Report on Electricity in Post-War Housing presented to the Electricity Committee on 15th March 1945, and circulated to Members of the Council on the instruction of the Electricity Committee.

To the Chairman and Members of the Electricity Committee

Mr. Chairman and Gentlemen,

Electricity in Post-War Housing

This Report concerns itself only with the use of fuel in post-war houses, and not with building structure, and the object is to suggest how far electricity should be used in preference to other fuels.

The provision of fuel using appliances should meet two essential requirements:-

(a) they should be suitable and efficient for the purpose,

(b) they should be such as the householders themselves would desire; that is, as far as is practicable, the householders should be allowed freedom of choice.

I have made a careful assessment of these two points and it is my view that electricity should be the fuel for all household purposes with the one exception that, in order to meet the preference shown by the majority of the public there should be an open fireplace in the principal living room and bedrooms over that living room, of post-war houses, with the provision of course, of electric plug points so that electric fires may be used when desired.

2. POSSIBLE OBJECTIONS TO ELECTRIC OPERATION

As the principal competitor in this field is the Gas Industry, let us consider the objections which they have raised to the use of electricity in post-war housing, concentrating particularly on the cooking load.

(a) The gas industry have frequently stated that electricity costs more than gas for cooking.

Up to the outbreak of war, this was true in many parts of the country, but in spite of this price difference, electric cooking, electric water heating and other electrical appliances were displacing the corresponding gas appliances in very large numbers to the complete satisfaction of the householders concerned.

Under present conditions in Luton, however, there is no doubt whatever that the cost of cooking is cheaper by electricity than by gas.

Both services are approximately the same cost when the price of gas per therm is not more than ten to twelve times the cost of electricity per unit.

The Luton Domestic Tariffs are:

<table>
<thead>
<tr>
<th>either</th>
<th>Lighting Flat Rate:</th>
<th>4d. per unit</th>
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<tr>
<td>Heating and Cooking Flat Rate:</td>
<td>2d. per unit</td>
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on Two Part Tariff: Fixed Charge per quarter. All units at £a. per unit.

All the consumers in the temporary houses would adopt the Two-Part Tariff, as this would definitely be cheaper than the Flat Rates for the lighting and water heating installations which are obligatory. All units used for cooking, water heating and refrigeration therefore, would be supplied at £a. per unit, and in comparing the cost of electric operation with gas, this is the figure which must be taken for a fair comparison. To be competitive gas would require to be not more than 6d. per therm, and in Luton the price of gas at present is 10d. per therm.

The following extract from the "Gas World" dated the 28th February, 1945, indicates that the gas industry resents the change in competitive position:-

"It would seem that unless there were drastic changes in respect of prices, gas prices downwards and electricity prices upwards, the gas industry would not be in the same happy price position as formerly; therefore gas must be sold on its efficacy".

(b) That gas is preferred by householders for cooking.

This was true until about 15 years ago because gas was generally the only alternative to solid fuel, and between the beginning of the century and 1930, the gas industry sold or hired approximately 10 million gas cookers by displacing solid fuel cooking. Since about 1930, both solid fuel and gas cookers have been consistently displaced by electric cookers.

The following figures illustrate the growth of electric cookers in use:-

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
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<tbody>
<tr>
<td>1929</td>
<td>60,000</td>
</tr>
<tr>
<td>1934</td>
<td>410,000</td>
</tr>
<tr>
<td>1939</td>
<td>1,600,000</td>
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At the beginning of the war the rate of increase was greater than ever, but as cooker manufacture had to give way to munitions production, it was necessary to refuse to connect any cookers unless absolutely necessary for war purposes. At the present time there are about 12 million electric cookers in use.

At the beginning of the century, it was no argument against gas cooking that the majority of householders used solid fuel ranges. Similarly at the present time it is no argument against cooking by electricity, that the majority of householders use gas cookers. Progress must be made and this implies that in the post-war era, electricity will displace gas cooking. Already in some places such as Welwyn-Garden-City 65% of the householders use electricity for cooking, and the demand for cookers is still increasing rapidly.
It is significant that the development of electric cooking is frequently greatest in inner boroughs such as Hull, Tilbury, Gravesend, Stepney, Poplar, Bethnal Green and Hackney.

(c) In Luton itself, by far the majority of households use gas for cooking.

This argument when applied to a locality is no sounder than when applied to the nation as a whole, and in fact in Luton it is of no consequence whatever that there are a large number of gas cookers in use, because until 1937 there was no conscious domestic electrification in the Borough of Luton, and in fact it was not encouraged by the Undertaking. Luton was therefore approximately ten years behind the rest of the country in commencing domestic electrification, but the increase in demand has been as great as the national average, and although at the moment this cannot be fulfilled, there are nevertheless, many thousands of people in Luton who are anxious to have electric cookers as soon as the war conditions permit.

(d) That electricity is slow, particularly for the boiling of pans and kettles on hotplates.

In the early days of electric cooking this criticism was true because at that time boiling plates were of primitive design and also the Electricity Undertakings could not cope with high maximum demands. Consequently the loading of the various heaters, particularly the hotplates, was kept to a minimum and electricity got the reputation for slowness in operation. (In spite of this however, electric cookers made rapid advances and electric cooking was adopted by many thousands of people who had previously been content with gas).

Now that high loadings are in general use it is very different matter with the modern cooker. A test made in Luton under Winter conditions shows that the time taken to boil 3 pints of water on a solid electric hotplate (2 K.W. loading) starting from cold, is approximately 95 minutes. This is approximately the same as the time required for boiling the same quantity of water on a modern gas ring, and in fact I have been informed that the Birmingham Corporation Gas Department's Specification for gas rings requires that they shall be capable of boiling 3 pints of tap water in not more than 10 minutes.

In recent designs of hotplates, loadings have been further increased and there are already prototype hotplates with a loading as high as 4 K.W. capable of boiling 3 pints of water in 5 minutes. By means of high loading hotplates, the boiling of pans can be quicker on an electric hotplate than on a gas ring, and there is now no justification whatever for using gas rings to augment the hotplates of electric cookers. The boiling of water for tea-making however, is normally done in an electric kettle and with the high loadings which have now been in use for some years, boiling a kettle is easily quicker by electricity than by gas.

(e) That breakdowns in electricity service have been frequent.

The record of the electricity supply industry during the war has been better than that of the gas industry in respect of continuity of supply. We are not concerned however, with war conditions and it must be admitted that there have been frequent breakdowns in the supply in some parts of Luton. These breakdowns however, have been almost
exclusively confined to the old D.C. areas, and during the last two years have averaged 45 minutes per consumer per year. Even this figure cannot be regarded as having much influence on the use of electric cookers in these areas, but in the A.C. areas, breakdowns have had practically no effect whatever on depriving consumers of the use of their electric cookers. For the majority of A.C. consumers there have been no breakdowns whatever except minor wartime breakdowns of the Central Electricity Board Supply. Now that the new grid Substation at Sundon is in operation, I anticipate further improvements in supply.

(f) Regarding the use of electricity for room heating, the gas industry claims that electric fires give a "dry" feeling to the air.

This is true of obsolete type fires for both electric and gas operation, but the difficulties have been overcome by both industries in their modern appliances, which do not dry the air unless there is low voltage or low gas pressure.

3. THE ADVANTAGES OF ELECTRICITY FOR COOKING ARE:

(a) The cost of operation is lower than with gas.

(b) Speed of hotplates can be quicker than with gas-rings with the new developments in electric cookers.

(c) Automatic regulation by means of thermostats and simmering devices, is extremely close and economical.

(d) Electric cooking is essentially a clean method of cooking. With gas cooking on the other hand, burnt gas fumes are created in the cookers and are expelled into the kitchen. The gas industry has now recognised that these fumes are objectionable and in their recent kitchen planning exhibition they recommend and have included, an electric extraction fan in every kitchen.

(e) Electric cookers are silent in operation whereas gas cookers are frequently noisy.

(f) Electricity distribution is free from the trouble of obstruction in gas pipes and the consequent need for "blowing out".

(g) The combustion of gas is accompanied by the creation of extra moisture in the atmosphere and the use of gas involves more rapid deterioration of internal decorations in a house than with electric operation.

There is a marked change in gas propaganda on the use of electricity in domestic premises, and although until recently the gas industry made strong efforts to retain gas lighting and even tried to devise a gas operated thermo pile for the operation of wireless sets, it now recognises that there are many matters on which it is useless to compete. The following quotation from the recent gas industry publication on kitchen planning is significant:-

"Electricity must be produced and used both for power and light, for in this it is
supreme. In terms of domestic use, bearing in mind national economy, in towns this means gas for cooking, coke and gas for water and space heating, gas or electricity for refrigeration, electricity for lighting, driving agitators in washing machines, ventilator fans, ironing etc. and for many tasks in the country where the cost of gas mains is prohibitive."

With the further development of domestic electrification and the improvement of efficiency of electrical generation, it will probably not be long before even the gas industry acknowledges the inevitability of electricity being used in the majority of British homes for cooking and water heating.

4. WHAT DOES THE PUBLIC WANT?

Both nationally and locally there is no doubt that the public wants electric appliances in ever increasing quantities. In order to obtain reliable information, several organisations have carried out large scale surveys, and extracts from three of these are given below:

(a) Society of Women Housing Managers

Cooking: "It is therefore of special interest that in this question the tenants departed from their tendency to choose the most familiar of the three methods set before them, over half choosing electricity. Only very rarely did anybody already using it want anything different."

Heating: "The electric fire was chosen by the largest number, the second choice being a coal fire, specially needed in time of illness; a small number chose gas. A demand was shown for electric points in all rooms, particularly in bedrooms."

(b) Scottish Housing Advisory Committee.

Question: "How would you like to cook, assuming the three methods were available and cost comparable?"

Answers:

<table>
<thead>
<tr>
<th></th>
<th>HM Forces</th>
<th>Workers in Industry</th>
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<tbody>
<tr>
<td>Gas</td>
<td>31 per cent</td>
<td>36 per cent</td>
</tr>
<tr>
<td>Electricity</td>
<td>59 &quot;</td>
<td>57 &quot;</td>
</tr>
<tr>
<td>Gas or Electricity</td>
<td>5 &quot;</td>
<td>2 &quot;</td>
</tr>
<tr>
<td>Coal</td>
<td>3 &quot;</td>
<td>2 &quot;</td>
</tr>
<tr>
<td>Gas and coal</td>
<td>2 &quot;</td>
<td>2 &quot;</td>
</tr>
</tbody>
</table>
(c) Standing Joint Committee of Working Women’s Organisations.

Cooking: "Electricity is the first choice for cooking, with a majority in every area, including rural areas."

Water Heating: "... electric heater is the first choice .... Very few women want gas..."

Heating of Rooms:

Living Room: Electricity is preferred to gas by the minority who do not want coal fires.

2nd Living Room: Opinion is divided between coal and electric fires. Gas fires are a long way behind in popularity.

For Bedrooms: The majority of women in every area, varying from 83% in the north and rural areas to 95% in London want electricity for heating bedrooms, unless there is central heating. The minority want coal or gas fires.

Electricity Supply in general: "Women in the country, as well as town, are almost unanimous in wanting electricity. Mr. Thorne is losing popularity. In villages and rural areas where there is as yet neither electricity nor gas, women want to by-pass the gas stage and go straight to electricity."

After a careful assessment of the post-war use of electricity in Luton, I estimate that 60% of the new houses built in Luton will want electricity for cooking, and the Heads of my Distribution and Consumers’ Departments, consider this figure should be exceeded.

5. APPLICATION TO POST-WAR HOUSES

(a) Permanent Houses

With regard to permanent housing schemes on which there would presumably be the possibility of change of appliances should the consumer's first choice not be justified by later experience, it would be desirable that consumers should be allowed free choice of fuel.

As mentioned above, I estimate that this would result in 60% of the houses using electric cookers and 50% gas, but as housing schemes develop over the next ten years, it may well be at the later stages that 50% or more of the householders will adopt electricity for cooking. In this respect it is worthy of note that in the Corporation's housing schemes in the City of Kingston-upon-Hull there was a change of mind of many consumers. On one Estate of 134 houses, 130 tenants originally chose gas for cooking. Within four months however, 106 of the tenants changed to electric cookers, only 24 standing by their first choice of gas. On the total of several housing estates in Hull, there is a preference of 11 to 1 in favour of electricity.
compared to gas, for cooking.

(b) Temporary Houses

The Government circular on temporary accommodation, specifies that electricity shall be used for lighting, and for an electric immersion hot water heater in each of the temporary houses. Cooker and wash boiler (taken as a whole) may be either electric or gas. No doubt the wish of a Local Authority would be to provide fuel which, in addition to being efficient would also meet the wishes of the householders. Let us examine three hypothetical cases:-

(i) Cooker, wash boiler - 100% gas. Quite obviously this would mean in Luton that 80% of the householders would be dissatisfied, because while wanting electricity they would be forced to use gas.

(ii) Cooker, wash boiler - 50% electricity 50% gas

If the applications for houses were sorted out, and all gas houses allocated to people who wished to use gas, there would be 60% of the householders using gas when they wished to use electricity. In practice it is doubtful whether such a sorting out process would be feasible, and if no real attempt were made to satisfy individual fuel requirements of householders, then 80% of the gas houses would be occupied by people who wished to use electricity.

(iii) Cooker, wash boiler - 100% electric. This course would undoubtedly give the greater satisfaction to the majority of householders, as it would please 80%, leaving only 20% using electricity, when for the time being they would have preferred gas.

The decisions of Local Authorities on the matter of temporary houses indicates clearly that the pre-war usage or indeed the present usage of fuels can be no guide to the future as between electricity and gas.

I understand that decisions in the Area of which Luton is the centre, have already been made by Bedford, Dunstable, Aylesbury and Hitchin, and in all these cases the decision has been for the all-electric operation of the temporary housing scheme.

Yours faithfully,

[Signature]

Borough Electrical Engineer.