

CHEAP ELECTRIC POWER

An Open Letter to the People of New Brunswick and Nova Scotia.

For more than three years I have been in England on important work, but the approaching peace has left me free to return to my home in Canada, and free to take up the building of a large hydro-electric plant, that will supply the people of both New Brunswick and Nova Scotia all the electric power they will require, for many decades to come.

While I was in England there were constantly sent to me the clippings from home newspapers, that showed how keen the people were to have cheap electric power, but judging by the tone of these publications, many people in these provinces fail to realize that you cannot create water-power, but must necessarily use that which Nature has provided or do without it; and there are no great waterfalls in these provinces, and the smaller powers (such as the Grand Falls of New Brunswick) could only yield power to a limited extent, and are, at present, uncommercial propositions.

For many years before the war I studied the problem of a great tidal plant to give power to these provinces, and I think the best plan is to lay the whole matter before the people, in the most candid manner, and let them decide through their legislative houses, whether they wish to take it up or not.

I am ready and anxious to take the matter up, if I get the proper backing, but I will not touch it unless I do, as I have other important engineering work in hand.

The situation just before the war (and I presume it is the same today) was this:

After many years of work on the subject I had invented a means of obtaining continuous (24 hours service) electric power from the tides, which is thoroughly practical, when the topography of the land is correct, and the rise and fall of the tides is sufficient, to provide a practical "head" of water.

We have these conditions combined at the mouths of the Petitcodiac and Memramook rivers, opposite Hopewell Cape, and a "tide electric" plant built at this point would be capable of furnishing over 120,000 gross horsepower, without any dredging of the Memramook, and up to more than 200,000 gross horsepower by dredging the Memramook, as increasing demand would require, many years from the present time.

To explain the system briefly, a dam is built from Hopewell Cape to Coles Bay, on the eastern shore of the Memramook river, and a wing-dam and "spillway" connect this dam with Polly Point. The Petitcodiac is thus made a high-level basin, which is filled at every high tide, by means of electrically operated gates; while the Memramook river is thus made a low-level basin which is drained at every low tide by similar gates. The power-house, with its turbines and electric generators, would be located on the wing-dam, and the water from the high-level basin would flow through the turbines directly into the tidal source (the Bay of Fundy) from half tide to half tide (through the low-tide period) and into the low-level basin (the Memramook river) from half tide to half tide (through the high-tide period), these changes being accomplished by electrically-operated gates in the spill-way under control of the attendants, thus obtaining continuous "24 hour service" from the plant.

In 1914 I took out a Canadian patent on this invention, and after working out the general plans of the Hopewell Cape plant, I laid the whole matter before a firm of New York engineers (in April, 1915) and asked for their very candid opinion and criticism. This firm is one that makes a specialty of hydro-electric plants and has had great experience with them.

After going over my plans and estimates carefully their decision was briefly this:

The project is thoroughly sound from an engineering standpoint, but we rather doubt if the population served is big enough to make it an attractive proposition for capitalists, since the return on the original investment would be small for several years, and until, in fact, the population served had considerably increased, when the investment would pay well.

The layman will have no difficulty in understanding this when I explain that the chief cost of the undertaking is the great dam (about two miles long), and this dam must be built whether the output from the plant is small or great. It is proposed to run the first power-lines from the plant at Hopewell Cape, to both St. John and Halifax, and power would be available for all intermediate towns and villages, such as Hampton, Sussex, Moncton, Amherst, Truro, etc., etc., the total power at present required being in the neighborhood of 60,000 gross, or 30,000 net at delivery points.

Now the initial cost of the undertaking is about \$7,100,000 (exact estimates cannot be given until the site of the dam has been explored by borings), and if \$30.00 per horse-power a year was paid, in the average, for the power, the gross receipts of the plant would be in the neighborhood of \$900,000 per annum. Of this annual income 7 per cent. of the income should be put aside for depreciation and operating expenses so that the net income would not amount to more than about 5 per cent. of the cost, the original investment, and this would hardly be attractive to capitalists at the present time.

In the course of five to ten years, population would come to the cheap power (as it always does), and when the demand rose to 100,000 gross, or 50,000 net horse-power, the investment would bear an entirely different aspect.

In the building of the original dam provision would be made for the installation of all turbines up to the full capacity of the plant (about 200,000 gross horse-power, so that as time goes on, as demand required, there would simply be the cost of the turbines and generators to add to the initial cost of the plant, and we would then have a total cost of say \$9,000,000, and the depreciation and operating expenses, on this at 7 per cent. would be \$630,000, while the annual income would be about \$1,800,000 so that the net income would rise to \$1,170,000 or

12 per cent. on the total capital expenditure of \$9,500,000.

As the demand increased the proportionate deductions for depreciation and cost of operation decreases, and eventually the return on the capital expenditure would be a very handsome one, and the plant could afford to reduce its charge to \$25 per horse-power a year, and eventually to \$20, or even less.

However "Capital" is proverbially impatient and is not willing to wait for long periods for the returns on its investments, and it therefore depends on the governments and the peoples of the two provinces to provide the capital for this undertaking, if they really want cheap electric power at the present time.

There are two courses open to the provincial governments—either that they build the plant as a government institution, in which case I presume the convicts from the Dorchester Penitentiary might be employed (although this might arouse opposition from "the poor" and delay the completion of the work), or else that they guarantee to a private company the interest for a certain number of years on a sufficient bond issue to make an attractive proposition to a body of private capitalists.

Personally, I am not in favor of government management, for it has been

proven—times without number—that government management is not efficient management, and I think the very best way would be for the New Brunswick government to guarantee interest on a bond issue equal to one-third the total cost, and for the Nova Scotia government to do the same, allowing a privately-owned company to provide the other third of the cost, with an agreement that would allow the company to receive a fair return on its invested capital, and a sinking fund that would gradually pay off its indebtedness to the two provinces.

The interests of the people would be safe-guarded by a proper charter to the company, in which the public and company interests were equitably arranged.

I have had many opportunities to observe government management in the United States, Canada and England, and I feel sure that the interests of the people would be best, and most efficiently, served by company management.

The question will naturally arise as to how such a plant would affect the navigational, farming, fishing and other rights of the Petitcodiac and Memramook rivers and valleys, and very fortunately, these local interests would be affected very beneficially.

The dam itself would form an important highway connecting Hopewell

and Polly Point, with the eastern shore, and supplying a ferry service that is exceedingly irregular and unsatisfactory on account of the high tides.

The waters of the Petitcodiac would be held in by the dam, and "the tide" would only rise and fall six to eight feet (instead of the thirty-eight to forty-five feet as at present) vessels would be passed through a lock in the dam and there would always be water at the Moncton and other wharves on the Petitcodiac, where, at present, there are mud-flats much of the time.

The Memramook is almost entirely an agricultural valley, its navigation is practically nothing—its grasslands are protected against the highest tides by means of dykes, and these are only opened about once in two years to allow the salt-water to flow over the grass-lands and fertilize them.

The building of the dam would make of the Memramook a "low-level-basin" and the waters in this river would be abnormally low most of the time, but to accommodate the agricultural interests of this valley, it could be arranged to overflow the grasslands by

one high tide (say, once in two years, or once a year, as the majority of farmers decided necessary.)

This operation would interfere with the working of the "tidal electric" plant, for about six hours, but by selecting a suitable tide, this interruption need only occur between midnight and 6 a. m. (on the night selected) and notice could be sent to all users of electric current of this temporary interruption. The installation of the plant would make it unnecessary for the farmers on the Memramook to maintain dykes, which they do at present at considerable trouble and expense.

I have been unable to find that any fishing industry exists on either of these rivers that would be adversely affected.

The public will naturally inquire how I personally propose to benefit in the undertaking and I will be equally candid about this:

While the plant was building I would expect to act as chief engineer and general manager at a moderate salary to be agreed upon with the company or Government, as the case might be, and when the plant was completed and delivering power I would expect to receive a fair payment on my patent, in the form of cash, stock in the company, or royalty as might be arranged. For the details of design of the plant I would employ the very best hydro-electric engineers with extended experience in ordinary hydro-electric experience and I would act with these engineers in an advisory capacity on the special and novel problems of a tidal plant.

The plant that I am here proposing to the two provinces, offers them a very great opportunity. If it is built it will be the first great tidal power development in the world, it will attract population and develop industries of all kinds in both provinces and should greatly increase the prosperity and population of both.

Power from a tidal source has the great advantage over any other water-power, in that it is entirely unaffected by seasons of the year or by a drought; tidal power of any source is limited only by the money that can be raised, and these minimum tides have been those that I have always considered in my calculations on this proposed plant.

With good support I am ready to go ahead with this work, and it is the only adequate and practical source of electric power in the two provinces that does not interfere with important pre-existing rights of the lumbering, and other industries; but if the undertaking is to be unduly hampered by legislative restrictions, and lack of proper governmental support, it would be unwise to commence the building of the plant until the slow growth of population and public demand made its building absolutely imperative.

(Signed) W. RUPERT TURNBULL.
Rothsaw, N. B., January, 1914.

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