely on its consumers' meters being accurate the respective Councils were advised to improve matters by installing proper testing gear, by employing trained testing staff, and by carrying out periodical tests. A great deal more requires to be done generally in this matter. A portable testing set to test *in situ* the principal supply meters in licensees' undertakings has been assembled; testing of these meters along with a selection of consumers' meters will be carried out in the current year.

The supply pressure at Madura was tested and found to be unsatisfactory and recommendations were made for improving it.

An extension building for the standards laboratory has been completed and will be occupied in the current year along with additional plant comprising a second sine wave alternator set for precision testing, a motor generator set for battery charging by night, instrument transformer testing, equipment and apparatus for stroboscopic measurement of frequency.

The meter and relay test section at Coimbatore was transferred from the beginning of the official year to the control of the Engineer-in-charge, Pykara System.

74. *Cinemas.*—The total number of cinemas in the Presidency was 279 of which 157 were permanent and 122 were travelling. There was a rapid increase in the number of cinemas which in result engaged the major portion of the time of one gazetted officer involving also extra clerical and accounting work. The number of inspections made during the year was 402 as against 355 of last year. Five prosecutions were conducted during the year under the Cinema Act for breaches of various cinema rules; fines totalling Rs. 345 and ranging from Rs. 20 to Rs. 100 were imposed.

75. *Revenue.*—A total revenue of Rs. 30,767 was realized as follows:—

	RS.
Fees for inspection under the Indian Electricity Act	8,323
Do. cinema inspections	16,937
Do. meter test	1,678
Do. advice	751
Do. arbitration	48
Do. miscellaneous	546
Do. licences	3,000
Total	31,283

76. *Accidents.*—Seventy-seven accidents occurred during the year of which 32 proved fatal as compared with last year's figures of 60 and 24, respectively. Details regarding the 32 cases of fatality are analysed below:—

Area.	Employees.	Non-employees.	Animals.	Total.
Pykara system ..	2	19	..	21
Licencees ..	4	6	1	11
Total ..	6	25	1	32

Causes of fatality—

Cause.	System Voltage.					Lighting conductor.	Total.
	66000V.	33000V.	22000V.	11000V.	230/400V.		
1 Climbing of poles and towers out of curiosity or intention to commit suicide ..	16	1	2	3	1	..	23
2 Climbing poles in spite of warning ..	..	..	..	..	2	..	2
3 Faulty wiring ..	..	..	..	..	4	1	5
4 Induction shocks or contacts ..	..	..	1	1	..	..	2
Total ..	16	1	3	4	7	1	32

77. *Madras Local Authorities Electrical service.*—This service was formed with effect from 22nd February 1936 and consisted initially of 12 posts. Three more posts were sanctioned during the year for the charge of the undertakings at Coimbatore, Tiruppur and Anantapur bringing the total strength of the service to 15. The Municipal engineers already in employment were admitted to the service and three were appointed by direct recruitment. Control of the service involves considerable additional work and a new Assistant Engineer was sanctioned for the purpose and detailed to work under the Electrical Inspector.

78. *General.*—Other important work dealt with by the Electrical Inspector were as follows:—

A short code of working instructions was prepared for safe working on overhead lines.

A set of model forms of licences was prepared for the several types of licencees, company, local authority generating and non-generating.

Two disputes, one between the Guntur licensee and municipal council and the other between the Nellore licensee and municipal council, were decided by arbitration.

A large volume of work in connexion with the grant of powers of Telegraph Authority and approval of methods of construction was done.

ELECTRICAL INSTALLATIONS IN GOVERNMENT BUILDINGS.

79. With increase in the number of towns receiving electric supply, the work in connexion with electrical installation in Government buildings continues to increase. The value of new work completed together with details of maintenance cost and energy charges are given in table No. 5 below:—

Table No. 5.

Electrical installation in Government buildings.

Details.	1933-34.	1934-35.	1935-36.	1936-37.
	LAKHS.	LAKHS.	LAKHS.	LAKHS.
1 Total capital cost to end of the year ..	39.5	41.31	43.16	44.87
2 Cost of new works constructed in the year ..	1.50	1.82	1.85	1.71
3 Total maintenance charges in the year, excluding current consumption charges ..	1.33	1.35	1.62	1.62
4 Total current consumption charges paid in the year ..	2.1	2.2	2.33	2.32
5 Percentage of maintenance charges on the total capital cost ..	3.4%	3.3%	3.76%	3.6%

80. *Works completed or in progress.*—The more important of the works completed during the year were—

- (1) New Engineering College Electrical Laboratory, Guindy.
- (2) Madras Legislative Assembly Hall (Senate House).
- (3) Hospitals at Mangalore, Virudunagar and Dindigul and the Venereal block, Madras General Hospital.
- (4) Collectors' quarters at Chittoor, Masulipatam and Nellore and Collector's office at Mangalore.
- (5) District Judges' quarters at Negapatam and Cuddalore and District Courts at Salem and Mangalore.
- (6) Superintending Engineer's quarters at Waltair.
- (7) Quarters of the District Superintendents of Police at Nellore, Waltair and Cuddalore.
- (8) Central Jail, Vellore.

Among the works in progress may be mentioned—

- (1) Natural Science block, Presidency College, Madras.
- (2) New Dining hall, Government House, Madras.
- (3) Government Hospital at Sivaganga.

81. *Preparation of estimates.*—About 1,290 estimates for new works, maintenance and repairs were prepared during the year costing around Rs. 9.0 lakhs. The following are the more important of the new works estimated for—

- (1) Air conditioning plants for the X-Ray room and the Urological theatre, Bernard Institute of Radiology, Madras.
- (2) Government Press—Conversion to H.T. supply.
- (3) Additions and improvements in the General Hospital, Madras.

- (4) Additions and improvements to Government House, Guindy.
- (5) Government Hospitals at Palni, Mayavaram, Nellore, Cocanada, Hospet, Vannarpet, Tinnevely, Palamcottah, Negapatam, Masulipatam, Calicut, Kumbakonam, Proddatur, Tuticorin, Vellore and Bezwada.
- (6) Inspection Bungalows at Karur, Conjeeveram, Tuticorin, Chittoor, Hospet, Hindupur, Erode and Tanjore.
- (7) Customs offices at Calicut, Mangalore and Cochin.

STAFF.

82. Important changes in the superior staff of the department during the year were as follows:—

Mr. E. J. B. Greenwood, Electrical Inspector, was on leave from March to November 1936 and Mr. M. Subramaniam, Divisional Electrical Engineer, officiated for him. On Mr. Greenwood's return, Mr. Subramaniam went on leave for two months and in January 1937 was posted as Divisional Electrical Engineer, Coimbatore, *vice* M.R.Ry. B. Ramasomayajulu, granted leave.

Mr. G. Sundaram, Executive Engineer, Electrical and Mechanical Division, was appointed from 15th April 1936 as Personal Assistant to the Chief Engineer, *vice* Mr. T. J. Mirchandani, who proceeded on leave out of India from 15th April 1936. Mr. T. J. Mirchandani was, on return from leave in July 1936, appointed as Electrical Engineer, Construction and Civil Engineering Branch, with headquarters at Madras and was placed in charge of the construction of the Vizagapatam and Bezwada Thermal Schemes. His headquarters were transferred to Vizagapatam in January 1937.

Mr. G. Yoganandam, Assistant Engineer, Electrical and Mechanical Division, was appointed as Executive Engineer, Electrical and Mechanical Division, from 15th April 1936, *vice* Mr. G. Sundaram.

Mr. P. M. Chengappa, Assistant Engineer (Civil), was appointed in April 1936 as Executive Engineer in charge of Transmission Line Construction Division, Mettur.

Mr. P. Natesa Ayyar, Assistant Executive Engineer, Technical Section (Civil), was appointed in January 1937 as Executive Engineer of the newly formed Civil and Hydraulic Division, Madras.

The following officers were admitted to the full membership of the Madras Electrical Service during the year:—

Class I—Category 3—

Mr. L. Ekambaram.

Class V—

Mr. V. N. Swami.

The following appointments of Assistant Engineers were made during the year:—

Class I—Category 3 of Madras Electrical Service—

Mr.	V. P. Appadurai.	
"	P. Venkataramiah.	
"	P. R. Sundaram.	
"	P. A. Krishnan.	
"	B. V. Ananda Rao.	
"	G. S. Rama Ayyar.	
Mr.	S. Padmanabhan.	} Appointment under
"	V. K. Sethuraman.	

Class II—

Mr.	A. Krishnamurti Ayyar.	
"	G. Venkataraman.	
"	H. Raghavendra Rao.	
"	G. S. Rajan.	
"	S. Ramaswami.	
Mr.	R. Venkataraman.	} Appointment under
"	K. Y. S. Menon.	
"	K. R. Rajagopalan.	

Class V—

Mr.	K. R. Thorvey.
"	V. Krishna Ayyangar.

H. G. HOWARD,
Chief Engineer for Electricity.

APPENDIX A.

List of constructions undertaken with expenditure to end of 1936-37.

Name of schemes.	Expenditure during 1936-37.	Total expenditure to end of 1936-37.
Capital expenditure.	RS.	RS.
I. Government schemes—		
(1) Pykara system—		
58 a. Pykara Hydro-Electric scheme ..	2,91,568	1,18,77,988
58 b. Supply of power to Salem and Erode and Tiruchengode and Edapady ..	45,463	4,76,883
58 c. Distribution of power in Coimbatore district ..	6,67,442	22,96,341
58 d. Supply of electric power to Palghat ..	..	1,21,553
58 e. Supply of electric power to Devarghola ..	..	66,475
58 j. Supply of electric power to Frith Hall Tea Factory ..	..	6,105
58 m. Supply of electric power to Komarpalayam ..	..	26,303
58 q. Mukurti dam ..	5,65,927	13,63,054
58 r. Supply of electric power to Rasipuram ..	74,675	74,675
58 s. Supply of electric power to Madura ..	3,14,720	3,14,720
58 t. Supply of electric power to Virudunagar and Rajapalayam ..	3,687	3,687
58 u. Additional generating machinery at Pykara ..	93,604	93,604
Total, Pykara system ..	20,57,086	1,67,21,388
(2) Mettur Hydro-Electric scheme—		
58 k. (i) Mettur Hydro-Electric scheme (Main) ..	47,11,864	64,15,236
58 k. (ii) Supply of power to Trichinopoly ..	— 5,470	11,75,056
58 k. (iii) Supply of power to Negapatam ..	1,09,406	20,77,988
58 k. (iv) Supply of power to Karur ..	7,716	79,516
58 k. (v) Supply of power to Ranipet, Kaveripakkam and Conjeeveram ..	1,304	1,304
Total, Mettur system ..	48,24,820	97,49,098
(3) Thermal schemes—		
58 f. Dindigul electric supply scheme ..	781	1,33,312
58 g. Virudunagar electric supply scheme ..	705	1,47,482
58 h. Palni electric supply scheme ..	— 47	63,477
58 i. Theni, Periyakulam and Bodinayakanur ..	7,611	1,55,912
58 t. Vizagapatam Thermal station ..	23,731	23,731
58. Bezwada Thermal station ..	48,071	48,071
Total, Thermal schemes ..	80,852	5,71,985
II. Municipal undertakings—		
Coimbatore ..	39,066	5,55,976
Tiruppur ..	24,661	1,93,397
Pollachi ..	6,613	1,87,602
Udamalpet ..	64,061	64,061
Karur ..	9,754	86,560
Dindigul ..	7,750	1,32,150
Virudunagar ..	10,430	1,61,350
Palni ..	2,519	40,884
Periyakulam ..	4,640	59,062
Bodinayakanur ..	..	43,384
Total, Municipal undertakings ..	1,69,494	15,24,426
III. 41. Civil Works—New Electrical Works ..	1,71,000	44,87,000

APPENDIX B.

Budget provision for capital works in 1937-38.

	1937-38 Budget (full year).
Capital expenditure.	RS.
I. Hydro-Electric schemes—	
A. Pykara Hydro-Electric Project—	
79. Pykara Hydro-Electric scheme ..	2,66,700
79. Additional generating machinery at Pykara ..	23,20,200
79. Supply of electric power to Tiruchengode and Edapady ..	4,600
79. Distribution of power in the Pykara system ..	2,17,300
79. Supply of power to Virudunagar and Rajapalayam ..	9,11,100
79. Mukurti dam ..	4,25,000
79. Supply of electric power to Rasipuram ..	6,900
79. Supply of electric power to Madura ..	23,33,600
79. Construction of transmission lines and other works for supply of power to intending consumers ..	5,50,000
Pension charges ..	13,600
Total, Pykara Hydro-Electric Project ..	70,49,000
B. Mettur Hydro-Electric Project—	
79. Mettur main scheme ..	21,49,500
79. Erode-Trichinopoly extension ..	1,000
79. Trichinopoly-Negapatam extension ..	1,000
79. Karur electric supply scheme ..	..
79. Extension of supply to Ranipet, Kaveripakkam and Conjeeveram ..	3,35,600
Pension charges ..	7,300
Total, Mettur Hydro-Electric Project ..	24,94,400
II. Thermo-Electric schemes—	
79. Dindigul electric supply scheme ..	— 1,33,300
79. Virudunagar electric supply scheme ..	— 1,47,100
79. Palni electric supply scheme ..	— 63,600
79. Theni, Periyakulam and Bodinayakanur electric supply scheme ..	2,200
79. Vizagapatam Thermal station ..	15,70,900
79. Supply of electric power to Bobbili ..	99,100
79. Bezwada Thermal station ..	13,65,700
Total, Thermo-Electric schemes ..	26,93,900
Grand total ..	1,22,37,300
Deduct lump sum for probable savings ..	— 6,35,300
Total, Capital outlay on electric schemes—Budget Estimate for 1937-38 ..	1,16,02,000
50. Civil Works—Electric installation in Government buildings—	
Works ..	1,80,600
Grand total ..	1,17,82,600

APPENDIX C.

Details of establishment charges of the department and fees earned during 1936-37 and estimated for 1937-38.

	Expenditure in 1936-37 (final modification).	1937-38 Budget (full year).
	RS.	RS.
Electrical Engineer (General)—		
Salaries, allowances, etc.	72,900	72,300
Revenue	..	..
Net cost ..	72,900	72,300
Electrical Inspector—		
Salaries, allowances, etc.	56,000	67,700
Revenue	33,000	41,000
Net cost ..	23,000	26,700
Revenue from water-power	..	..
Royalty from Mysore Government	20,000	20,000
Chief Engineer's office including Technical Section—		
Salaries, allowances, works, etc.	2,10,000	1,74,700
Revenue (charges recoverable from Governments and departments)	2,05,300	2,31,100
Net cost ..	4,700	— 56,400
Pykara Hydro-Electric system—		
Salaries, allowances, etc.	2,54,100	2,38,300
Less charges payable to or recoverable from Governments and departments	— 1,09,700	— 60,500
Net salaries and allowances	1,44,400	1,77,800
Operation and maintenance expenditure	2,36,100	2,49,500
Revenue	22,62,500	24,45,000
Net surplus ..	18,82,000	20,17,700
Mettur Hydro-Electric system—		
Salaries, allowances, etc.	..	71,800
Less charges payable to or recoverable from Governments and departments	..	— 800
Net salaries and allowances	..	71,000
Operation and maintenance expenditure	..	35,000
Revenue	..	2,70,000
Net surplus ..	..	1,64,000

APPENDIX C—cont.

Details of establishment charges of the department and fees earned during 1936-37 and estimated for 1937-38—cont.

	Expenditure in 1936-37 (final modification).	1937-38 Budget (full year).
	RS.	RS.
Dindigul, Virudunagar and Palni Government schemes—		
Salaries, allowances, etc.	16,800	18,100
Less charges payable to or recoverable from Governments and departments	— 24,300	— 17,000
Net salaries and allowances ..	— 7,500	1,100
Operation and maintenance expenditure	51,200	46,300
Revenue	62,100	57,000
Net surplus ..	18,400	9,600
Theni Government scheme—		
Salaries, allowances, etc.	9,900	14,800
Less charges payable to or recoverable from Governments and departments	— 9,000	— 9,400
Net salaries and allowances ..	900	5,400
Operation and maintenance expenditure	12,300	14,100
Revenue	19,800	24,700
Net surplus ..	6,600	5,200

APPENDIX D-1—cont. Table of electric supply costs and records—Companies—cont.

Name of undertaking.	Cost per unit sold—cont.				Average price obtained.				Supply records (units sold per head of population).		K.W.	PER CENT.	
	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)			(34)
	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	Private light, heat and domestic.	Industrial power.	Maximum load on under-	
		Insurance, Management salaries and	Total working costs.	Interest and loan repay-ment.	Total costs.	Private supply.	Public lighting.	Total supply.					
1 Madras ..	..	..	..	..	..	..	..	..	..	..	..	..	..
2 Kanadukathan ..	..	..	..	..	..	..	..	..	..	..	..	..	..
3 Devakottai ..	..	..	..	..	..	..	..	..	..	..	..	..	..
4 Cochin ..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 Trichinopoly-Srirangam ..	..	..	..	..	..	..	..	..	..	..	..	..	..
6 Rajahmundry ..	..	..	..	..	..	..	..	..	..	..	..	..	..
7 Calcutt ..	..	..	..	..	..	..	..	..	..	..	..	..	..
8 Karakudi ..	..	..	..	..	..	..	..	..	..	..	..	..	..
9 Vellore ..	..	..	..	..	..	..	..	..	..	..	..	..	..
10 Gunter ..	..	..	..	..	..	..	..	..	..	..	..	..	..
11 Kumbakonam ..	..	..	..	..	..	..	..	..	..	..	..	..	..
12 Nattarasankottai ..	..	..	..	..	..	..	..	..	..	..	..	..	..
13 Sakon-Erode ..	..	..	..	..	..	..	..	..	..	..	..	..	..
14 Mangalore ..	..	..	..	..	..	..	..	..	..	..	..	..	..
15 Palghat ..	..	..	..	..	..	..	..	..	..	..	..	..	..
16 Tirunelveli-Tuticorin-Palamcottah ..	..	..	..	..	..	..	..	..	..	..	..	..	..
17 East Tanjore ..	..	..	..	..	..	..	..	..	..	..	..	..	..
18 Nellore ..	..	..	..	..	..	..	..	..	..	..	..	..	..
19 Tirupati-Tirumala ..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 Visnupatnam ..	..	..	..	..	..	..	..	..	..	..	..	..	..
21 Chittoor ..	..	..	..	..	..	..	..	..	..	..	..	..	..
22 Nizampatnam ..	..	..	..	..	..	..	..	..	..	..	..	..	..
23 Okur ..	..	..	..	..	..	..	..	..	..	..	..	..	..
24 Proddatur ..	..	..	..	..	..	..	..	..	..	..	..	..	..
25 South Arcot ..	..	..	..	..	..	..	..	..	..	..	..	..	..

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APPENDIX D-2. Table of electric supply costs and records—Local authorities.

Name of undertaking.	(1)	(2)	Year of operation.	Year of accounts to which the figures refer.	(3)	(4)	(5)	Revenue.				(10)	(11)	
								From meter rent and other sources.						
								(6)	(7)	(8)	(9)			
Capital—Total expenditure at the end of year.														
From electric supply.														
Costs—Working costs.														
Per cent to capital outlay during the year averaged.														
1 Ootacamund	..	13th	..	1935-36	..	24,616	AC 400/230 V. 50 ~	..	656,808	142,403	4,031	119,480	67,852	10-45
2 Bellary	..	9th	..	Do.	..	47,573	Do.	..	374,216	84,216	5,300	68,194	93,974	7-78
3 Madura	..	8th	..	1934-35	..	182,018	Do.	..	822,042	282,579	11,799	162,311	178,783	21-5
4 Tanjore	..	7th	..	Do.	..	69,899	Do.	..	365,370	96,111	7,506	76,861	31,412	8-8
5 Cochin	..	6th	..	Do.	..	66,952	Do.	..	410,896	71,517	10,429	64,980	44,664	11-8
6 Coonoor	..	6th	..	1935-36	..	14,326	Do.	..	180,431	42,607	2,792	37,427	19,786	11-05
7 Bezwada	..	5th	..	1934-35	..	60,427	Do.	..	459,432	95,684	3,815	70,573	52,867	11-62
8 Hindupur	..	5th	..	Do.	..	14,211	DC 460/230 Volta.	..	137,136	17,787	1,106	23,632	6,931	6-74
9 Kurnool	..	5th	..	Do.	..	35,314	AC 400/230 V. 50 ~	..	279,819	48,011	8,481	63,951	92,704	8-16
10 Semblam	..	5th	..	Do.	..	33,127	Do.	..	111,698	31,686	986	26,015	12,632	11-7
11 Coimbatore	..	4th	..	Do.	..	65,258	Do.	..	337,543	57,239	5,015	45,058	85,047	11-27
12 Coimbatore	..	3rd	..	1935-36	..	96,198	Do.	..	621,869	186,365	8,882	132,619	100,789	20-2
13 Pollachi	..	3rd	..	Do.	..	22,112	Do.	..	182,708	57,789	2,618	78,383	12,969	7-4
14 Tiruppur	..	3rd	..	Do.	..	18,059	Do.	..	171,411	24,841	2,235	70,498	20,804	13-05
15 Masulipatam	..	2nd	..	1934-35	..	66,928	Do.	..	292,377	30,760	2,280	52,918	15,316	5-83
16 Virudunagar	..	2nd	..	1935-36	..	33,081	Do.	..	150,024	43,094	2,874	45,968	4,981	8-24
17 Dindigul	..	2nd	..	Do.	..	43,617	Do.	..	123,892	44,232	3,782	47,965	9,421	8-06
18 Alandur *	..	1st	..	1934-35	..	13,500	Do.	..	11,097	..	..	..	..	..
19 Karur	..	1st	..	1935-36	..	19,850	Do.	..	78,332	17,932	1,564	21,015	3,804	5-77
20 Palni	..	1st	..	Do.	..	18,399	Do.	..	37,161	13,064	718	16,808	..	..
21 Tiruvottiyur	..	1st	..	1933-34	..	21,673	Do.	..	16,014	2,576	623	8,365	..	..
22 Hospet	..	..	..	1934-35	..	21,673	Do.	..	..	..	..	..	..	..
23 Udamalpet	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24 Bodinayakanur and Periyakulam municipal (Government managed) undertakings — No accounts.	..	..	..	..	..	..	..	..	..	..	..	..	..	..

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APPENDIX D-2—cont. Table of electric supply costs and records—Local authorities—cont.

Name of undertaking.	(12) Interest and income-tax on profits less credits.	(13) Amount provided for loan repayment.	(14) Financial result: surplus + or deficit.	(15) Amount provided for depreciation and reserve.	(16) Total of depreciation and reserve.	(17) Number of consumers.	(18) Number of units sold.	(19) Increase + or decrease in bulk per cent on previous year.	Cost per unit sold.		
									Generation.	Coal and other fuel.	Salaries and wages.
	RS.	RS.	RS.	RS.	RS.				AS.	AS.	AS.
1 Ootacamund	21,808	19,089	40,130	..	..	933	15,82,913	27.22	Energy purchased in bulk from Govern- ment.	Energy purchased in bulk from Govern- ment.	Repairs, maintenance and stores.
2 Bellary	18,900	13,442	24,232 (—)	..	..	636	2,50,009	9.77	..	..	..
3 Madhura	46,646*	40,505†	393,982	..	..	1,660	12,43,603	92.5	..	..	..
4 Tanjore	18,684	7,494	47,607	..	..	590	4,37,533	17.25	..	..	..
5 Coimbatore	18,822	13,251	2,629 (—)	..	..	456	3,36,533	27.06	..	..	..
6 Coonoor	8,925	4,899	11,111	..	..	418	1,72,381	25.8	..	..	..
7 Barwade	17,741	11,615	20,539 (—)	..	..	519	5,54,101	29.7	..	..	..
8 Hindupur	6,000	3,507	19,001 (—)	..	..	183	51,022	29.4	..	..	..
9 Kurur	7,784	12,450	99,115 (—)	..	..	382	2,61,793	15.75	..	..	..
10 Sengbam	3,813	2,400	13,550 (—)	..	..	116	1,54,608	14.3	..	..	..
11 Coimbatore	10,787	7,044	3,713	20,940	20,113	453	2,45,080	6.4	..	..	..
12 Coimbatore	24,287	10,470	50,440	..	..	1,882	12,47,149	29.3	..	..	..
13 Pollachi	11,837	3,205	1,163	7,087	7,087	531	6,00,769	34.7	..	..	..
14 Tiruppur	15,331	3,544	59,394 (—)	..	..	531	8,71,594	17.15	..	..	..
15 Masulipatam	17,343	12,374	..	..	..	286	1,30,181	104	..	..	..
16 Virudunagar	6,721	..	..	1,060	4,795	349	2,79,688	103	..	..	..
17 Dindigul	6,949	2,459	..	..	..	459	2,44,993	..	..	..	..
18 Alandur †	4,581	1,880	..	..	..	327	92,784	..	..	..	..
19 Karur	..	..	..	..	..	105	61,486	..	..	..	..
20 Palni	585	..	3,026 (—)	..	..	28	13,065	..	..	..	..
21 Tiruvottiyur	243	..	166 (—)	..	..	..	..	..	..	..	..

22 Hospet Accounts after the licensee has commenced operation not available.

23 Udamalpet No accounts.

24 Rodinayakkanur and Periyakulam municipal (Government managed) undertakings — No accounts.

* Includes loan repayment amount.

† Includes interest.

‡ Accounts after the commencement of supply not available.

APPENDIX D-2—cont. Table of electric supply costs and records—Local authorities—cont.

Name of undertaking.	Cost per unit sold.			Average price obtained.		Supply records—Units sold per head of population.			Maximum load on undertaking load factor.	
	(23) AS.	(24) AS.	(25) AS.	(26) AS.	(27) AS.	(28) AS.	(29) AS.	(30) AS.	(31) AS.	(32) AS.
1 Ootacamund	..	..	..	..	..	..	..	..	..	..
2 Bellary	..	..	..	..	..	..	..	..	..	..
3 Madhura	..	..	..	..	..	..	..	..	..	..
4 Tanjore	..	..	..	..	..	..	..	..	..	..
5 Coimbatore	..	..	..	..	..	..	..	..	..	..
6 Coonoor	..	..	..	..	..	..	..	..	..	..
7 Barwade	..	..	..	..	..	..	..	..	..	..
8 Hindupur	..	..	..	..	..	..	..	..	..	..
9 Kurur	..	..	..	..	..	..	..	..	..	..
10 Sengbam	..	..	..	..	..	..	..	..	..	..
11 Coimbatore	..	..	..	..	..	..	..	..	..	..
12 Coimbatore	..	..	..	..	..	..	..	..	..	..
13 Pollachi	..	..	..	..	..	..	..	..	..	..
14 Tiruppur	..	..	..	..	..	..	..	..	..	..
15 Masulipatam	..	..	..	..	..	..	..	..	..	..
16 Virudunagar	..	..	..	..	..	..	..	..	..	..
17 Dindigul	..	..	..	..	..	..	..	..	..	..
18 Alandur	..	..	..	..	..	..	..	..	..	..
19 Karur	..	..	..	..	..	..	..	..	..	..
20 Palni	..	..	..	..	..	..	..	..	..	..
21 Tiruvottiyur	..	..	..	..	..	..	..	..	..	..
22 Hospet	..	..	..	..	..	..	..	..	..	..
23 Udamalpet	..	..	..	..	..	..	..	..	..	..
24 Rodinayakkanur and Periyakulam municipal (Government managed) undertakings — No accounts.	..	..	..	..	..	..	..	..	..	..

Accounts after the licensee has commenced operation not available.

No accounts.

* Accounts after the commencement of supply not available.

APPENDIX E.

Details of plant installed of electric supply undertakings in service.

Number and name of undertaking.	Total installed capacity of plant in Generating or Receiving Stations.	Details of plant installed.
1 Madras	53,750 K.V.A.	3 × 1,875; 1 × 6,250; 1 × 7,500; 1 × 15,625 and 1 × 18,750 K.V.A.
2 Kanadukathan	370 K.W. ..	2 × 65; 1 × 130; 1 × 110 K.W.
3 Devakottai	140 K.W. D.C. 160 K.V.A. A.C.	1 × 60 K.W.; 2 × 40 K.W.; 1 × 160 K.V.A.
4 Cochin	72 K.W. ..	2 × 21; 1 × 30 K.W.
5 Ootacamund	1,200 K.V.A.	2 × 600 K.V.A. receiving.
6 Trichinopoly-Srirangam ..	2,250 "	3 × 750
7 Madura	1,406.5 "	3 × 187.5; 1 × 375; 1 × 460 K.V.A.
8 Calicut	775 "	2 × 250; 1 × 150; 1 × 125 K.V.A.
9 Tanjore	300 "	Receiving.
10 Coonoor	350 "	2 × 100; 1 × 50; 4 × 25 K.V.A. receiving.
11 Sembiam	100 "	3 single phase units of 33½ K.V.A. each receiving.
12 Karaikudi	350 "	2 × 75 K.V.A.; 2 × 100 K.V.A.
13 Conjeeveram	467 "	1 × 66.6; 1 × 133.3; 1 × 267 K.V.A.
14 Vellore	680 "	3 × 135; 1 × 275 K.V.A.
15 Tirupati-Tirumalai ..	480 "	2 × 100; 1 × 280 K.V.A.
16 Kumbakonam	370 "	1 × 200; 2 × 75; 2 × 10 K.V.A. receiving.
17 Salem-Erode	1,075 "	5 × 215 K.V.A. (3 sets in Salem and 2 in Erode) receiving.
18 Coimbatore	700 "	Receiving.
19 Nattarasankottai ..	165 "	2 × 82.5 K.V.A.
20 Tiruppur	500 "	Receiving.
21 Pollachi	400 "	Do.
22 Mangalore	750 K.W.	3 × 250 K.W.
23 Palghat	150 K.V.A.	Receiving; 1 × 100; 1 × 50 K.V.A.
24 Tinnevely-Tuticorin ..	1,000 K.W.	2 × 500 K.W.
25 Tiruvottiyur	200 K.V.A.	2 × 50; 1 × 100; receiving.
26 Dindigul	380 K.W. ..	2 × 190 K.W.
27 Virudunagar	380 "	Do.
28 East Tanjore	"	Receiving.
29 Palni	135 K.V.A.	1 × 95 K.V.A.; 45 K.V.A.
30 South Arcot	537.5 "	4 × 125; 1 × 37.5 K.V.A.
31 Karur	"	Receiving.
32 Udumalpet	"	Do.
33 Negapatam	1,225 K.V.A.	1 × 1,000; 3 × 75 K.V.A. receiving.
34 Alandur	200 "	2 × 50; 1 × 100 K.V.A. receiving.
35 Chittoor	140 "	2 × 70 K.V.A.

APPENDIX E—cont.

Details of plant installed of electric supply undertakings in service—cont.

Number and name of undertaking.	Total installed capacity of plant in Generating or Receiving Stations.	Details of plant installed.
36 Okkur	120 K.V.A.	2 × 60 K.V.A.
37 Periyakulam	"	Receiving power from Theni.
38 Bodinayakanur	"	Do.
39 Bellary	273 K.W. ..	2 × 55; 1 × 67; 1 × 96 K.W.
40 Bezwada	750 K.V.A.	1 × 50; 2 × 150; 1 × 400 K.V.A.
41 Cocanada	450 K.W. ..	1 × 40; 2 × 80; 1 × 250 K.W.
42 Hindupur	60 "	2 × 25; 1 × 10 K.W.
43 Hospot	133 K.V.A.	2 × 54; 1 × 25 K.V.A.
44 Kurnool	313 "	1 × 53; 1 × 80; 1 × 180 K.V.A.
45 Masulipatam	235 "	2 × 117.5 K.V.A.
46 Guntur	350 K.W. ..	2 × 150; 1 × 50 K.W.
47 Nellore	330 K.V.A.	2 × 133; 1 × 64 K.V.A.
48 Proddatur	132 "	2 × 66 K.V.A.
49 Rajahmundry	560 "	2 × 133; 1 × 294 K.V.A.
50 Vizagapatam	240 "	Receiving power from Harbour Power House.

APPENDIX F-1.

Electric supply undertakings in service.

Local authorities.	Companies.
1 Alandur.	1 British Cochin.
2 Bellary.	2 Calicut.
3 Bezwada.	3 Chittoor.
4 Bodinayakanur.	4 Devakottai.
5 Cocanada.	5 Guntur.
6 Coimbatore.	6 Kanadukathan.
7 Conjeeveram.	7 Karaikudi.
8 Coonoor.	8 Kumbakonam.
9 Dindigul.	9 Madras.
10 Hospot.	10 Mangalore.
11 Hindupur.	11 Mayavaram-Mannargudi-Tiruvarur.
12 Karur.	12 Nattarasankottai.
13 Kurnool.	13 Nellore.
14 Masulipatam.	14 Negapatam.
15 Madura.	15 Okkur.
16 Ootacamund.	16 Palghat.
17 Palni.	17 Proddatur.
18 Pollachi.	18 Rajahmundry.
19 Periyakulam.	19 South Arcot.
20 Sembiam.	20 Salem-Erode.
21 Tiruppur.	21 Trichinopoly-Srirangam.
22 Tanjore.	22 Tinnevely-Tuticorin-Palamcottah.
23 Tiruvottiyur.	23 Tirupati.
24 Udumalpet.	24 Vellore.
25 Virudunagar.	25 Vizagapatam.

APPENDIX F-2.

New licences granted and under construction.

1 Ellore.	} Licences granted during the year.
2 Adoni.	
3 Ambur-Vaniyambadi.	
4 Bobbili.	
5 Chingleput.	
6 Villivakkam.	
7 Tiruvallur.	
8 Ongole.	
9 Gudiyattam.	
10 Gudivada.	
11 Narasaraopet	
12 Anantapur	
13 Cuddapah	
14 Sivakasi	
15 West Ramnad	
16 East Ramnad	
17 Tellicherry-Cannanore	
18 Anakapalle	
19 Kodaikaral	

APPENDIX F-3.

Applications for licence under consideration.

Serial number and place for which licence has been applied	Company or local authority.
1 Vizianagram	Local authority.
2 Kollegal	Do.
3 Tiruppattur	Do.
4 Dharapuram	Do.
5 Wellington Cantonment	Local authority (Cantonment).
6 Tiruvannamalai	Local authority.
7 Tindivanam	Company.
8 West Godavari	Do.
9 Nuzvid	Do.
10 Peddapuram-Samalkot	Do.
11 Chicacole	Do.
12 Udipi	Do.

APPENDIX G.

List of villages electrified in Coimbatore district.

Serial number and name of village.	Serial number and name of village.
1 Kallar.	45 Arasur.
2 Thekkampatti.	46 Rasipalaiyam.
3 Nellithorai.	47 Madukarai.
4 Dasampalaiyam.	48 Palathorai.
5 Mettupalaiyam.	49 Avanashi.
6 Karamadai.	50 Rakkiampalaiyam.
7 Chikkarampalaiyam.	51 Thirumuruganpundi.
8 Puthur.	52 Angeripalaiyam.
9 Chinnaputhur.	53 Chandrakavi.
10 Onnipalaiyam.	54 Erode.
11 Virapandi.	55 Peria Negamam.
12 Perianaickenpalaiyam.	56 Uthukuli.
13 Sengalipalaiyam.	57 Makkinayakkanpatti.
14 Idigarai.	58 Samathur.
15 Vyampalaiyam.	59 Samanthorai.
16 Athipalaiyam.	60 Kottur.
17 Kiranatham.	61 Malayandipatnam.
18 Mettupalaiyam (hamlet).	62 Angalakurichi.
19 Koilpalaiyam.	63 Iyerpadi.
20 Kalapatti.	<i>Anamalais.</i>
21 Mailampatti.	64 Valparai.
22 Kariampalaiyam.	65 Udampet.
23 Kondayampalaiyam.	66 Gomangalampudur.
24 Kurudampalaiyam.	67 Pottayampalaiyam.
25 Tudiyalur.	68 Venasapatti.
26 Perur.	69 Ganapathipalaiyam.
27 Perursettipalaiyam.	70 Velur.
28 Telungupalaiyam.	71 Raghalbavi.
29 Peelamedu.	72 Pudur Nattam.
30 Papanaiickenpalaiyam.	73 Peria Valavadi.
31 Ganapathi.	74 Chinna Valavadi.
32 Krishnarayapuram.	75 Dhali.
33 Vellakinar.	76 Jellipatti.
34 Sowripalaiyam.	77 Bhavani.
35 Vellalur.	78 Uppilipalaiyam.
36 Nanjundapuram.	79 Ondipudur.
37 Podanur.	80 Talapalaiyam.
38 Kurichi.	81 Kalbhavi.
39 Oddarapalaiyam.	82 Karumampalaiyam.
40 Pidampatti.	83 Moduthupalaiyam.
41 Kallipalaiyam.	84 Singampatti.
42 Kannampalaiyam.	85 Ammapettai.
43 Sulur.	86 Omareddiyur.
44 Ravathur.	

Government of Madras

PUBLIC WORKS DEPARTMENT

(Electricity)

G.O. No. 2072-A, 12th October 1937

Electricity Department—Administration Report for 1936-37—
Recorded with remarks.

READ—the following paper :—

From the Chief Engineer for Electricity, dated 16th July 1937,
No. 1881/37-G-11.

Order—No. 2072-A, P.W. (Electricity), dated 12th October 1937.

Recorded.

2. The report contains a very interesting record of the continued rapid and satisfactory progress of electrical development in the province under the direction of the Chief Engineer for Electricity during the past year.

Among the more outstanding features of the year are the undertaking of large additions to the Pykara power plant with a view to meet the very gratifying growth in power demand; substantial progress in the construction of the Mettur hydro-electric scheme, with promising indications of the growth of Mettur as an industrial settlement, and the starting of work on the Vizagapatam and Bezawada thermal electrical schemes for meeting the power needs of the Andhra districts included within the scope of the two schemes.

3. His Excellency the Governor is pleased once again to place on record his warm appreciation of the continued initiative, energy and foresight shown by Mr. Howard in the planning of the electrical development of the province, and of the good work done by him and by the officers of the department. As electricity comes to be more and more largely used in the future for industrial and agricultural purposes, the value of his pioneer work in the field

2 No 2072-A, P.W. (ELECTRICITY), 12TH OCTOBER 1937

of electrical development in the last few years and the sound judgment shown in the recent rapid expansion of the department's activities are certain to be increasingly appreciated.

(By order of His Excellency the Governor)

W. SCOTT BROWN,
Secretary to Government.

To the Chief Engineer for Electricity.
" Chief Engineer (General, Buildings and Roads).
" Chief Engineer for Irrigation.
" Development Department.
" Local Administration Department.
" Education and Public Health Department.
" Public (General) Department.
" Librarian, Madras Legislature.
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