

C O N T E N T S

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(1947 - present day)
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ELECTRICITY - THE GROWTH OF AN INDUSTRY

This project aims to cover the growth of the Electricity Supply Industry from its early days in the late nineteenth century with particular reference to electricity supply in Liverpool, through nationalisation, with regard to the effects on supply and distribution of electricity, and changes in organisational structure after nationalisation.

The project also has a look into the future with particular reference to fuels used for generation.

R E F E R E N C E S

50 Years in the Service of Liverpool

Nationalisation in British Industry : Leonard Tivey

Understanding Electricity (1981)

Organisation of the Electricity Supply Industry in England and
Wales

1. THE HISTORY OF ELECTRICITY (1878 - 1940)

As early as the year 1878 the corporation of Liverpool had under consideration the question of lighting the streets of the city by electricity. The interest had been aroused by an exhibition of an arc lamp in one of the main streets, by the British Electric Light Company, and by the use of the electric light by Mr. G. F. Lyster, the engineer of the Dock Board, during the construction of the new entrance to the Langton Dock. In 1879 the Corporation obtained an Act of Parliament conferring certain powers with respect to street lighting by electricity, but no positive action was taken under the Act which expired in due course in 1884.

In 1882 Messrs. Holmes and Vaudrey commenced business in Liverpool as Civil Engineers, and in 1883 formed the Liverpool Electric Supply Company Limited, with a nominal capital of £10,000. The company made an immediate success, paying 5% dividend on the first year's trading.

In 1885 the company, who had been supplying electricity without statutory powers, applied to the Board of Trade for a provisional order and in 1888 the company, with the consent of the Corporation, obtained a licence from the Board to supply electrical energy in a portion of the city and to use underground mains for the purpose.

By 1895 the company had established four power stations, and were charging 7½d. (3p) per unit for lighting, and 5d. (2p) per unit for power. The share capital of the company was £250,000, with a dividend paid of 5½%.

In 1896 negotiations which had been going on for some time, culminated

in the purchase of the company by the Corporation for £400,000. This represented a bonus of £150,000 on the share capital at that date, as the assets of the company (plant, cables, etc.) were priced at £250,000. Most of the company's staff was taken over under the terms of the agreement, and Mr. A. Bromley Holmes became the Corporation's first City Electrical Engineer.

As demand increased, it was necessary for the Corporation to build larger power stations; these were located at Pumpfields and Lister Drive, which is now the Liverpool District Office of MANWEB. By 1919 all of the smaller and older power stations had been closed down, while Lister Drive had been expanded and was now generating 37 M watts. In 1923 another 50 M watts capacity was added at Lister Drive. By this time the price per unit had dropped to 2d. (1p).

At about the same time a Committee, with Lord Wier as chairman, was set up to consider the future of the generation of electricity from a national point of view. This led to the Electricity (Supply) Act of 1926. The Act's main result was the setting up of the Central Electricity Board who controlled all generation, and confined it to the most economical power stations. The interests of the Local Authorities were carefully watched by a joint committee of the Association of Municipal Corporations and the I.M.E.A. (Incorporated Municipal Electrical Association).

Although the 1926 Act had so radically altered the basis of generation and transmission of electricity, it was found to be defective in its detail; the major example of this was probably that all electricity was sold by the Local Authority, none was able to be sold by

the Central Electricity Board to consumers direct. Two Bills were passed to alleviate these problems.

The first Bill, promoted by the Conference of Local Authorities owning electricity undertakings in the London Area, gave general enactment to various provisions concerning electricity supply which had been secured in the previous years by Private Acts. As the mover of the Bill said on the second reading in the House of Commons: "In a word it may be said that the main object of the Bill is to avoid what might be called piecemeal application to the legislature for statutory powers".

The second Bill which was a Government measure consisted of four operative clauses and sought to:

- (a) empower the Central Electricity Board to make certain arrangements with authorised undertakers who were the owners of generating stations, but which were not selected stations for the purposes of the Regional Schemes;
- (b) enable the Central Board in special circumstances to enter into agreements at other than the appropriate tariff for the area;
- (c) authorise the Central Board to supply electricity directly to Railway Companies for certain purposes;
- and (d) amend Section 12 of the 1926 Act so as to enable in certain circumstances the transmission charges and allowances to be pooled and appropriately divided.

Previously Section 12 was concerned with the undertakers who actually gave the bulk supplies. These undertakers owned extensive interconnected high voltage systems, which were used for supplies to small consumers as well as large consumers; therefore, under Section 12, difficulties arose in determining the extent to which the transmission system was used for the purpose of giving an individual bulk supply, this led to inequalities in the charges to be passed on, and in some cases resulted in the bulk supply charges being raised. However, the amendment to the clause enabled the costs and charges of either the whole or a part of an interconnected transmission system to be pooled and appropriately apportioned.

After the Act of 1926 the national grid was built and completed by 1936 with the exception of the North Eastern regions who were not included into the system until 1938. Supervision was exercised by the Electricity Commissioners who were a body established after the Electricity (Supply) Act of 1919 to secure, regulate and supervise voluntary reorganisation.

2. NATIONALISATION - A BRIEF HISTORY

Due to the unpopular attitude in mid-Victorian times, the ideas of socialism - and hence nationalisation - were never considered until the late 19th century. The first favourable resolutions for nationalisation were passed by the Trades Union Congress in the 1880's and 1890's with the motion for the nationalisation "of the means of production, distribution and exchange" being successful in 1894, though in the following year this demand was modified to mean the nationalisation of land, minerals and railways. In 1990, ¹⁸⁹⁰ a group of trade unions and socialist societies came together to form the Labour Party, whose aim was to secure a distinctive representation of the workers in Parliament. In the period before the first World War, various nationalisation motions were carried by the TUC and some nationalisation Bills introduced in the House of Commons, for the purpose of demonstration by the minority of Labour members of Parliament. However, these actions were overshadowed, in the Labour movement as well as outside it, by more urgent industrial and political issues.

The experiences of the first World War with regard to the effectiveness of industry controlled by Government had put trade unionists in a more radical frame of mind, and led to the Labour Party forming a new constitution. Clause 4 of the document stated the objective of the party was:

"To secure for the producers by hand or brain the full fruits of their industry, and the most equitable distribution thereof that may be possible, upon the basis of common ownership of the

means of production, and the best obtainable system of popular administration and control of each industry and service."

The Labour Party's election programme in December 1918 was called 'Labour and the new social order' and included wide proposals for social and fiscal reform. Moreover, it contained specific and far-ranging proposals for public ownership including the electricity supply industry.

Even though they had formed Governments in 1924 and 1929, they were never able to secure a large enough majority in the House of Commons and therefore were never in a position to implement nationalisation plans which they had repeatedly put forward at elections. However, there were reports written between 1936 and 1945 on certain industries which recommended action so drastic that many thought it would not come about without nationalisation. One such report was made by the McGowan Committee who in 1936 recommended considerable amalgamation of the existing undertakings in the electricity industry.

What were the reasons for Nationalisation?

There had been a considerable rise in the demand for electricity, as graph 1 shows, for the Liverpool area alone. Nationally, the consumption of electricity had increased from 3,200 Gwh in 1920 to just under 36,000 Gwh in 1948/9. The number of consumers had increased from 908,000 to 11.3 million in the same period. Due to the increase in output of electricity, the consumption of coal had also increased, as graph 2 shows, and so only the most efficient stations were to be used if the price of electricity was to be kept down. Graph 2 also indicates

how efficiently the coal was being used, but it was seen that greater economies could be made if larger power stations were used.

It was also felt that a general standardisation of methods would be important in such matters as metering of electricity and distribution, and this could only be achieved by a considerable amalgamation of the existing undertakings.

Furthermore, due to the increasing growth of electricity, it was becoming more and more apparent that there were great difficulties in the organisation of the existing system, and that totally separate bodies from the Corporations should be formed to deal with the distribution of electricity. So in 1947, the Nationalisation Act was passed, with the Conservatives opposing the Bill on the grounds that it would cause great dislocation and that the position of the consumers would be damaged. The Liberals voted for it.

3. FORMATION OF THE NATIONALISED ELECTRICITY INDUSTRY 1947 - 1956

The industry was nationalised in 1947 and the 564 undertakings then producing electricity in England, Wales and Southern Scotland, two thirds of which were Local Authority undertakings, were brought under public ownership. The enabling Act of 1947 created a two tier organisational structure for the industry with the British Electricity Authority forming the central body and having responsibility for organising and pooling generating capacity and inter-area electricity exchanges through the grid system, the latter being reinforced to allow this. Retail distribution was organised by Electricity Boards, of which there were twelve in England and Wales, and two in the South of Scotland.

This structure of the industry remained intact until 1954 when, as a result of the Electricity Reorganisation (Scotland) Act, the two Area Boards serving the South of Scotland were merged. Like the North of Scotland Hydro-Electric Board, the newly created South of Scotland Electricity Board was made responsible for the generation and transmission of electricity as well as its distribution. The remainder of the British Electricity Authority was re-named The Central Electricity Authority. Since this date, the two Scottish Boards have remained independent of industry in England and Wales.

Further Change - The Herbert Report on the Electricity Industry

In the mid 1950's, the Government appointed a committee under the chairmanship of Sir Edwin Herbert, "to enquire into the organisation and efficiency of the electricity supply industry". From this study

several conclusions were made. The principal ones concerning the organisation were:

1. There should be a further separation of generation from general supervision and policy making. A new generating board should be set up.
2. More freedom should be given to Area Boards in a number of respects and, in general, control should be "judicious and stimulating". The headquarters staff of the Corporation was too large, and both the Area Boards and subordinate officials on the generating side complained of too much interference. This led to confusion of responsibility, and over-occupation with detail at the job.
3. The central headquarters took too long to approve and took too close an interest in the design and planning of generating stations.
4. Area Boards should allow District Managers to run their own shows and to exercise discretion in dealing with labour and public.

As well as the recommendations that were to change the structure of the electricity supply industry, other contributions in the report made reference to the commercial running of the business. The report said: "We state our view without any qualification that the governing factor in the minds of those running the Boards should be that it is their duty to run them as economic concerns and to make them pay."

The report considered the role of the electricity supply industry as a trading body, and declared from the outset that its efficiency would be measured in strictly economic terms, and success depended on meeting the needs at the lowest possible cost. It also stated that the price of electricity was to be related to its cost, and those customers who caused the cost to rise should meet the increase - "The first principle of tariff making should be to secure that charges reflect the supply".

How was the Organisational Structure Changed

Following the findings of the Committee, the organisational structure was changed in England and Wales only, to give a three-part system. The twelve Area Board continued in their role of retail distribution within their own areas and were completely autonomous. However, the Central Electricity Authority was replaced by two bodies, the Electricity Council and the Central Electricity Generating Board (CEGB).

The Electricity Council is a federal body whose representatives are from the CEGB, Area Boards, and has members appointed by the Secretary of State for Trade and Industry. One of the members of the Council is appointed chairman. The Council's responsibilities include the programme of its industrial research as well as industrial relations, in particular the machinery for the negotiation of salaries, wages and conditions of employment. It also has the responsibility for shaping the general policy of the electricity industry as well as advising the Department of Trade and Industry on matters affecting the industry. Although the Council has considerable powers, it cannot control the plans, capital programmes or tariff policies of the

CEGB or Area Boards, although they are expected to consult with the Council on any proposals or changes in these respects.

The CEGB is responsible for the generation of electricity and its supply to the Area Boards. It is organised into five separate regions (figure 4) each of which has the responsibility of generating and supplying electricity to the Area Boards in the region. However, the regions are co-ordinated from the CEGB's Central Control Headquarters in London, which controls the number of power stations in operation, and their output to the national grid. The scale of the CEGB's operations accounts for about 75 per cent of the industry's capital investment.

The Area Boards are the "retailers" of electricity to the consumers - each Area Board purchases bulk supplies of electricity from the CEGB and is responsible for retail sales to consumers within its area. They also sell appliances through over 1,000 shops and do electrical contracting work.

Work of Area Boards, therefore, covers:

- (i) Engineering - their distribution networks
- (ii) Commercial - sales of electricity and appliances and contracting activities
- (iii) Financial - including normal accountancy functions and billing of consumers
- (iv) Secretarial and Legal - including personnel functions

In the organisation of the distribution areas under the 1947 Act, account was taken of balance between Urban and Rural areas. There is no "typical" area board, since boards' characteristics are related to differences of geography, regional outlook, historical development of

electricity supply and predominant way of life. The supply is almost universal, with only the most remote farms and other rural premises, numbering perhaps 2,000 - 3,000 remaining unconnected.

4. POWER IN THE FUTURE

Today 176,000 workers man Britain's power supply system, which comprises 213 generating stations, over 10,000 miles of high voltage (400,000 volts or 275,000 volts) transmission lines, about 435,000 miles of distribution cables and over half a million substations. This massive network serves 22,500,000 domestic, commercial and industrial customers 24 hours a day, 265 days a year.

In most power stations, coal, oil, gas or nuclear power create steam to drive turbo-generators which feed the national grid with power. In addition, the energy in falling water is exploited in hydro-electric power stations in Scotland and North Wales.

Fossil fuels, such as coal and oil, are not infinite and it is becoming more obvious that new energy sources must be looked into with regard to the generation of electricity.

Nuclear power leads the way to the future. Already nine nuclear power stations are producing about one-eighth of our electricity. Three more stations are in an advanced state of construction and work on another is to start shortly. When completed and in operation about one-fifth of our electricity will be nuclear based. Britain's nuclear power stations have been reliable over the past 30 years and produce very cheap electricity. In fact, if all costs are taken into account, including capital charges, the complete nuclear fuel cycle, and provision for de-commissioning the nuclear plant at the end of its useful life, nuclear power is 25 per cent cheaper than coal and 30 per cent cheaper than oil. Other forms of energy are also being

investigated, such as thermal heat and wave power.

Thermal Power: In many areas of the world there is a potential for getting low grade heat from rocks, and Cornwall is one area that is being investigated.

Wave Power: The movement of the sea along a 150-mile stretch of Britain's Atlantic coast could yield enough energy to satisfy all the country's needs. The difficulty is in harnessing it.

Theoretically, rocking vanes, set in giant sized chains could act as floating generators, using the motion of waves to turn turbines. Early experiments suggest that, in theory, as much as 90 per cent of the coastal seas power could be tapped.

As well as this, the CEEGB are building Britain's third pumped storage hydro-electric power station. This will help to overcome electricity's one great failing - it cannot be stored. Pumped storage power stations are already in operation at Ffestiniog in North Wales and on Loch Awe in Scotland.

Behind the workings of an old slate quarry on the side of Elidir Fawr (about 3,030 ft. high) a vast generating station called Dinorwic is being created inside the mountain. At the top of the mountain is one lake, Marchlyn Mawr; a second Llyn Peris is at the bottom.

Water can be released from the top lake to rush through the power station, driving six turbines on its way down to Llyn Peris. At ten seconds' notice, Dinorwic will be able to generate 1,320 megawatts when it is all linked to the national grid. At night, when demand is low, excess electricity in the grid will be used to pump the water back up the mountain - ready to be used again the next day.

Dinorwic provides a vital store of power, a 'failsafe' reserve of electricity that can be brought into the system almost immediately whenever it is needed.

Fig. 1.

9.1.

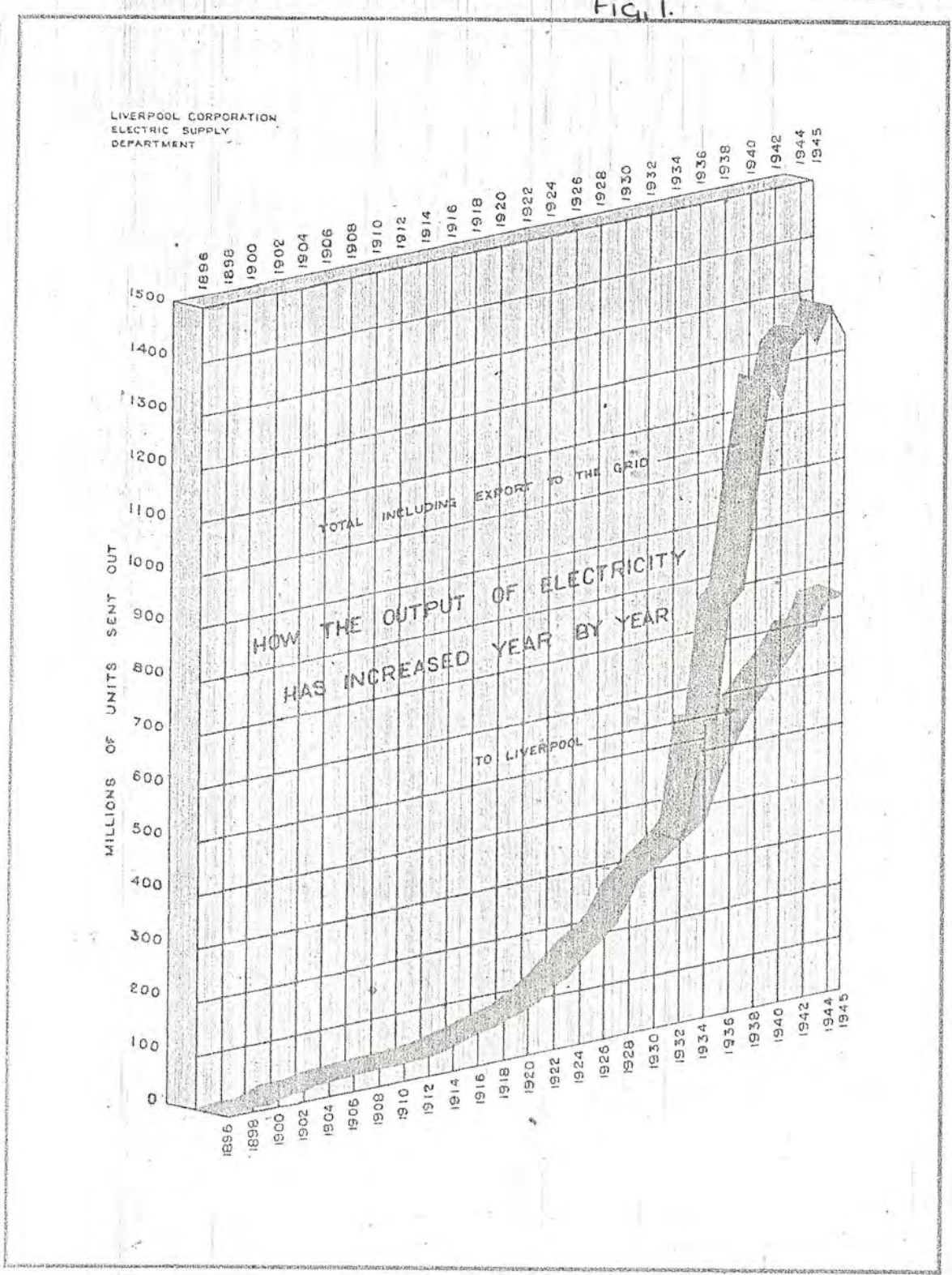
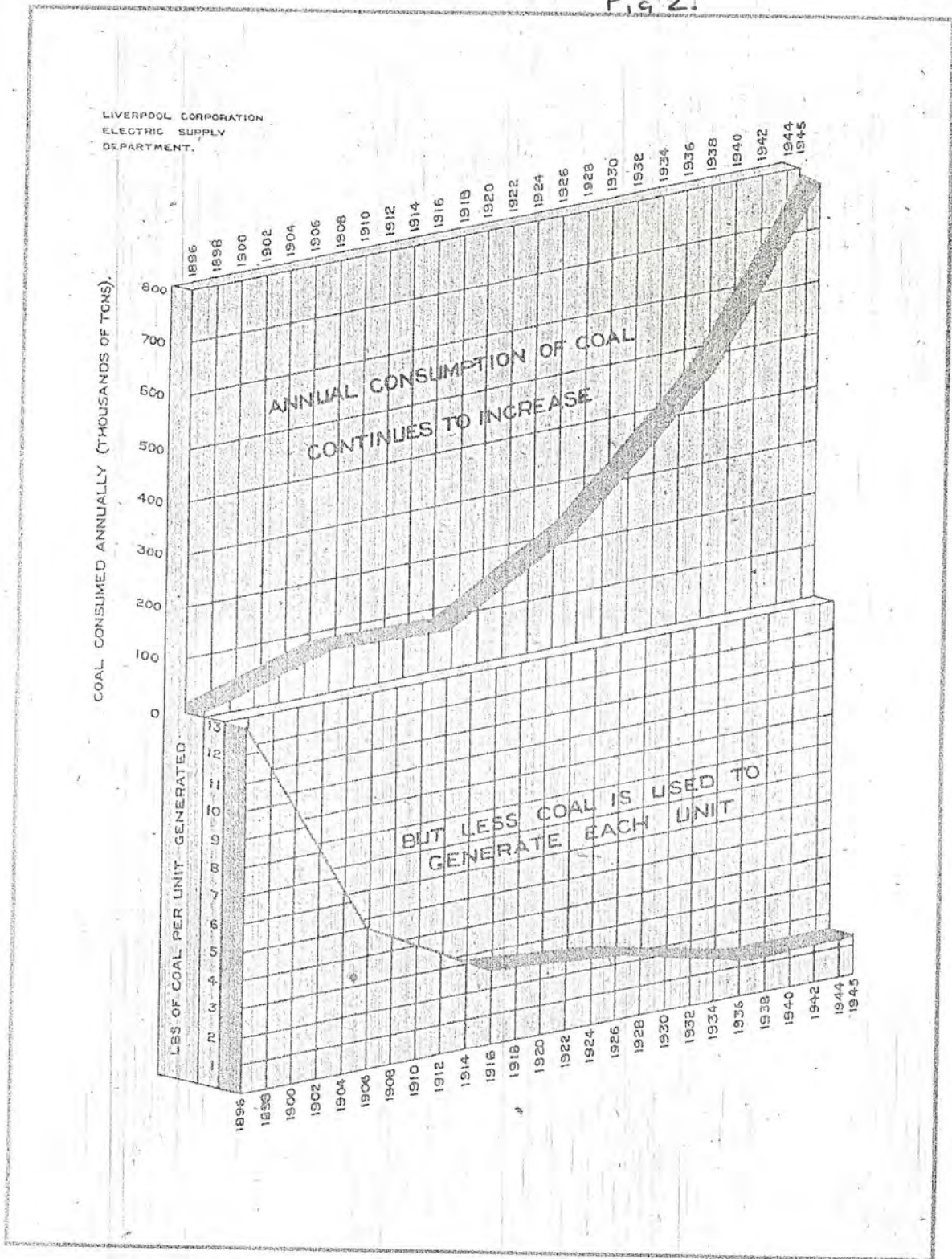
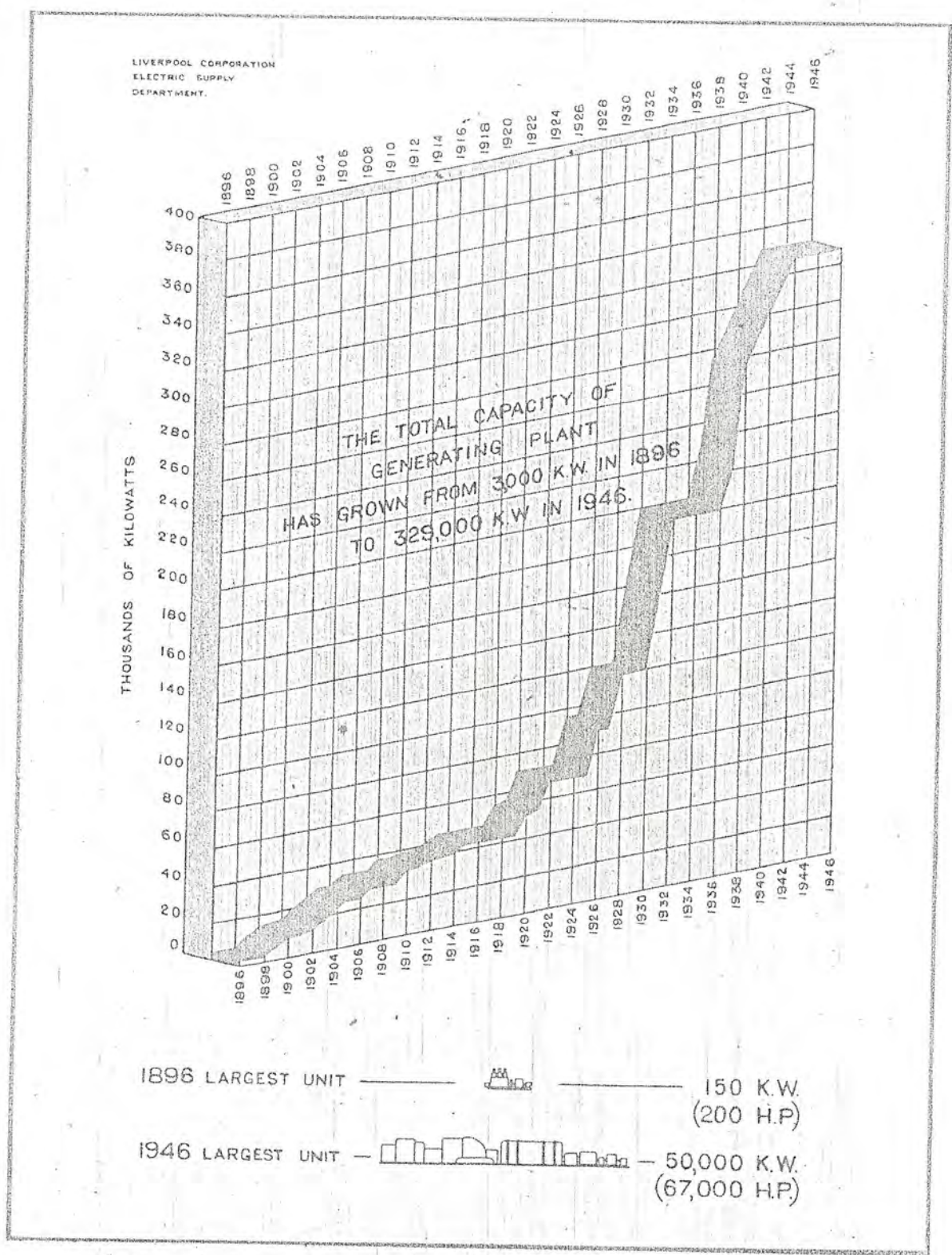


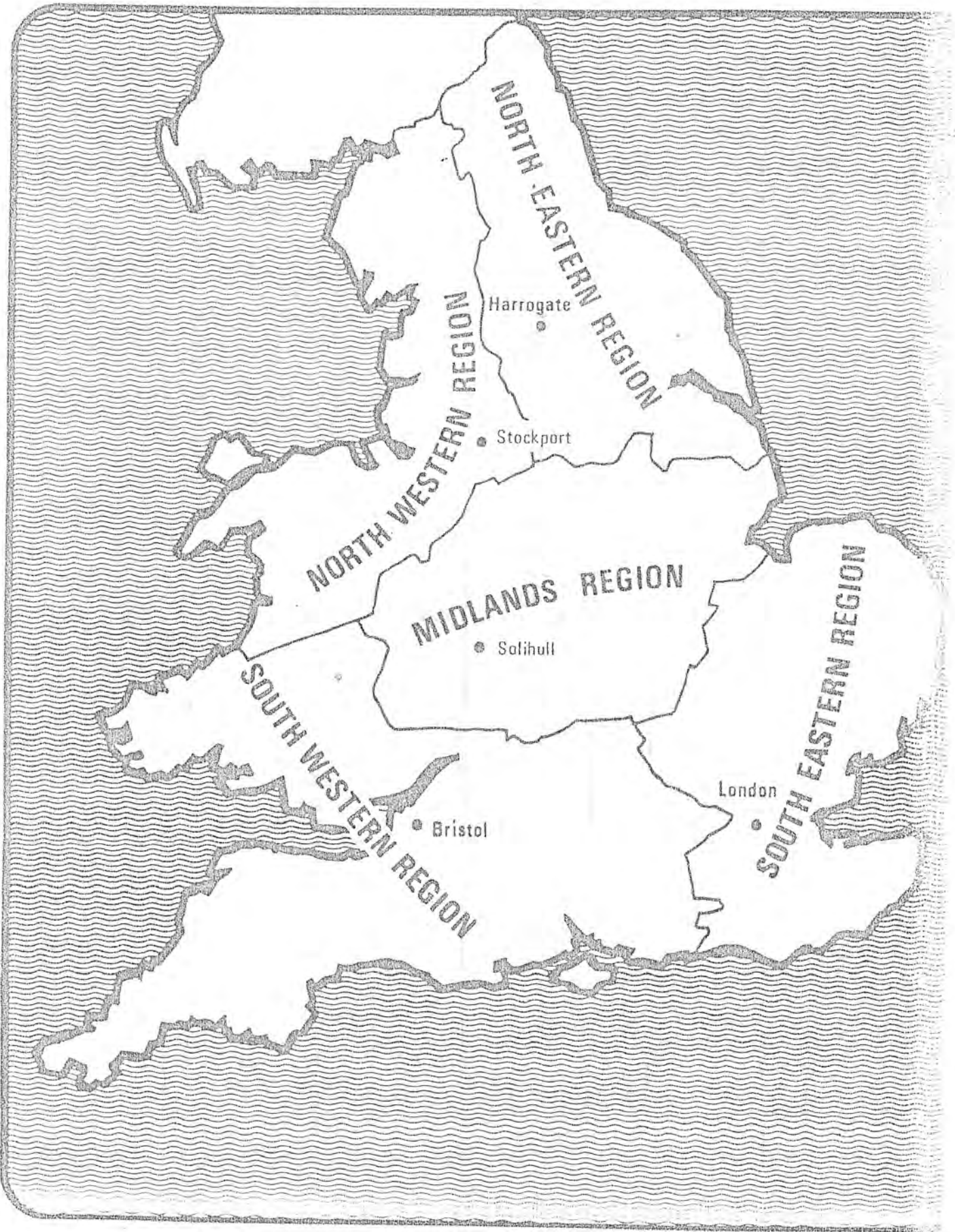
Fig 2.





Central Electricity Generating Board

FIG 4.



Area Electricity Boards

FIG 5.

