ELECTRICITY IN INDUSTRY

An article specially written for this Centenary Supplement by WALTER S. LEWIS, C.B.E., J.P., Comp I.E.E., A.C.T. (B'ham), Chairman Midlands Electricity Board.

Consumption of electricity in the Midlands Electricity Board's Stroud District is now exceeding 50 million units annually. Just over half is being used in the industries of the district, the growth and expansion of which has been closely related to the development of electricity supply: this modern source of power has replaced the water power which, in the nineteenth century, was relied upon by mills in the Stroud valleys.

The growth of the electricity load in local factories and workshops is evidence of industrial progress and efficiency, for experience shows a significant relationship between electricity consumption and the rate of industrial production. For example, in Britain during 1952, due to export market difficulties, there was a fall in the index of industrial production, and this was reflected in a reduced rate of increase in the number of units which the M.E.B. sold to industry throughout its 5,000 square miles area. Last year the rate of increase in electricity sales to industry was more normal, and at the same time there was a welcome rise in the figures of total national production.

The amount of electricity required can therefore be regarded as a good guide to the industrial situation. At present in Stroud the signs appear to be favourable. The Stroud District of the Board is supplying a total of some 250 industrial consumers, representing almost all the trades and industries whose development is transforming Stroud into a small-scale Birmingham—the city of a thousand trades. Engineering products, fine cloth from the mills, leather board and plastics, paint, furniture, bedding, electrical equipment, quarried stone and timber, a range of manufactures from knitting needles to heavy castings going to markets all over the world—all now rely on a plentiful supply of electricity.

Agriculture too is relying more and more today for its efficiency on electricity, and in this respect the Board is carrying out its responsibilities. To date, 436 of the total of some 500 farm premises in the Stroud District have been connected, compared with only 150 connected at vesting date in 1948, and it is anticipated that all except a few isolated farms in the District will have the supply by the end of 1955.

In 1948, when the M.E.B. was established, industrial consumption of electricity in the Stroud District was about 17 million units annually. Today the annual rate exceeds 25 million units and the greater part of the growth has been the increasing use made of electricity by the many established firms—a sure sign of increasing mechanisation and a readiness to adopt modern methods of production, a sure sign too of industrial health, for as mechanisation and the use of electricity increases, productivity or output per man-hour inevitably tends to increase.

In Stroud, as elsewhere in Britain, however, industry still has a long way to go to outstrip its American competitors in this respect. According to the teams which have studied relative productivity in the two countries, it is estimated that the average American worker has about three times as much power at his elbow than his British counterpart. The significance of this trend in relation to Britain's economic future is receiving attention at all levels in the electricity supply industry. Leaders of the industry are urging the need for a bigger capital investment programme, and members of Electricity Boards are serving on many productivity committees. In Stroud, Mr. R. C. Wright, A.M.I.E.E., District Manager for the M.E.B. is a member of the local Productivity Committee.

In the meantime, the electricity supply industry is doing everything possible to ensure firstly that industry has all the electricity it needs, and secondly that there is maximum efficiency of utilisation.

So far as availability of supply is concerned, nationally the British Electricity Authority has increased generating capacity by 50 per cent since the war and has started on construction of the great new power transmission network known as the Supergrid which will provide Britain with an electricity distribution system second to none in the world. Mr. D. P. Sayers, the Deputy Chairman of the M.E.B., played an important part in planning this £70 millions project in his former capacity as the Authority's deputy chief engineer (transmission).

Work has also begun on the construction of the first experimental atomic power station, another development which may profoundly affect national fuel policy in the future and lay even more emphasis on electricity as the only means of distributing this new form of energy.

Locally, steps are being taken to meet the enormously increased demand for electricity. High voltage supplies, first made available in the Stroud valleys in 1925, were improved by the former West Gloucestershire Power Company in 1947, when the 33 kV line from Lydney was extended to Dudbridge, near Stroud. Work is now in progress on further

extensions of these high voltage mains from Ryeford, near Stonehouse, north east to Camp, near Bisley, and south east to Cherington, to better serve the outlying parts of the District. The British Electricity Authority also has plans to establish another grid point for the bulk supply of electricity to the District at Ryeford.

In these and other ways the electricity supply industry is ensuring that electricity is available and will be available, for the home, the farm and the factory.

But to what extent is it being or will it be used effectively? A great deal of costly new generating plant is not at present working at full capacity except during the daily peak load periods. To improve the economics of operation and so reduce the cost of electricity all round—or at least enable the industry to hold present prices despite constant coal-price increases—the "valleys" in the daily demand curve have to be filled up, or, in other words, there has to be an improvement in load factor, that is, the relation of the maximum or peak-period demand to total units used in a specified period. On 5th February this year the maximum demand in the Stroud District reached an all-time record level of 17,600 kVA compared with a maximum demand of only 8,250 kVA reached in the District in the Board's first year, 1948-9.

To fill up the "valleys," or spread the load more evenly, it is necessary to build up the domestic and agricultural load, but industrial consumers can make a big contribution. The Board offers them every inducement to do so by framing its standard industrial tariff so that the average price of the electricity they use decreases as they improve their load factor.

Continuous shift working, making maximum use of capital equipment installed both in the factory and at the power stations, would be the ideal solution and would be welcomed by the electricity supply industry in industries which find it possible to arrange it as a means of reducing costs and stepping up output with the same amount of machinery.

There are, however, other means by which a factory can improve its load factor. In suitable cases, savings on electricity costs can be made by carrying out special processes at night-time for instance.

Space heating equipment brought into operation an hour or two before work starts and switched off at the peak period when machinery is started up can reduce the maximum demand. Better still, use can be made of electric floor warming installations or of heat storage systems in which water is heated or steam raised by electricity at night and used for space heating during the day without increasing the maximum demand.

Industrial costs of electricity can also be reduced by improvement of the power factor, which involves the reduction of the waste or "wattless" current flowing in a factory circuit. This is achieved by installing the correct motors for a particular application and by installing power factor correction equipment, the capital cost of which is rapidly recovered from lower electricity bills.

There is in addition an enormous field in which better utilisation of electricity can improve productivity, quite apart from the obvious method of increasing mechanisation. Research has shown, for example, that increases of output ranging from 5 to 25 per cent, depending on the nature of the work, can be achieved by improvement in factory illumination. Labour costs can be reduced and operations speeded up by the use of mechanical handling devices, most of which are powered by electricity.

Power factor can be improved by the use of electric furnaces for the heat treatment of metals, and modern methods of high-frequency and dielectric heating have increased the speed and precision of many operations. Another important new sphere of development is the use of electronic control and inspection equipment, which in some spheres promises to bring nearer the engineer's dream of the fully automatic factory.

To help to keep industry abreast of these modern developments, the M.E.B. has opened an Industrial showroom in Birmingham, where demonstrations are arranged from time to time. In addition, there are on the Board's commercial staff, experts who are always ready to advise on the most economic and effective electrical installations and equipment. Locally, their services can be obtained through the Manager of the Stroud District. The indications are that works managements in the Stroud area are becoming increasingly aware of the advantages that can be obtained from full and efficient use of electricity and this progressive outlook is already making an important contribution to the wealth of the district and those employed in its industries and to the establishment of new industries. All members of the Board's staff are anxious to do all they can to ensure that in the future electricity will play its vital part in the national effort by helping to improve productivity and to bring greater prosperity to Stroud's important industries.

Electricity Service for Stroud's Industries

It was in 1925 that the first supply of high voltage electricity was brought to Stroud. Since then the expansion and development of industry in and around Stroud has been enormous, and in this electricity has played a not unimportant part. Every year sees a wider and more profitable use for the power of electricity.

Midlands Electricity have experts on electrification in many fields of industry. Their services and advice are at all times freely available. By calling on them from time to time industrialists can ensure that their factories and plant contrive to keep abreast of modern developments.

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