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# The BULLETIN of the NATIONAL DISTRICT HEATING ASSOCIATION

ORGANIZED 1909

VOLUME XXXIII

OCTOBER 1947

NUMBER 1



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Volume XXXIII

January, 1948

Number 2

## District Heating in Great Britain

THE first district heating scheme in Europe was started in Manchester in 1911, where industrial premises and places of amusement in the centre of the city were supplied with heat and hot water from a central generating station. The scheme is still in operation supplying steam at 100 psi and at 300 psi. One year later the question of planning a housing site to be served with heat and hot water from a central source was discussed in Dundee, but any development of the scheme was postponed owing to the outbreak of war. In 1918 however, the district heating of two housing schemes, each with densities of less than 10 per acre, were planned in Dundee and first came into operation in 1923.

Despite the early start, there was very little development of district heating in Great Britain during the inter-war periods. Among the few exceptions were a number of colliery companies, notably in the Midlands, who made use of their exhaust steam to supply hot water to nearby miners' houses. On the industrial side, some of the trading estates, which were developed during this period, provided steam for space-heating and for process purposes from central boiler houses (Slough, Bucks and North Hillington in Scotland). Steam for the trading estate at Treforest, South Wales, is supplied from a power station of the South Wales Power Company. The main economic difficulty encountered has been the variations of load which have to be met where the estate contains firms from a number of different industries, each with different requirements.

In addition, steam links have been successfully established between power stations and factories,

or between neighbouring factories, with a considerable saving in fuel and operational costs. One of the largest of these is at Leicester, where the electricity undertaking is supplying pass-out steam to a large rubber works nearby. There has been a considerable increase in the number of steam links between adjacent factories during the war, as the result of the fuel efficiency campaign.

Although the provision of low-cost houses by local authorities developed considerably during the inter-war years, the initial experiment at Dundee was not followed up. The main reasons, no doubt, were the pre-war low-cost of coal and the intermittent heating that the people were accustomed to tolerate in the average British winter. Again, in contrast to the practice of the federal housing authorities in the United States, it has never been customary for local authorities in Great Britain to provide their tenants with heating services as part of an all-in rental.

### POST WAR DEVELOPMENT

The opportunities for reconstruction afforded as a result of the war encouraged the investigation of different methods of heating houses and in October 1942 the Department of Scientific and Industrial Research appointed a Sub-Committee of the Heating and Ventilating (Reconstruction) Committee to investigate the desirability and possibility of developing schemes for the supply of heat and hot water from central sources.

The final report of the Sub-Committee is not yet completed but an Interim Report on District

Heating was published in which the pros and cons of district heating were discussed and experimental schemes advised. In the course of its work the committee has also worked out in detail a scheme for a thermal-electric station to serve a city of 250,000 inhabitants, partly with the object of elucidating the problems likely to be met in applying district heating in this country and partly to provide a yardstick against which the merits of other schemes could be assessed.

Early in 1946 the Fuel and Power Advisory Council appointed by the Government under the Chairmanship of Lord Simon of Wythenshawe, presented its report on Domestic Fuel Policy to the Minister of Fuel and Power. Their recommendations on the standards of heating to be adopted and the most suitable means of achieving those standards included the encouragement of experimental district heating schemes.

Post war housing development in Great Britain is largely in the hands of local authorities. A memorandum illustrating the technical and financial aspects of district heating as applied to small estates has been prepared and circulated to all local authorities. Similarly a questionnaire has been drawn up and sent to local authorities as a guide to the type of problems they should consider when investigating the possibilities of district heating.

Schemes for district heating for individual estates are submitted to the Government and are examined in detail from both a technical and financial point of view. Local authorities at the moment, have no general powers to supply heating services and consequently schemes fall into one of two categories. In the first are those where the local authority has taken special powers in Private Bills passed through Parliament authorising the local authority to produce and sell heat for both domestic and private industrial purposes. Manchester, the L o n d o n

County Council (Westminster) and Dudley are authorities who have taken these special powers. In the second are schemes which are operated under the Ministry of Health's Housing Act, solely in connection with public housing proposals.

District heating schemes are not granted extra subsidy by the Government to cover loss in operation, and every care is taken when the plans are forwarded for consideration to ensure that the schemes promise to be financially self-supporting. The ministry of Health, if satisfied with the soundness of the scheme, makes a loan to the local authority repayable at 2½ per cent interest over a specified period of years, based on the estimated life of the plant and equipment involved in the district heating scheme. Detailed lists of the equipment used and the loan periods to be allowed have just been agreed upon and the following illustrates their application to some of the main stems:

Boiler plant and equipment	15 years
Boiler house	30 years
Concrete ducts and mains	30 years
House installations	60 years

The effect of loan periods is important. For instance, had it been possible to give a full 60 year loan for all work, the economic weekly charge could be reduced substantially.

#### HOUSING SCHEMES

There are about 26 local authorities considering district heating schemes at the moment and about seven of these propose to investigate thermal-electric development. The following table briefly summarizes the information on size of scheme and charges for those schemes which have been approved in principle and for which tenders have been invited and construction programmes considered.

#### STRAIGHT THERMAL SCHEMES

Scheme	No. of Dwelling Units	Heat Supplied (Therms-annum-unit)	Charge to <sup>(1)</sup> Tenant per week
URMSTON	1317 houses	385	4-7
SALISBURY	522 houses and public buildings	344	4-11

BONNYRIGG	183 cottages	630	7-8
BILSTON	350 houses and flats	712	6-8
BRYNMAWR	98 houses and flats	619	9-4
DAGENHAM	716 dwellings and public buildings	415	5-9
HOUNSLOW WEST	340 houses and flats	692	10-4
LUTON	1700 houses and public buildings		5-6
TWICKENHAM	1064 houses and public buildings	435	5-0

### THERMAL-ELECTRIC SCHEMES

PIMLICO	1690 flats and public buildings	535	4-8½
WYTHENSHAWE	5121 houses 2464 flats	761	5-1

(1) One shilling is equivalent to twenty four and one-third cents. One pence is one-twelfth shilling.

Four of the schemes are at present under construction, that at Urmston, Lancashire, being the most advanced. About 22 bungalows have been occupied for some time now, supplied with heat and hot water from a temporary boiler plant housed in a sub-station. About 60 of the houses are nearing completion and should be occupied by the beginning of autumn, whilst it is hoped that a hundred houses will be supplied with district heating services by the beginning of the winter. Construction is also proceeding at Bemerton Heath, Salisbury and at Bonnyrigg in Scotland, where it is expected that most of the tenants will be miners.

The majority of district heating schemes so far examined are planned to provide with "back-ground heating" to a temperature of 60-65 F in the living room and 55 F in the bedrooms, kitchen and hallway. One open fire will be retained in the living room in most of the schemes, although one or two propose to provide topping up with gas or electric fires.

It will be noted from the above table that there has been no standardisation of the amount of heat and hot water to be supplied, with resultant variations in the cost to the tenant. The charges shown on the table are also average figures for the total number of dwellings included in each district heating service. For example, the charge

of 4-7 per week at Urmston is an average charge over the 1317 dwellings of varying sizes. The charge at the moment to the small bungalows now occupied is only 3-3 per week.

Although most of the schemes are small there is considerable variation in size from the 98 dwellings at Brynmawr to the 7585 dwellings at Wythenshawe. There is also a wide variation in the type of dwelling unit both between the different schemes and indeed within the same scheme. At Brynmawr, for example, it is proposed to erect four detached four bedroom houses, 46 three bedroom terrace houses, 12 three room flats, 13 two room flats and 22 one room flats. The amount of heat supplied will vary from 1127 therms per annum to the larger houses to 264 therms per annum to the one room flats.

Apart from those already mentioned, the following local authorities are making preliminary investigations into the possibility of employing district heating in their new housing developments: Birmingham, Cheltenham, Dartford, Nottingham, Darwen, Priesthill Tenement area (Glasgow), Newburn (Northumberland), Bournemouth, Barking, Wembley, Yarmouth, Bedford, Crewe, Stafford and Swindon.

## NEW TOWNS

In October 1945, a committee was appointed under the chairmanship of Lord Reith "to consider the general questions of establishment, development, organisation and administration that would arise in the promotion of new towns in furtherance of a policy of planned decentralisation from congested urban areas . ." In their report the committee expressed the view that the time had arrived for a full scale test of district heating in Great Britain and recommended its trial on an adequate scale in one of the first new towns where its use could be planned from the beginning. Such schemes may, of course, be very much wider in scope than the housing projects mentioned above since heat may also be supplied for industrial purposes either for space heating or for process work.

The committee's recommendation has been applied to the development of the new town at Stevenage, Hertfordshire, and the detailed plans and the construction programme are almost complete. They are based on the assumption that there will be an increase in the population of this new town from 6,000 to 60,000 over 6 years and the plans provide for 6 residential neighbourhoods with a separate industrial zone. The district heating scheme proposed is thermal electric.

A similar development is proposed at East Kilbride in Scotland and the plans for district heating are in course of preparation.

## RECONSTRUCTION OF CITY CENTRES

Enemy action left large devastated areas in the centres of many of the principle cities of Great Britain and reconstruction affords an opportunity for the application of district heating. Proposals, it is understood, are being considered for the cities of Bristol, Coventry and London, but as far as is known, no definite decisions have been taken.

## THE ELECTRIC INDUSTRY

Among the provisions of the Electricity Act, 1947, for the nationalisation of the electric industry in Great Britain, is a clause relating to district heating. This makes it the duty of the Central Authority to investigate methods by which heat obtained from or in connection with the generation of electricity may be used for the heating of buildings in neighbouring localities or for any other useful purpose and for carrying out research into such matters. The area electric boards are correspondingly empowered to provide or assist other persons to provide for the heating of buildings by such methods.

## Boston Section Meeting

Forty attended the regular fall meeting of the NDHA Boston Section in the Boston Edison Company Auditorium on the evening of October 8th.

Chairman George K. Saurwein presided over the meeting and explained the new sectional membership classification. Preparation of a new mailing list was begun.

NDHA First Vice-President Henry L. Martin gave a brief talk on the scope of the annual meeting last June at Atlantic City.

Summaries of various reports from the national meeting were then given as follows:

1. Sales Development Committee report on New Customers—Ralph E. Day, Holyoke Water Power Company
2. Rates—Everett Kinchla, Boston Edison Company
3. Mile long, 10 in., 600 lb, steam main at Rochester, N. Y.—Frederick J. Randlett, Boston Edison Company
4. Snow melting at Rochester, N. Y.—A. L. Dutton, Boston Edison Company
5. Report on steam losses—C. M. Hutt, Boston Edison Company
6. Use of steam for air conditioning in New York—Walter Davis, York Company
7. Remedial measures at steam main and cable crossings—R. F. Prescott, City of Taunton, Mass.
8. Practice of laying up boilers—G. H. Gowdy, Cambridge Steam Corporation

Preliminary plans were laid for a spring meeting, probably an afternoon inspection trip, dinner and technical session.