

1398

CALIF HYDRO-ELECTRIC SCHEME.

- 120/44. Suggestions for Harnessing Tide for Power.
 1201 Generation of Electricity by Wind-power.

R MITCHELL.
 T FITZROY RJ.
 STANLEY.
 31. 3. 51.

The Colonial Secretary.
 Port Stanley
 F. II.

Sir:

I have the honor to request the pleasure, of an interview with His Excellency The Governor.

I have been making a survey of the possibility of installing Hydro Electric Plant in the various settlements. As the installation of such plant, where practical, would contribute to the welfare of the people in the settlements, I feel His Excellency would be interested in an outline of the project.

I have now been requested by various interested parties in Port Stanley to extend my tour to the settlements in the East Falkland Island. I would be grateful if an interview could be granted me before my departure. I regret that the periods of my stay in Stanley has been reduced by the imminent departure of various managers on leave, who require a report before this month Fitzroy. I must leave today Sat 31st for Teal Inlet, by air I propose to return from there on Monday 2 April also by air. I will then be in Stanley until the evening of Wednesday 4th April when I must begin my tour. Hoping that his Excellency will be able to fit me into these times I remain Sir.

Your obedient servant
 R. Mitchell

2 22-11-1971
101 10113717
10113717
10 8 10

The following is a list of
10113717
10113717

YE Reverse. I hope to fly Mr. Mitchell in from T.I.
on Monday morning. Would YE care to see him?

no pages Monday afternoon 140

According to the records of the
21/3/11

21/3/11

File

21/3/11

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CS 3-10

If/when our Water Engineer arrives and when he has completed first essentials here I would like him to be present and to Paul Howard to discuss their Hydro-Electric proposals on which the Fann's directors (very prudently) await a professional opinion before they will give permission to go ahead. This progressive Fann deserves any help that

#36

Government can give it — they

would assign their own Engineers

to do the job.

MC 5/x

BU 3074
31/4
15/4
15/8

The Falkland Islands Company, Limited.

(INCORPORATED BY ROYAL CHARTER 1851.)

REGISTERED 1902.

AGENTS FOR LLOYDS.

TELEGRAMS "FLEETWING PORTSTANLEY" VIA RADIO.



Stanley,

27th July, 1954.

Sir,

HYDRO ELECTRIC SURVEY.

With reference to the discussion with His Excellency the Governor at the Annual General Meeting of the Sheep Owners Association on the subject of a proposed hydro electric survey of the Colony, I quote, as requested, a letter received from our Head Office dated 8th June last -

" We quote letter dated 31st ulto. from Mr. E. G. Mathews :-

" With reference to my recent conversation with you, I think it would be a sound thing in the general interest to have a survey made of any places where hydro electric power might be suitably generated in the Falkland Islands.

" I have had a talk with Mr. Walker of Gilbert Gilkes & Gordon Ltd. and he thinks it possible that he may be able to make a trip himself early next year, or to send a competent colleague, and he thinks that a sum of £1,000 would about meet the expenses of that trip. He would require at least five weeks in the Islands to do any real good and possibly he might wish to stay a little longer.

" Mr. Blake tells me that Holmsted Blake & Co. will definitely contribute £100 towards the cost and so will J. L. Waldron Ltd., but if more were required, on a proportionate basis, the increase would be provided.

" I think that the Government should contribute to the cost and I expect ^{who} there are several other concerns in the Falkland Islands who would gladly come in.

" Perhaps you would be good enough to cause an enquiry to be made and let me know with what result, so that I can continue negotiations with Messrs. Gilbert Gilkes & Gordon. P.S. Mr. Walker has just come to the telephone. He has talked the matter over with his Chairman and evidently is rather keener on making the journey than he was when I saw him the other day. He wishes me to say that his firm would only require the repayment of expenses and that, therefore, the sum of £1,000 would be in excess of his needs".

The Honourable
The Colonial Secretary,
Stanley.

ACB Have we any
previous P.R. or hydro
electric schemes? we have?
W.R.

Reply at 4

See 13

2. The proposed survey was warmly welcomed by members of the Sheep Owners Association and, in addition to this Company, a number agreed to subscribe up to \$100 each. Other farmers at present on leave will undoubtedly wish to contribute also.

3. In order that the survey may be carried out to the best advantage, it has been suggested that the surveyor should arrive in the Colony not later than 1st February so that streams may be inspected when usually at their lowest flow.

4. I understand that His Excellency is in favour of such a survey of this nature and I am to enquire if Government will contribute towards the cost, and to what extent.

I am,
Sib,
your obedient servant,

[Signature]
Manager.

SLA *2*
see consider & discuss. I
would like to combine investigation
with wind generation also if possible

NBS.
As far as Stanley is concerned a Hydro scheme is not owing to the high capital cost. I believe there are many possibilities for small Hydro plants in the Camp. The Meteorological Station are gathering information for the possible use of wind generators to run in parallel with the alternators here, this is being done in conjunction with Mr Ed Golding of the British Electrical and Allied Research Association. If the Government are considering submitting to the S.O.A. scheme I suggest their representative contact Mr Golding before leaving to discuss possibilities of combining both wind and water for generation here.

[Signature]
31-7-54.

Y.E.

(3)

I think a token contribution of £100 from Govt would be reasonable / subject to S.P.C. approval and at the same time we should ask that the surveyor should bear in mind the possibility of wind generation.

2) C.M.O. is conducting certain experiments locally but the problems for Stanley & Camp are somewhat different. In the former case the aim would be to supplement the diesel generation of electricity and thus save fuel and in the Camp wind generation might either be complementary to a hydro electric scheme or even provide all necessary power on its own. C.M.O. has shown me a pamphlet which he is following up displaying a small plant which would be a wind generating plant which produces hydrogen gas which in turn is contained in cylinders & solves the problem of economic storage. It would just about suit one settlement's requirements.

Q.S.

£100 aff^d subject to anything CT may have to say. RV to inform KB noted for info

RA 4

C.T.

Above
Have you any views?

Q.S.

A.C.S.

5.

③ is typical of F.P.C. - let somebody else pay - if they can get enough guarantees of £100 it will not cost them anything and if the project is feasible they will probably become Agents for the generators and take a rake off.

2. No objection to a contribution of £100 or even more provided the balance is shared proportionately among the farms.
- { We must be sure our contribution assists everybody not just one firm.

N.B. Blake & Waldron already in.
Scheme sponsored by F.P.C. J

J.B.
6/8

Copy in 1201. - Large Scale
Generation of Electricity by Wind-power.

9th August,

54.

Sir,

3.

I am directed to refer to your letter of the 27th of July, 1954, and to state that Government is prepared to contribute up to \$100 towards the cost of this survey.

2. Though not wishing to make this contribution in any way conditional it is requested that Mr. Walker should direct his attention also to the possibility of wind generation.

3. Government has for some years been making investigations into the possibility of large scale wind generation for Stanley and is working in co-operation with Mr. E.W. Golding of the British Electrical and Allied Research Association and, though the practical method of wind generation in the Camp would probably be by means of small units for individual settlements, it is suggested that it would be useful for Mr. Walker to have a talk with Mr. Golding before he sails.

I am,

Sir,

Your obedient servant,

(Sgd) C. Campbell

The Manager,
Falkland Islands Company, Limited,
STANLEY.

COLONIAL SECRETARY

BU 25/8

The Falkland Islands Company, Limited.

(INCORPORATED BY ROYAL CHARTER 1851.)

REGISTERED 1902.

AGENTS FOR LLOYDS.

TELEGRAMS "FLEETWING PORTSTANLEY" VIA RADIO.

Stanley,

10th August, 1954.



Sir,

I have to acknowledge receipt of your letter No.1398 dated 9th August, 1954 advising that Government is prepared to contribute up to £100 towards the cost of a hydro electric survey, for which I thank you.

We agree that it would be most useful for Mr. Walker to discuss the possibility of wind generation with Mr. E. W. Golding before leaving for the Colony, are are suggesting that this be arranged.

I am,

Sir,

your obedient servant,

[Signature]
for Manager.

The Honourable
The Colonial Secretary,
Stanley.

See 11

*Ad. Pse. show this
& my letter to come
& ask him to be good
enough to put
the G in the picture.
11/8
21/6*

9

A

H.C.S.,

I am not sure that Mr. Golding is the man to
advise about small units such as the farms scheme. He is
responsible for rural electrification & wind power research and his
interest is presumably in large units capable of feeding the "grid".
Dr. R.A.E. Galloway of the Colonial Products Research Council, who is
mentioned in Enfield's letter to Mr. Rowe, may be more suitable.
To be sure, I suggest Mr. Walker is asked to see both men.
Please see drafts at both ends for approval.

G.D.
15.8.54

S.S.A.

B

H.C.S.

Drafts pl. If you approve C.A.O. suggests S.O.A.
shd not inform Mr. Walker of position.

15/8/54

C

33-37

1201

ACP. I think the draft, very
adequate - when despatched
the return file will
advise me.

16/8

C.M.O.

to you. 16/8/54

Mr. M.

Do C.M.O. early pl.
Now at 3 p.m. there is a paper for them
herein.

Extract from the Minutes of a Meeting of Executive Council
held 14th September, 1954.

1398.

15. Camp Hydro-electric Scheme.

Council approved the payment of a sum not exceeding
3200 towards the cost of Hydro-electric survey.

Whittle

Acting Clerk of the Executive Council.

H.B.S.

Yours 9 C. pl. lps. referred to are filed in
1201 at 33-37.

W.H.
17/9.

1398

Copy on 1201 - Large Scale Generation
of Electricity by Wind Power.

11

20th September,

54.

Sir,

8 7

I am directed to refer to my letter No. 1398 of the 9th of August, 1954, and to your letter of the 10th of August, 1954, on the subject of the hydro-electric survey and to state that it would be appreciated if Mr. Walker could also have a talk with Dr. R.A.M. Galley of the Colonial products Research Council, particularly as the latter is more concerned with small scale wind generating units. Both he and Mr. Golding have been advised that Mr. Walker may be getting in touch with them.

I am,

Sir,

Your obedient servant,

(Sgd) C. Campbell

COLONIAL SECRETARY.

The Manager,
Falkland Islands Company, Limited,
STANLEY.

7x11 in 1201
We should have copies of
7x11 in 1201 (after the
mail) P'
Act. Mr. R. A.
How done
28/9/54
20/9

H.B.S.

I. v. o. 10 are you amending 7 pt.?

18.29/9

No — the intention was
to go up to £200 two were
asked for it. I will have to
test it as well.

30/9

24/11 mail

The Falkland Islands Company, Limited.

(INCORPORATED BY ROYAL CHARTER 1851.)

REGISTERED 1902.

AGENTS FOR LLOYDS.

TELEGRAMS "FLEETWING PORTSTANLEY" VIA RADIO.

Stanley,

3rd November 1954

The Honourable the Colonial Secretary,
STANLEY.

Sir,

Hydro-Electrical Equipment.

36
14-20
With reference to our letter dated 27th July 1954 and your reply thereto No. 1398 of 9th August, we enclose for your information copy of a letter we have received from Messrs. Gilbert Gilkes & Gordon Ltd. on this matter.

I am, Sir,

Your obedient servant,

Ing Creece
MANAGER.

*See for any comments
for a SPH may wish
to make.
G
9m*

HEL
I have no comments other than I think it
a sound plan, I will pass to SPH

ADL

10/11/54

See 21

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H.B.

The letter from Messrs G.G. & G. Ltd. is most comprehensive and covers all of the salient points of generation by water power here.

I note it is proposed that Mr Walker plans to spend 4 weeks here. I fear that this will not give him sufficient time to carry out a complete survey and put up schemes for all of those interested. As a suggestion would not the Aero-Aircraft be put at his disposal during his stay and perhaps four Managers be asked to complete simple surveys as outlined at 19.

If time allows Fox Bay East should be surveyed as a possible site at some future date for this means of generation.

Mr Hopkins has some comments to make regarding meteorology and asked that this file might be passed on to him.

E. J. G. G. G.
13.11.54.

Ref No. 2. I passed to S.P.H. and agree with the above remarks

14/11/54
A.G.

GILBERT GILKES & GORDON LTD.

PNW/EH

KENDAL,
Westmoreland.
ENGLAND.

13th August 1954.

L.W.H. Young Esq.,
Chairman,
The Falkland Islands Co, Ltd.,
120 Pall Mall, LONDON. S.W.1.

Dear Mr. Young,

HYDRO-ELECTRIC EQUIPMENT.
in the
FALKLAND ISLANDS.

This letter is to confirm some of the points raised when I had the pleasure of meeting you on August 9th in company with our London Manager, Mr. J. H. Walker, and our Research Officer, Mrs. V.F.E. Wilson. The object of the meeting was to discuss the possibilities of developing Hydro-Electric power in small units in the Falkland Islands, with particular reference to the suggestion that we should send out an engineer fully qualified in this class of work to make a survey and report to you and to the other Companies and individuals concerned upon his findings and recommendations.

I understand that you may wish to hand copies of this letter to others interested and at the risk of repeating certain facts and information which are familiar to you I am proposing to make it as comprehensive as possible so that those we have not met may be able to assess the situation.

GILBERT GILKES & GORDON LTD.

We are a firm whose Head Office and Works are at Kendal, Westmorland, and our London Office at Craven House, Kingsway. For nearly one hundred years we have been manufacturing small and medium water turbines varying in output from below 1 B.H.P. to upwards of 10,000 B.H.P., and in most parts of the world we have supplied some thousands of relatively small units, the majority of which operate in outlying areas with the minimum of supervision.

In Scotland and Wales particularly we have catered for the supply of hydro-electric sets developing from 1 to 100 KW for country houses, farms, sawmills, small factories and rural electricity supplies, and there is certainly no other firm in this country which has had anything like as much experience as we have in this class of work.

Where the owner of a country house or estate has a reasonable supply of running water upon his property, his normal procedure is to ask us to send an engineer to investigate the quantity of water flowing in the stream, the head or "drop" of water which can be made available, the recommended power of turbine to be installed and the cost of supplying the materials.

When making our recommendations the strictest technical honesty is essential. It often happens that we have to recommend a property owner not to proceed with a hydro-electric scheme because we are satisfied that over a period it would not give him the service required due to seasonal water shortage,

Hydro-Electric
Equipment:

- 2 -

constructional difficulties, or other reasons which were not apparent to the non-technical man.

In designing our water turbines and their speed governors we have concentrated upon sound and robust design, laying great stress upon the fact that simplicity, long life and the minimum of maintenance are ultimately more important to the user than the lowest possible capital cost.

Thus while other manufacturers may from time to time offer equipment at a lower price than ours, we think we may say that we have a world wide reputation for quality which you or your friends could confirm from a number of independent sources.

From the above you will see that we have a store of both civil and mechanical experience behind us, but I should perhaps point out that we do not undertake civil engineering work in connection with hydro-electric installations as this is normally done by a local builder with some advice and possibly supervision from our engineering staff.

THE DEMAND FOR WATER POWER IN THE FALKLAND ISLANDS.

Since the war we have received several enquiries for small hydro-electric installations in the Falkland Islands and we give below a resume of the more important ones with which we have been asked to deal :

Our Ref.	Year of Quotation	Output KW	Prospective Purchaser
7853 T.	1948	15	Falkland Islands Co.
20083 T.	1951	36	Spearing & Waldron Ltd.
11362 T.	1953	3or 5	Bertrand & Felton Ltd.

The information provided with the above enquiries was not as complete as we should have liked, but we submitted quotations for equipment which, so far as we could judge, would be suitable for the requirements.

Our interest in this market was raised, and the writer, our London Manager and our Market Research Officer tried to obtain as much information as they could, starting with Colonial Reports on the Falkland Islands 1950/1. From this Report we were disappointed to note that the total population of the Falkland Islands was only 228,0, about half of whom lived in Port Stanley, 100 in Darwin, and 900 in some 34 scattered farm settlements in East and West Falkland. Port Stanley is supplied with electricity from a Diesel Power Station and we understand that the C.D.C. meat freezing plant will also have Diesel power.

According to Professor Butland of the Department of Geography, Birmingham University and the Colonial Office List 1954, large numbers of houses are equiped with wind generators and assuming that all this information was correct it appeared that the potential market for hydro-electric equipment would certainly not justify our sending out an engineer to investigate.

On the other hand we have your assurance and that of other farming interests in the Falkland Islands that small, simple hydro-electric units supplying outlying settlements would be most valuable as they would provide electricity for lighting and possibly, in some cases, space and water heating, together with power to operate small domestic and other machines

Hydro-Electric
Equipment:

- 3 -

machines.

The provision of such amenities would help to make life on the farms very much more attractive and we gather that a feature which particularly appeals is the small amount of labour required to maintain a hydro-electric set, the saving in the cost of oil fuel and peat cutting, and the fact that in the event of war or serious international trouble, oil supplies might be cut off for long periods.

Mr. Walker was also advised by Mr. Barton that it was not true to say that the winds were continuous throughout the year with the result that the wind generator is perhaps a less attractive alternative to the hydro-electric set than other sources of information had given us to understand.

It would, therefore, appear that if the conditions of stream flow, head and proximity of power house site to a settlement are satisfactory, a number of units might be purchased.

Our information is much too meagre to enable us to hazard more than a vague guess, but perhaps from 5 to 15 settlements in the Islands might be provided with hydro-electric equipment.

AVAILABLE WATER POWER POTENTIAL:

Here again we think it wise to open with the pessimistic note which we quote from the Colonial Office List 1954 :

" There are no streams worth exploitation as a source of power supply. None of the rivers are navigable, being for the most part nothing more than streams a few miles long, of little volume. Much of the drainage is into peat bogs and rock-strewn valleys, known as "stone runs", the moorland vegetation absorbing most of the relatively small rainfall."

The statement "no water power is available" is one which the author has, unfortunately, not attempted to qualify. If he was looking for a source of power supply sufficient to give some hundreds or even thousands of kilowatts and ignoring anything less, the statement is probably correct, but the fact remains that some power can be generated from water whenever it descends, and the ~~max~~ amount of power is in all cases proportional to the product of the rate of flow of water and the head through which it descends. Thus a stream which not possibly give 100 KW might suitably be developed to give 5 KW throughout the year, sufficient, for instance, for lighting to a small settlement. For an isolated home 1 or 2 KW can be a real blessing.

As you know, we have been continuing our research making every possible contact to find out as much as we can about the geographical features and the flow in the streams. Mr. Walker is at present working on this aspect, but we are coming to the conclusion that little more can be done without investigating at site.

The average rainfall appears to be from 15" to 20" measured in various parts of the Islands, and there is an advantage that it is apparently reasonably distributed throughout the year. We understand that rainfall occurs on an average of 150 days per annum. The driest part of the year is usually in January or early February when the nights will be long and the weather presumably reasonably warm. Thus at this time of the year the amount of power available at this time would be less serious than if the dry period always occurred in the winter and August.

Hydro-electric
Equipment:

- 4 -

Mr. Walker has estimated that it looks as though 1 Kilo-watt of power might be generated for every 20 feet of head per square mile of catchment area (gathering ground). This is most a rough approximation and should be treated as an indication only.

We know that many of the streams are some miles in length and can probably assume with safety that some of them have gathering grounds of from 5 to 20 square miles or possibly considerably more. Thus if we take a stream having a gathering ground of 5 square miles above a point at which a head of 50' could be developed we might recommend a $12\frac{1}{2}$ KW unit. On one of the larger streams with a gathering ground of 20 square miles above a point at which a head of 20 feet could be developed we might recommend a 20 KW unit which would supply both lighting and power for several dwellings.

It is at this stage that we run into the ~~major~~ major difficulty, namely our lack of knowledge of elevations, or the catchment area of the streams which appear nearest to the settlements. We have two maps in our possession, the first being the Directorate of Colonial Surveys map DCS 30/1 which we have had enlarged from the Colonial Reports of the Falkland Islands 1950/1, and the Falkland Islands Survey dated 1883 kindly loaned to us by Mr. Mathews. These have no contours and most of the streams are only indicated by dotted lines. The geography and rainfall appear in some respects similar to that of North-East Scotland and we can only say that in that area a certain number of small hydro-electric units operating satisfactorily.

If in fact much of the rainfall is absorbed in the peat bogs and evaporation is at a greater rate than we should anticipate in this country, our figures may be optimistic, but we understand that the prevailing winds have a high humidity so that excessive evaporation probably does not occur.

TYPE OF PLANT PROPOSED

The two normal types of water turbine employed for small developments, such as are proposed here, are the Impulse turbine (Pelton Wheel or our patent Turgo Impulse Wheel) if the head available is more than about 50 to 100 feet, and the Francis turbine if the head is below this. Each machine consists of a wheel and shaft driven round as the water passes through the turbines, the shaft being directly connected to the electric generator. Normally if the head is more than about 50 feet, a small dam is built across the stream and the water is led to the turbine through a pipe which may be anything up to 30" diameter, depending upon the head and the power to be generated. The speed of the turbine is controlled by a governor or.

The plant should be enclosed in a small house. We take it would probably be constructed from concrete. It comprises the turbine, generator and a simple switchgear. From the turbine house the current is led to the settlement by overhead wires.

To enable standard electrical equipment to be used, we should normally recommend 240 volts single phase current generators. If direct current is available, it is sometimes possible to economise in the capital cost of small units by providing a turbine without a generator, the voltage controlled by an automatic voltage regulator.

Hydro-Electric
Equipment:

- 5 -

The turbine is started up by the simple operation of opening a handwheel and may then be left running unattended. We recommend that the set should be visited at least once a week for inspection and greasing. If, in particular cases, it is felt that the period between visits should be extended, we could make special provision and we can also arrange for automatic shut down in the event of any fault such as hot bearing, major electrical fault, etc. developing. Safety shut-down equipment is, however, rather expensive when compared with the total cost of a small unit and is not usually considered necessary.

Each individual site should be surveyed independently to determine the most suitable method of developing the water power, but it might be an advantage to sacrifice some efficiency of operation if it were found that identical turbines could be used at different sites.

The turbine should be located as close as possible to the settlement or dwelling to be supplied, but it is not essential that it should be immediately adjacent. For units having an output up to about 5 KW and supplying single phase current, line losses are likely to be considerable if the turbine is more than half to three-quarter of a mile from the point to be supplied. For larger units longer transmission lines can be used and in certain cases if a good water power site can be found it might pay to install transformers and transmit over much greater distances at a higher voltage.

For ~~very~~ small streams it may be possible to build a small storage dam and fit automatic flow control to the turbine so that when the load is light the water will store up in the dam to be drawn down again in the ~~water~~ evening when the lights are in use. It is also possible sometimes to fit remote starting and stoping so that when electricity is not required, no water at all flows through the turbine and the dam can fill up from a stream which otherwise would be too small to generate useful power.

There is a possibility that in certain cases a very small water turbine might be used to help out a wind generator. Probably this would require a small Pelton Wheel operating with the storage from a small reservoir fed by a trickle of water. If there were spells of calm the Pelton Wheel could be opened up and used to charge the batteries, allowing the reservoir to fill up again when the wind generator was working.

Sometime ago Mr. Walker discussed this question with Mr. Golding of the Electrical Research Association who is, as you know, a specialist in wind power investigation. He quite agreed with the idea that the small Pelton Wheel might be used as an auxiliary to wind power, and also put forward the interesting suggestion that the windmill should pump water to a high level reservoir which would then be used to drive the Pelton Wheel, thus cutting out accumulators.

INVESTIGATING ENGINEER

We have attempted to outline above the situation as we see it. We believe that there is a definite need for some small hydro-electric sets in the Falkland Islands, and although the conditions are clearly not ideal we think, from the rather meagre information at our disposal, that a number of attractive schemes could be worked out.

Hydro-Electric
Equipment:

- 6 -

We should like to have been able to give you some idea regarding the cost of small and medium sized hydro-electric schemes, but the conditions vary so greatly between different sites that it is really impossible to do so. The capital cost of a hydro-electric scheme is always greater than that of a Diesel generating set of similar size, but the running and maintenance costs are a mere fraction. In general it is cheaper to develop a site where the flow of water is relatively small, but a considerable head can be obtained, than it is to obtain power from a much bigger stream, utilising only a low head.

The cost of transmission lines must also be taken into account and it might easily happen that the cost of a 5 KW installation at one point (including pipes, transmission line, etc) might be twice as great as that of a similar installation at another point.

We should be prepared to send a fully experienced engineer to investigate possible schemes, and in all probability this would be our London Manager, Mr. J. H. Walker, who has over 30 years of experience in this class of work in Great Britain, Ireland and overseas.

We feel that the potential in the Falkland Islands is small and we could not undertake the cost of sending Mr. Walker in the hope that sufficient business would materialise to cover all our expenses. We should, therefore, expect your Company (possibly sharing with other Companies as has been suggested) to pay all out-of-pocket expenses, including travelling, living and incidental expenses, insurance, medical charges, passport and visa charges, special equipment, etc. from London to the Falkland Islands and return. You would, we know, make all facilities available to Mr. Walker in the Falkland Islands and would give him all assistance possible.

We estimate that about 4 weeks in the Falkland Islands should be sufficient to enable him to investigate the more promising sites and he would almost certainly be able to instruct certain of your people out there in the method of making such investigations so that in future they could carry out similar surveys.

The procedure involved is to select a suitable stream / or streams which are clearly not too far from the points they are to supply, walkup them, and guess roughly the amount of water flowing and the head which could conveniently be obtained in a reasonable distance.

after selecting suitable points for the intake and power house the difference in head is obtained by means of a level and staff, and a suitable "track" for the pipeline should be roughly pegged out. At the same time if a party of two or three are making the investigation some of the party can be erecting a simple wooden measuring weir as near as possible to the site of the intake weir in order to measure accurately the amount of water flowing.

The length of transmission line should then be obtained (probably from the map) and we then have the basic information to enable us to decide if a scheme is feasible, what size of plant can be recommended and what the cost of materials will be.

Upon his return to this country Mr. Walker would submit a report

13th August 1954.

L. W. H. Young,

Hydro-Electric,
Equipment,

- 7 -

to those interested and we should tender for the schemes which were considered economical.

For this work we should charge a fee of 250 guineas. This would be substantially less than the cost to which we shall be put due to the loss of Mr. Walker's time while away and preparing his report, and the replacement of his services in London by staff from Kendal.

For every £1000 of orders received a credit of 25 guineas from the fee would be made, so that if orders to the value of £10,000 were received the fee would be eliminated. The above would apply to orders received within two years of the date of submission of Mr. Walker's report and no further credits would be made on orders received after that date.

GENERAL

We trust that this letter gives a clear picture of the situation and very much hope that should you decide to accept our proposals we may have the pleasure of supplying a number of small hydro-electric units in the Falkland Islands and that these will add to the prosperity and happiness of those in the territories.

We understand that January/February would be the best months for making a survey, and should you be in a position to give early agreement to our proposals we would take immediate steps to collect as much information as possible with a view to Mr. Walker leaving about the end of the year or at such time as recommended by you.

Yours sincerely,

(sgd) Paul. M. Wilson,

Chairman.

LWS.

Re see 13a. Pass file to CMO now?

10/3/12.

Yes.
Gin

C.M.O

13a please - passed to you as requested,
for your comments.

W. J. B. L.
6/12

To CMO pl.

Recalled for Extract
from S.F.C. Minutes
10/25/15.

The Falkland Islands Company, Limited. 21

(INCORPORATED BY ROYAL CHARTER 1851.)

REGISTERED 1902.

AGENTS FOR LLOYDS.

TELEGRAMS "FLEETWING PORTSTANLEY" VIA RADIO.

Stanley,

16th November

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The Honourable the Colonial Secretary,
STANLEY.

Sir,

Hydro-Electrical Equipment

13
22-24 With reference to our letter of 3rd inst. we enclose copies of further correspondence on this subject with Messrs. Gilbert Gilkes & Gordon Ltd.

I am, Sir,

Your obedient servant,

[Signature]
MANAGER.

Bob

8th October, 1954.

22

P.N. WILSON, ESQ.,
Messrs. Gilbert Gilkes & Gordon, Ltd.,
Kendal, Westmorland.

Dear Mr. Wilson,

With reference to your letters reference PNW/EH, dated the 13th August, and 28th September respectively, we have now got the agreement of a number of farmers who would like to avail themselves of Mr. Walker's services. These are J.J. Waldron Ltd., Port Howard, Holmsted, Blake & Co., Ltd., Hill Cove, Bertrand & Felton, Roy Cove; Port San Carlos Ltd., Port San Carlos; & Pitaluga Bros., Salvador. Though I am of the opinion that the prospects of a hydro - electric survey of our farms are not very promising we are prepared to come in to make a survey possible. The Falkland Islands Government is also making a contribution.

On behalf of all concerned we undertake to cover Mr. Walker's expenses from England, back to England, this is to include air passages, living and incidental expenses, insurance, medical charges, passport and visa charges, special equipment, etc. Farmers concerned will make all facilities available to Mr. Walker in the Falkland Islands and give him all assistance possible. We suggest that he leaves by air at the beginning of February, to arrive at Port Stanley 10th idem, leaving Port Stanley mid-March to arrive U.K. about 10 days later. With regard to the expenses will you kindly amplify what you have in mind under the heading Insurance and Special Equipment.

On behalf of all concerned we agree to your fee of 250 guineas and the credit thereon proposed in para. 3 of page 10 of your letter dated 13th of August. last.

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We are working on a rough itinerary but must rely on transit by sea, land-rover, and horse; if the Government planes can be availed of, his movements will be expedited but we can place no reliance on them. In the meantime kindly let us know if there is any further information we can give you.

The Colonial Secretary to the Falkland Islands Government has suggested that Mr. Walker might have a further discussion with Mr. Golding re wind-power, also with Dr. R.A.E. Galley of the Colonial Products Research Council, who is concerned with small scale wind generating units, both he and Mr. Golding have been advised that Mr. Walker may be getting in touch with them.

Yours faithfully,
For THE FALKLAND ISLANDS COMPANY LIMITED

(sgd) L. W. H. YOUNG

Managing Director

GILBERT GILKES & GORDON LTD.,
KENDAL,
WESTMORLAND. 23

S.T.2685. PNW/EH.

L.W.H. Young, Esq.,
The Falkland Islands Co. Ltd.,
London, S.W.1.

11th October, 1954.

Dear Mr. Young,

Thank you for your letter of 8th October, 1954 instructing us to carry out a survey of small water powers in the Falkland Islands over the period February-March 1955.

We agree to carry out the survey to the best of our ability, and assuming that he is available (and we have no reason to doubt this) the work will be undertaken by our London Manager Mr. J.H. Walker.

We think that we have sufficient information at our disposal to make the necessary arrangements apart from matters of detail such as times of planes, boats, etc.

We are leaving Mr. Walker to go into these various questions, many of which will not involve further correspondence at this stage.

We will certainly collaborate with Dr. R.A.E. Galley and ~~Mr.~~ ~~through~~ Golding regarding the possibility of wind power generation. Although we are not manufacturers of wind power equipment Mr. Walker has a personal interest in this subject and it has always been our policy to recommend to prospective clients the installation of the generating plant which we consider most suitable. There is a possibility that at certain sites a combination of wind power for pumping water to a small storage reservoir and the subsequent developing of water ^{power} by means of a small Pelton wheel or turbines might prove an economical method of generating electricity.

I much appreciate the confidence which you and the other participating companies are placing in us and very much hope that we may be able to give you some genuine assistance.

Yours sincerely,

(Sgd). Paul. N. Wilson.

- C O P Y -

GILBERT GILKES & GORDON LTD.,
Craven House, Kingsway,
LONDON, W.C.2. 24

Our Ref. S.T. 2685. JHW/JAE.

L.W.H. Young, Esq.,
The Falkland Islands Co. Ltd.,
120 Pall Mall,
London, S.W.1.

12th October, 1954.

Dear Mr. Young,

Mr. Wilson has sent me a copy of your letter of the 8th instant and his reply of the 11th instant. He is just leaving for Scotland and asked me to apologise for him having omitted in his letter of the 11th to reply to your specific questions in regard to insurance and special equipment.

We in this company are normally insured by the company, but when we are flying or in other special circumstances, the insurance is suitably modified. In this as in other cases, then, the additional premiums would be regarded as part of the expenses. I have spoken to you on the telephone upon this matter and am writing to our Secretary in regard to particulars.

The special equipment referred to in Mr. Wilson's letter is really inserted to cover any special clothing which might be needed in visiting an unusual area, or indeed any special instruments. In this particular instance, I cannot at the moment see that any special instruments will be needed. You seem to have the necessary levelling equipment there, but even if not, I think that anything necessary could be taken with me, and is already in our possession. Altogether, then, if you were to assume for the moment £20 or £30. I think this would amply cover anything that might be necessary.

I am informing Mr. Chaplin of Enfield Cables that you would very much like to accept his invitation to visit St. Albans and perhaps Dunkirk, and I will be in touch with you again later about this matter.

Yours sincerely,

For GILBERT GILKES & GORDON LTD.

(Sgd) J.H. Walker.

London Manager.

MINUTES OF A MEETING OF STANDING FINANCE
COMMITTEE HELD IN THE OFFICE OF THE COLONIAL
SECRETARY ON FRIDAY THE 4th FEBRUARY, 1955.

Present: The Honourable the Colonial Secretary (Chairman)
The Honourable Mr. S.C. Luxton
The Honourable Rev. W.F. McWhan, M.B.E.

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| Minutes | 1. The Minutes of the previous Meeting were confirmed. |
| A.I.S.E's. | 2. The Committee approved the A.I.S.E's. detailed on the Schedules appended below. |
| Select Committee | 3. The Committee agreed that the following points should remain in abeyance until all members of the Committee had an opportunity to discuss them.
(a) Repatriation of W. Murdock.
(b) Boarding School on West Falklands.
(c) Museum, Town Hall. |
| Purchase of Quarter | 4. Committee agreed in principle to the purchase of a quarter-in-Stanley costing approximately £2,500. |
| Hydro Electric Survey | 5. Committee agreed to the contribution of £100 by Government towards the Camp Hydro Electric Survey. |
| Arrears of Pay late Naturalist | 6. Committee agreed to the payment of arrears of salary to Dr. Hamilton for the period 1st - 7th November and the sum involved amounts to £12. 12s. 9d. A.I.S.E. to issue at next meeting. |

Chairman

Secretary

SCHEDULE 1953/54

<u>Head</u>	<u>Subhead</u>	<u>Amount</u>
(VIII) EXTRAORDINARY EXPENDITURE		£. s. d.
	N.I. Equipment power Station	644. -. -. =====

SCHEDULE 1954/55

V EDUCATION	1. v Pupil Teachers	105. -. -. vi Clerk	62. -. -. 5. Board & Lodgings	72. -. -. VI HARBOUR & AVIATION	N.I. Student Pilot	88. -. -. IX MILITARY	5. Incidental Expenses	13. -. -. 6. Uniforms	400. -. -. X MISCELLANEOUS	N.I. Typewriter	53. -. -. XIV PUBLIC WORKS	1.xiv Apprentices	60. -. -. 6. p.tce. Power Plant	5427. -. -. =====
														£ 6280. -. -. =====

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The Falkland Islands Company, Limited.

(INCORPORATED BY ROYAL CHARTER 1851.)

REGISTERED 1902.

AGENTS FOR LLOYDS.

TELEGRAMS "FLEETWING PORTSTANLEY" VIA RADIO.

Stanley,

12th September

19 55

The Honourable the Colonial Secretary,
STANLEY.



Sir,

28 We enclose copy of the Report prepared by Mr. J. H. Walker following his recent survey into Hydro-Electric and other Power Resources in the Colony.

We have also supplied copies of the Report to Messrs. Howkins, Weir and Gutteridge, whose assistance was much appreciated by Mr. Walker.

I am, Sir,

Your obedient Servant,

A. G. Davlin

MANAGER.

29.
Y. H. Submitted for. I have not yet had
time to read.
J. 16/9

Copies filed in relevant files

No. 1201
Circ. No. 4.

November, 1955.

To: All Members of Ex. C.
 From: The Colonial Secretary,

S.F.C. (Comm. No. 1.)

Subject: Power Resources in the Falkland Islands.

1. As Honourable Members are aware Mr. J.H. Walker, the London Manager of Gilbert Gilkes and Gordon Ltd., recently carried out a survey of hydro-electric and other power resources in the Falkland Islands. This Memorandum summarises, for the information of Members, certain recommendations and conclusions made and formed by Mr. Walker in his report. It also summarises the conclusions reached by Government after consideration of the Walker Report.

2. In general terms Mr. Walker concluded that there are a number of sites in the Falkland Islands where small water power schemes would be possible but that few of these are deserving of further consideration on account of various factors. He has recommended that measuring weirs should be constructed in certain streams which might be harnessed and flow readings should be taken for twelve months and then analysed in conjunction with rainfall figures, in order to determine whether hydro-electric plants should be installed on the farm stations concerned. The report contains advice to farm managers as to how records should be obtained. Finally, the Walker Report indicates the possibility, subject to more data, of the development of wind power.

3. Specifically the Walker Report examines the cost of production of electricity in Stanley (at the time Mr. Walker collated his information the basic cost of the fuel component was 1.9 pence per Kw. Hr. as compared to .99 pence per Kw. Hr. now that oil is purchased in bulk) and suggests that it would be well worth while investigating the possibility of some power being obtained by other means i.e. hydro or aero generation.

4. After a visit to the Murrel River, Mr. Walker concluded that it would be worth while installing a measuring weir in the river and arranging for readings to be taken. He had in mind that subject to satisfactory data being obtained over a year or so, it might prove an economic proposition, as an adjunct to the present Stanley supply, to install a small diversion dam that would lead water into a contour channel, in turn feeding a pressure penstock to convey water down to a turbine. A hydro-electric installation such as this would be automatic in the sense that its output would be automatically adjusted according to the available water supply. It could be so designed that a visit would only be necessary every few days and continuous attendance would not be required. But, before the full costs and economics of such a scheme could be established, a detailed survey of the area would be necessary.

5. The Walker Report and the question of utilising the power resources of the Falklands have been referred to and considered by the Civil Engineer, the Superintendent of the Power and Electrical Department and the Chief Meteorological Officer. The situation as it exists today

/and

and the conclusions reached by the technical officers concerned are summarised in the paragraphs that follow:-

1. STANLEY.

6. Electricity is at present generated from diesel engines at a cost of 4.73d. per unit, made up as follows:-

	<u>Annual Cost</u>	<u>Cost per Unit.</u>
1. Wages	£4600	2.00
2. Replacement	1500	0.65
3. Maintenance	1000	0.44
4. Distribution	1500	0.65
5. Fuel	<u>2250</u>	<u>0.99</u>
Total	£10850	4.73

The above fuel component, (previously 1.9d. per unit) is based on the latest bulk price of oil and it is very probable that it is as low a figure as can be achieved with diesel plant in the Falklands. Demand is rising at about 16% per annum (20,000 units) and several heavy loads may be expected in the near future (the hospital electrode boiler, the water pumping station, the Falkland Islands Company peat bricketting plant and possibly the ancillary equipment for a Falkland Islands Company slipway, which, it is understood, is under consideration by the Company). Present indications are that the demand may reach a maximum of 10^6 units per annum several years hence, although it may be expected to increase beyond this figure if any substantial reduction in the cost per unit could be achieved. It will be appreciated from the above data, that costs of production are closely related to consumption. Thus, if the consumption doubled, components 1-4 would be spread over more units and a reduction in the cost per unit could be achieved.

7. There are four possible methods of generation:

1. Diesel
2. Steam, fired by peat.
3. Water Power.
4. Wind Power.

In any event wind power cannot provide a continuous supply and must be linked with one of the other three forms of generation. It is, in effect, a fuel saver.

8. Peat has been used effectively in a number of countries (including Ireland and Russia) and about 4,000 yards would be required to produce the present demand of 550,000 units per annum, assuming the same order of efficiency as in the case of the existing diesel plant (i.e. 30%). However, this type of plant is not likely to be as flexible as the diesel engine and it may be necessary to generate at full output for most of the day to meet peak demand. If this is necessary then up to twice the fuel would be required but as the demand increases the load distribution should become smoother and the consumption of fuel should become closer to 8,000 yards per million units. At present Government contract rates, peat costs about £230 per 1,000 yards and the fuel component cost of meeting the present demand for $.55 \times 10^6$

/units

units per annum should lie between £900 and £1,840 per annum (approximately .4 to .8d. per unit), which compares favourably with the £2,250 spent on gas oil (.99d. per unit). Replacement and maintenance costs might also be rather less than with diesel plant, but it is not possible to estimate these components accurately. Wages and distribution would be as for diesel plant. The problem with peat would be to ensure a regular supply (especially for a large plant) and this would become increasingly more difficult as peat in the proximity of the town is worked out. However, the potentially low fuel component might justify further enquiries from the Department of Scientific and Industrial Research, Fuel Research section, to see whether conversion to peat might be worthwhile when the question of replacing the existing diesel plant arises in fourteen or fifteen years time.

Hydro Plant.

9. This type of generation has of course important advantages over both diesel and steam in that it can be semi-automatic in operation (cost of wages might be reduced), the maintenance costs are low and there is no fuel component. Mr. Walker estimated a flow of 50 cusecs during his visit and, from a study of the contours, thought that a fall of 50ft. might be obtained in a distance of about 500 yards. A flow measurement made later by the Civil Engineer gave 33 cusecs and a more recent one in October yielded only 4.3 cusecs. Assuming a fall of 50ft. this minimum flow would yield only about 15 kw. in the absence of a large storage dam. Mr. Walker warns against the use of large storage dams because of the nature of the foundation material and, in view of this and the very small flow obtained recently, it is considered that there can be no possibility of the Murrel providing a regular source of power for the whole of Stanley unless a dam of considerable size were to be constructed. However, if the average flow is of the order of 20 - 30 cusecs, the Murrel stream could provide a useful booster supply for Stanley, amounting in effect to a fuel saver and could in all probability meet the requirements of Stanley over a long period.

10. It is impossible to provide reliable estimates until a careful survey of both flow and fall have been carried out and related to the demand, but the following figures will indicate the probable order of cost and the financial implications of a hydro-electric "booster" scheme that would generate 75 kw.

Hydro Plant to generate 75 kw.

Transmission line from Murrel to Moody Brook	+	£11,500
Civil Engineering Works		19,500
Hydraulic Machinery		<u>4,000</u>
Total		£35,000

Present indications are that, assuming a 50ft. fall is available, this plant would operate at full output for at least nine months each year and when the new water works are in operation the Stanley load is never likely to fall below 70-75 Kw, so that the entire output from the hydro plant could be used. The plant should therefore

/replace

+Line Moody Brook/Stanley will be provided in any event for the new water works.

/at

replace about $.5 \times 10^6$ units per annum, which would otherwise be provided by diesel. It is possible that a C.D. & W. grant might be obtained for this project but, assuming the necessary capital was obtained by loan, the immediate financial implications would be :-

<u>Estimated Annual Saving</u>		<u>Estimated Annual Expenditure</u>	
Saving of diesel fuel p.a.		Amortisation payments	
£2,080		(for 30 years)	£2,150
Saving in depreciation		Replacement Dam	190
and replacement of		Replacement generators	200
existing diesel plant		Maintenance of Plant	
£500		& extra lines	300
Total	£2,580	Total	£2,840

The installation would be automatic in operation and need only be visited once every few days. No extra staff would be required.

11. From the above, and assuming that it would be necessary to service a loan, the scheme would not appear to be an economic proposition. However, once the loan has been paid the estimated annual savings and expenditure would be £2,580 and £695, i.e. a net saving of £1,385 p.a. The latter represents a fuel component cost of .3d. per Kw. The following factors should also be borne in mind:-

- (i) Hydro-electric generation, in the circumstances of the Falklands (and assuming of course that survey and other data indicate a satisfactory source of power) is an assured source of supply and it is not dependant on the importation of fuel from overseas which, in time of emergency, might be difficult and might in certain circumstances cease for some time. On the other hand, with the installation of the new storage tanks a two year supply is assured unless there is a substantial increase in consumption or heavily increased demands from other sources. Consequently this factor is important but need not be overstated.
- (ii) The basic cost per Kw. Hr. in the case of oil fuel generated power is calculated on the present price of imported fuel - £14. 15. 0. per ton in bulk. It is unlikely that this price will decrease in future. It may, in fact, increase and in that case hydro-electric generated power would present a more attractive proposition.
- (iii) If the Murrel River yields a flow of the order of 30 cusecs for nine or ten months during the year then it would be possible, by storage of water overnight for use on the following day (and this would not require a very large dam), to provide hydro power for the whole of Stanley for the greater part of the year. It would still be necessary to retain the diesel plant for use in the dry spring months but there would be an appreciable drop in maintenance and replacement costs and a reduction in the cost of electricity to the consumer might perhaps materialise. However, the possibilities could only be assessed after relating the flow in the Murrel to the

actual demand and a good deal of further thought would have to be given to the matter.

Electricity from Wind Power.

12. The tests so far carried out at Sapper Hill indicate that this site compares with the best so far investigated in the British Isles, and it would be capable of yielding 4,500 units of electricity per annum for each kilowatt of rating. Therefore a plant rated at 70 Kw. would produce 315,000 units per annum, all of which would be absorbed after the water pump is installed and as the general consumption rises. The cost of the plant would be about £7-9,000 plus £3,000 for power lines to Stanley. The wind plants are expected to give thirty years' service with virtually no maintenance. Therefore, assuming that the sum of £12,000 is borrowed for thirty years at $4\frac{1}{2}\%$, the estimated costs would be:-

<u>Annual Saving on Diesel Plant.</u>		<u>Annual Expenditure</u>	
Saving on gas oil (315,000 units)	£1,310	Amortisation on £1200	£740
Saving on depreciation and replacement of existing diesel plant	300	Maintenance of plant and extra power lines	£100
Total	£1,600	Total	£840

The annual saving would therefore be of the order of £800. No allowance is made for replacement of plant, which is regarded as consumable over a period of 30 years and the annual cost of £840 may be regarded as the "fuel component" in the production of 315,000 units i.e. $\frac{£840}{315,000} = .64d.$

per unit. Figures as low as .3d. per unit have been suggested by the British Electricity Authority in their preliminary reports. From paragraph 10 it will be seen that these compare with $\frac{£2845}{.5 \times 10^6} = 1.36d.$ per unit for hydro power, dropping to .3d. after the initial loan is cleared.

13. A further possibility is that with the utilisation of wind power as a fuel component it may be possible to utilise surplus electricity for the heating of buildings. It will be seen from paragraph 12 that it may be possible to produce electricity from wind power at a fuel component cost of around .3d. - .6d. per unit, in which case surplus production from a generator larger than 70 kw. could be used economically for heating furnaces. This would ensure that there was no loss as a result of the greater capital expenditure on a larger plant and much of the output from a larger plant could be absorbed by the town when demand exceeded the minimum of 70 Kw. A preliminary investigation suggests that a plant of the order of 200 Kw. might be obtained for a maximum capital outlay of £30,000 (£1,850 p.a. for 30 years) and a net saving on gas oil of nearly £1,000 per annum might be expected at the Power House and in heating furnaces, plus about £350 p.a. on depreciation of diesel engines. The 70 Kw. and 200 Kw. plants would therefore compare as follows:-

	<u>Annual Expenditure</u>	<u>Net Saving</u>
70 Kw.	£840	£770
200 Kw.	£1,850	£1,350

It should be borne in mind, however, that it will be some years before aero generators of suitable rating for use

at Sapper Hill are in production, and then it would be advisable to wait a short period after the first production models are available for the design to be perfected.

Summary and Comparison of the different methods.

14. (i) Peat and gas oil are the only two certain sources of power because it appears that neither hydro power nor wind power can be obtained in sufficient amounts at all times.
- (ii) Peat would appear to be capable of yielding a fuel component between .4 and .8d. per Kw., which is appreciably less than can be achieved with gas oil (.99d. per unit) but there may be over-riding difficulties in winning the quantity required and preparing it in a form suitable for automatic stoking.
- (iii) Hydro power is capable of yielding a fuel component of about .3d. per Kw. after the initial loan is cleared but the cost would be 1.36d. per Kw. if a loan had to be serviced.
- (iv) Wind power should yield a fuel component of between .3 and .64d. per Kw. and the capital outlay is much less than for a hydro plant. However, the output from a wind generator will be liable to short period variations and the diesel plant must be available at all times to take over the load; whereas the hydrogenerator output will change comparatively slowly and there may be long periods in the winter when the diesel plant could be dispensed with (see paragraph 10).

II. The Camp.

Hydro Power.

15. The Walker Report indicates a number of places where hydro power might be developed economically and gives details of how to measure potential output. Hydro power is only likely to be available at a few stations and the alternative for the remainder is wind power.

Wind Power.

16. The results at Sapper Hill suggest that exposed sites in the Falklands will yield 4,500 units per kilowatt of rating and it seems reasonable to suppose that the majority of farms could find sites within a short distance of their settlements, capable of producing 2,500 units per annum. It is not intended that wind power should be used as the only source of supply, as this would require very large battery storage to provide against long periods of calm, but aero-generators might be used effectively with existing diesel and battery plant, to save fuel. Also it is understood that new designs of wind plant are being tested and it is possible that these may prove more reliable than the small plants used in the Colony for many years. The cost is likely to be of the order of £150 - £200 per kilowatt of rating and assuming that the plant gives only ten years of service the fuel component cost per unit could be $\frac{£200}{2,000 \times 10} = 2.4d.$ per unit.

$$\frac{£200}{2,000 \times 10} = 2.4d.$$

This is less than can be achieved by small diesel plant and a figure of less than 1d. per Kw. might be attainable on good sites, if the plant has a life of 20 - 30 years. Many farms would find the output of 2,000 units per annum from a plant of 1 Kw. rating sufficient for the whole of their requirements and the diesel plant would only be required for periods of calm and periods of heavier load, beyond both the wind generator and the storage batteries.

17. In these circumstances, the C.M.O. has recommended that:-

- (a) Cheap cup counter wind instruments should be installed at Stanley, Darwin, Fox Bay and Pebble Island to bring out any important variations in wind speeds over the area as a whole.
- (b) The measurements taking place on Sapper Hill should be continued for a further twelve months so that comparisons can be made with the simultaneous records from the Camp stations.
- (c) Long term averages should be extracted from existing Stanley records to derive more representative power curves for Stanley and, by comparison with the camp stations, for the area as a whole.

18. In addition consideration has been given (and further advice is being obtained from the Colonial Research Laboratory) on the possibilities and implications of linking diesel plant, such as that installed in a number of farm settlements, which is capable of carrying a maximum load with a smaller wind plant and storage batteries capable of dealing with the average load. Preliminary calculations and estimates suggest that some such system, if practicable, would result in a substantial saving in fuel oil. The principle would be that the batteries would "float" between both the wind driven and diesel generators and the switching of both generators would be automatic.

General Summary and Conclusions.

19. The following summary and conclusions are suggested for the consideration of Honourable Members:-

- i. On the information available there would appear to be some possibilities and potentialities with regard to both hydro-electric power and aero-generated power so far as the supply of electricity to Stanley is concerned and it would be worth while carrying out further investigations.
- ii. There might be possibilities with regard to small hydro electric schemes on individual farms. The potentialities should be left to the farms to explore and take whatever action is necessary and required.
- iii. There appear to be possibilities in linking aero-generation with diesel plant and these should be given further examination. It might be worth giving consideration when further information has been obtained to the installation of a small pilot wind plant of about 2 Kw. at Fox Bay where full records of output and fuel consumption can be maintained. This would provide a practical test

of the type of plant now available and might assist farmers in deciding whether it would be to their advantage to install similar equipment.

If Honourable Members are in agreement with these conclusions, expenditure of the following order would be required:-

A). Hydro-Electric.

1.	A measuring weir should be constructed on the Murrel River.	Estimated cost	£100
2.	Readings should be taken for a minimum of 12 months.	Estimated cost	£100
		Total	£200

Note:

- (a) A survey of the Murrel River area between a point above the 150 ft. contour to a point below the 100 ft. contour. This survey can be undertaken at no cost by a F.I.D.S. surveyor passing through Stanley and it is proposed that the necessary arrangements for this should be made. This survey was recommended in the Walker Report.
- (b) The installation of measuring weirs (where necessary) measuring notches and the collation of data at points on individual farms (as recommended by the Walker Report) as preliminaries to the possible installation of small hydro-electric projects on individual farms should be left to the farms concerned should they desire to take further action.

B). Aero-Electric.

1.	The installation of cup counter anemometers at Darwin, Fox Bay and Pebble Island.	Estimated cost	£100
2.	Replace anemometer at Sapper Hill	Estimated Cost	£20

Note: Further enquiries to be made with regard to the desirability of installing a 2 Kw. wind generator at Fox Bay

Total	£120
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W. G. H. C. G.
COLONIAL SECRETARY.

MINUTES OF A MEETING OF STANDING FINANCE COMMITTEE
HELD IN THE OFFICE OF THE COLONIAL SECRETARY ON
FRIDAY THE 25th NOVEMBER, 1955.

Present:- The Honourable the Colonial Secretary (Chairman)
The Honourable Mr. S.C. Luxton
The Honourable Mr. A.L. Hardy, B.E.M., J.P.
The Honourable Rev. W.F. McWhan, M.B.E.
The Honourable Mr. K.W. Luxton, J.P.

Minutes The Minutes of the Meetings held on 14th
September, 26th September and 7th October were confirmed.

Arising out of Minutes The Chairman informed the Meeting that it was Government's intention to amend the Old Age Pensions Ordinance to enable pensioners to draw pension in the United Kingdom and other countries. The Secretary of State had raised the question of extending to the Falkland Islands the reciprocal agreements at present in force between the United Kingdom and a number of other Colonies with regard to Old Age and Sickness Benefits. The Chairman informed members that this matter was being taken up with the Colonial Office with a view to examining the full implications.

A.I.S.E's. The Committee approved Additional provision as shewn on the attached schedule.

Purchase of Houses at Ajax Bay The Chairman informed members that Government considered it desirable to tender for the Manager's house and bungalows at Ajax Bay with a view to easing the housing shortage in Stanley. If obtained they would be used for housing Government Staff. The Committee agreed to the purchase but considered the estimated figures shown in the Memorandum were too low, with regard to both the proposed tender figures and the estimated amount required for dismantling and re-erection. The Committee recommended the following :-

- (1) That Government tender for 4 bungalows @ £900 each plus furniture £225 making a total per bungalow of £1,125.
- (2) That Government tender for one unfurnished bungalow at £900.
- (3) That Government tender for the Manager's house for £2,800 plus £500 for furniture. (£3,300 complete).
- (4) If Government acquired the houses, Government should endeavour to arrange for dismantling and re-erection by contract on the understanding that the same contractor would be required to both dismantle and re-erect. The advice of the Committee should be sought as to which tender should be accepted. The Hon. Mr. S.C. Luxton and the Hon. Mr. A.L. Hardy agreed to make enquiries with regard to persons able and willing to tender.
- (5) Government should tender for the remaining two bungalows when the Receiver puts them up for sale.
- (6) In the event of Government being unable to arrange for dismantling and re-erection by contract, Government should proceed on the basis of the recommendation made in Memorandum No. 5.

Sighting of Vessels from Cape Pembroke Lighthouse The Committee agreed to the payment to Keepers at Cape Pembroke Lighthouse of a fee of 7/6d for reporting the presence of ships other than H.M. Ships, "Fitzroy" and locally registered craft. Additional provision amounting to £10 was approved for the remainder of the year.

David Alazia The Committee agreed to expenditure from Public Funds amounting to £390 per annum together with £78 per annum in respect of holidays for a training course in the School for

the Blind, Liverpool, for David Alazia with the proviso that no further committments would be involved.

Government
House Car

The Committee were asked to consider the purchase of a car for H.E. the Governor to replace the present one which is in a bad state of repair. The cost of a new car landed at Stanley was estimated at £707 and additional expenditure was approved by the Committee. With regard to the present vehicle it was agreed that the question of it being converted for the purpose of a hearse be left in the hands of the Colonial Secretary who would approach the Falkland Islands Co. Ltd. regarding conversion. In the event of the cost of this work being much in excess of £100 the matter would be referred back to Committee. Approval of a moderate amount over and above the £100 was left to the Colonial Secretary's discretion.

Salary
Adjustments

Committee were asked to consider the following increases in salaries :-

- | | |
|--------------------|--|
| (a) R/T Operator | from £270 - £290 |
| (b) District Nurse | from £240 - £275 |
| (c) Clerk Treasury | accelerated promotion from
£300 to £345 and then £360,
£375, £390, £400. |

The Committee recommendations were as follows :-

- | | |
|--------------------|--|
| (a) R/T Operator | from £270 - £320 w.e.f. 1st October, 1955. |
| (b) District Nurse | from £240 - £300 " " " " |
| (c) Clerk Treasury | from £300 - £345 " " " " |
| | and then £360, £375, £390, £400. |

Power Resources
in the F. Is.

The Committee considered a Memorandum dealing with a survey carried out by Mr. J.H. Walker in connection with hydro-electric and other power resources in the Falkland Islands. It was recommended that further investigations with regard to both Hydro-Electric and Aero-Electric power should be followed up on a moderate scale for a period of two years. The recommendations made in Memoradnum No. 2 were approved.

Copies
on 1201
on 28/D

Roads and
Water Filtration
Projects

The Committee considered a Memorandum regarding Stanley Roads and Water Filtration Projects. The unanimous opinion was that a qualified engineer should be appointed to complete the road programme after the expiry of the contract of the present Engineer.

Port Howard
School

The Chairman informed the Meeting that it was likely that the cost of the West Falkland school at Port Howard would exceed the estimate by some £500 - it was possible, however, that the amount might be reduced by the purchase of a second hand generator from Port Howard and a stove from Albemarle.

Peat Survey

The Chairman produced a letter in which the Falkland Islands Co. Ltd. asked if Government would be prepared to meet half the cost of a survey on peat carried out by Mr. Ohrstram, a peat expert, and amounting to £693. 5s. Od. Committee were unable to recommend any payment by Government.

Messengers

The Committee agreed that the salary scale for messengers should be converted to a flat £70 per annum. Salaries would be adjusted accordingly.

Materials ex
Ajax Bay

The Chairman informed the meeting that Government wished to purchase certain stores from Ajax Bay and asked Committee's approval to spend up to £1,000. The Committee agreed and intimated that further funds would be made available for this purpose if required.

[Handwritten signature]

COPY

*(Original filed in 1201 - Large Scale Generation of Electricity by Wind-Power).

Extract from the Minutes of a Meeting of Executive Council held 15th November, 1955.

1201

6. Power Resources in the Falkland Islands.

After discussion Council adopted Executive Council Circular No. 4 of 9th November, 1955, and advised that the proposals set out in paragraph 19 be put into effect.

See 9

(Sgd) J. Bound

Clerk of the Executive Council.

2 on 12/11/55
No

BU 26/5/56 BU 44/27/56

41

30/5/56

bu 30/5/56

bu. 15/8/56

Dec 15/9/56 A.

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17/12

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15/2 57/2
Bu. 75/8
57/11/2

42

S.P.D.

13. What is the present position re?

Q

2/4/58.

N.B.

43

While on leave last year I made enquiries regarding the possibility of linking up the Fox Bay plant with a wind driven generator, after some consultation with C.A. Ferguson I thought it wise for technical reasons not to advise the Government to adopt the idea.

Regarding Wind generation for Stoney. The Dept. for Scientific & Industrial Research, Wind Section, are still examining data collected over a period of three years from a proposed site on Sappers Hill. The C.M.O. has discontinued their recordings now. The D.S.I.R. will eventually analyze the data they have and will inform the C.M.O. of the purely theoretical aspects. After that we can examine the practical aspects.

By [Signature]

11-7-58.

11-7-58
6/1/60
15/7/60
[Signature]