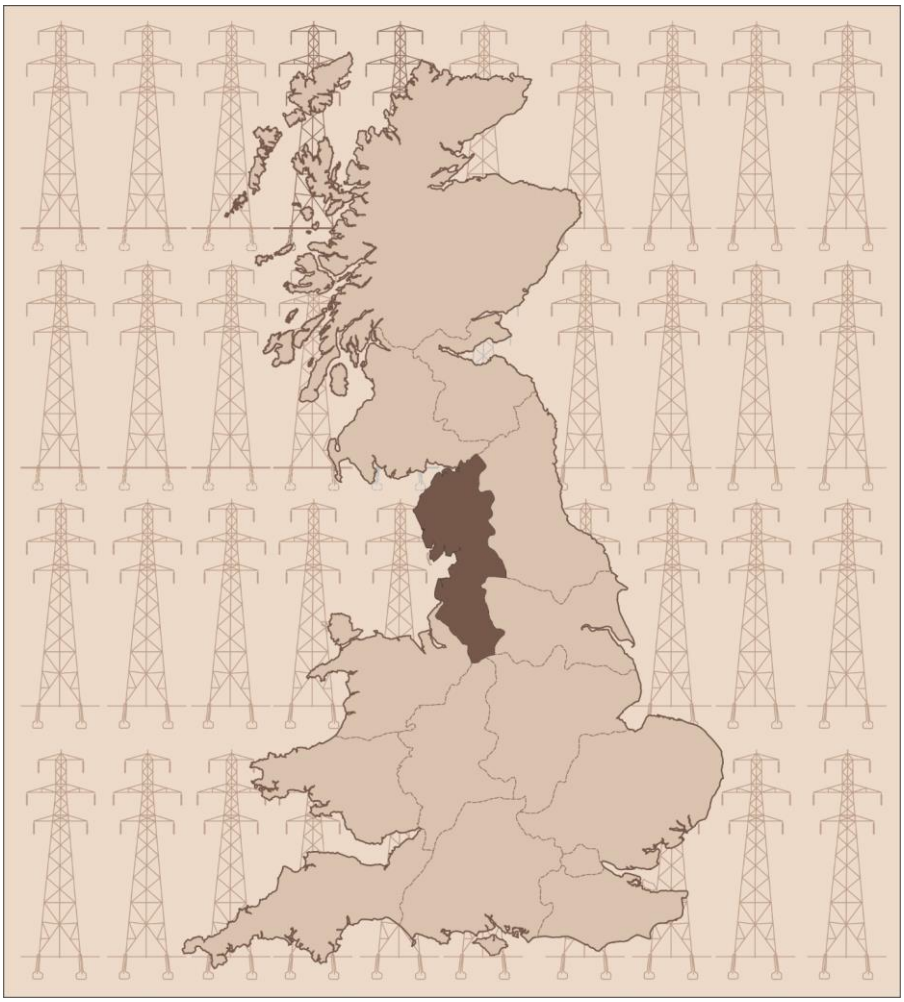

THE NORTH WESTERN ELECTRICTY BOARD AREA

Regional and Local Electricity Systems in Britain

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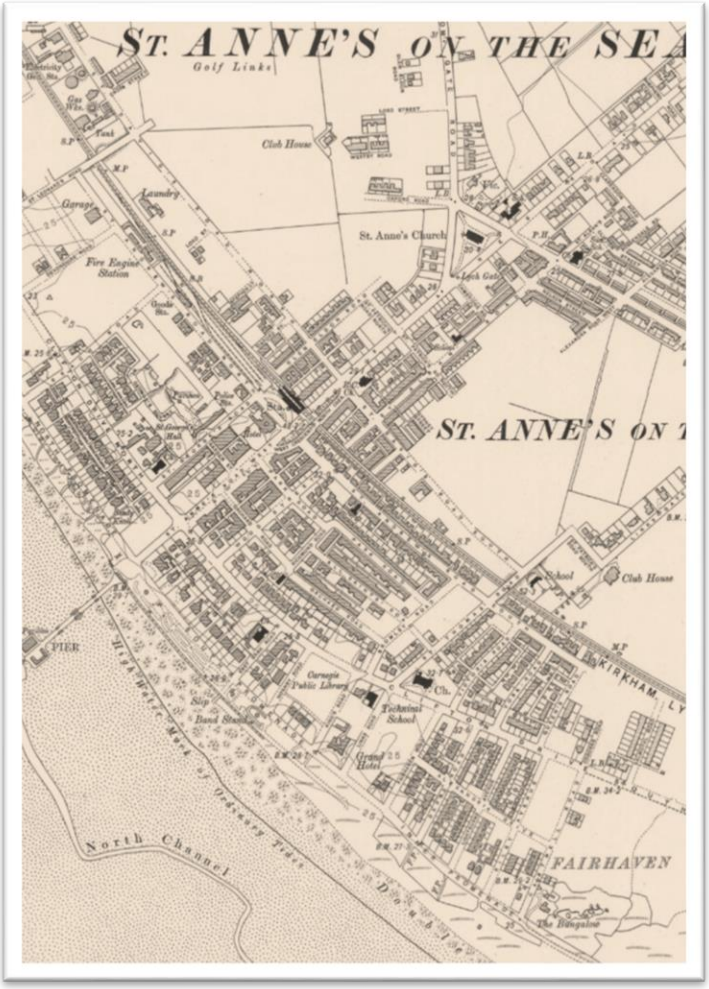

ST ANNE'S-ON-THE-SEA

The Urban District Council opened the DC power station in March 1901 to serve growth of the planned resort town. Supply was extended to Lytham after the merger in 1922. The small power station (1,890kW capacity in 1925) remained in service until the late 1930s.

Ordnance Survey Six Inch Map, Lancashire LIX.SW, 1909 (National Library of Scotland)

Introduction

Public electricity supplies began in Britain during the 1880s. By 1900 most urban places with over 50,000 population had some form of service, at least in the town centre. Gradually the isolated points on the national map began to coalesce, especially when the national grid helped local organisations to connect small towns, villages, and eventually farms.

In the process of electrification, hundreds of municipal and company organisations developed local and sometimes regional systems. Before nationalisation in 1948, however, there was little consolidation of areas.

The study of British electricity systems is a remarkably daunting task. While there is a rich legacy of detailed annual surveys, these publications have to be tracked down. The user is then faced with immense alphabetical listings of all sorts of enterprises, often in places which no longer have much meaning except to local residents. Since there are few contemporary maps, listing and grouping the electricity organisations geographically is difficult and often time-consuming.

These notes are offered as an outline guide to the pre-1948 local authorities and companies which developed electricity supplies in North West England.

The North Western Electricity Board Area

The area was first defined by the Ministry of Fuel and Power in a White Paper published in January 1947, a month before debate began on the Electricity Bill.[1] Fourteen area boards were to be established for electricity distribution or retailing. Generation and transmission were to be the responsibility of the British Electricity Authority.

Each area board was defined to provide a diversity of load between urban and rural areas and, where possible, avoided cutting across distribution networks. The North Western Area, as defined at this time, had been part of the North West England and North Wales Electricity Scheme Area since 1928. The other part of this very large region became the Merseyside and North Wales Electricity Board Area.

In detail the North Western Area included the counties of Cumberland and Westmorland and parts of Cheshire, Derbyshire, Lancashire (including Manchester) and the West Riding of Yorkshire.[2]

[1] Ministry of Fuel and Power, ***Electricity Supply Areas***, Cmd 7007. (London: HMSO, 1947).
[2] Electricity Act 1947, 10 & 11 Geo 6, Ch 54, First Schedule.

Constituents of the North Western Electricity Board Area

When the North Western Electricity Board began operations on 1 April 1948 it incorporated the services and areas of 60 local authorities, 3 joint boards and 13 companies. The constituent areas varied enormously in size. The Mid-Cumberland Electricity Company covered 850 square miles while the Ashton-in-Makerfield Urban District occupied an area of less than one square mile. Preston Corporation's electricity department served an area of 204 square miles, considerably larger than the 9 square miles of Preston County Borough.

With an area of about 4,831 square miles and an estimated population of about 4.5 million, the North Western Electricity Board Area covered every type of district from the sparsely populated parts of the Lake District to the densely settled areas of central Manchester. The distinctive economic geography of the region resulted in a high proportion of industrial sales (55.2 percent) and a correspondingly low proportion of domestic sales (35.2 percent).

The dominance of the Greater Manchester in the region, with about 60 percent of the North Western Electricity Board Area's population made Manchester the obvious location for the Board's head office. Office accommodation was very hard to find and in the first year the administration was dispersed in five offices scattered across the city.[3] New buildings in the course of erection in Cheetham Hill then became available and the Board settled there for several decades.

Development of Electricity Supply Areas

The 1948 pattern illustrated in **Figure 1** represented the climax of over 50 years of development. Unusually for a new innovation, electricity for public supply was subject to tight national regulations from an early stage. The Electric Lighting Act 1882 required "undertakings" to apply for a licence or provisional order from the Board of Trade.[4] This requirement followed the precedents for earlier public utilities which had to "break up the streets" to lay mains or tracks. Electric Lighting Orders provided the basic conditions of a franchise to operate within a defined area, limiting the maximum prices that could be charged to consumers and, for private companies, a time limit of 21 years after which the local authority could purchase the system. An amendment in 1888 extended the time period to 42 years. All the Electric Lighting Orders were subject to Parliamentary approval. Major changes such as amalgamation of companies and extension of area required special acts.

Only a few public electricity systems were established under the 1882 Act. By 21 December 1882 the Board of Trade had received 109 applications for Electric Lighting Orders. After

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[3] ***First Annual Report and Accounts of the North Western Electricity Board 1948-49*** (HMSO, 1949), p.6**.**

[4] Basic details of this Act and subsequent legislation are outlined in ***Electricity Supply in Great Britain: A chronology*** (London: Electricity Council, 1977).

scrutiny by the office and Parliament, 69 ELOs were granted to local authorities and companies. Eight of these came to fruition over the next decade, while the others were abandoned as the early optimism waned given the uncertainties of the market for electricity and the limitations of early technology.

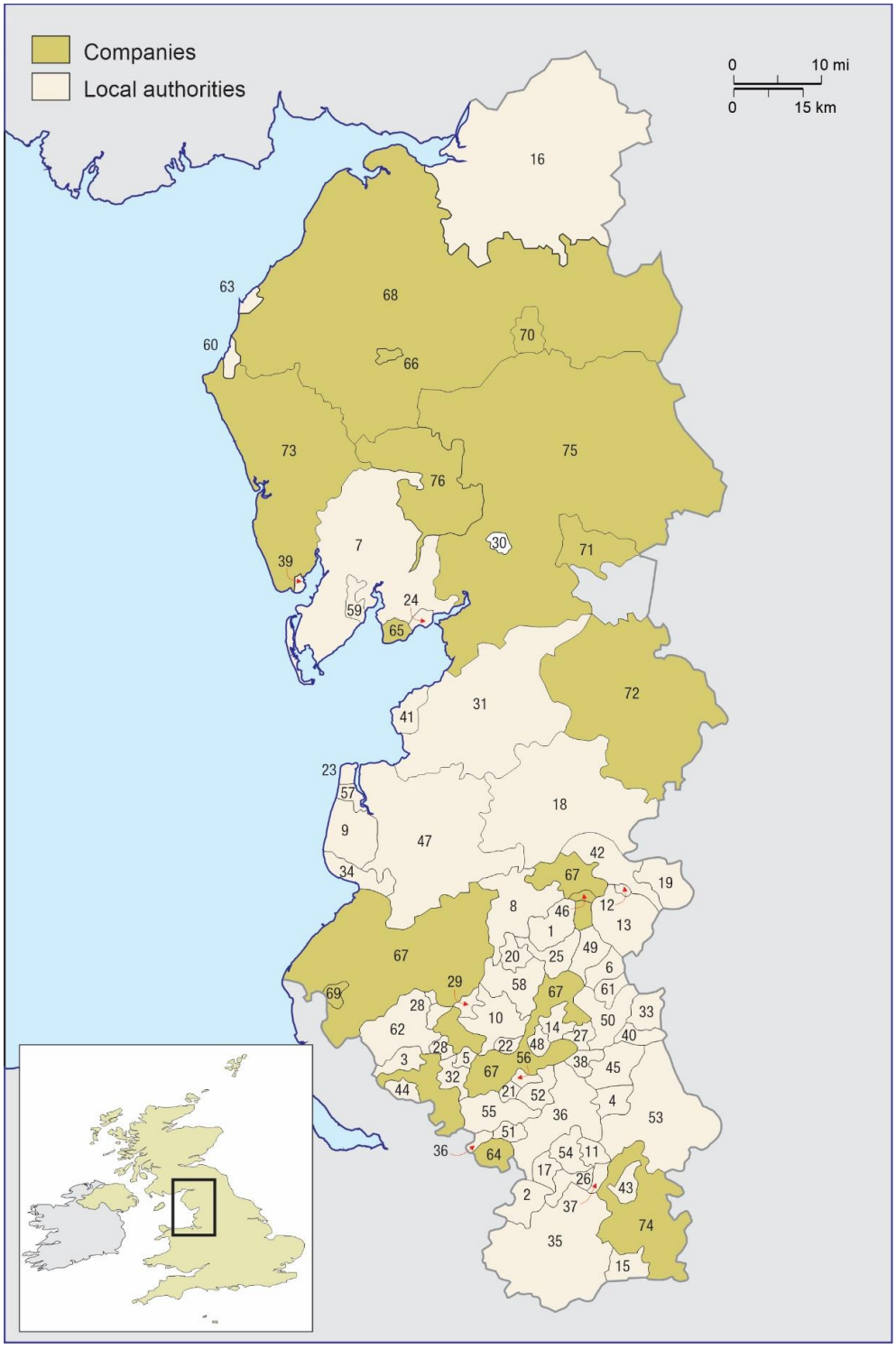

Figure 1 **CONSTITUENT AREAS OF THE NORTH WESTERN ELECTRICITY BOARD 1948**

Table 1 **NORTH WESTERN ELECTRICITY BOARD AREA CONSTITUENT UNDERTAKINGS 1948**

Map No.	Local Authorities		
1	Accrington MB	**33**	Littleborough UD
2	Alderley Edge & Wilmslow EB	**34**	Lytham St Anne's MB
3	Ashton-in Makerfield UD	**35**	Macclesfield MB
4	Ashton-under-Lyne MB	**36**	Manchester CB
5	Atherton UD	**37**	Marple UD
6	Bacup MB	**38**	Middleton MB
7	Barrow-in-Furness CB	**39**	Millom RD
8	Blackburn CB	**40**	Milmow UD
9	Blackpool CB	**41**	Morecambe & Heysham MB
10	Bolton CB	**42**	Nelson MB
11	Bredbury & Romiley UD	**43**	New Mills UD
12	Brierfield UD	**44**	Newton-le-Willows UD
13	Burnley CB	**45**	Oldham CB
14	Bury CB	**46**	Padiham UD[1]
15	Buxton CB	**47**	Preston CB
16	Carlisle CB	**48**	Radcliffe MB
17	Cheadle & Gatley UD	**49**	Rawtenstall MB
18	Clitheroe MB	**50**	Rochdale CB
19	Colne MB	**51**	Sale MB
20	Darwen MB	**52**	Salford CB
21	Eccles MB	**53**	SHMD Board[2]
22	Farnworth MB	**54**	Stockport CB
23	Fleetwood MB	**55**	Stretford & District EB
24	Grange UD	**56**	Swinton & Pendlebury MB
25	Haslingden MB	**57**	Thornton Cleveleys UD
26	Hazel Grove & Bramhall UD	**58**	Turton UD
27	Heywood MB	**59**	Ulverston UD
28	Hindley UD	**60**	Whitehaven MB
29	Horwich UD	**61**	Whitworth UD
30	Kendal MB	**62**	Wigan CB
31	Lancaster MB	**63**	Workington MB
32	Leigh MB		
Companies			
64	Altrincham ES Co	**71**	Sedbergh ES Co
65	Cark & District E Co	**72**	Settle & District E Co
66	Keswick EL Co	**73**	South Cumberland ES Co
67	Lancashire EP Co	**74**	Trent Valley & High Peak E Co (pt)
68	Mid-Cumberland E Co	**75**	Westmorland & District ES Co
69	Ormskirk ES Co	**76**	Windermere & District ES Co
70	Penrith ES Co		

Notes:

[1] Operated by Lancashire EP Co

[2] Stalybridge, Hyde, Mossley & Dukinfield Transport and Electricity Board

Source: W.E. Swale, ***Forerunners of the North Western Electricity Board*** (Manchester: NWEB, 1963), Schedule of Authorised Undertakings.

Key to Abbreviations

CB: County Borough
EL Co: Electric Light Company
EL&P Co: Electric Light & Power Company
EP Co: Electric Power Company
ES Co: Electricity Supply Company
ES&P Co: Electricity Supply & Power Company
MB: Municipal Borough
RD: Rural District
UD: Urban District

Eight of the applications in 1882 came from the North Western area. Six were from local authorities: the Barton, Eccles, Winton and Manton Local Board; Carlisle; Manchester; Nelson; Ulverston; and Wigan. Manchester and Wigan both withdrew from the proceedings while the others were all granted an ELO. However only Nelson implemented its Order (supply began in December 1892).[5] The others were later revoked by the Board of Trade since no action had been taken to implement the Orders. The Board of Trade rejected the applications made by the Union Electric Light & Power Co for Rochdale and the Lancashire & Yorkshire Electric Lighting Co for Stalybridge "…as the provisions of the Act had not been complied with."[6]

The value of electricity for publicity was recognised at an early stage by the ambitious Town Council of Blackpool (population 14,229 in 1881). An arc lighting system on the promenade was inaugurated in September 1879 and an electric tramway followed in 1885. The completion of the Tower in 1895, lit by thousands of lamps, added a highly visible symbol of the new technology. Four years later, the grant of a municipal coat of arms incorporated a thunderbolt to recognize the role of electricity in municipal development.[7]

Although general urban electrification failed to take off in the region, private systems began to develop. Private generation provided a market for electrical equipment, helped the training of workers, and gave opportunities to refine details of the new technology. By 1887 there were many examples of private electric lighting in Manchester—the Theatre Royal in Peter Street; Sharp, Stewart's Locomotive Works in Great Bridgewater Street; and Mather & Platt in Deal Street, Salford.[8] Outside the city, the Rhodes & Sons cotton mills at Hadfield near Glossop were lit by electricity.[9] Muncaster Castle, near Ravenglass in Cumberland, also had electric lighting installed by Edmundsons.[10]

The Royal Jubilee Exhibition opened by the Prince and Princess of Wales on 2 May 1887, like other exhibitions of the decade, featured electric lighting. Arc maps installed by the Anglo-American Brush Electric Lighting Corporation were used in the main buildings while incandescent lighting by the Manchester and District Edison Electric Lighting Company was installed in art galleries and dining rooms.[11] The dynamo room, generating current for all the lighting, had a capacity of 1,000kW. A separate powerhouse supplied energy for the lighting and pumping needs of the Fairy Fountain located at the centre of the Botanical Gardens site. With an attendance of 4.7 million, the exhibition was a successful venture, helping to publicise

[5] Nelson Corporation (incorporated in 1890) superseded the Nelson, Barrowford, Booth, and Great and Little Marsden Local Board.

[6] "Report by the Board of Trade respecting the applications to and Proceedings of, the Board of Trade under the Electric Lighting Act 1882," ***Parliamentary Papers*** 1883. HC 237. P.6.

[7] For general development of the town see: Allan Brodie and Matthew Whitfield, ***Blackpool's Seaside Heritage*** (Swindon: English Heritage, 2014).

[8] ***The Engineer***, Vol.64, 1887, pp.217-281, reporting on the British Association for the Advancement of Science meeting in Manchester.

[9] ***The Engineer***, Vol.63, 1887, pp. 78, 147.

[10] ***The Engineer***, Vol.61, 1886, p.216.

[11] K.G. Beauchamp, ***Exhibiting Electricity*** (London: IEE, 1997), pp.148-151. ***The Engineer*** covered the exhibition in detailed reports.

the value of electricity and show off the products of local manufacturers such as Mather and Platt. Paulden's, a Manchester department store, later purchased some of the surplus lighting equipment for installation at its building on Stretford Road.[12]

Public electricity supply schemes began to take off in 1889-90 when applications for Electric Lighting Orders resumed. Nationally, there were 17 applications in 1889 and161 in 1890. The 27 applications from the North West were made by 13 local authorities and 13 companies together with a partnership of T.R. Andrews and T. Preece applying for a franchise in Morecambe. All the local authorities were granted an ELO while the companies were successful only in Ashton-under-Lyne and Preston. The Morecambe partnership was successful in obtaining a franchise and under the title of the Morecambe Electric Light & Power Co. operated a system from 1892 to 1896 when it was sold to the local council.[13]

With the authority of an ELO, most of the new electricity organisations began work on building a new system. The National Electric Supply Co. in Preston was offering some supply by the end of 1890. Manchester began supply in July 1893 and Salford in 1895. Accrington and Wigan were slow, not bringing in public supply for another decade. Bacup was even slower, only opening its system in August 1911.

While the Board of Trade developed regulations for safety, inspected and approved new systems as well as collecting annual returns, the Board provided no guidance on general policy or technical matters. These were left to the operator and consulting engineer to decide. Consequently after 1888 large numbers of fragmented operators developed DC and AC systems with little attempt at co-ordination. AC systems with frequencies varying from 25 cycles (Hz) to 100 cycles were established. The lack of standardisation would be a major problem when interconnection between areas became advantageous.

An outline of development is presented in three phases: local initiatives from the 1880s to World War I, state intervention to the 1940s, and nationalisation from 1948.

I Local Initiatives

Figure 2 and **Table 2**, derived from a rare map of electricity undertakings in the British Isles, provide a snapshot of the development of public supply areas over the previous three decades.

The 42 local authorities were clear examples of local initiative in developing electric light and power. Manchester Corporation (population 719,275 in 1911) was the largest of the local authorities. Brierfield Urban District (population 8,259) was the smallest. Brierfield purchased a bulk supply from Nelson Corporation while Manchester operated three power stations. Nelson

[12] Kathryn A. Morrison, ***English shops and shopping: An architectural history*** (London: Yale University Press, 2003), p.139.
[13] R.H. Parsons, ***The early days of the power station industry*** (Cambridge: Cambridge University Press, 1939), pp.151-153.

was the first local authority in the region to open a municipal system. Fleetwood and Morecambe had both started an electricity service with private companies.

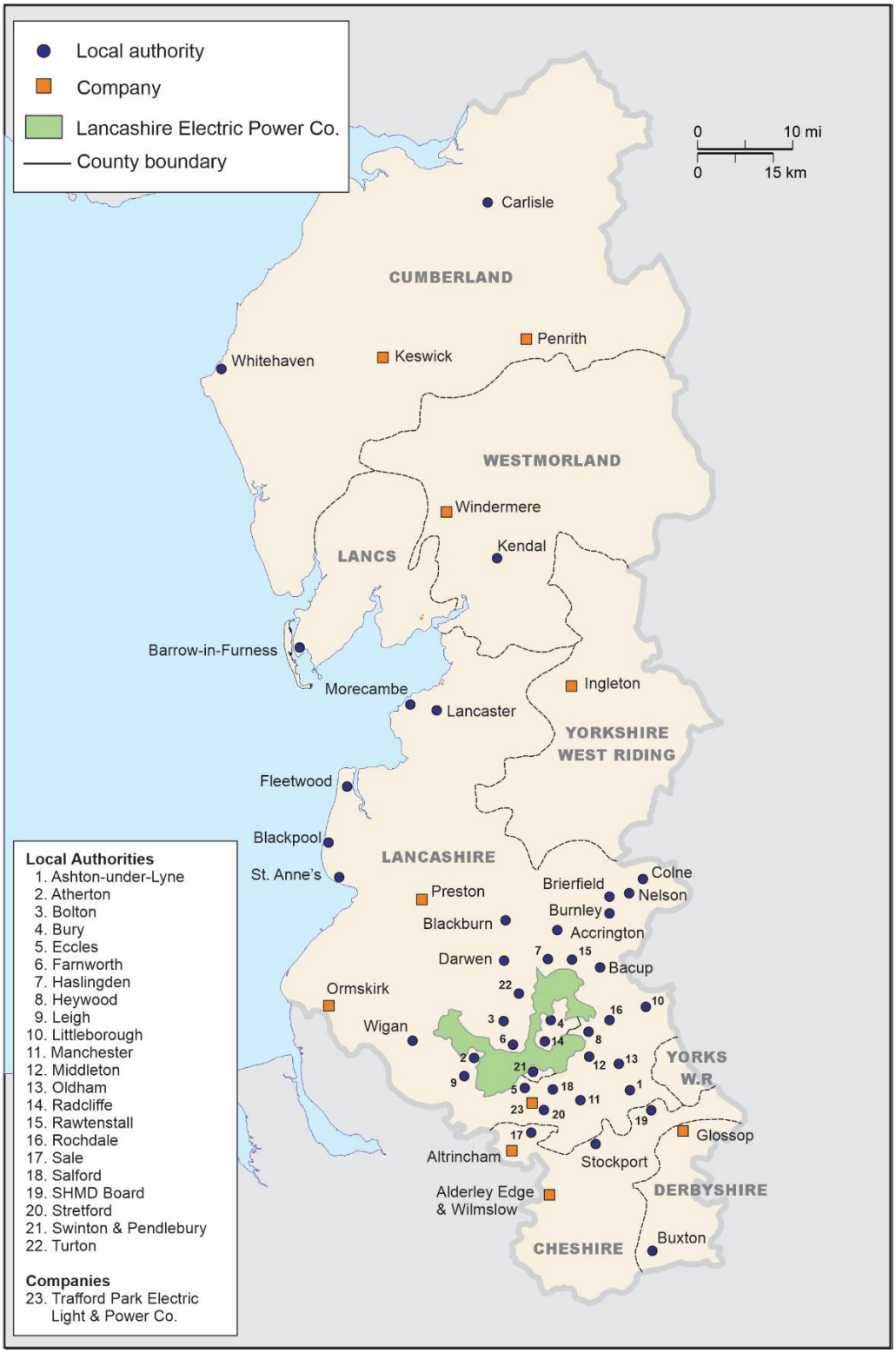

Figure 2 **ELECTRICITY UNDERTAKINGS IN NORTH WEST ENGLAND C. 1912**

Table 2 **NORTH WESTERN ELECTRICITY BOARD AREA ELECTRICITY SUPPLY UNDERTAKINGS C.1912**

UNDERTAKING	*COUNTY*	*SUPPLY BEGAN*[1]
Local Authorities		
Accrington	Lancs	1900
Ashton-under-Lyne	Lancs	1899
Atherton	Lancs	1903
Bacup	Lancs	1911
Barrow-in-Furness	Lancs	1899
Blackburn	Lancs	1895
Blackpool	Lancs	1893
Bolton	Lancs	1894
Brierfield	Lancs	1902
Burnley	Lancs	1893
Bury	Lancs	1896
Buxton	Derbys	1900
Carlisle	Cumberland	1899
Colne	Lancs	1902
Darwen	Lancs	1899
Eccles	Lancs	1898
Farnworth	Lancs	1898
Fleetwood	Lancs	1900[2]
Haslingden	Lancs	1911
Heywood	Lancs	1901
Kendal	Westmorland	1902
Lancaster	Lancs	1894
Leigh	Lancs	1900
Littleborough	Lancs	1911
Manchester	Lancs	1893
Middleton	Lancs	1902
Morecambe	Lancs	1892[3]
Nelson	Lancs	1892
Oldham	Lancs	1894
Radcliffe	Lancs	1904
Rawtenstall	Lancs	1909
Rochdale	Lancs	1900
St Anne's	Lancs	1901
Sale	Cheshire	1903
Salford	Lancs	1903
SHMD Board[4]	Ches/Lancs	1904
Stockport	Cheshire	1898
Stretford	Lancs	1903
Swinton & Pendlebury	Lancs	1907
Turton	Lancs	1911
Whitehaven	Cumberland	1893
Wigan	Lancs	1899/1900
Companies		
Alderley Edge & Wilmslow	Cheshire	1899
Altrincham	Cheshire	1895
Glossop	Derbyshire	1903
Ingleton	Yorks (West Riding)	1900
Keswick	Cumberland	1890

UNDERTAKING	*COUNTY*	*SUPPLY BEGAN*[1]
Lancashire Electric Power Co	Lancs	1905
Ormskirk	Lancs	1912
Penrith	Cumberland	1909
Preston	Lancs	1890
Trafford Park N/S	Lancs	1899
Windermere	Westmorland	1893

Notes:
[1] W. E. Swale, ***Forerunners of the North Western Electricity Board*** (Manchester: NWEB, 1963).
[2] Fleetwood & District Electric Light and Power Syndicate Ltd, taken over by Urban District Council 1908.
[3] Morecambe Electric Light & Power Co. sold to Council in 1896. A new ELO was granted in 1898.
[4] Stalybridge, Hyde, Mossley & Dukinfield Tramways and Electricity Board.
N/S non statutory undertaking (outside 1882/1888 Acts).

Source: "Map showing Electric Lighting, Power and Traction Undertakings in Operation." Supplement to ***Garcke's Manual of Electrical Undertakings.*** Undated but c 1912. [Copy from National Library of Scotland]

The 11 companies in the North West were very varied in scale and location—some on the fringes of the region, others in the core. Ingleton Electric Light Power, launched in 1900 when the village had aspirations of becoming a substantial coal-mining community, represented the former. The Trafford Power & Light Supply Co, begun about the same time to serve the new industrial estate, was firmly in the core of the region. Although competing with private generators such as British Westinghouse, the Trafford Company had a capacity of 4,100kW in 1909 compared with less than 100kW in Ingleton. Preston, a large County Borough with a population of 117,000 in 1911, was very unusual in the region, with its electricity system owned by the National Electric Supply Co. The system was bought by the Corporation in 1922.

The Lancashire Electric Power Company was by far the largest operation in the company sector. Municipal interests had been strong in opposition to the Power Company Bill in 1899 but the private Act of 1900 empowered the company to provide supply to large industrial customers and bulk supply to authorised undertakings. Unlike the usual 42-year franchises granted to companies under the Electric Lighting Act 1888, the power company Acts had no time limits. Raising capital for the new power company proved more difficult than anticipated but with the assistance of the Edmundson's Electricity Company, the Lancashire Electric Power Company was finally launched in 1904 and the power station on the River Irwell at Radcliffe was opened the following year. The initial capacity of 6,000kW was doubled by 1913, extended to 22,375kW by 1917 and enlarged again to 42,375kW in 1921.[14] By this time the LEPCo was the second largest undertaking in the region and a serious rival to the dominance of Manchester Corporation.

There is only limited evidence of non-statutory companies in the North West. The Keswick and Windermere companies had begun in this way and obtained ELOs later—Windermere in 1895

[14] Graham Edge, ***The record breakers of the Lancashire Electric Power Company Ltd: Radcliffe, Padiham and Kearsley Power Stations 1905-1981*** (Walkden: Gingerfold Publications, 2006), p.73.

and Keswick in 1896. Thomas Wilkinson (c1862-1955) established a small suction gas power plant to serve the village of Arnside, Westmorland in 1907. Five years later, T. Williamson (Arnside) Ltd opened a separate plant across the Kent estuary in Grange-over-Sands which operated until 1926 when taken over by the Urban District Council.[15]

Electrification in the North West region around 1912 was still incomplete, with only a small part covered by Electric Lighting Orders. Even in greater Manchester which had well developed municipal systems, there were gaps around Rochdale and Oldham. Chadderton (population 28,299 in 1911) was one of the largest examples. The Cheshire suburbs, such as Cheadle and Gatley, still awaited electricity supply. Workington (population 25,092), Maryport (11,418), Ulverston (9,592) and Leyland (8,088) all lacked a public system. Chorley (30,215) and Macclesfield (34,797) were, however, in the process of development and a system in each town was opened in 1914.

Lighting was still the dominant use for electricity until the late 1890s. The most profitable demand was in shops, offices, hotels, theatres (and later cinemas) and public buildings. Residential sales were more limited by the expense of installation and the high retail prices. With lighting, much of the load on generating equipment was confined to the evening hours, a feature that also contributed to the high prices. Diversification of the load, especially in the daytime, was essential if electricity was to become a viable alternative to gas. Such diversification began with the electrification of tramways and the substitution of electric motors for small steam engines and manual power.

The limitations of DC supply systems became apparent to larger undertakings after 1900 and in the search for economies of scale the introduction of more efficient prime movers became a priority. Manchester, for example, adopted AC (50 Hz) for its new power station at Stuart Street opened in 1902.[16] This station was able to serve the whole supply area through a network of sub-stations that converted the AC to DC for local distribution. Modernisation in Oldham and Stockport followed a decade later when 3 phase AC was generated alongside the existing DC system. Mixed AC/DC systems became increasingly common from this time. Conversion to a full AC system was, however, a long process; Manchester and Oldham still had some DC customers as late as 1957.

Radcliffe power station (1905) of the Lancashire Electric Power Co. was the first all-turbine generating plant in the region and served as a model of efficient operation. Stuart Street had been designed when big reciprocating steam engines were the normal prime movers. Two very large 6,000 hp engines driving 3,750kW alternators had just been installed when Radcliffe was opened. These would be the last engines used in Manchester and the first 4,500kW turbine was

[15] W.E. Swale, ***Forerunners of the North Western Electricity Board*** (Manchester: NWEB, 1963), p.91.
[16] Roy Frost, ***Electricity in Manchester: Celebrating a century of electricity supply in the city 1893-1993*** (Radcliffe: Neil Richardson, 1993), p.31.

added at Stuart Street in 1907. By 1915 one of the large engines only ten years old had been scrapped and three 7,000kW turbines added to the plant.

The 1912 data do not cover private generation which was very important at the time, not only in isolated establishments but also in urban centres where there was already a public supply.[17] Some examples are outlined here to give a sense of the scale and scope of private generation otherwise absent in most accounts of electrification.

Industrial firms relocating from crowded central city sites from the 1890s often built a power station as an integral part of the new workshops. Ferranti moving from London to Hollinwood in 1896 followed this pattern as public supply was not available at the time.[18] The Linotype Company's new works at Broadheath, Altrincham (1897) was designed for electric power and lighting and an extensive housing estate was also laid out beside the works.[19] At Belle Vue, Manchester, the Kendall & Gent machine tool works (1898) was another all-electric factory.[20] A decade later, two engine building works in the suburbs of Stockport were arranged for self-sufficient electric power. The Reddish works of Richard Hornsby & Sons Ltd used their own "Stockport" gas engines to generate electricity while the new Hazel Grove plant of Mirrlees, Bickerton & Day used diesel engines.[21]

Similar patterns of development were evident in other parts of the region. The works of the New English Manufacturing Co/Dick Kerr, opened in 1900, had electric drive and an independent powerhouse (1300kW by 1909).[22] At Barrow, the Naval Construction Works of Vickers, Sons & Maxim had two power stations, one for the construction slipways, the other at the adjacent engine works.[23] The adoption of electric drive in cotton mills was a slower process. Kearsley Mill (1906) was one of the earlier all-electric mills with a turbine-driven powerhouse attached.[24] Most of the new all-electric mills took power from public supply, such as the Acme Mill, Pendlebury (1906) and the very large Dunlop Mills at Rochdale (1914-). Both mills were supplied by the Lancashire Electric Power Co.

Manchester Corporation was particularly active in promoting industrial power. By 1907 the Beyer, Peacock locomotive works was taking all its electric power from the public mains.[25] The reconstructed cotton mills in Ancoats were connected to the city supply from 1912. More distant locations such as the CWS biscuit factory in Crumpsall and the Renold Chains works in

[17] The John Rylands Library in Deansgate, Manchester completed in 1899, generated its own electricity in the basement even though Manchester Corporation cables had been laid along the street. See: N. Pevsner, ***Lancashire: The industrial and commercial south*** (Harmondsworth: Penguin, 1969), p.285.
[18] "The works of Ferranti Limited, Hollinwood", ***The Engineer*** Vol.102, 1906, pp.168-170.
[19] "The Lino Company's works at Broadheath, near Manchester," ***The Engineer*** Vol.86, Nov 25 1898, pp.ix-xi.
[20] "An electrically-driven engineering works", ***The Engineer*** Vol.86, 1898, pp.590-592.
[21] "Stockport gas engine works", ***The Engineer*** Vol.105, 1908, pp.265-266; "A new oil engine works", ***The Engineer*** Vol.108, 1909, pp.52-53.
[22] "New electric manufacturing works", ***The Engineer*** Vol.89, 1900, pp.36-637.
[23] I.Mech.E. ***Proceedings***, 1901, pp.751-752.
[24] Mike Williams with D.A. Farnie, ***Cotton mills in Greater Manchester*** (Lancaster: Carnegie Publishing, 1992), pp.144-145.
[25] R.L. Hills and D. Patrick, ***Beyer, Peacock: Locomotive builders to the world*** (Glossop: Transport Publishing Co, 1982), pp.104-105

Burnage also used the Corporation supply system. The new Crossley works and National Aircraft Factory No. 2 in Heaton Chapel (later part of Stockport) were also part of the city network.

Some of the munitions plants of World War I were compelled to build independent power stations where the public supplies were inadequate. In Morecambe the National Filling Factory No 13 at White Lund had independent supply as did the National Projectile Factory at Lancaster (later bought by the Corporation and expanded for the public system).

Private generation generally retreated after the war as more public supplies became available. The Metrovick works in Trafford Park closed it power station and by 1929 was purchasing more than 17.5 million kWh per year.[26]

Some independent power stations were still very active at this time. The Partington Iron & Steel Co. at Irlam had plant with a capacity of 11,000kW. Bradford Colliery Co, a neighbour of the Stuart Street power station, still generated its own power (1,700kW capacity). For process industries using steam, independent electricity generation still seemed to be an economic proposition. This was clearly a factor in the late development of a private station at Lane Mills, Lancaster (capacity 7,000kW, opened in 1949) where the Williamson's linoleum works used a considerable amount of steam in the manufacturing process.[27]

Hotels were early in adopting electric lighting as one of the amenities of high-class hospitality. This was very evident in the resorts and spas in the North West. For isolated establishments like the Lodore Hotel in Borrowdale which featured electric light in its advertising, private generation was the only course. The hotel facilities also included "two electric launches run from the hotel to Keswick several times daily".[28]

Other large institutions of a different type were also introducing electric lighting. Whittingham Hospital, near Longridge, was illuminating the grounds with electricity by 1894. This large asylum also included a private gas works. The later Calderstone's Hospital near Whalley, completed in 1915, also had a gas plant as well as some electricity service.[29]

Throughout the region, country houses, estates and larger farms added electricity. Lyme Park was generating its own power by 1904. In contrast, Dunham Massey, when modernized in 1905-06 had a mains supply from the Altrincham Electric Supply Co.[30]

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[26] I.Mech.E. ***Proceedings***, 1929, p.728. The notes on works visits in the Manchester area made during the Institution's summer meeting reveal many examples of private generation.
[27] "Lane Mills thermal-electric generating station", ***The Engineer*** Vol.188, 1949, pp.293-296, 311-324.
[28] ***Bradshaw's April 1910 Railway Guide*** (reprinted Newton Abbot: David & Charles, 1968), p.1090.
[29] See: "The Asylum List" at: www.countyasylums.co.uk
[30] Pamela Sambrook, ***A country house at work: Three centuries of Dunham Massey*** (London: The National Trust, 2003), pp.178-179. The cost of laying the cable was £112. Drake & Gorham's bill for the installation work came to £1,284.

Electric Tramway Systems in the North Western Region[1]

	YEARS OPERATING	ROUTE MILES	MAX NO. OF CARS
Accrington Corporation	1907-1952	7.02	38
Ashton-Under-Lyne Corpn	1902-1938	6.92	39
Barrow-In-Furness Corpn	1904-1932	6.39	48
Blackburn Corpn	1899-1949	14.73	61
Blackpool Corpn	1885-	20.97	355
Blackpool & Fleetwood Tramroad	1898-1920[2]	8.21	41
Bolton Corpn	1899-1947	32.36	165
Burnley Corpn	1901-1935	13.05	72
Bury Corpn	1903-1949	13.67	60
City Of Carlisle Et Co	1900-1931	5.73	30
Colne & Trawden Co	1903-1934[3]	5.23	18
Darwen Corpn	1900-1941	4.36	25
Farnworth UD	1902-1906[4]	4.65	13
Glossop Co[5]	1903-1927	4.56	9
Lancaster Corp	1903-1930	2.99	12
Lytham St Anne's Corpn	1903-1937	7.51	56
Manchester Corpn	1901-1949	119.23	1,101
Middleton Et Co	1902-1925[6]	8.51	37
Nelson Corpn	1903-1934	2.74	20
Oldham Corpn	1900-1946	25.18	150
Oldham, Ashton & Hyde Co	1899-1921[7]	9.10	68
Preston Corpn	1904-1935	10.53	54
Rawtenstall Corpn	1908-1932	11.75	32
Rochdale Corpn	1902-1932	28.71	99
Salford Corpn	1901-1947	38.80	241
South Lancs Tramways Co	1902-1933	39.10	91
SHMD Board[8]	1903-1945	21.29	64
Stockport Corpn	1901-1951	19.46	87
Trafford Park Twy Co	1902-1908	4.00	7
Wigan Corpn	1901-1931	24.83	103

Thirty electric tramway systems were developed in the North West, 22 by local authorities[9] and eight by companies. Blackpool, an ambitious resort (population 14,000 in 1881) led the way in1885 with a conduit system along the Promenade. Despite many operating problems, such as sand blocking the troughs in the roadway, the private company survived and became part of a larger Corporation system in 1892.[10] The other systems in the region were opened between 1898 and 1908 and had car fleets ranging in size from over 1,000 in Manchester to only 12 in Lancaster.[11]

Only four of the systems had independent power stations, all the others drew their energy from the public supply. Blackpool's early system, several years ahead of good public supply, generated its own electricity at the depot in Blundell Street. The Blackpool and Fleetwood Tramroad Co built a power station at Bispham (600kW) and the Preston Corporation had a similar-sized plant at its Deepdale Road depot. South Lancashire Tramways began with a much larger power station at Atherton which supplied not only the tramway system but also the town. The Atherton station later became a "selected" station under the regional grid scheme.

Tramway power supply as a proportion of total sales was very important in the early years and ensured the viability of many public supply systems. In 1909, for example, tramway power supply represented 71.6 percent

of electricity sales in Oldham, 53.4 percent in St Anne's and 33 percent in Carlisle. Tramway power sales were still significant in 1925/26. The trams in Burnley accounted for45.9 percent of the town's electricity sales while the larger tramways in Blackpool and Manchester represented 32.8 and 17.1 percent of total sales.

Electric tramways provided fast, efficient and cheap urban transport and were very profitable before 1914. Motor bus competition after the war quickly ended the viability of the smaller systems.

Five electric railway systems were developed in the North West. The first to open, in 1908, was the Midland Railway's Heysham-Morecambe-Lancaster line. This was an experimental line, a possible prototype for larger-scale electrification by the railway company. Power was generated at Heysham Harbour, completed in in 1904 as an early all-electric port for services to Ireland.[12] The second electric line was a suburban service from Manchester (Victoria) to Bury opened in 1916. Although the line passed near the Radcliffe generating station of the Lancashire Electric Power Co, the Lancashire & Yorkshire Railway decided to build its own plant (10,000kW) at Clifton Junction.[13] Both the Heysham and Manchester systems used 25Hz for transmission. The third line was also a suburban service: the Manchester and South Junction and Altrincham Railway was a joint project between the LMS and LNER companies. Opened in 1931, the system drew current from public supplies, especially from a substation connected to the Stretford Electricity Board. The two Manchester suburban lines were connected together in 1992 when the new Metrolink system was completed.[14]

The Manchester-Sheffield-Wath railway electrification was a much larger project involving 74.6 route miles of line. Designed to improve the running of heavy coal trains, work began on the overhead 1,500-volt DC system in 1937. Delayed by the war and the need to build a new tunnel at Woodhead, the official opening took place on 30 May 1954. Power for the western section was drawn from a sub-station at Gorton.[15]

AC power at 25kv was adopted for the Manchester-Crewe electrification proposed by the British Railways Modernisation and Re-equipment Plan (1955). Electric service began operation in September 1960 and was extended to London four years later.

Notes

[1] Compiled from Keith Turner, ***Directory of British Tramways***, Vols 2 & 3 (Stroud: The History Press, 2009, 2010).
[2] Sold to Blackpool Corporation.
[3]Owned by Burnley, Colne & Nelson Joint Transport Committee 1933-34.
[4]The system was unprofitable and leased to South Lancashire Tramways Co.
[5]Owned by Urban Electric Supply Co which also provided the town's electricity supply.
[6]Sold to Middleton, Rochdale and Chadderton local authorities. The lines were worked by Manchester, Oldham and Rochdale Corporation systems.
[7]Taken over by Ashton, Audenshaw. Denton and Hyde local authorities. The lines were worked by Ashton and Manchester Corporations and SHMD Board.
[8]Stalybridge, Hyde, Mossley and Dukinfield Tramways and Electricity Board.
[9]Many other local authorities especially in the Manchester area owned the tracks and leased them to neighbouring operators. Eccles Corporation, for example, built and maintained the system that was leased to Salford. Tramway power sales in 1919/20 amounted to 40 percent of total electricity sales.
[10]G.S. Palmer and B.R. Turner, ***Blackpool by tram*** (Blackpool: privately published, 1988). pp.11-18.
[11]Ramsbottom Urban District opened a small "trackless" "(trolleybus) system in August 1913 with six cars. The system remained in use until 1931.
[12]"The electrification of the Heysham, Morecambe and Lancaster line," ***The Engineer*** Vol.105,1908, pp.610-612, 636-38.
[13]"Manchester to Bury electrification," ***The Engineer*** Vol 121, 1916, pp.34-36, 52-55, 75-78, 101-103, 125-128,167-169. The power station was sold to Lancashire Electric Power Co in 1931 and closed in 1934.
[14]John A. Senior and Colin Reeve, ***Metrolink Handbook*** (Glossop: Venture Publications, 2014).
[15]E.M. Johnson, ***Woodhead: The Electric Railway*** (Bredbury: Foxline Books, 2001), pp.172-180.

II State Intervention

Difficulties of interconnection, differences in AC frequencies, and the need for coal conservation by the use of larger scale plant became major issues in World War I when electricity usage nearly doubled. The Electricity (Supply) Act 1919 created a new organisation, the Electricity Commissioners, to replace the role of the Board of Trade.

A key mandate of the Commissioners was the restructuring of generation and transmission, by voluntary means since the earlier compulsory powers had been deleted from the legislation. The first stage of the procedure for establishing Joint Electricity Authorities was the definition of a series of Electricity Districts covering parts of the country where reorganisation was most needed. All the electricity undertakings in the defined area were then invited to submit proposals for reorganisation schemes emphasising the technical, administrative and financial aspects of a JEA.

Three Electricity Districts were defined in 1920 for the region: South East Lancashire, Mid Lancashire, North Lancashire and South Cumberland. The long deliberations that followed illustrate the difficulties faced by the Electricity Commissioners in attempting to create Joint Electricity Authorities that would consolidate generation in a single regional entity.

At the first inquiry held in Manchester during January 1922, the Commissioners attending soon learned that:

> *Authorities in the District (Salford and Stretford excepted) stated that they were unanimously opposed to the formation of a Joint Electricity Authority and emphasised that an Advisory Board should be set up.*[31]

A draft scheme for South East Lancashire was published in May 1922, approved by a second inquiry in June, and authorised by Special Order during the following year. The first meeting of 52 representatives, including two from the railway companies, was held in Manchester Town Hall on 19 July 1923. The South East Lancashire Electricity Advisory Board in its early years provided a useful forum for discussing issues of interconnection, promoting Special Orders for electricity service in new areas, and deciding on the best sites for new power stations. By the end of the decade most objectives of the Advisory Board had been accomplished. New schemes being implemented by the Central Electricity Board now superseded the possibilities offered by the earlier plans of Joint Electricity Authorities. Consequently the authorities in South East Lancashire decided to wind up the Advisory Board in 1931.[32]

In the Mid Lancashire Electricity District, the first inquiry held in Preston during February 1923 also agreed on the formation of an Advisory Board. Blackburn and Preston had proposed a Joint Electricity Authority but deferred to the majority view. A technical scheme of interconnection,

[31] Electricity Commissioners, ***Second Annual Report 1921-22***, p.83.

[32] A summary of the annual report of the Advisory Committee was published as Appendix A in the Electricity Commissioners, ***Annual Reports*** from 1923-24 to 1930-31.

especially between Preston and the coastal towns, and a proposal for a new power station at Padiham were approved. The first meeting of the Advisory Board was held in the Lytham St Anne's Town Hall on 7 April 1924. Unlike the South East Lancashire District, the Mid Lancashire Advisory Board continued in operation until 1948.[33]

For the North Lancashire and South Cumberland Electricity District, the inquiry held at Barrow concluded that development in that area was too scattered to be regarded as an integrated system. Some useful points were raised by the Commissioner and quickly implemented. These included the extension of the Barrow-in-Furness Corporation's service area and the consolidation of generating in the Lancaster-Morecambe-Heysham district.[34]

Ten new local authority electricity systems were established in the early 1920s:

1922 Cheadle and Gatley
1923 Milnrow, Whitworth
1924 Hazel Grove & Bramhall
1925 Bredbury & Romiley, Horwich, Newton-in-Makersfield, Ulverston, Workington
1926 Preesall

All these systems took bulk supplies from neighbouring undertakings. Workington's supply came from a colliery company and Preesall's from the United Alkali salt works. The Cumberland Waste Heat Owners Co Ltd which had supplied Egremont and Chator Moor was granted an ESO in 1924.

The 65 undertakings in 1925/26 (**Table 3**) operated a variety of systems. Most were mixed AC/DC (33 systems) reflecting the shift away from DC which had been popular in the early years of electrification. With an economic operating radius of 1-1.5 miles from the generating plant, DC was suitable only for city centres or small towns and villages. Buxton, Fleetwood and Kendal were among the ten places with wholly DC systems. Most of the AC systems worked at what had become the national standard of 50 cycles (Hz). There were, however, other frequencies in the region: 40 Hz in the SHMD Board area, 80 Hz in Altrincham, and 100 Hz in Kendal and Windermere. Parts of Blackpool worked at 83 Hz.

The data on generating capacity show a wide range in size from Manchester Corporation with 200,000kW to Ingleton with only 28kW. Steam turbines were dominant in the larger stations, ranging from 27,500 units at the new Barton generating station to 200kW machines in Morecambe. Older reciprocating steam engines were still common, especially for generating DC such as in Glossop. Gas engines were employed in Ormskirk and Penrith and diesel engines in Macclesfield.

[33] A summary report of the Advisory Board was published as Appendix D in the Electricity Commissioners, ***Annual Reports*** from 1924-25 to 1935-36. Lancashire Archives in Preston has a complete set of records for the Mid Lancashire Electricity District Advisory Board from 1924 to 1948. (Reference EY/1-23)

[34] Electricity Commissioners, ***Third Annual Report 1922-23***, pp.98-99.

Statistics on electricity consumption per head of population reveal major contrasts among electricity undertakings. Thirty-four places exceeded 100.0kWh per person. Stretford UD at 1,057.9kwh was particularly high, reflecting a vigorous municipal operation which had bought the Trafford Electric Light & Power Co in 1920, extended the power station, and persuaded many industrial concerns to take a public supply in place of private generation.

Each place had a distinctive market profile reflecting the local economic and social geography. Stockport's profile in 1925/26 consisted of 15.2 percent of sales in the lighting segment, 0.9 percent in public lighting, 12.0 percent for the tramways and 71.9 percent in power. Two towns, Bacup and Hindley with similar-sized populations (around 20,000) had very different market profiles. Bacup was dominated by power sales at 88.5 percent while Hindley showed 80.5 percent of sales in lighting segment. Annual per capita sales in Bacup amounted to 173.4kWh while sales in Hindley reached only 8.1kWh. One partial explanation for the low performance of Hindley was that the Lancashire Electric Power Co. covered most of the industrial power sales in the town.

Electrification and extension of supply areas were given a new impetus following the Weir Report (1925),[35] the Electricity (Supply) Act 1926 and the formation of the Central Electricity Board in 1927. Even before the detailed regional plans for the National Grid were announced, there was a quickening of interest in the formation of new companies and applications for Special Orders.

Seven new local authority undertakings were established:

1926 Ashton-in-Makerfield, Grange-over-Sands, Thornton Cleveleys
1927 Clitheroe, Millom
1930 New Mills

Five new company undertakings were also created:

1926 Cark & District (previously non-statutory)
1928 Trent Valley & High Peak (Chapel-en-le-Frith)
1932 Mid Cumberland
1933 Settle & District, Westmorland & District

Meanwhile the Lancashire Electric Power Co extended into West Lancashire and the Padiham areas. The Corporations of Barrow-in-Furness, Carlisle, Lancaster and Preston all took over previously unserved rural areas. By the mid-1930s all but a small part of the North West was now covered by statutory undertakings.[36]

[35] Ministry of Transport, ***Report of the Committee appointed to review the National Problem of the Supply of Electrical Energy*** (London: HMSO, 1927), 39 pp.

[36] The moorlands southeast of Sedbergh remained unclaimed until 1948.

Table 3 **NORTH WESTERN ELECTRICITY BOARD AREA ELECTRICITY SUPPLY UNDERTAKINGS 1925/26.**

UNDERTAKING	*COUNTY*	*SYSTEM*	*GENERATING CAPACITY kW*	*PER CAPITA CONSUMPTION kV*
Local Authorities				
Accrington MB	Lancs	AC/DC	15,600	185.1
Ashton-under-Lyne MB	Lancs	AC/DC	8,380	139.6
Atherton UD	Lancs	AC	-	278.9
Bacup MB	Lancs	AC	-	173.4
Barrow-in-Furness CB	Lancs	AC/DC	7,850	157.1
Blackburn CB	Lancs	AC/DC	25,000	136.4
Blackpool CB	Lancs	AC/DC	17,550	184.7
Bolton CB	Lancs	AC/DC	46,500	280.1
Bredbury & Romiley UD	Cheshire	AC	-	5.3[1]
Brierfield UD	Lancs	DC	-	27.7
Burnley CB	Lancs	AC/DC	8,000	93.1
Bury CB	Lancs	AC/DC	24,000	312.0
Buxton MB	Derbys	DC	810	54.0
Carlisle CB	Cumberland	AC/DC	9,000	186.8
Cheadle & Gatley UD	Cheshire	AC	-	101.9
Colne MB	Lancs	AC/DC	2,870	121.4
Darwen MB	Lancs	AC/DC	1,750	105.3
Eccles MB	Lancs	AC/DC	1,305	136.4
Farnworth UD	Lancs	AC/DC	-	70.9
Fleetwood UD	Lancs	DC	1,960	103.4
Haslingden MB	Lancs	AC	-	127.0
Hazel Grove & Bramhall UD	Cheshire	AC	-	30.6
Heywood MB	Lancs	AC/DC	-	111.0
Hindley UD	Lancs	AC	-	8.1
Horwich UD	Lancs	AC	-	17.7
Kendal MB	Westmorland	DC	380	26.5
Lancaster MB	Lancs	AC/DC	5,550	45.5
Leigh MB	Lancs	AC/DC	4,850	155.1
Littleborough UD	Lancs	AC	-	277.4
Lytham St Anne's MB	Lancs	AC/DC	1,890	166.7
Manchester CB	Lancs	AC/DC	209,150	291.1
Middleton MB	Lancs	AC/DC	100	288.5
Milnrow UD	Lancs	AC	-	190.4
Morecambe MB	Lancs	AC/DC	600	42.7
Nelson MB	Lancs	AC/DC	12,750	78.5
Newton-in-Makerfield UD	Lancs	AC	-	29.22[2]
Oldham CB	Lancs	AC/DC	32,000	216.3
Preesall UD	Lancs	AC	-	4.1[3]
Preston CB	Lancs	AC/DC	25,000	108.2
Radcliffe UD	Lancs	AC/DC	-	209.8
Rawtenstall MB	Lancs	AC/DC	11,956	200.5
Rochdale CB	Lancs	AC/DC	12,536	403.8
Sale UD	Cheshire	AC	-	49.6
Salford CB	Lancs	AC/DC	52,500	195.4
SHMD Board	Ches/Lancs	AC/DC	22,500	270.2
Stockport CB	Cheshire	AC/DC	20,500	253.8

UNDERTAKING	*COUNTY*	*SYSTEM*	*GENERATING CAPACITY kW*	*PER CAPITA CONSUMPTION kV*
Stretford UD	Lancs	AC/DC	17,250	1,057.9
Swinton & Pendlebury UD	Lancs	AC/DC	-	36.5
Turton UD	Lancs	AC	-	35.3
Ulverston UD	Lancs	AC	-	1.5[4]
Whitehaven MB	Cumberland	DC	2,140	99.0
Whitworth UD	Lancs	AC	-	111.0
Wigan CB	Lancs	AC/DC	20,500	112.4
Workington MB	Cumberland	AC	-	3.7[5]
Companies				
Alderley Edge & Wilmslow ES Co	Cheshire	AC/DC	645	40.7
Altrincham ES Co	Cheshire	AC	4,500	90.2
Cumberland Waste Heat Owners	Cumberland	AC	2,000	167.2
Electricity Co. of Macclesfield	Cheshire	DC	2,095	48.4
Glossop (Urban ES Co)	Derbyshire	DC	625	31.7
Ingleton EL&P Co	Yorks (West)	DC	28	10.3
Keswick EL Co	Cumberland	AC	187	34.4
Lancashire EP Co	Lancs	AC	68,875	..
Ormskirk ES Co	Lancs	DC	375	42.6
Penrith ES Co	Cumberland	DC	570	19.1
Windermere & Dist ES Co	Westmorland	AC	570	21.1

Notes:

[1] Supply began 26 September 1925.

[2] Supply began 16 July 1925.

[3] Supply began 1 January 1926.

[4] Supply began 17 November 1925.

[5] Supply began 1 May 1925.

Source: Electricity Commissioners, ***Engineering and Financial Statistics 1925/26.***

Transmission lines supported by tall steel towers became the most visible effect of state intervention as they appeared in the landscape during the early 1930s. Construction of a national grid was authorised by the Electricity (Supply) Act 1926. Plans were prepared by the Electricity Commissioners and consulting engineers for implementation by the Central Electricity Board.[37] The North West England and North Wales Electricity Scheme was adopted by the Central Electricity Board in October 1928, tenders were advertised, contracts made, and construction work began. Robert Blackmore (c1873-1939), formerly chief engineer with the SHMD Board, was appointed manager of the North West scheme in 1929.

The national grid was designed to connect "selected" power stations. These were generally the largest and most efficient generating plants which also had some potential for expansion. Twenty-seven stations received this designation in the North West (seven were located in the Merseyside and North Wales area). Two new stations were proposed--Clarence Dock, Liverpool opened in 1931 and Carrington on the Ship Canal near Manchester. The Carrington station was not built since Manchester Corporation, then in the midst of financial retrenchment, decided it would be cheaper to rebuild the existing power station at Stuart Street.

[37] ***Ninth Annual Report of the Electricity Commissioners 1928-1929*** (London: HMSO, 1929), pp.9-11.

Figure 3 NORTH WEST ENGLAND NATIONAL GRID 1936

The regional grid scheme consisted of a long spine from Carlisle to Crewe and ring mains connecting power stations in the Liverpool, Manchester and northeast Lancashire districts. About 350 route miles of 132kv transmission lines and 270 route miles of 33kv were built. The lower-voltage lines were used to connect smaller places such as Macclesfield, the Fylde coast towns and West Cumberland. Transformer stations were the most expensive part of the scheme amounting to 56 percent of the £4.2 million cost of the regional system in 1928. This was a factor limiting the number of points at which grid connections could be made. Only a few locations such as Natland on the southern fringes of Kendal were separate from power stations. Lower-voltage lines from Natland served Barrow-in-Furness and local distribution in south Westmorland. Frequency standardisation, another expense of the national grid, was confined to the 40Hz system of the SHMD Board.

Major engineering projects on the regional system included tall towers for the Ribble crossing at Penwortham as well as on the Manchester Ship Canal. Locating and building the transmission line was relatively easy in open country but difficult in urban areas. The 132kv line from Barton to Stockport used the flood plain of the Mersey but then had to make a long detour around Stockport and Hazel Grove to the transformer station near Bredbury Hall. The final link to Millgate power station was by underground cable.

An early challenge to transmission line construction arose in the Lake District where the CEB proposed a 33kv line from Penrith to Egremont via Keswick and the Whinlatter Pass.[38] Opposition to the proposed line was highlighted in a newspaper headline "The Marching Pylons": and the following article went on to describe the "…the battalions of pylons marching across the Whinlatter Pass".[39] Incidentally this article and similar features in the national press helped to popularize "pylon" in British usage. Although the CEB offered some compromise routes, there was continued opposition to any work in the Keswick area until 1933 when the Board quietly abandoned the project. Keswick remained isolated from the grid system until 1938 when the Mid Cumberland Electricity Co built an 11kv pole line from Penrith, via Keswick to Cockermouth. In later years the North Western Electricity Board was very careful not to antagonize the amenity interests in the Lake District.

When trading began on 1 January 1934, the grid had added a new layer to the complex of undertakings that operated the electricity supply system. The East Didsbury, Manchester grid control office of the Central Electricity Board now managed the flows of power on the transmission lines and directed the hour-to-hour operation of the selected power stations. These stations, such as the one in Preston, remained in the ownership and management of the Corporation but the daily operation was directed from Manchester. Planning for the future became increasingly centralised, particularly from London.

[38] Bill Luckin, ***Questions of Power: Electricity and the environment in inter-war Britain*** (Manchester: Manchester University Press, 1990), pp.102-109.
[39] ***Manchester Guardian*** 23 January 1929, p.13.

By this time most of the primary objectives of the 1926 legislation were being accomplished in the North West.

- Interconnection and mutual supply agreements, already begun a decade earlier, had been extended. The number of undertakings taking a bulk supply increased from 23 in 1925/6 to 42 in 1935/6.
- Electricity generation was concentrated in fewer stations. In 1935/36 the 22 elected stations directed by the CEB accounted for 95.7 percent of all electricity generated in the region. Two of the largest stations, Barton and Kearsley, took much of the regional load, accounting for 30.9 and 18.6 percent respectively. Output from the non-selected power stations amounted to only 4.3 percent of the total generation in the North West. Only a few places such as Burnley (82.3 percent), Leigh (52.3 percent) and Darwen (42.8 percent) were still generating a significant proportion of their total demand. Places still generating all their requirements—Altrincham, Barrow-in-Furness, Windermere and Keswick--still lacked a grid connection in 1935/36.
- Economies of scale in generation and a general rise in demand had reduced costs to the consumer, reflected in the decline of revenue per kWh sold. In Manchester the average revenue fell from 1.19 pence in 1925 to 0.95 pence in 1936. Comparable figures for Oldham are 1.54 pence falling to 1.07 pence. The general sense of lower prices helped to promote increased use of electricity.

Table 4 shows the situation in 1935/36 when 76 undertakings were in operation. Over the previous decade many changes had taken place. One significant shift was the disappearance of wholly DC systems. The number of AC systems had grown over the decade from 22 to 41 as new undertakings had been converted and others such as Lancaster and Morecambe had converted all their earlier DC service to AC.

Generating technology emphasised economies of scale with large units which brought significant reductions in coal consumption. The Hartshead station of the SHMD Board consumed 1.46lbs of coal for each kilowatt generated, compared with the older Tameside plant (closed in 1932) that consumed 2.41lbs in the 1920s. In 1935/36 the best performance in the region was by Kearsley which burned only 1.17lbs per kWh.

Table 4 **NORTH WESTERN ELECTRICITY BOARD AREA ELECTRICITY SUPPLY UNDERTAKINGS 1935/36.**

UNDERTAKING	*SYSTEM*	*GENERATING CAPACITY KW*	*PER CAPITA CONSUMPTION KV*
Local Authorities			
Accrington MB	AC	23,750	432.30
Alderley Edge & Wilmslow Elec Bd	AC/DC	495	195.00
Ashton-in-Makerfield UD	AC	-	65.60
Ashton-under-Lyne MB	AC/DC	15,500	308.10
Atherton UD	AC	-	351.11
Bacup MB	AC	-	317.60
Barrow-in-Furness CB	AC/DC	14,225	290.10
Blackburn CB	AC/DC	25,000	231.00
Blackpool CB	AC/DC	15,300	369.00
Bolton CB	AC/DC	42,350	492.80
Bredbury & Romiley UD	AC	-	567.30
Brierfield UD	AC	-	119.40
Burnley CB	AC/DC	8,000	171.20
Bury CB	AC/DC	26,000	453.80
Buxton MB	AC/DC	1,150	193.10
Carlisle CB	AC/DC	26,150	258.20
Cheadle & Gatley UD	AC	-	336.10
Clitheroe MB	AC	-	148.60
Colne MB	AC/DC	-	204.70
Darwen MB	AC/DC	1,750	189.60
Eccles MB	AC/DC	-	286.10
Farnworth UD	AC/DC	-	192.10
Fleetwood UD	AC/DC	-	539.70
Grange UD	AC	-	169.70
Haslingden MB	AC	-	328.90
Hazel Grove & Bramhall UD	AC	-	205.80
Heywood MB	AC/DC	-	162.70
Hindley UD	AC	-	36.00
Horwich UD	AC	-	91.50
Kendal MB	AC/DC	1,115	130.20
Lancaster MB	AC	10,950	542.40
Leigh MB	AC/DC	4,500	330.00
Littleborough UD	AC	-	286.00
Lytham St Anne's MB	AC/DC	1,890	458.30
Manchester CB	AC/DC	267,900	479.00
Marple UD	AC	-	73.70
Middleton MB	AC/DC	100	508.10
Millom RDC	AC	-	41.40
Milnrow UD	AC	-	453.10
Morecambe MB	AC	-	349.30
Nelson MB	AC/DC	12,750	194.90
New Mills UD	AC	-	104.90
Newton-in-Makerfield UD	AC	-	286.50
Oldham CB	AC/DC	74,250	347.50
Padiham UD[1]	AC	-	75.70
Preston CB	AC/DC	60,000	298.70
Radcliffe MB	AC/DC	-	359.30

UNDERTAKING	SYSTEM	GENERATING CAPACITY KW	PER CAPITA CONSUMPTION KV
Rawtenstall MB	AC	17,625	298.60
Rochdale CB	AC/DC	10,800	825.20
Sale UD	AC/DC	-	187.80
Salford CB	AC/DC	57,500	418.90
SHMD Board	AC/DC	37,500	477.80
Stockport CB	AC/DC	55,500	456.00
Stretford & District Elect Bd	AC/DC	10,000	1,408.80
Swinton & Pendlebury MB	AC/DC	-	131.90
Thornton-Cleveleys UD	AC	-	207.90
Turton UD	AC	-	136.50
Ulverston UD	AC	-	98.20
Whitehaven MB	AC/DC	2,140	136.40
Whitworth UD	AC	-	326.20
Wigan CB	AC/DC	19,500	188.00
Workington MB	AC	-	60.30
Companies			
Altrincham ES Co	AC	8,250	228.00
Cark & District E Co	AC	-	14.20
Electricity Co. of Macclesfield	AC/DC	2,080	168.70
Glossop (Urban ES Co)	AC	-	30.10
Keswick EL Co	AC	476	69.20
Lancashire EP Co	AC	161,250	..
Mid-Cumberland ES Co	AC	-	41.90
Ormskirk ES Co	AC	-	114.50
Penrith ES Co	AC	-	49.70
Settle & District ES Co	AC		52.50
South Cumberland ES Co	AC	-	280.00
Trent Valley & High Peak Co (pt)	AC	-	77.60
Westmorland & District ES Co	AC	-	87.90
Windermere & District ES Co	AC	720	58.70

Note: [1] Padiham system operated by Lancashire Electric Power Co.

Rationalisation of generation and interconnection of undertakings all contributed to reducing the cost of electricity. Other factors such as the growth of radio broadcasting[40] and lower prices for small appliances helped to boost electricity consumption. By 1935/36 there were 58 places in the region with per capita consumption levels above 100kWh. The Stretford & District Electricity Board continued in the lead at 1,408.8kWh, but other places such as Rochdale also ranked high.

[40] The BBC used the chimneys at the Bloom Street/Dickinson Street power station of Manchester Corporation for its regional transmitter from 1923 to 1931. Edward Pawley, ***BBC Engineering 1922-1972*** (London: BBC, 1972), p.39.

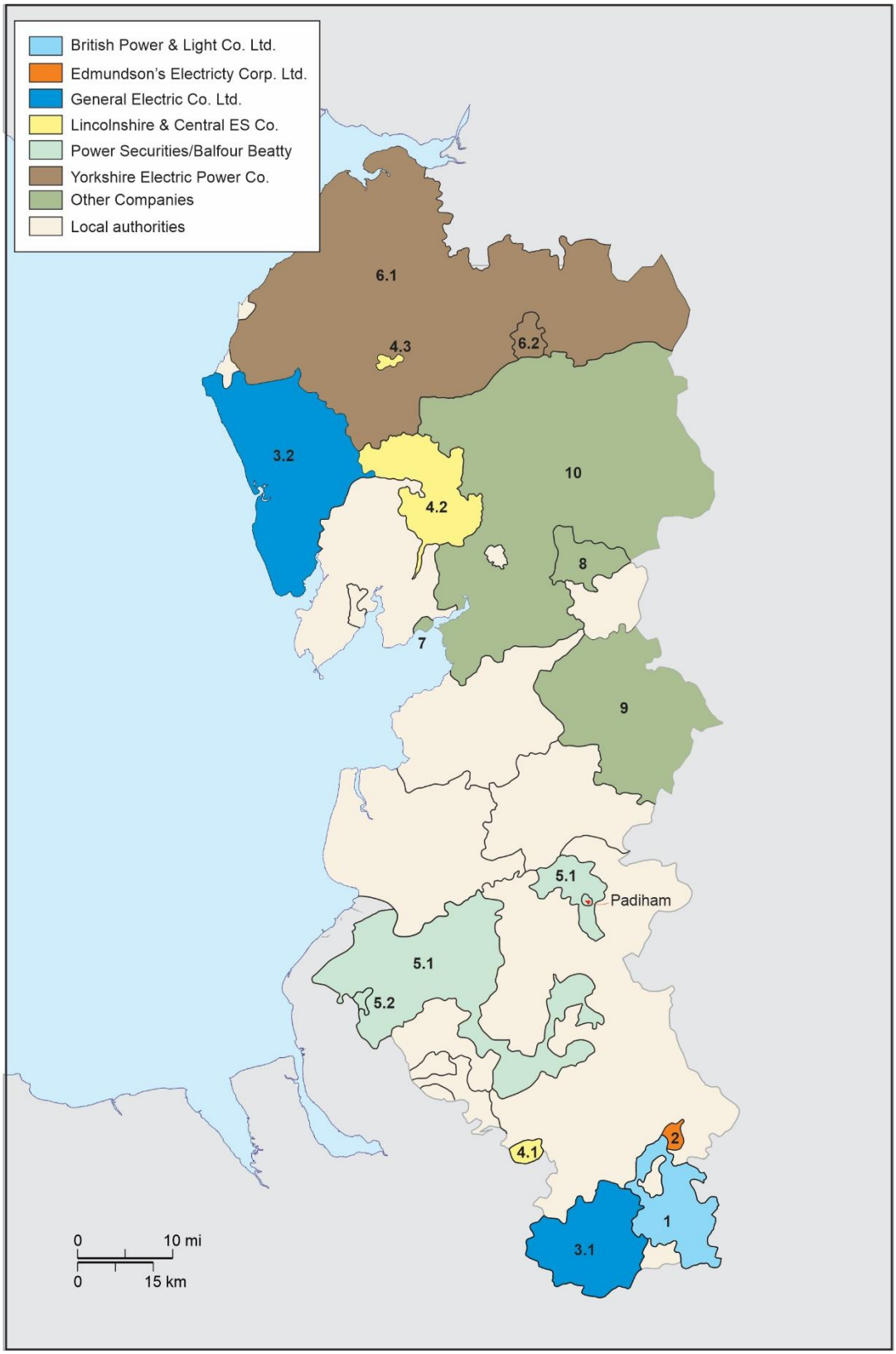


Figure 4 **NORTH WEST ELECTRICITY HOLDING COMPANIES 1934-35**

Table 5 **NORTH WESTERN AREA CORPORATE STRUCTURE OF ELECTRICITY HOLDING COMPANIES 1934/35.**

1. British Power & Light Co Ltd	Trent Valley & High Peak E Co (part)
2. Edmundson's Electricity Corporation Ltd	Urban ES Co – Glossop[1]
3. General Electric Co Ltd	3.1 Electricity Co of Macclesfield[2] 3.2 South Cumberland ES Co
4. Lincolnshire & Central ES Co	4.1 Altrincham ES Co 4.2 Windermere & District ES Co 4.3 Keswick EL Co
5. Power Securities/Balfour Beatty	5.1 Lancashire Electric Power Co 5.2 Ormskirk ES Co
6. Yorkshire Electric Power Co	6.1 Mid Cumberland Electricity Co 6.2 Penrith ES Co
Other companies	7 Cark & District Electricity Co 8 Sedbergh Electricity Supply Co[3] 9 Settle & District Electricity Co 10 Westmorland & District ES Co

Notes:
[1] Taken over by SHMD Board 1939
[2]Taken over by Macclesfield Corporation 1939
[3]Non-statutory until 1936

Source: Political and Economic Planning, ***Report on the Supply of Electricity in Great Britain*** (London: PEP, 1936), pp.140-141.

The growth of electrification, especially in the lighting segment, may be illustrated by the case of Stockport. Total electricity sales grew from 31.85million kWh in 1925/26 to 59.55m kWh a decade later. The lighting segment that included domestic uses expanded from 4.85m kWh to 16.70m kWh. Over the same period, per capita consumption in Stockport rose from 253.8kWh to 456.0kWh.

The 14 companies in the region were controlled by a variety of interests (**Table 5**). Some such as the Edmundsons' control of Glossop were old-established. Others were more recent. The Lancashire Electric Power Co joined the Power Securities/Balfour Beatty group in the early 1920s. British Electric Power & Light Company's subsidiary Trent Valley & High Peak represented investment in new companies covering previously undeveloped territory. Two companies not listed in the table, Settle & District and Westmorland & District, were also controlled by outside interests, namely Crompton Parkinson and Johnson & Phillips. Only the Cark company appears to have been locally owned.

Although state intervention had begun to rationalise electricity generation, the efforts of the Electricity Commissioners to reduce the very large numbers of distributors had been unsuccessful. The McGowan Report published in May 1936[41] and the subsequent government proposals were strongly opposed by many sections of the electricity supply industry. A recommendation in the McGowan Report, that all undertakings with annual sales of less than

[41] Ministry of Transport, ***Report of the Committee on Electricity Distribution***, May 1936 (London: HMSO, 1936). The report noted that there were no fewer than 635 separate authorised undertakings in Great Britain in 1934, comprising the Central Electricity Board, 3 Joint Electricity Authorities, 5 Joint Boards, 373 Local Authorities and 253 Companies and persons.

10 million kWh should be amalgamated, was particularly controversial. Since 37 of the 62 local authorities fell below this limit, here was strong opposition to the idea of amalgamation with larger authorities or companies. Radcliffe, Sale and Swinton & Pendlebury, elevated to boroughs in 1934-35, would have been very reluctant to lose any services reflecting municipal independence. The government's Outline of Proposals published in April 1937[42] was met with strong opposition and more pressing issues of the time meant that reorganisation of distribution was set aside.

Demand for electricity grew rapidly after 1936, particularly for industrial uses associated with rearmament and the war effort. Many shadow factories and vast ordnance complexes such as Chorley were built in the North West.[43] The scale of consumption of a single plant may be illustrated by the new Ford aeroengine works in Trafford Park. At peak production of Rolls-Royce "Merlin" engines, the factory consumed 52.0 million kWh per year (equivalent to the total electricity consumption of Preston in 1935/36).[44]

One new power station, Ribble B (130,000kW) was commissioned. Trafford Park station was rebuilt, and major extensions were added to nine power stations in the region. Kearsley station of the Lancashire Electric Power Co added two 50,000kW turbines between 1936 and 1938. A new feature of these extensions at Kearsley was the construction of three reinforced concrete cooling towers. Over the next two decades the tall hyperbolic cooling tower became a common feature of most new or extended power stations in the southern part of the region.

Table 6 lists the very small number of undertakings consolidated between 1920 and 1948. Preesall Urban District (population 2,043 in 1931) was the only local authority that transferred its electricity service to a larger neighbour. This resistance of local authorities to any loss of independence was a powerful force against all the pressures for consolidating distribution.

Table 6 **NORTH WESTERN ELECTRICITY BOARD AREA CONSOLIDATIONS.**

UNDERTAKING	***YEARS IN OPERATION***	***NEW OWNER***
Trafford [Park] EL & P Co	1897-1920	Stretford UD
Ingleton EL & P Co	1900-1934	Settle & District ES Co
Preesall UD	1926-1934	Preston Corporation
Glossop (Urban ES Co)	1903-1939	SHMD Board
CHANGES OF STATUS		
UNDERTAKING	***DATE***	***MUNICIPAL CONTROL***
National ES Co	1922	Preston Corporation
Alderley & Wilmslow ES Co	1928	Alderley Edge & Wilmslow EB
Stretford UD	1929	Stretford & District EB
Electricity Co of Macclesfield	1939	Macclesfield Corporation

[42] Ministry of Transport, ***Electricity Distribution: Outline of Proposals*** (London: HMSO, 1937).
[43] Wayne D. Crocroft, ***Dangerous Energy*** (Swindon: English Heritage, 2000), pp.211-223. Electricity for the Chorley complex was supplied by the Lancashire Electric Power Co.
[44] Edgar N. Duffield, ***Ford through European eyeglasses*** (Chelmsford: Mercury Press, 1947), p.161.

III Nationalisation

After three decades of discussion, the whole organisation of electricity was restructured following the Electricity Act 1947. From 1 April 1948, the North Western Electricity Board took over the assets of 76 local authorities, boards and companies (**Figure 1**).[45] The generating stations and transmission lines of the Central Electricity Board were transferred to the British Electricity Authority.

Electricity Distribution

The North Western Board was responsible for integrating all the undertakings. Systems had to be standardised and the multiplicity of tariffs reduced. For administrative purposes, the Board area was subdivided seven sub-areas and 35 districts. Initially many of the districts tended to reflect the pre-nationalisation company and municipal areas.

Figure 5 shows the geographical organisation in 1957 when there were seven sub-areas and 35 districts. One notable feature is the network of 112 service centres where consumers could pay their bills and purchase appliances.[46] These service centres were an important and profitable part of the Board's business.

Postwar economic development brought new demands for industrial supply, such as aircraft production in Manchester and the Preston area.[47] The Ministry of Supply (and its successor the UK Atomic Energy Authority) was a large consumer of power at its new establishments at Springfields near Preston and Sellafield in West Cumberland. Suburban growth throughout the region all contributed to the rising demand for electricity.

Over the decade 1948/9 to 1958/9, total sales of electricity in the North West grew from 4,444m kWh to 8,395m kWh. The number of consumers expanded from 1,300,225 to 1,616,302 over the same period. Employees of the Board increased from 10,273 in March 1949 to 13,181 in 1958.

[45] Three non-statutory companies at Dent, Soulby and Great Asby were also taken over in 1948. North Western Electricity Board, ***First Annual Report 1948-49*** (London: HMSO, 1949). Parliamentary Paper, Session 1948-49, HC348.
[46] ***Electricity Supply Handbook 1958*** (London: Electrical Times, 1958), pp.145-152.
[47] Economic diversification in the North West is considered in T.W. Freeman, H.B. Rodgers & R.H. Kinvig, ***Lancashire, Cheshire and the Isle of Man*** (London: Nelson, 1966), chapter 6.

Figure 5 **NORTH WESTERN ELECTRICITY BOARD AREA, 1957**

Electricity Generation and Transmission

The North Western Division of the British Electricity Authority covered the same area as the distribution board. It was an amalgamation of the 132kv transmission system developed by the Central Electricity Board and the power stations previously owned by the local authorities, boards and companies. The main tasks from 1948 were to integrate the various generating stations and their workforces, to modernise and standardise operations, and to expand capacity to meet the rapidly growing demand.

Table 7 **BRITISH ELECTRICITY AUTHORITY POWER STATIONS IN THE NORTH WESTERN DIVISION 1948/49**

POWER STATION	***CAPACITY kW***	***TYPE[1]***
Kearsley	168,075	S
Barton	161,500	S
Ribble B	130,000	S
Stuart Street	118,250	S
Bolton	107,500	S
Hartshead	100,250	S
Stockport	97,500	S
Carlisle	86,900	S
Blackburn	70,000	S
Trafford[2]	60,000	S
Agecroft	58,100	S
Ribble A	55,100	S
Radcliffe	53,550	S
Lancaster	52,450	S
Chadderton	41,250	S
Padiham	31,375	S
Greenhill (Oldham)	26,400	S
Bury	26,000	S
Barrow	24,050	S
Accrington	21,200	S
Rawtenstall	17,625	S
Blackpool	15,000	S, I
Nelson	12,750	S
Wigan	12,000	S
Rochdale	8,500	S
Burnley	7,315	S
Bloom Street	5,000	S
Leigh	4,000	S
Darwen	2,350	S
Whitehaven	2,000	S
Macclesfield	1,725	I
Buxton	1,150	I
Kendal	800	I
Alderley Edge	495	I
Coniston	300	H
Sedbergh	100	I

Notes: 1. S – Steam; H—Hydro-electric; I – Internal combustion (diesel). 2. Trafford rebuilt 1939-1947.
Source: Compiled from British Electricity Authority, ***Annual Report 1948-49***, Appendix 15.

Table 7 lists the 35 power stations in the new organisation. They varied in size from large turbine-powered stations at the top to small diesel-engined and a hydro unit at the bottom. A comparison with Table 4 shows that most of the new capacity had been concentrated at a few selected stations—notably Kearsley, Bolton, Hartshead, Willowholme (Carlisle), Blackburn, Lancaster, Stockport, Bolton and Barrow-in-Furness. One new station, Ribble B at Preston, had been built in the early part of the war.

Table 8 **Central Electricity Generating Board Power Stations in the North Western Division 1958/59**

POWER STATION	*CAPACITY kW*	*TYPE*[1]
Kearsley	272,075	S
Carrington	256,000	S
Chadderton B	246,000	S
Stuart Street	179,750	S
Barton	161,500	S
Huncoat	160,000	S
Blackburn	158,000	S
Hartshead	131,750	S
Ribble B	130,000	S
Roosecote	128,000	S
Westwood	128,000	S
Agecroft B	110,000	S
Bolton	107,500	S
Stockport	99,500	S
Fleetwood	90,000	S
Carlisle	86,900	S
Trafford	75,000	S, GT
Agecroft A	58,100	S
Ribble A	55,100	S
Radcliffe	53,550	S
Lancaster	50,250	S
Chadderton A	41,250	S
Padiham	31,375	S
Bury	26,000	S
Barrow	23,000	S
Blackpool	18,700	S, I
Greenhill	17,200	S
Nelson	12,750	S
Kendal	4,800	I
Alderley Edge	4,000	I
Buxton	4,000	I
Macclesfield	2,000	I
Coniston	300	H

Notes:
1. S – Steam; H—Hydro-electric; I – Internal combustion (diesel); GT—Gas turbine.
Source: Compiled from Central Electricity Generating Board, ***Annual Report 1958-59***, Appendix 1.

The last extensions to existing stations at Kearsley, Blackburn and Hartshead were completed in 1949-50. Reconstruction of Stuart Street in Manchester, begun in 1934, was finally completed at this time when a 60,00kW turbine entered service. Seven new stations were commissioned after nationalisation (**Table 8**): Agecroft B (1950); Westwood, Wigan (1951); Huncoat, Accrington (1952); Carrington (1953); Chadderton B (1953); Rooscote, Barrow (1953); and Fleetwood (1955). Most of the planning and design work had begun before 1948.

The original grid transmission system had been extended during the war (**Figure 6**) to reinforce supplies to West Cumberland and Barrow-in-Furness. A new line from Blackburn served the refinery and petrochemical plant at Heysham. Heavy demand from the Sheffield region was a factor in the building of the Hartshead-Neepsend line across the Pennines.

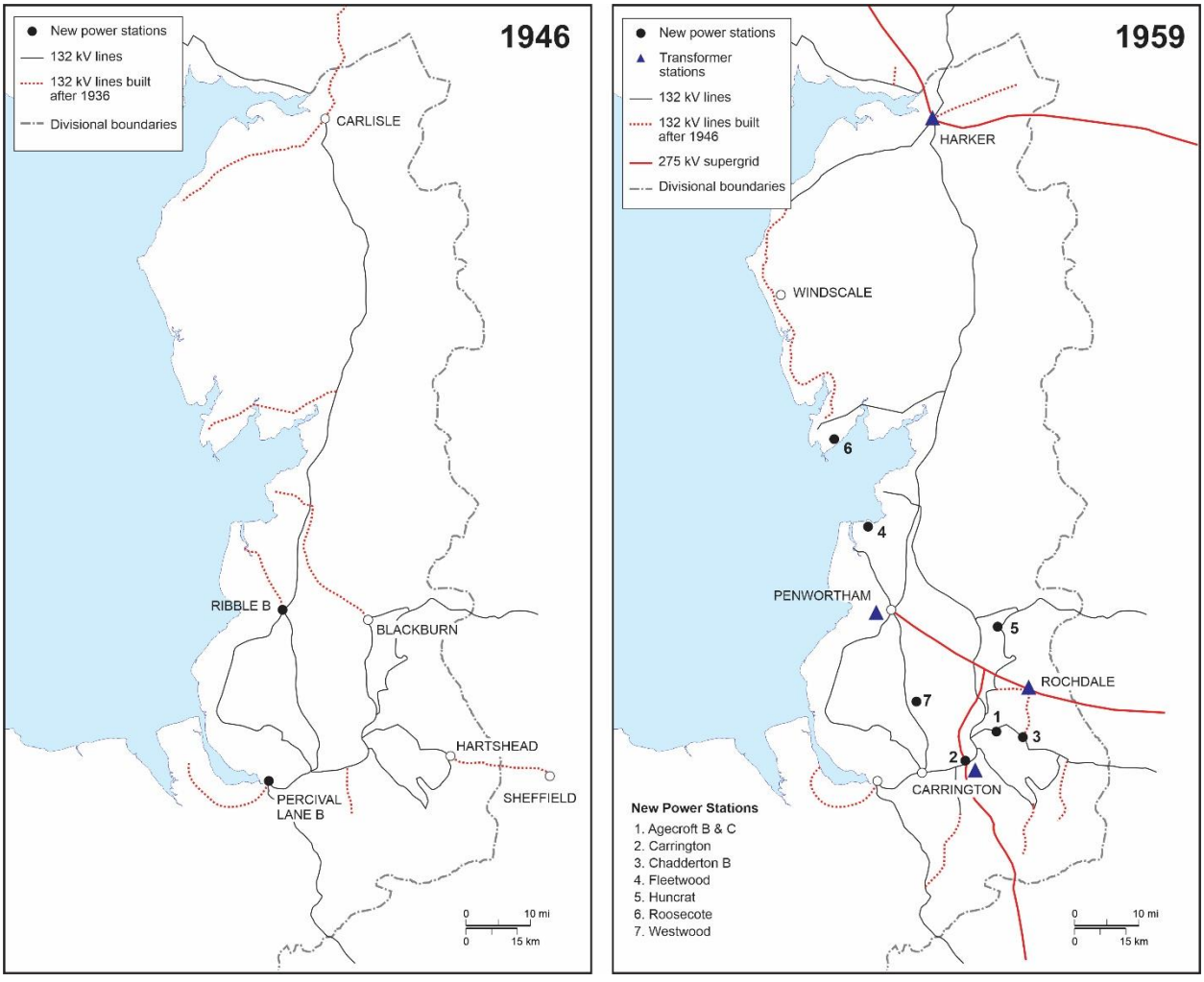


Figure 6A **DEVELOPMENT OF THE NATIONAL GRID 1946 and 1959.**

New 132kv lines built after 1946 included those in West Cumberland to meet the rising power demands of the Sellafield nuclear complex; Chadderton to Rochdale; Hartshead to New Mills[48]; and Stockport to Macclesfield. The line from Carlisle to Spadeadam completed in 1958/59 was built to supply the Rocket Establishment where static trials of the Blue Streak missile would be carried out.[49]

The evolving network of 275kv lines shown on the map reflected major strategic decisions made by the British Electricity Authority in 1950:

- Only limited development of coal-fired stations would take place in the North West gas a result of the high costs and limited supplies of coal in the region.
- Future demand would be supplied by larger stations with 100,000kW and even larger generators located in the Yorkshire and East Midlands coalfields. By 1959 the lines from Ferrybridge in Yorkshire and Drakelow near Burton-on-Trent were in service and delivering power to the North West.
- Nuclear reactors would supply some of the future electricity demand. Trawsfynydd in North Wales was already under construction and part of the grid line, from Carrington to Connahs's Quay, was completed.

The 275kv grid lines[50] (later raised in many sections to 400kv) provided the necessary linkages between the new supply areas and the regional demand. Major substations at Carrington, Rochdale, Penwortham (Preston), Harker (Carlisle) and Connah's Quay would connect with the existing 132kv network. By 1961 the line between Penwortham and Harker had been built and Merseyside was also linked into the 275kv system.

Development of new power resources became more difficult after the war as new legislation such as the Town and Country Planning Act 1947, the National Parks Act 1949 and the Clean Air Act 1956 added more public consultation and scrutiny. Longstanding complaints about power station pollution in the Manchester area forced the planners to raise the Agecroft C station chimney from 315ft to 450ft for greater dispersion of flue gases. The greater height and visibility of the 275kv transmission towers also brought objections especially in area of high amenity.

The North Western Division of the British Electricity Authority was amalgamated with the Merseyside and North Wales Division from 1 April 1954 as "an administrative experiment". This experiment formed the basis of a more general reorganisation, regrouping divisions into larger regions, which began with the formation of the Central Electricity Generating Board in 1958. These changes were part of a reorientation towards a more integrated national system. Some functions previously dispersed among the divisions were now centralised. Three project groups,

[48] Derek Brumhead, ***A history of electricity in New Mills*** (New Mills Local History Society, 2015).
[49] Wayne D. Crocroft, ***Dangerous Energy*** (Swindon: English Heritage, 2000), pp.255-259.
[50] A single 275kv circuit had a carrying capacity six times larger than the 132kv system. ***Power and Prosperity*** (London: British Electricity Authority, 1954), p.66.

for example, were responsible for power station planning and design. The Northern Project Group was housed in the offices of Agecroft power station. Transmission planning and design was later concentrated at an office in Guildford.

The North Western Region in 1959 was responsible for a large area extending from Aberystwyth to Carlisle, with the Manchester headquarters administering 9,189 employees, 57 power stations and 956 miles of transmission lines. The offices in East Didsbury, bought by the Central Electricity Board in the early 1930s, were extended to house the growing staff.[51]

Summary

Table 9 shows various indicators of the growth of electrification from 1900. Of the 29 undertakings in that year, 23 were local authorities, a point that illustrates the strong municipal role in the region. Only after World War I did the companies led by Lancashire Electric Power really begin to show on the map, especially in the northern parts of the region.

Table 9 **SUMMARY OF DEVELOPMENT IN THE NORTH WESTERN ELECTRICITY BOARD AREA**

	NUMBER OF UNDERTAKINGS[1]	*LOCAL AUTHORITY UNDERTAKINGS*	*NUMBER OF POWER STATIONS*	*GENERATING CAPACITY (kW)*	*PER CAPITA CONSUMPTION (kWH)*
1900	29	23	29	..	.. (4)[2]
1912	53	42	47	..	.. (36)[2]
1925/6	65	54	47	704,855	186 (133)
1935/6	76	62	40	1,016,466	383 (374)
1948/9	..	..	35	1,576,110	974 (821)[2]
1958/9	..	..	33	2,915,350	1,833 (1,765)[3]

Notes:

[1] Excludes all non-statutory undertakings.

[2] Great Britain 1900-1948/9 from Leslie Hannah, ***Electricity Before Nationalisation: a study of the electricity supply industry in Britain to 1948*** (London: Macmillan, 1979), pp.427-8.

[3] Calculated from data in Electricity Council, ***Handbook of Electrical Supply Statistics 1977***, p. 63 and census returns.

A sense of the rapid growth of demand from the mid-1920s is illustrated by the two final columns in the table. Economies of scale are reflected in the increasing size of power stations. Kearsley was the earliest to adopt 50,000kW turbines in the mid-1930s. The postwar generating stations were only a little larger.

Per capita consumption in the North Western region (with Great Britain in parentheses) shows substantial rates of growth. For much of the time regional consumption levels were above the

[51] "The Cedars", a mansion built in 1856, formed the core of the office complex. It was noted briefly in Pevsner (1969) and designated as a Listed Building in 1974. None of the subsequent documentation mentions its use by electricity authorities which occupied the property for about 40 years.

national average. The dip in 1935/36 shows the effect of the Depression on some of the traditional industries such as cotton.

Electrification was a much slower process than the enthusiastic promoters of the 1880s expected. Much effort and expenditure were needed to create viable electricity undertakings in the larger urban centres. This point of viability was reached about 1900, but extending the benefits of electricity over wider areas took much longer and universal electricity was probably not achieved until the 1950s.

Note on Sources

For the period before state intervention, Garcke's ***Manual of Electricity Undertakings***, first published in 1896, is the indispensable source. This annual volume lists all municipal and company electricity and tramway systems in comprehensive detail. Technical information on the generating and distribution systems is noted for each undertaking, as well as statistics on sales, revenue and expenditure. There are full details of personnel and company directors. Garcke also covers many of the non-statutory companies which were often significant in rural areas.

The contents of the ***Annual Reports*** of the Electricity Commissioners (1st, 1920-21 – 23rd, 1947-48) highlight the role of state intervention during this period and reflect the power of the Electricity (Supply) Act 1919. Under this legislation all power station and transmission line construction required consent of the Commissioners. Loans for local authority electricity undertakings, extensions of areas and transfers of ownership all required approval from London. Even the payment of subscriptions to associations such as the British Electrical Development Association and the Incorporated Municipal Electrical Association had to have the Commissioners' consent. The detailed supervision of expenditure also included the purchase of proceedings of conferences or meetings and the expenses of members and officers attending such meetings.

The ***Engineering and Financial Statistics***, also published by the Electricity Commissioners, were equally detailed. Local authorities and companies are separately listed with detailed tabulations of generating equipment, fuel consumption, output as well as sales (by type). Such data provide effective evidence on the scale and depth of electrification. The financial statistics cover revenue, expenditure and capital investment.

The Electricity Commissioners also published more specialised reports on plans for integrating local systems which formed the basis for the 132kv grid developed from 1927. All the publications of the Electricity Commissioners were issued under the authority of the Minister of

Transport.[52] They were, however, Non-Parliamentary Publications of HMSO and consequently were not always acquired by libraries at the time.

The Annual Reports of the Central Electricity Board from 1929 to 1947 contain, especially in the earlier years, comprehensive details of the progress of constructing the transmission grid. CEB reports were privately published and are rare items in library collections.

After nationalisation, details of the electricity supply industry become more accessible, although in some points less comprehensive. For the generating and transmission sector, the Annual Reports and Accounts of the British Electricity Authority (1948-1954), Central Electricity Authority (1955-57)[53] and the Central Electricity Generating Board (1958-1989) contain useful data. These reports were all published as House of Commons sessional papers until 1971-72. Thereafter they were no longer published by HMSO and became increasingly glossy in appearance and content. From 1964 many details, previously available in the Annual Reports were published in the CEGB ***Statistical Yearbook***. This was not published by HMSO and is comparatively rare.

The North Western Electricity Board annual reports and accounts were also published as House of Commons sessional papers until 1971-72. After this time the reports were no longer published by HMSO. Since privatization in 1990 the records of the Board appear to have been dispersed.

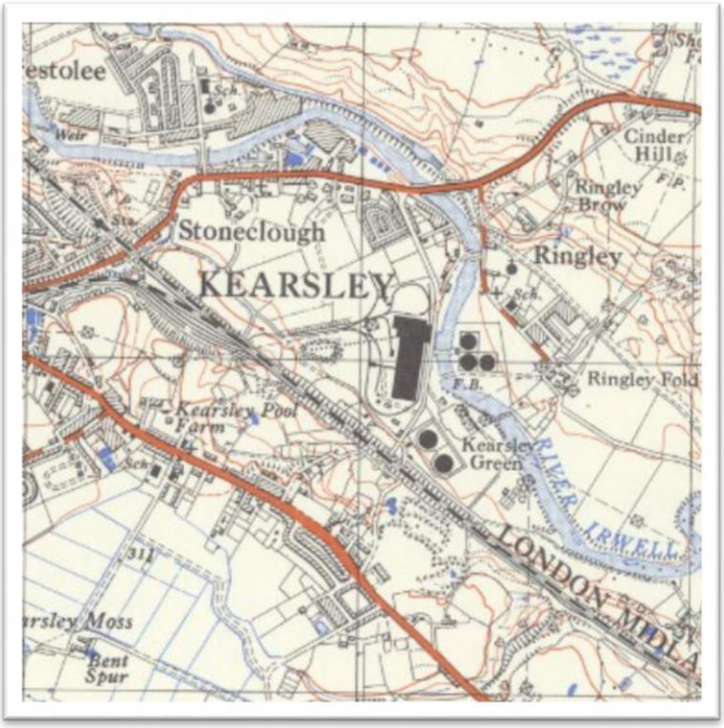
For historians of electricity development in the region, the Board has left an invaluable legacy in the publication of W.E. Swales, ***Forerunners of the North Western Electricity Board*** (Manchester: NWEB, 1963), 107pp. This volume contains not only the essential details of the 76 undertakings of 1948 set in the national context, but also many biographical vignettes of key people who would otherwise have been forgotten. These vignettes include major figures such as C.D. Taite (1872-1948), chief engineer and manager of the Lancashire Electric Power Co. from 1907 to 1946, and engineer-entrepreneurs like W.P.J. Fawcus (1869-1909) who built the early hydroelectric plant in Keswick, created the Altrincham and Trafford companies, and served as consulting engineer in the Manchester region.

From 1958-59 the Electricity Council, created to provide more linkages and coordination beyond the national and regional bodies, also published annual reports and statistical compilations. The ***Handbook of Electricity Supply Statistics,*** published at intervals between 1966 and 1989, includes helpful summaries. ***Electricity Supply in Great Britain: A Chronology***, also published in various editions, is especially useful for details of legislation and major events, especially technical changes from Michael Faraday's fundamental discoveries of 1831.

[52] See ***Annual catalogues of British government publications 1920-1970*** (Bishop's Stortford: Chadwyck-Healey. 1974).
[53] The change of title from British Electricity Authority resulted from the formation of the autonomous South of Scotland Electricity Board from 1 April 1955.

In the postwar period the ***Electricity Supply Handbook*** (published annually by the ***Electrical Times*** from 1947) is a very useful compendium of facts, figures and personnel in the industry. The detailed maps of the grid system are especially important. Like many annual reference works of its type, these volumes are quite scarce.

The Museum of Science and Industry in Manchester holds the records of the former Electricity Council. These include reports of the Electricity Commissioners, the Central Electricity Board and all the organisations after 1948. The archives also has an accessible set of Garcke's ***Manual.***



KEARSLEY

By 1950 Kearsley (capacity 272,000kW) was the largest power station in the North Western Division. First opened in 1929 by the Lancashire Electric Power Co, the complex had an electric railway system to connect with the adjacent main line. Cooling towers were added from 1936 to avoid overheating the River Irwell. Kearsley was a key point on the grid with a large substation.

Ordnance Survey 1:25,000 series, Sheet SD70, 1952 (National Library of Scotland)