

SUBMIT \$8,000,000

(Continued from Page 1)

The Hon. J. Walter Jones, Premier of Prince Edward Island, Charlottetown, P. E. I.

Sir:

In accordance with instructions received from you and after investigating the present situation with reference to the electric power supply for the Province, I submit herewith my report as to the future course which, in my opinion, your Government should pursue in order that the citizens of the Province of Prince Edward Island, and particularly those living in the rural districts, should be assured of an adequate and reliable supply of electric power at the least possible price consistent with the basic conditions as they obtain in the Province.

(1) BASIC CONDITIONS

With a view to a thorough understanding of the problem it would be well to point out some of the conditions which have a major effect on the power supply problem.

In the first place the Province is comparatively small, having a land area of 2,184 square miles and a relatively stationary population of 194,100, of which 24,200 are urban and 70,700 are rural dwellers. There are only two large centres having a population of over 2,000, viz. Charlottetown (14,821) and Summerside (5,934). The balance of the population (73,552) can, for the purposes of power supply, be considered as rural dwellers.

The Province is divided into three counties as follows:—

Table with 4 columns: County, Area (Sq. Miles), Population, Per Sq. Mile. Rows: Prince, Queen's, Kings.

From the above it will be seen that outside the two larger centres of population the problem is largely one of supplying a rather thickly populated rural area interspersed with a considerable number of smaller municipalities.

The Province has not been provided by nature with water powers of any magnitude, nor has it been supplied with coal, oil, or natural gas, hence power in quantity must necessarily be generated in thermal plants by means of imported fuel. This fact tends to increase the cost of power at the source above what it would be were it, for instance, generated by means of hydro-electric plants. This is not as detrimental as it might on the surface appear to be, since the cost of power delivered at the farm is in large measure determined by the costs of distribution.

Distribution Methods

Efficient methods of distribution will go a long way towards overcoming this initial handicap.

The net value of production for the Province in 1943 was \$20,000,000—equivalent to \$220 per capita. Of this 64% was from agricultural pursuits, 12% from fisheries and 11% from manufacturing.

It will thus be seen that farming is the principal source of wealth for the Province, and that manufacturing is secondary. As of the year 1943, the total amount of power used in manufacturing was 4,559 H.P., of which 1,117 H.P. was electric motors supplied by purchased power. The situation, however, has been considerably improved since that time, and there is no reason to doubt that an ample supply of power at a reasonable price made available, manufacturing might not assume a much larger role in the activities of the Province.

Farm Population

The farm population, according to the 1941 census, was 51,076 or 75% of the total population. There is an average of 4.2 persons living on each of the 12,234 farms, and in 1945, out of a total acreage of 1,167,829 acres, 467,100 acres were under cultivation. An interesting comparison of the net per capita production and the kilowatt-hours generated (and purchased) per capita for some of the Province is as follows:

Table with 4 columns: Province, Population, Net Production, Kwh. per Capita. Rows: Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Ontario.

Saskatchewan and Prince Edward Island being essentially agricultural are more nearly comparable than the other Provinces. There is, however, a connection indicated between high power consumption and high per capita production, which highlights the value of power in the production of wealth.

(2) PRESENT POWER SUPPLY

There is little opportunity for the development of hydro-electric power in the Province since the rivers are all short, the drainage area small, and the country generally flat with little fall.

There is a total of 2,917 H.P. in hydraulic turbines installed, of which 579 H.P. is used for the generation of electric power. The balance of the electric power used in the Province is generated by thermal plants, i.e. steam and diesel engine plants. In 1944 a total of 15,968,000 Kwh. generated only 185,700 were supplied by water power.

The increase in the use of electric power in the Province is indicated in the following tabulation of kilowatt-hours generated, showing that in the five years between 1939 and 1944 the amount of energy generated was doubled:—

Table with 3 columns: Year, Kilowatt Hours Generated, Per Annum. Rows: 1939, 1940, 1941, 1942, 1943, 1944.

Of the 15,968,000 kilowatt-hours generated in 1944, 4,320,000 kilowatt-hours were generated in publicly owned plants, and the balance of 11,648,000 kilowatt-hours in privately owned plants.

The consuming public in the Province is presently supplied from four sources, viz:—

- (1) The Maritime Electric Company with a steam plant in Charlottetown supplies Charlottetown and a small percentage of the rural consumers in the area from Borden and Cavendish to the eastern tip of the Island, i.e. a partial coverage of Queen's and King's Counties. (2) The Municipality of Summerside with a diesel electric plant supplies Summerside and a small rural area to the west of Summerside. It also supplies the Mount Pleasant Airport link about seventeen miles to the west. (3) A. A. Seales supplies a small rural territory lying between the areas supplied by Summerside and the Maritime Electric Company. (4) A number of small isolated diesel or gasoline units in villages such as Abington and O'Leary.

While the rural areas on the map supplied by these various systems appear imposing, it is apparent that only a very partial coverage has been obtained to date.

It would appear, however, that a considerable demand for rural service exists which has not yet been satisfied, and the amount of power distributed to the rural areas is comparatively small.

(3) MARITIME ELECTRIC COMPANY

In 1937 the Maritime Electric System had about 3800 customers and their total sales amounted to approximately 43 million kilowatt-hours, with a peak load of 1,876 Kw. In 1946 the number of consumers had increased to 6376 and the total sales to 10.7 million Kwh. By 1953, if the development of the rural area proceeds expeditiously, the total sales can be expected to be more than doubled.

Throughout the war the load increased at an abnormal rate, which soon exceeded the capacity of the steam plant to supply. It was, however, not possible to make additions to plant during the war, but towards its close plans were made to rehabilitate the steam plant and to provide additional capacity.

New Parsons Turbine

Since there are no hydraulic possibilities on the Island, a larger steam plant was indicated, and in view of the fact that the peak load in 1944 was 3,050 Kw. and that the load has been increasing at a rate exceeding 10% per annum, it was decided to purchase from the Parsons Company a 4000 Kw. unit, operating at 400 lbs. per square inch pressure and 750° temperature.

This machine was delivered in June 1947, and when the installation is completed the capacity of the plant will be 8200 Kw. A second Parsons turbine of 7500 Kw. capacity has been ordered for delivery in 1949. The existing turbines, although inefficient, are satisfactory for standby purposes and are being retained. When the 7500 Kw. unit is installed, the total capacity of the plant will be 15,700 Kw., of which 11,500 Kw. will, considering the size of the plant, be very efficient units, and 4200 Kw. which can with economy be used only as standby.

A modern Babcock-Wilcox boiler rated at 60,000 lbs. of steam per hour at 425 lbs. per sq. inch and 750° F. steam temperature was installed in 1946. A second unit, rated at 70,000 lbs. per hour, is now being manufactured by the Dominion Bridge Co. and will replace the present Edgemore boiler in 1948. When this plant is completed it will be much more efficient than the present plant.

The present plant is oil fired and is using about 1.7 lbs. of oil per net Kwhr. produced. It is expected that when the first new unit is in service this will drop to about 1.1 lbs. and when the second unit is installed to 1.0 lbs.

The oil being used has a specific gravity of 0.97 to 0.98 and a calorific value of about 18,300 BTU's per lb. At the present time it costs \$2.70 per barrel of 35 imperial gallons delivered.

(4) THE RURAL PROBLEM

The problem of supplying rural areas with electric power at reasonable cost has always been a difficult one and is not getting any easier with the passage of time due principally to the increasing cost of material and labor.

In the rural areas the consumers are not bunched together as in the case in the towns and cities, but are spread widely, with the result that to supply them a greater capital expenditure per customer is necessary, which naturally results in rates which are necessarily higher than in the towns and cities.

Prince Edward Island is, however, more favorably situated than is normally the case since 75% of its population dwells in the rural areas. Also a large percentage of the total acreage is under cultivation and the fact that the rural areas are plentifully interspersed with small municipalities tends to increase the number of consumers per mile and thereby decrease the cost of supplying service.

In Appendix I a tabulation is submitted in which the status of rural electrification for the various Provinces as of the year 1944, is set out. This tabulation indicates that the average annual bill for electric power on the farm varies from \$21.50 to \$76.00.

Unified Distribution

If anything like complete coverage of rural areas in Prince Edward Island is to be had, it is necessary to formulate and work to a unified plan of distribution; otherwise the coverage will be very spotty—the tendency being to supply the more populous and accessible areas and to ignore the leaner and more remote areas which require a heavier capital expenditure per consumer. This is the reverse of what should normally be the case, since the leaner areas have greater need of the assistance provided by electric power.

The reason for this situation is, of course, due to the fact that it is impossible to serve these more remote districts at rates which would be attractive to the consumer and still make a profit.

As early as 1925 the Government of the Province of Ontario realized this situation and decided to advance to the Hydro-Electric Power Commission sums of money called "Grants-in-Aid" of Rural Electric Line construction, which are now based on 50% of the capital cost of the rural lines. In 1945, out of a total capital investment of \$44,536,481 by the Hydro-Electric Power Commission of Ontario in rural lines, the Ontario Government has advanced the sum of \$22,024,204.

The status of rural electrification in Prince Edward Island, as of the year 1944, is indicated by the following tabulation:—

Table with 2 columns: Item, Value. Rows: Rural Customers, Kilowatts Consumed, Average Consumption per Customer, Total Revenue from Rural Customers, Average per Customer, Average Cost per Kilowatt-hour.

The attached Tabulations I and II are indicative of the progress made by the Hydro-Electric Power Commission of Ontario in the electrification of the rural districts of that Province. Table I is of interest, not so much as indicating the magnitude of the project, as to show the number of consumers per mile of line which has varied little over a period of twenty years, and also to show the gradual increase in the average peak load taken by each individual consumer from a value of 0.4 H.P. in 1925 to practically 1.0 H.P. in 1946.

This increase in demand for electric power is due to the growing appreciation of the value of electric power on the farm and the consequent increased use of electrically driven appliances.

Table II indicates the increasing use of energy (kilowatt-hours) by the consumers supplied from the rural lines and the consequent reduction in the cost per kilowatt-hour to the consumer.

Table I: Hydro-Electric Power Commission of Ontario Rural Power Districts. Columns: Year, Consumers, Miles, Power Supplied, H.P., Consumers Per Mile, Peak Per Consumer. Rows: 1925, 1930, 1935, 1940, 1945, 1949.

Table II: Hydro-Electric Power Commission of Ontario Rural Power Districts. Columns: Year, Class, Consumers, Kwh. Monthly, Kwh. Annually, Average Consumption Per Customer. Rows: 1925, 1930, 1935, 1940, 1945, 1949.

(5) SUGGESTED SYSTEM

In planning a comprehensive system of electric power distribution capable of supplying the whole Province, it should be borne in mind that the area to be served is comparatively small and the number of consumers relatively few, hence in my opinion, the whole program should be carried out by one supply authority only, with the added advantage of uniform rates throughout the rural areas and uniform standards of construction, operation and service.

In this connection I visualize that ultimately the whole Province will be served from one central station, with a tie line between the two main centres of population and rural lines running out from these two centres, and a blanket system of rural lines can be constructed without some form of subsidy or grant-in-aid, or other Governmental assistance. Hence in my opinion the natural body to accomplish this desirable end would be a Commission operating under Government authority.

The number of persons living outside the two main centres of population of Summerside and Charlottetown is approximately 75,200, which corresponds roughly with 16,700 possible consumers. If 90% of these ultimately took electric service, a total of 15,000 consumers would be supplied from the rural system. Based on seven consumers per mile, it would require 2,100 miles of rural line and 10,000 Kw. to serve them. The two larger municipalities between them would require an additional 10,000 Kw. so that after ten years or so from the present time, we can visualize a total provincial demand of 20,000 Kw.

One Central Plant

By concentrating all the power generation for the Province in one steam plant, it will be possible, due to the larger size, to incorporate features which will tend to reduce the cost of power generation to a minimum. In fact the new section of the present plant of the Maritime Electric Company, when completed, would be admirably suited for this service, and would require only additional capacity to supply the ultimate demand of the Province economically and efficiently.

Of this 20,000 Kw. possibly 6,000 Kw. would originate in that section of the Province which includes Summerside and those areas adjacent to and west of the municipality. In order to supply this district from the central steam plant, it would be necessary to provide one, and eventually two, transmission lines operating at, say, 44,000 volts, together with a step-up substation at Charlottetown and a step-down station at Summerside. Rural lines would radiate out from both centres of distribution, and they should preferably be of the type known as three phase four wire with 12,000 volts between phases and 6,900 volts between phase and neutral.

In this scheme it is visualized that the Summerside diesel engine plant would continue to operate and supply the municipality but, as and when, additional power was required that this would be supplied from the central steam plant. In any case a tie line between the two plants would be desirable in case of emergency. Eventually, as the load on the steam plant builds up and operating costs are reduced, it will probably be found more economical to close down the diesel plant and take all normal requirements from the central steam plant, using the diesel plant as a standby for peak loads.



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(6) RECOMMENDED PROCEDURE

There are at least three methods of initiating the above program, the end result in each case being the same.

In the first place, I would recommend that the Government proceed to form a Power Commission similar to those now functioning in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia, with the purpose of eventually taking over all the functions of electric power supply in the Province.

Placing the whole matter in the hands of a Commission will be in the interests of economy, uniformity of rates and accounting, and uniform methods of operation and construction. Furthermore, it is doubtful if service can be supplied to all rural areas at rates which will be attractive to the farmers without some form of governmental assistance, and this can best be handled by the Government itself.

As a matter of interest tabulated data has been included in the appendix to this report indicative of the growth of the New Brunswick, Saskatchewan, Manitoba and Ontario Power Commissions.

Alternative Methods

Three alternative methods of initial procedure are possible:—

(1) Under the first alternative, the Commission could possibly arrange to purchase power from the Municipality of Summerside and construct lines and supply rural load in the western end of the Province. As a part of this program an effort should be made to purchase the A. A. Seales System and incorporate it into the Provincial system. The lines could be extended from year to year until all desiring electric service are supplied.

This scheme presents one desirable feature, namely, it enables the Commission and its employees time to gain experience in the handling of rural electrification. (2) The second alternative scheme visualizes the Commission taking over either by amicable arrangement or by expropriation, all the lines presently supplying power in the rural areas of the Province, including the complete A. A. Seales system and other smaller systems, and also all the rural lines of the Maritime Electric Company. A contract for the supply of the necessary power would be made with the Maritime Electric Company, and also for the west end of the Island, possibly with the Municipality of Summerside.

The Commission could not doubt obtain sufficient experienced help from the power company employees, who are presently operating and maintaining these rural lines. If not, experienced help could probably be obtained from other Commissions operating rural lines, until such time as local men could be given the necessary training.

Third Proposal

(3) The third and final suggested program, and the one which I consider to be the best, and which I hereby recommend, involves the taking over in the immediate future of all the assets of the Maritime Electric Company, including the rural lines, the steam plant and the distributing system in the Municipality of Charlottetown as well as the smaller plants and systems owned by others and now supplying power in the Province, with the exception of the Municipality of Summerside.

These purchases should be made, if possible, by means of amicable negotiation, failing which it will be necessary to expropriate. Arrange to purchase the plant in the interests of the Province on a fee basis for a period of two or three years, which period would give the Commission time to become thoroughly acquainted with the system and to build up a competent organization to handle it, using the present Company staff as far as possible.

The Commission would, of course, under this alternative assume the obligations of the Company as regards the purchase of new equipment for the steam plant, such as turbo-generators, boilers, and auxiliary equipment, and employ the Company's engineers on a fee basis to complete the rehabilitation of the steam plant and the installation of new equipment now on order.

Summerside Plant

In the case of Summerside, it would be advisable in the interests of efficient and economical operation for the Province ultimately to purchase the diesel plant, in addition to the rural lines at present owned by the municipality (providing of course, that the municipality is willing to sell), and to supply the municipality with power at cost.

This change of ownership of the generating plant in Summerside would ultimately be advisable in the interests of economy, when an adequate tie line has been completed between Charlottetown and Summerside, and when the increases in loads there demand deliveries of power beyond the capacity of the diesel plant to supply. It would then be more economical to purchase this increased capacity from the steam plant and use the diesel plant as a standby.

In this manner the Provincial Commission would be in control of all generation, and the municipality of Summerside would handle its own distribution as at present. The distribution in the rural areas would, of course, be handled directly by the Provincial Commission.

The program for the electrification of the whole Province could be carried out over a period of from ten to fifteen years. On a fifteen year basis, lines would be built (or acquired) at an average rate of 140 miles per annum, and consumers added at an average rate of 1000 per annum. The complete program would cost the Province in the neighbourhood of \$8,000,000, of which the rural lines purchased and constructed would cost approximately \$5,000,000.

In this connection it should be noted that as of the year 1945, the New Brunswick Power Commission had invested a total of \$11,500,000 in electrical plants and systems; the Saskatchewan Power Commission \$11,800,000, and the Manitoba Power Commission \$10,400,000. The Hydro-Electric Power Commission of Ontario has invested \$44,500,000 in rural systems.

Respectfully submitted,

T. H. HOGG, Consulting Engineer.

FARM SERVICE BY CENTRAL ELECTRIC STATIONS

Table with 4 columns: Province, Customers, Total, Revenue Received. Rows: P. E. I., N. S., N. B., Quebec, Ontario, Manitoba, Sask.

Central Guardian

This column is reserved for news of local interest, but advertising of a new nature may be inserted at five cents a word strictly payable in advance.

- CRANWELL for Photographs. JIMMIE'S TAXI Phone 524. MacPHERSON'S—Men's Clothing. CONFEDERATION LIFE INSURANCE. TO HALIFAX in 55 minutes via Maritime Central Airways. Phone 2061 or 840.

ATTENTION QUEENS COUNTY—The "Masons" of Montague under Mr. "Bob" Clements are gathering donations for the Big Auction on behalf of the Crimpeo Children. Your help is needed. Make your donation now.

VALLEYFIELD CHURCH.—Service Sunday, October 26th, at 11:00 A. M. Orwell Hall at 7:30. Rev. James McInnes will conduct both services. A. S. Weir, Interim Chairman.

CHURCH OF SCOTLAND.—Services Lord's Day, October 26th, 1947. Booklyn 10:30 A. M. Iris 2:30 P. M. Murray River 7:30 P. M. Sabbath School at 2:00 P. M. Murray River. All services standard time.

ST. JOHN'S PRESBYTERIAN CHURCH, Belfast, Services Sunday, October 26th, will be as follows: Morning 11. Evening at 7.30. Please note Morning at 11 not at 3 o'clock as previously announced. Rev. E. C. Evans, Minister.

ST. PETER'S BAY PASTORAL CHARGE, United Church of Canada, Sunday, October 26th, 11 A. M. 2:30 P. M. 7:30 P. M. St. Peter's Bay W. M. S. Thanksgiving Service. Charlottetown octette will lead the service of song.

SUCCESSFUL STUDENT—Miss Edith C. Conroy, of Bellefleur, P.E.I. has completed the six weeks preliminary course at the Household Nursing School of Attendant Nursing, Boston, and this week was transferred to the Emerson Hospital in Concord, Mass. for a year of instruction and practice in bedside nursing. Upon completion of the 16 months' course, Miss Conroy will work as a graduate attendant-nurse in Boston.

ST. PAUL'S A.Y.P.A.—October 19th was Youth Sunday throughout the Church, and also, was the third Sunday of the month, which meant A.Y.P.A. members were faced with a pleasantly crowded day. The regular "third Sunday" Corporate Communion was attended at 8:30 a.m. followed by breakfast at the Charlottetown Hotel. These breakfasts have been a most enjoyable feature of A.Y.P.A. fellowship for the past year, and are made possible through anonymous donation. The Evening Service was attended by the members and the following assisted by reading the Lessons: Jimmie Abbott, Sid Jeffrey and George Anderson. An executive meeting was held later at 10:30.

Table with 4 columns: Province, Revenue, Capacity, etc. Rows: Alberta, B. C. and Yukon.

LIST OF HYDRO ELECTRIC POWER STATIONS SERVING TRANSMISSION SYSTEMS IN THE PROVINCE OF PRINCE EDWARD ISLAND

Table with 5 columns: Station, Name, River, H.P., Capacity. Rows: Maritime Electric Co. Ltd., A.—Montague, B.—Valley Field, John Leard, C.—Crapaud, Seales Hydro-Electric Co. Ltd., SA.—Kensington, Gordon Light & Power Co., AA.—Alberton, Charles W. Ives, SA.—North Tryon.

(Other appendices to the Report, dealing with Power Commission operations in other Provinces, have been omitted.)

Advertisement for Wellner's Jewellers. Features 'Favorites' for quality and value, jewelry from Wellner's, and a 'Morning Star' watch for \$37.50 up. Also mentions 'Lustrous Pearls' for \$395 up and 'Bulova Watches' for \$24.75 up. Wellner's Jewellers since 1868.