

# THE SOUTH WESTERN ELECTRICITY BOARD AREA

Regional and Local Electricity Systems in Britain

## ABSTRACT

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.

**Gerald T Bloomfield**

Professor Emeritus,  
University of Guelph

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### BARNSTAPLE POWER STATION

*A typical small DC municipal electricity works opened in 1903. Capacity reached only 1,050kW in 1923. Steam engines replaced by diesel units in 1930s.*

*Ordnance Survey, Six Inch Map series, Devon XIII.NW 1903 (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 South West England.

## The South 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.<sup>1</sup> 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 South Western Area, as defined at this time, had been part of the South West England and South Wales Grid Scheme Area since 1929. Other parts of this very large region were transferred to the Southern, Midlands and South Wales areas.

In detail the South Western Area included the whole of the counties of Cornwall and Devon and a small part of Dorset where Lyme Regis and Bridport were closely linked with the area. The eastern part of Somerset which included Frome and Yeovil became part of the Southern Area since the companies involved were already integrated with Wessex Electricity. Bristol and Bath Corporation electricity department's boundaries formed the northern limits of the new South Western Area. The boundary lines drawn in 1947 continue to be entrenched in the distribution area franchises of the present day.

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<sup>1</sup> Ministry of Fuel and Power, *Electricity Supply Areas*, Cmd 7007. (London: HMSO, 1947).

Generally the generating and transmission divisions of the national organisation coincided with those of the area boards. The South Western Area was, however, an exception. Partly to include major transmission lines which connected South Wales and England, the British Electricity Authority and its successors added part of Gloucestershire north of Bristol to its South Western Division. One effect of this discordance of boundaries can result in anomalies in the interpretation of statistics and other data.

## Constituents of the South Western Electricity Board Area

When the South Western Electricity Board Area began operations on 1 April 1948 it incorporated the services and systems of 11 local authorities, 27 companies and one power company.<sup>2</sup> There were enormous variations in the size of the constituent areas. Cornwall Electric Power covered about 1,156 square miles while the Holsworthy company occupied an area of just over one square mile. Bristol Corporation's electricity department served an area of 100 square miles, considerably larger than the county borough. As in many places, electricity service areas did not always coincide with those of local authorities.

With a total area of about 5,560 square miles and an estimated population of about two million, the South Western Electricity Board Area had the lowest population density of any of the 14 area boards constituted in 1948. At 376 persons per square mile, this was well below the national average of 704 psm.<sup>3</sup> One implication of this low population density was a high ratio of distribution costs to total revenue. The distinctive economic geography of the South West resulted in a low proportion of industrial sales (30.7 percent) and a correspondingly high proportion of domestic sales (50.7 percent).<sup>4</sup>

Bristol was by far the largest electricity authority in the South West, accounting for about 35 percent of regional sales and 56 percent of generating capacity while serving only 25 percent of the population. As the largest urban centre, Bristol was the obvious place for the South Western Electricity Board Area headquarters, with its offices in Electricity House.<sup>5</sup>

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<sup>2</sup> The South West had a low proportion of local authority undertakings (28.2 percent) compared with the national average (64.9) at the time of nationalisation.

<sup>3</sup> SWEB, *First Annual Report & Accounts* HC240 (HMSO, 1949) p.2.

<sup>4</sup> The averages for the area boards in England and Wales were 34.5 percent domestic and 50.2 percent industrial in 1948/49. Calculated from data in Electricity Council, *Handbook of Electricity Supply Statistics* 1977 edition, pp.64-65.

For general geographies of the region see: A.H. Shorter, W.L.D. Ravenhill and K.J. Gregory, *Southwest England* (London: Nelson, 1969) and F. Walker, *The Bristol Region* (London: Nelson, 1972). The coverage of Somerset in this series is disappointing.

British Association for the advancement of Science handbooks also provide valuable contemporary material:

C.M. McInnes and W.F. Whittard eds. *Bristol and its adjoining counties* (1955);

F. Barlow ed. *Exeter and its region* (1969).

<sup>5</sup> Peter G. Lamb, *Electricity in Bristol 1863-1948* (Bristol: Bristol Branch of the Historical Association, 1981), pp. 29/.33. The office building on a very prominent site in central Bristol was designed by Giles Gilbert Scott (1880-1960). It is one of his largely unrecognized buildings for the electricity supply industry, being overshadowed by his power station work at Battersea, Bankside, Rye House and North Tees.

TABLE 1 CONSTITUENTS OF THE SOUTH WESTERN ELECTRICITY BOARD, 1 APRIL 1948

<b>Local Authorities</b>	
1	Barnstaple Corporation
2	Bath Corporation
3	Bridport Corporation
4	Bristol Corporation
5	Exeter Corporation
6	Lyme Regis Corporation
7	Plymouth Corporation
8	Plympton St Mary RDC
9	Taunton Corporation
10	Tiverton Corporation
11	Torquay Corporation
<b>Companies</b>	
12	Bideford & District Electric Supply Co. Ltd
13	Bridgwater & District Electric Supply and Traction Co. Ltd
14	Brixham Gas & Electricity Co. Ltd
15	Bude Electric Supply Co. Ltd
16	Burnham & District Electric Supply Co. Ltd
17	Chudleigh Electric Light & Power Co. Ltd
18	Culm Valley Electric Supply Co. Ltd
19	Dawlish Electric Light & Power Co. Ltd
20	East Devon Electricity Co. Ltd
21	Electric Supply Corpn (Falmouth) <sup>1</sup>
22	Exe Valley Electricity Co. Ltd
23	Holsworthy Electric Supply Co. Ltd
24	Ifracombe Electric Light & Power Co. Ltd
25	Lynton & Lynmouth Electric Light Co. Ltd
26	Mid-Somerset Electric Supply Co. Ltd
27	Minehead Electric Supply Co. Ltd
28	North Somerset Electric Supply Co. Ltd
29	Paignton Electric Light & Power Co. Ltd
30	St Austell & District Electric Lighting & Power Co. Ltd
31	Salcombe Gas & Electricity Co. Ltd
32	Seaton & District Electric Light Co. Ltd
33	South Somerset & District Electricity Co. Ltd
34	Teignmouth Electric Lighting Co. Ltd
35	Urban Electric Supply (Dartmouth & Kingswear) <sup>2</sup>
36	Wellington District Electricity Co. Ltd
37	West Devon Electric Supply Co. Ltd
38	Weston-super-Mare & District Electric Supply Co. Ltd
<b>Power Company</b>	
39	Cornwall Electric Power Company

Notes: <sup>1</sup> Originally vested in South East Scotland Board.

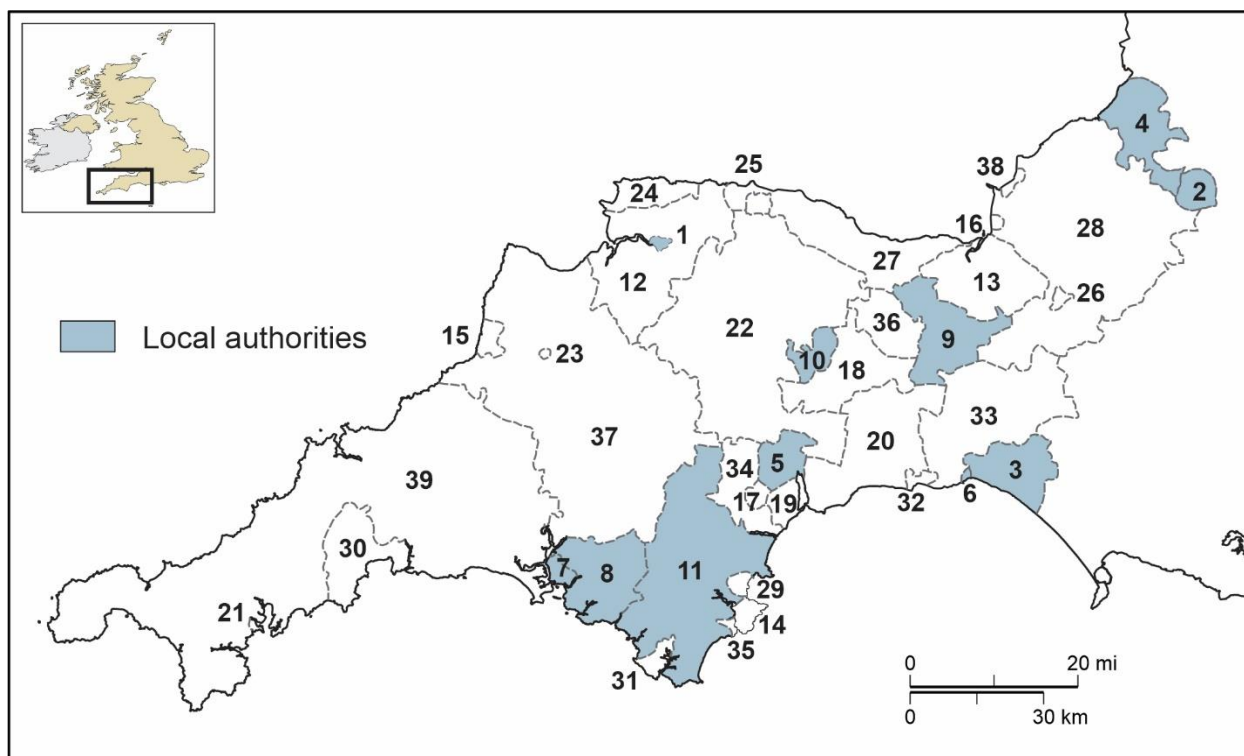
<sup>2</sup> Originally vested in East Midlands Board.

Both undertakings were formally transferred to South Western Board on 5 July 1949.

Source: South Western Electricity Board, *First Report and Statement of Accounts for the period 1 January 1948 to 31 March 1949*. HC340 1948-9 (HMSO 1949) pp. 26-27. Appendix D.

## 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. 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.



**FIGURE 1 CONSTITUENT AREAS OF THE SOUTH WESTERN ELECTRICITY BOARD 1948**

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 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 the early technology.

Three of the applications in 1882 came from the South West. Bristol Corporation's application was successful and an ELO was granted although the system did not open for another decade. The Union Electric Light and Power Co. Ltd applied for two franchises, one in Exeter and the other for Plymouth, Stonehouse and Devonport, but these "...were not considered as the provisions of the Act had not been complied with."<sup>6</sup>

Although general urban electrification failed to take off in the 1880s, there was significant development of private systems which provided a market for electrical equipment, helped in the training of electrical workers, and gave opportunities to refine details of the new technology. In the South West, Ashton Court, a large country house on the southern fringes of Bristol, had a working system of 228 lamps installed by 1885.<sup>7</sup> This system was powered by a Crossley gas engine while at Hestercombe House, near Taunton, a water-powered dynamo installed in 1887 provided lighting for the estate.<sup>8</sup> Industrial establishments were also adopting the new form of illumination. W.D. & H.O. Wills introduced electric lighting in their Bristol tobacco factory in 1886<sup>9</sup> and the Anglo Bavarian Brewery in Shepton Mallet followed in 1889.

The take-off of public electric supply schemes began in 1889-90 with increased numbers of applications for Electric Lighting Orders. Nationally, there were 17 applications in 1889 and 161 in 1890. In the rest of the 1890s a further 459 applications were filed with the Board of Trade.<sup>10</sup>

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 standardization would become a major problem when interconnection between areas became advantageous.

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

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<sup>6</sup> "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.

<sup>7</sup> "Electric lighting in Somersetshire," *The Engineer* vol 60, 1885, p.161.

<sup>8</sup> Peter Daniels ed. *A Guide to the Industrial Archaeology of Somerset* (Association for Industrial Archaeology, 2019), p. 52.

<sup>9</sup> Peter G. Lamb, *Electricity in Bristol 1863-1948* (1981) p.11.

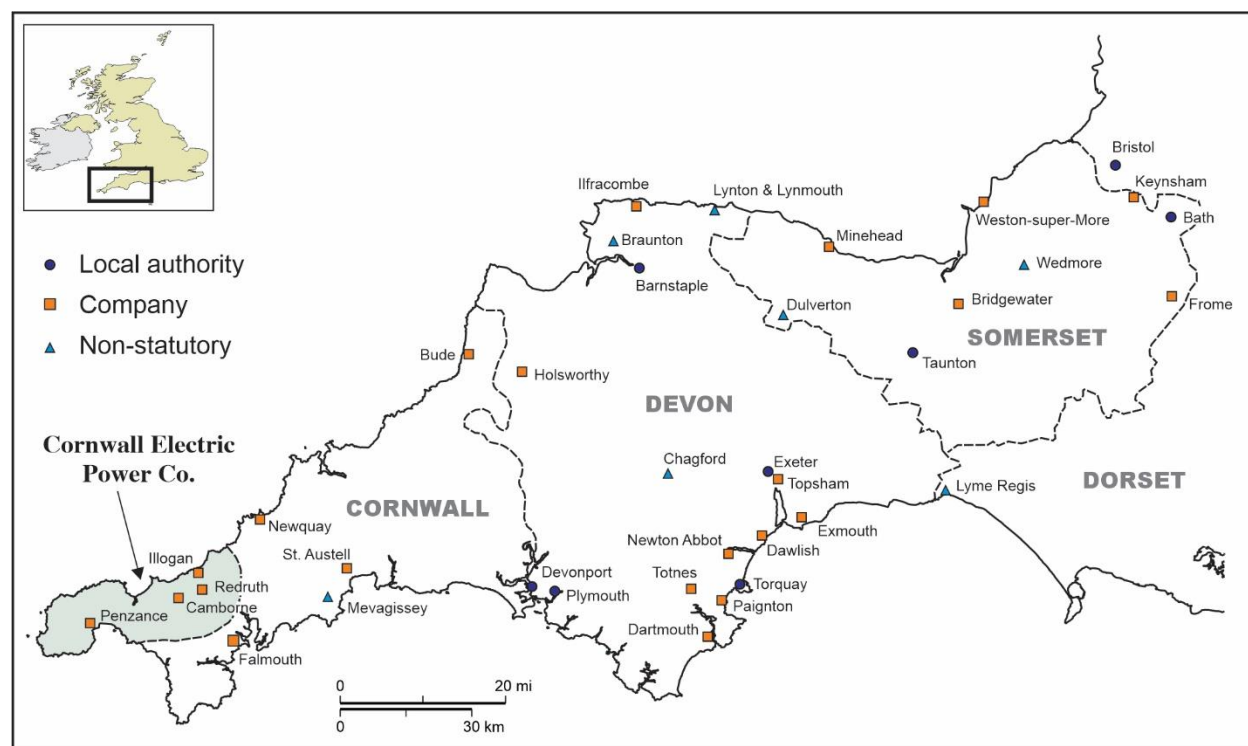
<sup>10</sup> Board of Trade, Proceedings under the Electric Lighting Acts. *Parliamentary Papers* 1899. HC 237.

## 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 eight local authorities were clear examples of local initiative in developing electric lighting and power. Early development in Taunton, Bath and Exeter began with short-term contracts for street lighting with H.G. Massingham, a Taunton entrepreneur.<sup>11</sup> After operating for about seven years, each system was taken over and expanded by the municipality. Bristol Corporation, while early in securing an Electric Lighting Order, was cautious in actual implementation and investment. Plymouth was equally cautious but was an early innovator in combining lighting and tramway supply in a single generating station.

Most of the places in the South West with an electricity supply were served by companies, operating under an Electric Lighting Order which had been approved by the local authority. In seven cases, the operators were non-statutory companies with arrangements for overhead wire service outside the constraints of the Electric Lighting Acts.



**FIGURE 2 ELECTRICITY UNDERTAKINGS IN SOUTH WEST ENGLAND C. 1912**

<sup>11</sup> Peter Lamb, "Massingham family in the Bristol area", *Histelec* article No S20, Western Power Electricity Historical Society website [wpehs.org.uk](http://wpehs.org.uk). See also David Gledhill and Peter Lamb, *Electricity in Taunton 1809-1948* (Somerset Industrial Archaeological Society, SIAS Survey No. 3, 1986).

TABLE 2 SOUTH WEST ENGLAND: ELECTRICITY SUPPLY UNDERTAKINGS C1912

<i>Undertakings</i>	<i>County</i>	<i>Supply began<sup>2</sup></i>
<b>Local authorities</b>		
<i>Barnstaple</i>	Devon	1903
<i>Bath</i>	Somerset	1889
<i>Bristol</i>	Gloucester	1893
<i>Devonport<sup>1</sup></i>	Devon	1902
<i>Exeter</i>	Devon	1889
<i>Plymouth</i>	Devon	1899
<i>Taunton</i>	Somerset	1886
<i>Torquay</i>	Devon	1898
<b>Companies</b>		
<i>Braunton N/S</i>	Devon	1909
<i>Bridgwater</i>	Somerset	1904
<i>Bude</i>	Cornwall	1908
<i>Camborne</i>	Cornwall	1902
<i>Chagford N/S</i>	Devon	1891
<i>Dartmouth</i>	Devon	1902
<i>Dawlish</i>	Devon	1911
<i>Dulverton N/S</i>	Somerset	1904
<i>Exmouth</i>	Devon	1905
<i>Falmouth</i>	Cornwall	1906
<i>Frome</i>	Somerset	1904
<i>Holsworthy</i>	Devon	1910
<i>Ilfracombe</i>	Devon	1903
<i>Illogan</i>	Cornwall	1903
<i>Keynsham</i>	Somerset	1889
<i>Lyme Regis N/S</i>	Dorset	1908
<i>Lynton &amp; Lynmouth N/S</i>	Devon	1890
<i>Mevagissey N/S</i>	Cornwall	1896
<i>Minehead</i>	Somerset	1902
<i>Newquay</i>	Cornwall	1906
<i>Newton Abbot<sup>3</sup></i>	Devon	1902
<i>Paignton</i>	Devon	1909
<i>Penzance</i>	Cornwall	1911?
<i>Redruth</i>	Cornwall	1902
<i>St Austell</i>	Cornwall	1890
<i>Topsham<sup>4</sup> N/S</i>	Devon	1904
<i>Totnes</i>	Devon	1904
<i>Wedmore N/S</i>	Somerset	1908
<i>Weston Super Mare</i>	Somerset	1901
<b>Power Company</b>		
<i>Cornwall Electric Power</i>	Cornwall	1911

N/S non-statutory undertaking (outside 1882/1888 Acts). Not in Electricity Commissioners publications.

Notes: 1 Also supplied East Stonehouse UD. Both were amalgamated with Plymouth in 1914.

2 Most dates from *Histelec* Chronology. [www.wpehs.org.uk](http://www.wpehs.org.uk)

3 Acquired by Torquay Corporation in 1923.

4 To Exeter Corporation in 1924. Topsham remained a parish in St Thomas RD until 1966 when transferred to Exeter.

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]

Non-statutory companies were significant in rural areas from the 1880s until the late 1920s when larger undertakings began expanding beyond town boundaries. A few non-statutory operations in remote areas continued until 1948.<sup>12</sup>

About half the companies were wholly local in management; the others were subsidiaries of larger national businesses. In the “electricity boom” from the mid-1890s several contracting firms began to develop and operate complete local systems. The largest was Edmundson’s Electricity Corporation Ltd which by 1910 was operating 46 systems from Inverness to Guernsey. There were seven systems in the South West—Camborne, Dartmouth, Frome, Ilfracombe, Illogan, Newton Abbot and Redruth. Some of these were operated by the Urban Electric Supply Co, an Edmundson’s subsidiary. Other contractor-operated companies in the region included the Electric Supply Corporation Ltd (Dawlish, Exmouth, Falmouth and Totnes) and Christy Brothers (Bude and Holsworthy). The British Electric Traction Co. developed and operated the combined electricity and tramway system in Weston-super-Mare.

The Cornwall Electric Power Company was the only example of a power company in the region. An Act of 1902 gave the company rights to supply power to mines, factories, railways etc throughout the county except for the northern extremity of the county (Stratton Rural District and Bude). The company could also deliver electricity “in bulk” to local distributors such as Penzance. Unlike other electricity companies, power companies could operate in perpetuity, not being subject to the 42-year franchise concession. The Cornwall Electric Power Co. was unable to raise capital and was acquired by Edmundson’s in 1907. With new capital support, the company built a generating station at Hayle and began operations in 1910/11.<sup>13</sup>

Six additional companies developed local electricity supplies around 1912. The Brixham Gas Co. (established 1838) added electric lighting in 1911. Launceston & District began local service in 1912. Burnham & District began in 1914, and the Mid-Somerset Co. during 1915. The Clevedon & District Electric Supply Co. (a Christy Brothers subsidiary) opened in 1913, was the most significant of the newcomers. Wartime growth in the Bristol area created new demand especially for the Portbury National Shipyard. Instead of expanding its own small generating facilities, the company began to take a bulk supply from Bristol Corporation. This wartime growth formed the basis of territorial expansion after the war, under the new name of North Somerset Electric Supply Co.

Electrification in the South Western region around 1912 was still incomplete and mostly confined to major towns and some smaller places where local enterprise had developed a system. Significant towns without an electricity service included Yeovil (population 14,487 in 1911), Truro (11,235), Midsomer Norton & Radstock (10,989), Tiverton (10,205) and Wellington (7,633). There was no interconnection even between adjacent systems such as the three

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<sup>12</sup> A small system at Ashreigney, Devon, opened in 1934 in the Exe Valley Company’s territory, was one of the last to be established. In 1947, 41 consumers were being served by a 5kw generator (Garcke’s *Manual* 1947-48, p.73). The prevalence of non-statutory companies in the South West deserves a special study of this type of electricity supply.

<sup>13</sup> Eric Edmonds, “Electricity in Cornwall” Pts 1 & 2, *Histelec* articles No S22 and S23.

undertakings around Torbay. Only a very small part of the South Western region was covered by Electric Lighting Orders: most of the territory was still unclaimed.

Lighting was 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 to other uses, 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 1912 map does 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. Some examples are outlined here to give a sense of the scale and scope of private generation otherwise absent in many accounts of electrification.

C & J Clark's shoe factory in Street, Somerset was a typical case of an expanding industrial firm generating electricity first for lighting then powering machines, and later providing a supply to the town. The Royal Navy dockyard in Devonport was much larger with its own power station (3,400kW capacity in 1910) comparable in size to the local municipal stations in Devonport and Plymouth.<sup>14</sup> Retreating from Glasgow to the Bristol area in 1913, Carson's Ltd had to build a substantial power house for their new chocolate factory since the land near Mangotsfield was far from any public supply.<sup>15</sup> A decade later, however, when Fry's began consolidating manufacturing at Somerdale, well beyond the city boundary, the company was able to draw its electricity from the extended Corporation mains.

In Cornwall, Marconi's wireless telegraph station at Poldhu generated its own power from 1901. The Great Western Railway when modernising the transshipment of china clay at Fowey built a small power station at the harbour.<sup>16</sup> Advertisements in *Bradshaw's Railway Guide* of 1910 emphasized electric lighting as one of the amenities of a high-class modern hotel.<sup>17</sup> Isolated hotels such as King Arthur's Hotel at Tintagel and Tregarthen's Hotel, St Mary's in the Scilly Isles, featured electric lights as well as the scenic views. Other large institutions of a different type were also replacing lamps or gas with electric lighting. The Devon County Asylum at Exminster converted in 1896 and later institutions such as the Tone Valley Hospital near Taunton had generating facilities from the beginning. Throughout the region country houses, estates and larger farms added electricity as small oil and petrol generating sets became available from manufacturers such as Petters Ltd of Yeovil and R.A. Lister & Co, Dursley, Gloucs.

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<sup>14</sup> Ted Luscombe, "Centenary of Plymouth Electricity" *Histelec* S12, 1999.

<sup>15</sup> "A new chocolate factory building," *The Engineer*, vol 117, 1914, pp.35-39.

<sup>16</sup> *The Engineer*, vol 137, 1924, pp.195-196.

<sup>17</sup> *Bradshaw's April 1910 Railway Guide* (reprinted Newton Abbot: David & Charles, 1968), pp. 1007-1189. Includes hotel advertisements from Aberdeen to York.

Private generation gradually retreated in significance as public supply networks were extended and retail prices for power were reduced. One late private power station was built at Puriton (1939-41) as part of the Royal Ordnance Factory, Bridgewater.

### Electric Tramway Systems in South West England<sup>1</sup>

	<i>Years Operating</i>	<i>Route Miles</i>	<i>Max No of Cars</i>
<i>Bath Co.</i>	1904-1939	14.8	40
<i>Bristol Co.</i>	1895-1941	31.1	238
<i>Camborne &amp; Redruth Co.</i>	1902-1927	3.4	8
<i>Devonport &amp; District Co.</i>	1901-1915 <sup>2</sup>	9.2	33
<i>Exeter Corporation</i>	1904-1931	5.0	37
<i>Plymouth, Stonehouse &amp; Devonport Co.</i>	1901-1922 <sup>3</sup>	2.9	15
<i>Plymouth Corporation</i>	1899-1945	17.6	171
<i>Taunton Co.</i>	1901-1921	1.7	12
<i>Torquay Co.</i>	1907-1934	9.2	42
<i>Weston-Super-Mare Co.</i>	1902-1937	2.9	18

Ten electric tramway systems were opened between 1895 and 1917. Only the Exeter and Plymouth systems were owned and operated by local authorities. Two companies—Camborne & Redruth and Weston-super-Mare combined public electricity with the tramway operation.

The Bristol and Bath companies built generating stations, a loss of potential load for the municipal electricity systems. Bristol Tramways' power station at Counterslip was substantial and even as late as 1927/28 was generating more power (15.9 m kWh) than the public supply system of Torquay (14.6 m kWh).<sup>4</sup> The new Princes Rock power station of Plymouth Corporation, opened in 1899, was one of the earliest to combine generating for lighting and traction.<sup>5</sup> The Exeter tramway system accounted for 42 percent of the electricity sales in 1908-9. Tramway supply in 1925-26 as a proportion of total electricity sales varied from 42 percent in Plymouth to 21.5 percent in Exeter, 16.4 percent in Torquay and 10.2 percent in Weston-super-Mare.<sup>6</sup>

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

<sup>1</sup> Compiled from Keith Turner, *Directory of British Tramways*, Vol 1 (Stroud: Tempus Publishing, 2007).

<sup>2</sup> Acquired by the Plymouth Corporation following the amalgamation of local authorities in the Plymouth area 1914.

<sup>3</sup> As in note 2 above.

<sup>4</sup> Electricity Commissioners, *Generation of Electricity in Great Britain. Year ending 31<sup>st</sup> March 1928*. (London: HMSO, 1928)

<sup>5</sup> Institution of Mechanical Engineers, *Proceedings*, 1899, p.449.

<sup>6</sup> Electricity Commissioners, *Engineering and Financial Statistics 1925-26*.

## II State Intervention

Difficulties of interconnection, the differences in AC frequencies, and the need for coal conservation by the use of large-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. While the initial proposals for national restructuring were thwarted, the Electricity Commissioners managed to develop plans for more efficient and lower-cost generation and to encourage the expansion of service areas to supply small towns and rural areas.

Table 3 lists the statutory supply undertakings in 1925/26. The non-statutory undertakings noted earlier in Table 2 generally continued in existence until acquired by new supply companies or, as in the case of the old established Lynton and Lynmouth companies, were later “legitimized” by Special Order.<sup>18</sup>

In the local authority sector, Bristol had acquired the Keynsham company in 1921 and Torquay Corporation had bought out the Newton Abbot undertaking in 1922 and expanded the generating station there. Three new undertakings had been added to the list: Lyme Regis where the non-statutory company was taken over in 1923, Sidmouth (first supply in 1923) and Tiverton (1924).<sup>19</sup>

Several new companies were added in the 1920s, mostly serving a town and suburbs. These included Bideford and Teignmouth in 1922, Chudleigh and Yeovil in 1923, Seaton in 1924, Budleigh Salterton and Callington in 1925. The North Somerset company, renamed from the Clevedon & District, had also begun a gradual expansion of its service area southwest of Bristol.

The 42 undertakings in 1925/26 operated a variety of systems. DC was the most common, with 27 systems, and 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. The 15 undertakings with AC systems were further subdivided by different frequencies. Nine operated at 50 cycles (Hz) a frequency that had become a national standard after 1903. Bath and Bristol also had parts of the cities working at 100 Hz and 93 Hz respectively. Exeter’s system worked at 60 Hz and the Cornwall Electric Power Co. and related distributors had adopted 25 Hz in 1910. At this time, this was a popular frequency in South Wales, the Birmingham area and the Clyde Valley for traction and industrial power.

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<sup>18</sup> Although non-statutory undertakings were not listed in the *Engineering and Financial Statistics*, all new stations and extensions of existing stations required the consent of the Electricity Commissioners. The Electricity Special Order for Lynton and Lynmouth was dated 10 December 1928. The ESO had been made by the Electricity Commissioners on 7<sup>th</sup> September. It was later confirmed by the Minister of Transport and subsequently laid before each House of Parliament for at least 30 days. Electricity Commissioners *Annual Report* 1928-29, p.187 and *Annual Report* 1920-21, pp.29-30. The procedures for Special Orders were described in the *Annual Report* 1920-21, pp.29-30, fn.18, p.7.

<sup>19</sup> Tiverton had been granted an Electric Lighting Order as early as 1890 but no action had followed. An Electricity Special Order dated 6 March 1924 authorized the borough to establish an electricity system.

Table 3 SOUTH WEST ENGLAND: ELECTRICITY SUPPLY UNDERTAKINGS 1925/26

	COUNTY	SYSTEM	GENERATING CAPACITY kW	PER CAPITA CONSUMPTION kWh
<b>Local Authorities</b>				
<i>Barnstaple</i>	Devon	DC	1,050	46.3
<i>Bath</i>	Somerset	AC/DC	4,700	67.5
<i>Bristol</i>	Gloucester	AC/DC	35,390	149.5
<i>Exeter</i>	Devon	AC/DC	5,800	59.4
<i>Lyme Regis</i>	Dorset	DC	200	35.6
<i>Plymouth</i>	Devon	AC/DC	17,450	68.0
<i>Sidmouth</i>	Devon	DC	174	13.3
<i>Taunton</i>	Somerset	AC/DC	2,500	43.1
<i>Tiverton</i>	Devon	DC	152	5.8
<i>Torquay</i>	Devon	AC/DC	10,225	113.0
<b>Companies</b>				
<i>Bideford &amp; District</i>	Devon	AC	200	7.7
<i>Bridgwater &amp; District</i>	Somerset	DC	800	26.3
<i>Brixham Gas Co.</i>	Devon	DC	200	10.5
<i>Bude</i>	Cornwall	DC	236	61.5
<i>Budleigh Salterton</i>	Devon	DC	66	17.7
<i>Burnham &amp; District</i>	Somerset	DC	240	22.7
<i>Callington &amp; District</i>	Cornwall	DC	50	4.6
<i>Camborne</i>	Cornwall	AC	-. <sup>1</sup>	8.0
<i>Chudleigh</i>	Devon	DC	38	9.0
<i>Dartmouth<sup>a</sup></i>	Devon	DC	330	37.7
<i>Dawlish</i>	Devon	DC	200	37.1
<i>Exmouth<sup>b</sup></i>	Devon	DC	515	20.8
<i>Falmouth<sup>b</sup></i>	Cornwall	DC	502	18.3
<i>Frome<sup>c</sup></i>	Somerset	DC	725	132.4
<i>Holsworthy Gas &amp; Elect</i>	Devon	DC	45	31.8
<i>Ilfracombe</i>	Devon	DC	330	16.0
<i>Illogan<sup>a</sup></i>	Cornwall	AC	-. <sup>1</sup>	4.1
<i>Mid-Somerset</i>	Somerset	DC	-. <sup>2</sup>	30.9
<i>Minehead</i>	Somerset	AC/DC	438	64.8
<i>Newquay</i>	Cornwall	DC	295	49.4
<i>North Somerset</i>	Somerset	AC	-. <sup>3</sup>	10.7
<i>Paignton</i>	Devon	DC	-. <sup>4</sup>	48.2
<i>Penzance &amp; District</i>	Cornwall	AC	-. <sup>1</sup>	28.2
<i>Redruth<sup>a</sup></i>	Cornwall	AC	-. <sup>1</sup>	1.6
<i>Seaton &amp; District</i>	Devon	DC	80	9.7
<i>Teignmouth</i>	Devon	DC	190	10.9
<i>Totnes<sup>b</sup></i>	Devon	DC	164	16.0
<i>Weston-Super-Mare</i>	Somerset	AC/DC	3,500	48.2
<i>Yeovil</i>	Somerset	DC	160	7.3
<b>Power Company</b>				
<i>Cornwall Electric Power</i>	Cornwall	AC	9,700	..

## Notes:

<sup>a</sup> Urban Electric Supply Co.<sup>b</sup> Electric Supply Corporation<sup>c</sup> Edmundson's Electricity

## Notes:

1. Bulk supply from Cornwall Electric Power Co.

2. Supply from C &amp; J Clark, shoe manufacturers.

3. Bulk supply from Bristol Corporation.

4. Bulk supply from Torquay Corporation.

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

The data on generating capacity in Table 3 show that all but seven of the 42 undertakings generated their own electricity. Only nine undertakings had generating capacities of over 1,000 kW. Steam turbines were dominant in all the larger power stations and the units varied in size from one at 7,000 kW at Feeder Road, Bristol to a 150 kW machine in Frome.<sup>20</sup> A few places such as Barnstaple, Dartmouth and Ilfracombe were wholly served by reciprocating steam engines. Other types of generating technology included gas engines (important in Bideford, Bridgwater, Minehead and Tiverton) and diesel engines that were widely employed in small power stations.

Statistics on electricity consumption per head of population reveal major contrasts among electricity undertakings. Only three places, Bristol, Frome and Torquay, exceeded 100.0 kWh per person. Many smaller places such as Ilfracombe and Totnes, which had electric supply for 20 years, languished at 16.0 kWh per capita. Each place had a distinctive market profile reflecting the local economic and social geography. Exeter had a well-balanced profile, consisting of 48.2 percent in the lighting segment, 5.1 percent in public lighting, 21.5 percent in tramways and 25.2 percent in power. Tramways in Bath were operated by a private company with its own power station. Unlike Exeter, Bath had a large engineering works (Stothert & Pitt) which took a significant part of the Corporation's power supply. Two towns, Exmouth and Frome, had similar populations (around 10,000) but very different market profiles. Exmouth was dominated by lighting at 89.6 percent, while in Frome the power sector amounted to 88.0 percent. Annual per capita sales in Exmouth were only 20.8 kWh while per capita sales in Frome had reached 132.4 kWh.

Electrification and extension of supply areas were given a new impetus following the Weir Report (1925),<sup>21</sup> 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. Over the next decade almost all the empty areas of the map were covered by new or extended supply areas. The only unclaimed areas were a small area of Exmoor south of Lynmouth, an area northwest of Bridport, and a curious sliver of territory on the northern edge of Bath.

New local authority suppliers after 1925/26 were Bridport Borough (population 5,917 in 1931) and the Plympton St Mary Rural District Council (population 23,543). Both areas began service in 1929. Plympton St Mary was a fairly rare example of a Rural District Council becoming an electricity supplier. Some existing local authorities were also active in extending their supply area, the most notable being Bristol and Torquay. Bristol acquired the Almondsbury undertaking in 1929, extending into the Thornbury Rural District. Torquay, by the mid-1930s, had the largest area of any local authority supplier in the South West, covering the Newton Abbot, Totnes and Kingsbridge Rural Districts. The small Totnes undertaking was acquired in

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<sup>20</sup> The Frome machine dated from 1904 when the new generating station was one of the first to be equipped with turbines. R.A.S Hennessey, *The Electric Revolution* (Newcastle-upon-Tyne: Oriol Press, 1972) p.87. Bristol's first turbine set, a 1,000 kW unit, was installed in 1905. Peter G. Lamb, *Electricity in Bristol 1863-1948* (1981) p.17.

<sup>21</sup> Ministry of Transport, *Report of the Committee appointed to review the National Problem of the Supply of Electrical Energy* (London: HMSO, 1927), 39 pp.

1935. In 1948 the Torquay Corporation supply area covered 354 square miles, very much larger than the borough area of 9.7 sq mls.

In the company sector there were ten new formations and three former non-statutory undertakings that had become authorised. Apart from Salcombe Gas & Electric (service begun 1930) which was the last of the small area creations, the new organisations all covered virtually all the territory previously unclaimed. Several earlier undertakings were often incorporated into the new companies. The East Devon company, for example, acquired the Sidmouth UD, Budleigh Salterton and Exmouth company operations. The Exe Valley company incorporated several non-statutory businesses in Bampton, Dulverton and South Moulton, as well as the system built by Crediton UD.

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.<sup>22</sup> The South West England and South Wales Electricity Scheme was adopted by the CEB in June 1930, tenders were advertised, contracts made, and construction work began.

In the South West a simple 132kv transmission line was built across the region from Hayle to Bristol where there were connections to the Midlands and South Wales and eastwards to Oxford and London. Exeter was also a junction point with a line via Dorchester to Southampton (Figure 3). 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. Six power stations in the South West were on the selected list in 1934:

- Bath Corporation (connected to the grid at Melksham by a 33kv line).
- Bristol Corporation, Portishead (opened in 1929)
- Cornwall Electric Power Co., Hayle
- Exeter Corporation
- Plymouth Corporation
- Torquay Corporation (Newton Abbot)

Two other stations at Bristol (Feeder Road) and Taunton were added later as “special agreement stations”. Remaining power stations were expected to continue until they became too expensive to operate; Barnstaple and Weston-super-Mare lasted until 1958.

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<sup>22</sup> *Tenth Annual Report of the Electricity Commissioners 1929-1930* (London: HMSO, 1931), p.14.

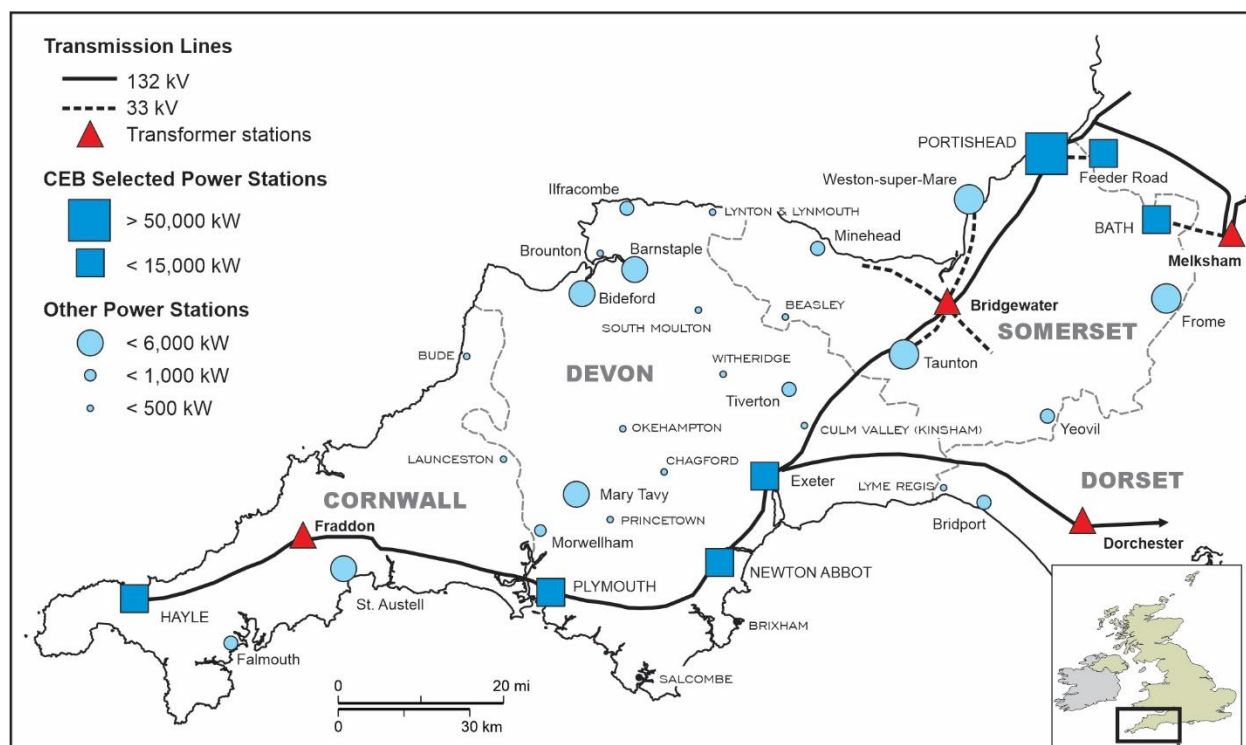


FIGURE 3 SOUTH WEST ENGLAND NATIONAL GRID 1935-36

All electricity distributors were expected to draw their grid supplies from the nearest power station substation. There were only two special substations in the South West. One at Fraddon, easily reached from Newquay, St Austell and Truro. The other at Bridgewater Main where the CEB also erected lower voltage lines (33kv) to Weston-super-Mare via Burnham, Langport (for North and South Somerset companies), Watchet (for Minehead) and Taunton.

The Grid Scheme plans of 1929/30 made no provision for supply to northwest Devon and this area was still self-sufficient in electricity generation in 1935/35. Whitehall Securities built its own 33kv line to Bideford from Exeter in the late 1930s. The West Devon company was one of the last undertakings in England to have to develop its own generating system. From 1931 the company built a series of diesel and hydroelectric stations to serve its very large area of 817 square miles. West Devon was finally connected to the Grid in July 1942 when the company built its own 33kv line to the Exeter substation from Okehampton.<sup>23</sup>

<sup>23</sup> F.E. Pitt, "Hydro-electric developments in West Devon", *Journal of the Institution of Electrical Engineers* Vol. 92(1), 1945, pp. 111-113. The paper also includes a very detailed map of the company's transmission system.

TABLE 4 SOUTH WEST ENGLAND: ELECTRICITY SUPPLY UNDERTAKINGS 1935/36

	County	System	Generating capacity kW	Per capita consumption kWh
<b>Local Authorities</b>				
<i>Barnstaple</i>	Devon	DC	1,340	116.4
<i>Bath</i>	Somerset	AC/DC	20,500	269.3
<i>Bridport</i>	Dorset	AC	936	100.2
<i>Bristol</i>	Gloucester	AC/DC	133,590	392.1
<i>Exeter</i>	Devon	AC/DC	15,350	219.1
<i>Lyme Regis</i>	Dorset	DC	200	103.4
<i>Plymouth</i>	Devon	AC/DC	34,850	189.5
<i>Plympton St Mary RDC</i>	Devon	AC	-	52.2
<i>Taunton</i>	Somerset	AC/DC	5,625	172.0
<i>Tiverton</i>	Devon	DC	558	48.0
<i>Torquay</i>	Devon	AC/DC	22,725	290.0
<b>Companies</b>				
<i>Bideford &amp; District</i>	Devon	AC	1,335	43.9
<i>Braunton</i>	Devon	DC	154	36.7
<i>Bridgwater &amp; District</i>	Somerset	AC/DC	-	44.9
<i>Brixham Gas Co.</i>	Devon	DC	440	35.4
<i>Bude</i>	Cornwall	AC/DC	470	99.2
<i>Burnham &amp; District</i>	Somerset	AC	-	187.0
<i>Callington &amp; District</i>	Cornwall	AC	-	91.1
<i>Camborne</i>	Cornwall	AC	-	35.5
<i>Chudleigh</i>	Devon	DC	-	64.3
<i>Culm Valley</i>	Devon	AC	18	43.8
<i>Dartmouth<sup>a</sup></i>	Devon	AC	-	66.1
<i>East Cornwall</i>	Cornwall	AC	-	15.6
<i>East Devon</i>	Devon	AC	-	90.7
<i>Falmouth<sup>b</sup></i>	Cornwall	DC	542	47.5
<i>Exe Valley</i>	Devon	AC/DC	539	25.8
<i>Holsworthy Gas &amp; Electric</i>	Devon	AC	-	115.8
<i>Ilfracombe</i>	Devon	AC/DC	856	45.2
<i>Illogan<sup>a</sup></i>	Cornwall	AC	-	16.4
<i>Liskeard Gas &amp; Electricity</i>	Cornwall	AC	-	68.5
<i>Lynnton &amp; Lynmouth</i>	Devon	AC	370	124.8
<i>Mid-Somerset</i>	Somerset	AC	-	112.6
<i>Minehead</i>	Somerset	AC/DC	835	86.1
<i>Newquay</i>	Cornwall	AC	-	156.4
<i>North Somerset</i>	Somerset	AC	-	112.8
<i>Paignton</i>	Devon	AC	-	145.7
<i>Penzance &amp; District</i>	Cornwall	AC	-	80.7
<i>Porlock &amp; District</i>	Somerset	AC	-	93.0

	<i>County</i>	<i>System</i>	<i>Generating capacity kW</i>	<i>Per capita consumption kWh</i>
<i>Redruth<sup>a</sup></i>	Cornwall	AC	-	53.8
<i>St Austell &amp; District</i>	Cornwall	AC/DC	1,189	62.0
<i>Salcombe Gas &amp; Electricity</i>	Devon	AC	104	42.0
<i>Seaton &amp; District</i>	Devon	AC	-	75.9
<i>South Somerset</i>	Somerset	AC	-	41.1
<i>Teignmouth</i>	Devon	AC	-	80.2
<i>Truro</i>	Cornwall	AC	-	65.7
<i>Wellington District</i>	Somerset	AC	-	55.7
<i>West Cornwall</i>	Cornwall	AC	-	33.0
<i>West Devon</i>	Devon	AC/DC	2,600	36.7
<i>Weston-super-Mare</i>	Somerset	AC/DC	3,200	145.2
<i>Yeovil</i>	Somerset	DC	795	93.8
<b><i>Power company</i></b>				
<i>Cornwall Electric Power Co.</i>	Cornwall	AC	26,600	

Notes:

<sup>a</sup> Urban Electric Supply Co.

<sup>b</sup> Electric Supply Corporation

Source: Electricity Commissioners, *Engineering and Financial Statistics 1935/36*.

When trading began on 1 January 1935, the grid had added a new layer to the complex of undertakings which operated the electricity supply system. The Bristol grid control office of the CEB 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 Plymouth, remained in the ownership and management of the Corporation but the daily operation was now directed from Bristol. Portishead, the largest power station, worked continuously to serve the regional base load. Other selected stations generally worked two shifts to cover the daily demand. Planning for the future became increasingly centralised, particularly from London.

Table 4 and Figure 3 show the situation in 1935/36 when 53 undertakings were in operation. Over the previous decade many changes had taken place. One significant shift was the decline in the number of wholly DC systems (from 27 to 9) while the AC systems increased from 7 to 30. The number of combined AC/DC systems also increased. Frequency standardisation at 50 Hz was almost complete by 1936, leaving only the isolated Lynton & Lynmouth Company operating at the old 100 Hz frequency. The cost of the conversion, mostly in Cornwall and Exeter, was one of the expenses of the national grid.

Interconnection between undertakings, which had been minimal in the early 1920s, was now normal practice in most places. The Electricity Commissioners, as part of their mandate for reorganising generation, had encouraged bulk supply agreements between neighbouring undertakings and small stations could be closed. Such agreements would be a benefit for the

later grid system, reducing the number of transformer stations. Torquay Corporation made its first agreement, with Paignton, in 1925. Further agreements followed with other companies in Teignmouth (1926-27), Salcombe (1930-31), Dartmouth (1930-31), Totnes (1933-34) and finally Brixham (1935-36).<sup>24</sup> The Teignmouth company made similar agreements with its neighbours in Dawlish (1931-32) and Chudleigh (1934-35). As a result of these arrangements, many smaller systems were linked up with the Newton Abbot power station. By 1935-36 only 13 undertakings generated all their electricity requirements. Five were local authorities--Barnstaple, Bridport, Lyme Regis, Taunton and Tiverton. The eight companies were Bideford, Brixham, Ilfracombe, Launceston, Lynton & Lynmouth, St Austell, West Devon and Weston-super-Mare. Isolation from the grid explains why some undertakings such as Barnstaple and Bideford were wholly independent. For places such as Taunton and Weston-super-Mare, the grid connection was still being built.<sup>25</sup>

Generating technology emphasized economies of scale with larger units. Portishead power station, opened in 1929, had two 20,000 kW and one 50,000 kW generators at this time. Such machines and the larger boilers were much more economical in coal consumption. By 1936 coal consumption at Portishead was 1.09 lb per kWh generated compared with 2.4 lbs at the older Feeder Road station. Such changes in efficiency contributed to reducing the cost of electricity. Diesel power from smaller stations continued to grow and water power reappeared as new stations were built at Mary Tavey and Morwellham.

Rationalisation of generation and interconnections of undertakings contributed to reducing the cost of electricity. Other factors such as the growth of radio broadcasting and lower prices for small appliances helped to boost electricity consumption. By 1937/38 there were 17 places with per capita consumption above 100 kWh, ranging from Bristol at 392.1 kWh to Bridport and Lyme Regis at 100.2 kWh. Places with little industrial demand still tended to lag behind.

The growth of electrification, especially in the lighting segment, may be illustrated by the case of Exeter. Total electricity sales grew from 3.86 million kWh in 1925/26 to 17.40 m kWh a decade later. The lighting segment which included domestic users expanded from 1.86 m kWh to 13.30 m kWh over the same period. There was a corresponding increase in the number of consumers. Over the decade per capita consumption in Exeter rose from 59.4 kWh to 219.1 kWh.<sup>26</sup>

While the creation of new areas appeared to be making an even more fragmented map, much of the new development was controlled by holding companies which provided a new form of integration. Figure 4 and Table 5 show the situation in 1937 when three organisations had a dominant position.

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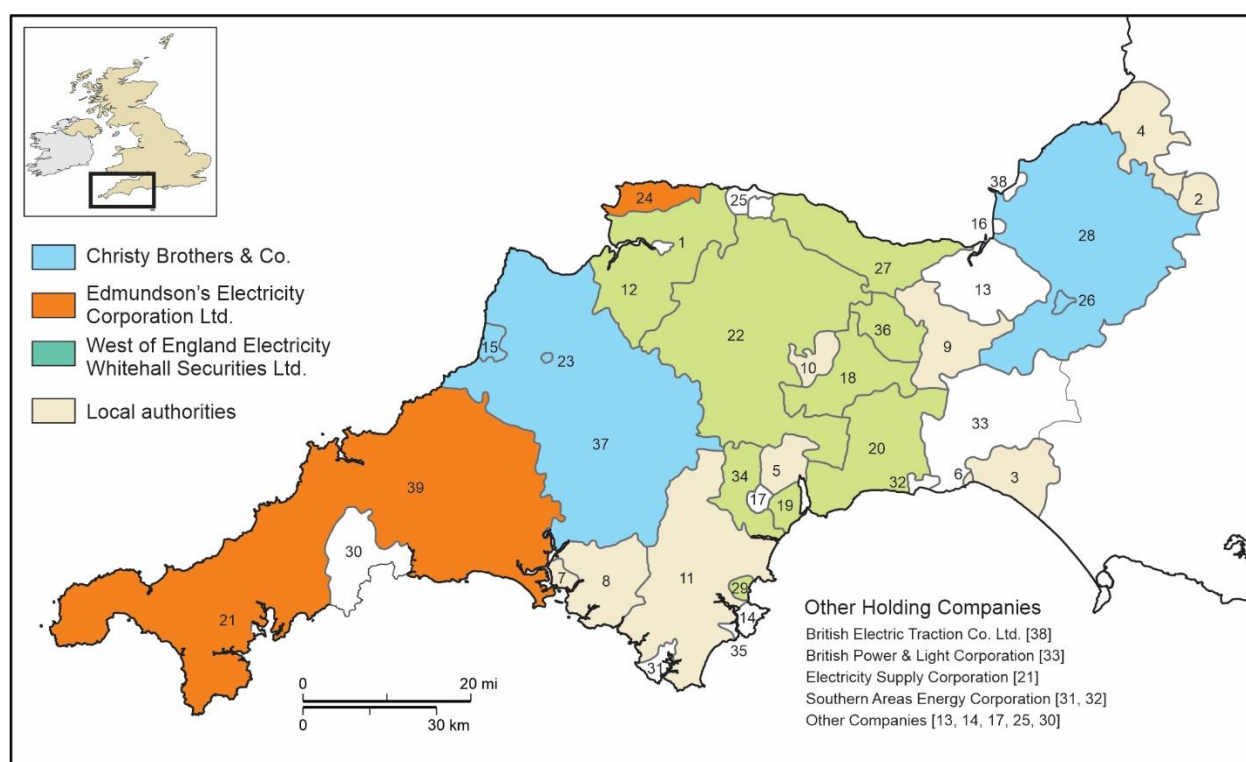
<sup>24</sup> The dates are taken from the Electricity Commissioners *Annual Reports*.

<sup>25</sup> The 33 kV line from Bridgwater Main transformer to Taunton station was completed late in 1936. See Gledhill and Lamb, *Electricity in Taunton 1889-1948* p.1

<sup>26</sup> The data are derived from the *Engineering and Financial Statistics* 1935-36.

Edmundson's Electricity Corporation had, in the late 1920s, been revived by US capital and began new acquisitions. By 1935 the company was the second largest in Britain. In the southwest, the Cornwall Electric Power Co. acquired all but two of the small distribution companies established in the previous decades in its territory.<sup>27</sup> The Frome and Yeovil undertakings were transferred to Wessex Electricity, a large Edmundson's operation created in 1927.

Christy Brothers' subsidiary, the North Somerset company, had expanded southwards and acquired several local undertakings.<sup>28</sup> The company also established the West Devon operation which acquired a large territory and built up a self-contained system based on hydro-electric stations from 1930.



**FIGURE 4 SOUTH WESTERN ELECTRICITY AND HOLDING COMPANIES C. 1937**

<sup>27</sup> Eric Edmonds, "Electricity in Cornwall" Pt 2, *Histelec* article No S23. Edmonds note the major consolidation of all the Edmundson's subsidiaries after the Cornwall Electric Power Act 1936.

<sup>28</sup> Peter Lamb & Eric Lodge, "Christy Brothers in the South West", *Histelec* article No S15.

**TABLE 5 SOUTH WESTERN ELECTRICITY BOARD AREA: CORPORATE STRUCTURE OF ELECTRICITY HOLDING COMPANIES C 1937**

<i>Edmundson's Electricity Corporation Ltd</i>	Cornwall Electric Power Ilfracombe Urban Electric Supply (Dartmouth)
<i>Christy Brothers &amp; Co. (Chelmsford)</i>	Bude Burnham Holsworthy Mid-Somerset North Somerset West Devon
<i>Whitehall Securities Ltd (West of England Electricity)</i>	Bideford Culm Valley Dawlish East Devon Exe Valley Minehead Paignton Teignmouth Wellington
<i>Southern Areas Electric Corporation Ltd</i>	Salcombe Seaton
<i>British Power &amp; Light Corporation</i>	South Somerset
<i>British Electric Traction Co. Ltd</i>	<b>WESTON-SUPER-MARE</b>
<i>Electricity Supply Corporation</i>	<b>FALMOUTH</b>
<i>Other Companies</i>	Bridgwater Brixham Chudleigh Lynton & Lynmouth St Austell

Whitehall Securities Ltd was a new entrant from 1928 acquiring existing undertakings and developing new franchises from its base in Exeter. Outside capital backing was essential for the development of new supply mains across its extensive territory. The various companies operated under the title of West of England Electricity.<sup>29</sup>

Other new corporate entities included the Southern Area Electricity Corporation Ltd (Salcombe & Seaton) and British Power & Light Corporation which held the franchise for South Somerset.

Seven company areas remained outside the larger national groups. St Austell and Bridgwater covered fairly extensive territories, while Brixham, Chudleigh, Lynton & Lynmouth, Falmouth (Electric Supply Corporation) and Weston-super-Mare (British Electric Traction) were only small enclaves.

<sup>29</sup> Selwyn Grant, "West of England Electricity", *Histelec* article No S26.

Although state intervention had begun to rationalise electricity generation, the efforts of the Electricity Commissioners to reduce the very large numbers of distributors were unsuccessful. The McGowan Report published in May 1936 and the subsequent government proposals were strongly opposed by many sections of the electricity supply industry.<sup>30</sup> A recommendation in the McGowan Report that all undertakings with sales of less than 10 million kWh should be amalgamated, was particularly controversial. In the South West, only seven of the 53 undertakings were above this limit. The seven included Bath, Bristol, Exeter, Plymouth, Torquay, the North Somerset Co. and Cornwall Electric Power Co. The government responded with an Outline of Proposals in April 1937 but the continued opposition and more pressing issues of the time meant that reorganisation of distribution was set aside.<sup>31</sup>

Edmundson's Electricity Corporation took note of these moves toward amalgamation and reduced the number of small subsidiaries in Cornwall and Wessex company territories. The spatial organisation of 1937 (Figure 4) remained essentially unchanged until nationalisation a decade later.

Table 6 lists the various undertakings that were consolidated between 1914 and 1948. Only three of the 24 were local authorities. Devonport was part of the Plymouth area local government unification. Sidmouth and Crediton UD both merged with local companies.

Between 1935-46 and 1948 a few small power stations were closed. These included Lyme Regis, Tiverton, Braunton, Witheridge (Exe Valley Co.) Launceston, St Austell, Salcombe and Princetown (West Devon Co.) Taunton power station, closed in 1937, was later recommissioned in 1948 and worked until 1957.<sup>32</sup>

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<sup>30</sup> 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.

<sup>31</sup> Ministry of Transport, *Electricity Distribution: Outline of Proposals* (London: HMSO, 1937).

<sup>32</sup> Gledhill and Lamb, *Electricity in Taunton*, pp.21/26. Central Electricity Authority, *Annual Report 1957-58*, p.24.

TABLE 6 SOUTH WESTERN ENGLAND CONSOLIDATION OF ELECTRICITY SUPPLY BEFORE 1948

<i>Undertaking</i>	<i>Years in Operation</i>	<i>New Owner</i>
<i>Devonport CB</i>	1902-1914	Plymouth
<i>Keynsham Co.</i>	1889-1921	Bristol
<i>Newton Abbot Co.</i>	1902-1922	Torquay
<i>Topsham Co.</i>	1904-1924	Exeter
<i>Budleigh Salterton Co.</i>	1904-1924	East Devon Co.
<i>Exmouth Co.</i>	1905-1930	East Devon Co.
<i>Sidmouth UD</i>	1923-1930	East Devon Co.
<i>Crediton UD</i>	1927-1932	Exe Valley Co.
<i>Totnes Co.</i>	1904-1935	Torquay
<i>Frome Co.</i>	1904-1935	Wessex Electricity <sup>1</sup>
<i>Callington Co.</i>	1925-1936	Cornwall Electric Power Co. <sup>2</sup>
<i>Camborne Co.</i>	1902-1936	Cornwall Electric Power Co.
<i>East Cornwall Co.</i>	1930?-1936	Cornwall Electric Power Co.
<i>Illogan Co.</i>	1903-1936	Cornwall Electric Power Co.
<i>Launceston &amp; District Co.</i>	1912-1936	Cornwall Electric Power Co.
<i>Liskeard Gas &amp; Electric Co.</i>	1929-1936	Cornwall Electric Power Co.
<i>Newquay Co.</i>	1906-1936	Cornwall Electric Power Co.
<i>Penzance Co..</i>	1911?-1936	Cornwall Electric Power Co.
<i>Redruth Co.</i>	1902-1936	Cornwall Electric Power Co.
<i>Truro Co.</i>	1926?-1936	Cornwall Electric Power Co.
<i>West Cornwall Co.</i>	1928?-1936	Cornwall Electric Power Co.
<i>Braunton E L &amp; P Co.</i> <sup>3</sup>	1909-1936	Bideford Co.
<i>Porlock &amp; District Co.</i> <sup>4</sup>	1911-1937	Minehead Co.
<i>Yeovil Co.</i>	1923-1937	Wessex Electricity <sup>1</sup>

## Notes:

1. Wessex Electricity Ltd became part of the Southern Electricity Board in 1948.
2. Details from E. Edmonds, "Electricity in Cornwall part 2", *Histelec Supplement* S23 (2003). [wpehs.org.uk](http://wpehs.org.uk)
3. Braunton E L & P Co. was a Non-Statutory undertaking until 1929.
4. Porlock & District was a Non-Statutory undertaking until 1927.

### III Nationalisation

After three decades of discussion the whole organisation of electricity was restructured following the Electricity Act 1947. From 1 April 1948, the South Western Electricity Board took over the distribution assets of eleven local authorities and 28 companies (Figure 1). The generating stations and the transmission lines of the Central Electricity Board were transferred to the British Electricity Authority.



FIGURE 5 THE SOUTH WESTERN ELECTRICITY BOARD. SOURCE: Electricity Supply Handbook 1958, after p.215

#### Electricity Distribution

The SWEB was responsible for integrating the 39 undertakings. An early scheme was the extension of the 33kV distribution network.<sup>33</sup> Systems had to be standardised and the multiplicity of tariffs reduced. For administrative purposes, the Board area was subdivided five sub-areas and 22 districts.<sup>34</sup> Initially the districts tended to reflect the pre-nationalisation

<sup>33</sup> The SWEB *First Annual Report* 1948-49 includes a map of main distribution lines (Appendix C).

<sup>34</sup> Map of administrative areas, Appendix B in *First Annual Report*. For details of administrative organisation: see Peter Lamb, "SWEB Chronology, 1948-1990," *Histelec* 528, 2004, and Peter Lamb. "SWEB Central Accounting Office (CAO)," *Histelec* 54, 2013. This paper documents the centralisation of accounting in Plymouth.

company and municipal areas. The SWEB area was extended to the Scilly Isles in 1958 when the small St Mary's undertaking was transferred to the Board by the CEGB.<sup>35</sup>

Figure 5 shows the geographical organisation in 1957 when there were four sub-areas and 19 districts. One notable feature is the network of 113 service centres where consumers could pay their bills and purchase appliances. These service centres were an important and profitable part of the Board's business.<sup>36</sup>

The SWEB's first decade of operation coincided with a major phase of growth in demand in all segments of the market. Between 1948/9 and 1958/9 the number of consumers rose from 531,000 to 754,000 and sales increased from 1,173 m kWh to 2,966 m kWh.

### **Electricity Generation and Transmission**

The South Western Division of the British Electricity Authority covered the area of the SWEB together with part of Gloucestershire. It was an amalgamation of the 132 kv transmission system developed by the Central Electricity Board and the power stations previously owned by companies and local authorities. 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 shows the 27 power stations in the new organisation. They varied in size from large turbine-powered stations at the top to small diesel-engined and hydro units at the lower end of the table. A comparison with Table 4 shows that most of the growth in capacity after 1935/36 had been concentrated at four selected stations—Portishead, Plymouth, Newton Abbot and Hayle. One new station at Castle Meads, Gloucester had been built in 1942 to cope with wartime demand.

Within a decade, most of the objectives planned in the late 1940s had been fulfilled. Except for the hydro stations at Mary Tavey, Morewellham and Chagford, all the small stations had been shut down. One existing station, at Hayle, had been extended in 1948 and 1959 and three new stations at East Yelland (1953-58), Plymouth B (1952-1960), and Portishead B (1955-59) had been completed. These would be the last conventional steam stations in the South West. By the time the last 60,000 kW turbine unit had been installed at Plymouth, much larger units were in service at new stations in the coalfield area of the East Midlands.<sup>37</sup> Between 1948/9 and 1958/9 the number of power stations in the South West had been reduced from 27 to 13 while the generating capacity had been doubled (Table 8).

Some changes were also made to the 152 kv transmission grid. A new line connected East Yelland power station to the 1930s grid at Fraddon and near Taunton. Additional supply points to the SWEB were constructed at Axminster, Churchill (for North Somerset), Lockleaze (North Bristol) and Ryeford (Stroud).

<sup>35</sup> Central Electricity Generating Board, *Annual Report 1958-9*, p.10.

<sup>36</sup> David Cousins and Peter Lamb, "SWEB's commercial success," *Histelec* S61, 2015.

<sup>37</sup> Castle Donington had 100,000 kW units from 1956 and the first 200,000 kW turbine was installed at High Marnham in 1959.

TABLE 7 BRITISH ELECTRICITY AUTHORITY POWER STATIONS IN THE SOUTH WESTERN DIVISION 1948/49

<i>Power Station</i>	<i>Capacity kW</i>	<i>Type<sup>1</sup></i>
<i>Portishead A</i>	248,159	S
<i>Plymouth A</i>	65,700	S
<i>Newton Abbot</i>	51,825	S
<i>Hayle</i>	47,800	S
<i>Castle Meads (Gloucester)</i>	40,075	S
<i>Feeder Road (Bristol)</i>	31,778	S
<i>Bath</i>	20,000	S
<i>Exeter</i>	13,500	S
<i>Mary Tavey<sup>2</sup></i>	3,892	H, I
<i>Taunton</i>	3,000	S
<i>Weston-Super-Mare</i>	2,600	S
<i>Barnstaple</i>	2,120	I
<i>Bideford</i>	1,135	I
<i>St Austell (Ponts Mill)</i>	1,057	I
<i>Bridport</i>	936	I
<i>Minehead</i>	765	I
<i>Ilfracombe</i>	706	I
<i>Morwellham<sup>2</sup></i>	700	H
<i>Lynmouth</i>	512	I, H
<i>Bude</i>	460	I
<i>Brixham</i>	340	I
<i>South Moulton<sup>3</sup></i>	285	I, H
<i>Falmouth</i>	240	I
<i>Okehampton<sup>2</sup></i>	175	I
<i>Beasley<sup>3</sup></i>	66	I, H
<i>Kensham<sup>4</sup></i>	32	H
<i>Chagford<sup>2</sup></i>	26	H

## Notes:

1. S – Steam; H – Hydro-electric, I – Internal combustion (largely diesel).

2. Ex West Devon Co.

3. Ex Exe Valley Co.

4. Ex Culm Valley Co.

Source: Compiled from BEA, *Annual Report 1948-49*, Appendix 15.

By the late 1950s some results of new expansion plans for the grid and generating capacity were beginning to show in the landscape. Since the existing national transmission grid was limited in capacity, especially for interregional transfers of power, a new Supergrid at 275 kv was being developed. A line from Melksham to Pyle in South Wales was under construction in 1959 and the tall towers for the Severn crossing at Aust and Benchley Point had been completed. Another 275 kv line from Melksham to Exeter was in the planning stages. New generating technology in the form of nuclear reactors was being introduced, with new power

stations at Berkeley and Hinkley Point. These were approved in 1957 and construction was underway. Berkeley opened in 1962 and Hinkley Point in 1965.

**TABLE 8 CENTRAL ELECTRICITY GENERATING BOARD POWER STATIONS IN THE SOUTH WESTERN DIVISION 1958/59**

<i>Power Station</i>	<i>Capacity kW</i>	<i>Type<sup>1</sup></i>
<i>Portishead B</i>	325,000 <sup>2</sup>	S
<i>Portishead A</i>	248,159	S
<i>East Yelland</i>	186,225	S
<i>Plymouth B</i>	99,000 <sup>3</sup>	S
<i>Hayle</i>	87,800	S
<i>Plymouth A</i>	65,700	S
<i>Newton Abbot</i>	51,825	S
<i>Castle Meads (Gloucester)</i>	40,075	S
<i>Bath</i>	20,000	S
<i>Exeter</i>	12,000	S
<i>Mary Tavey<sup>2</sup></i>	3,988	H, I
<i>Morwellham<sup>2</sup></i>	700	H
<i>Chagford<sup>2</sup></i>	26	H

Notes:

1. S – Steam; H – Hydro-electric, I – Internal combustion (largely diesel).
2. Extended by one 60,000 kW unit in 1959/60.
3. Extended by two 60,000 kW units in 1959/60.

Source: Compiled from CEGB, *Annual Report 1958-59*, Appendix 1.

From January 1958, when the Central Electricity Generating Board took over from the Central Electricity Authority, there were changes in the administrative structure. A new South Western Region was established incorporating the Southern, South Western and South Wales Divisions. Under the new arrangements the regional director became responsible for the higher-order planning and administration of 43 power stations, 1,768 miles of transmission lines and 8,979 employees. The divisions were retained for a few years before operational management became more centralised. Design work was transferred to new project groups. Bristol retained its position in the new administrative system with new offices added to the existing complex of buildings and the 1930s Grid House in Oldfield Road, Clifton.

## Summary

Table 9 shows various indicators of the growth of electrification from 1900. The six undertakings in that year were all local authorities. All the companies then were non-statutory, illustrating the importance of that type of organisation in the earlier phases of development. Three of the six municipal systems in Bath, Exeter and Taunton had also begun as non-statutory organizations. The number of undertakings grew rapidly from 1900 to 1912 and continued to a peak in the mid-1930s when consolidation began. Power station numbers show a similar pattern but peaked in 1925-26 when bulk supply agreements resulted in the closure of small generating stations. Rationalisation increased sharply after 1948-49.

**TABLE 9 SUMMARY OF DEVELOPMENT IN THE SOUTH WEST**

	<i>Number of Undertakings<sup>1</sup></i>	<i>Local Authority Undertakings</i>	<i>Number of Power Stations</i>	<i>Generating Capacity (kW)</i>	<i>Per Capita Consumption (kWh)</i>
1900	6	6	6	..	.. (4) <sup>3</sup>
1912	30	8	28	..	.. (36)
1925/6	42	10	37	97,311	69 (133)
1935/6	53	11	35	276,101	190 (374)
1948/9	..	..	27	537,875 <sup>2</sup>	543 (821)
1958/9	-	..	13	1,140,489 <sup>2</sup>	1,321 (1,765) <sup>4</sup>

Notes:

1. Excludes all non-statutory undertakings.
2. Includes Castle Meads, Gloucester power station.
3. 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.
4. Calculated from data in Electricity Council, *Handbook of Electricity Supply Statistics 1977*, p. 63 and census returns.

Sources: Tables 2-4.

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. The largest station in 1925-26, Feeder Road, Bristol had an installed capacity of 35,390 kW. A decade later the new Portishead station had 92,900 kW. By 1948-49 further extensions had raised the capacity to 24,150 kW. The new Portishead B station had a capacity of 325,000 kW in 1958-59.

Per capita consumption in the South West (with Great Britain in parentheses) shows substantial rates of growth. Without large power-consuming industries, however, the region always lagged below national levels. Bristol (149 kWh in 1925-26 and 392 in 1935-36) was one of the few places above the national average.

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 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 also 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 (1<sup>st</sup>, 1920-21 – 23<sup>rd</sup>, 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.<sup>38</sup> They were, however, Non-Parliamentary Publications of HMSO and consequently were not always acquired by libraries at the time.

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<sup>38</sup> See *Annual catalogues of British government publications 1920-1970* (Bishop's Stortford: Chadwyck-Healey. 1974).

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.

Another source of local detail for the interwar period are planning reports prepared for local authority districts. There are two notable examples for Somerset: ***The Bristol and Bath Regional Planning Scheme*** (University of Liverpool Press/Hodder & Stoughton, 1930) and ***Somerset Regional Report: A survey and a plan*** (University of London Press, 1934). Both studies have beautifully coloured maps of the electricity supply areas in very fine detail.

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 (1948-1949), Central Electricity Authority (1955-57)<sup>39</sup> 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 South Western Electricity Board annual reports and accounts were also published as House of Commons sessional papers until 1971-72. A detailed chronology of the SWEB activities by Peter Lamb (***Histelec*** Supplement 28) is a useful guide to the contents of the annual reports.

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.

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.

Before privatization of the electricity supply industry in 1990, the area boards had retained most of the basic records of the pre-1948 undertakings. Since that time such archival materials have been dispersed or in some cases lost.

Two collections have materials relevant to electrification in South West England:

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<sup>39</sup> The change of title resulted from the formation of the autonomous South of Scotland Electricity Board from 1 April 1955.

In Manchester, the Museum of Science and Industry has the records of the former Electricity Council. These include reports of the Electricity Commissioners, the Central Electricity Board, all of the organisations after 1948, as well as a set of Garcke's **Manual**.

In Bristol, the Western Power Electricity Historical Society has a museum and extensive archival collection. The Society began in 1994 when employees of the former SWEB began salvaging records of all the former undertakings in the region. A set of Garcke's **Manual** is a valuable part of the collection for research beyond the South West. The Society has been very active in publishing articles of wide interest and has a particularly effective and comprehensive website at [www.wpehs.org.uk](http://www.wpehs.org.uk)



#### EAST YELLAND POWER STATION

*An early postwar station connected to the grid by a network of transmission lines. First 30,000kW turbine commissioned in 1953. Well located in relation to cooling water and coal supplies by collier or railway.*

*Ordnance Survey, 1:25,000 Map series. Sheet SS 43, 1961 (National Library of Scotland)*