~ *Preface* ~

The developments and achievements of South Australia's constantly changing electricity industry are often not obvious to the wider community. Yet the gradual spread of poles, wires and towers – from Adelaide's central business district to the remotest borders of this State – are part of a fascinating and often tumultuous history, which spans just over 100 years.

Indeed, this very obvious infrastructure is a constant reminder of the electricity industry's remarkable evolution, which has significantly supported the growth of this State's economy – particularly in rural South Australia.

My own career with ETSA and its subsequent "daughter" organisations spans some thirty years across the areas of generation, distribution and transmission. It has been a privilege to have been a part of some of the exciting and sometimes dramatic events that have unfolded during the continual development of South Australia's electricity industry.

The many employees of the Adelaide Electric Supply Company (AESCo) and its descendant organisations (the Electricity Trust, ETSA – and now ElectraNet SA – for the transmission activity) have cultivated a strong internal community environment, which has endured the challenges of rapid expansion and major restructuring. To have experienced the atmosphere of true camaraderie, highlighted time and time again within the pages of ElectraNet SA's founding history, is a heart-warming reflection. This atmosphere of goodwill and motivation is still powerfully evident within ElectraNet SA's highly skilled and dedicated personnel.

So as history repeats itself yet again in its eternal cycle, ElectraNet SA is now poised on the edge of a new and challenging era. The business is fully prepared and technologically advanced to successfully meet any challenges brought its way, as it moves from Government ownership into the private sector.

When an organisation aims to achieve a benchmark in leading edge

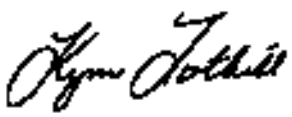
Kym Tothill
ElectraNet SA

technology and performance, however, it is easy to lose sight of important business origins and traditionally embraced ideals and values.

Pathways for Power – the Story of ElectraNet SA – is meant as a small legacy to South Australia: to those who built, maintained and operated the transmission system in South Australia; to those involved in the evolution of the National Electricity Market; and to our new owner. It provides a brief history which concentrates on the evolution of the high voltage transmission system and the associated power system Control Centre within South Australia.

My special thanks go to those past and current employees, quoted throughout the text, and the many others who have offered their memories and assistance. The time spared in their busy schedules, to assist in the assembly of this brief historical account, has certainly been appreciated. In addition, my sincere appreciation to Rachael Tomlins who has successfully and enthusiastically offered her time to co-ordinate the involvement of all these contributors.

I trust you will enjoy the tales woven within – a story that, even now, continues to unfold.



Kym Tothill
Chief Executive

~ *Contents* ~

Preface 5

Chapter One 9
At the Beginning: 1897–1946

Chapter Two 29
Unbounded Growth:1946–1986

Chapter Three 57
Change Upon Change: 1986–1996

Chapter Four 77
Into the Future: 1996–2000

Endnotes 91

Select Bibliography 97

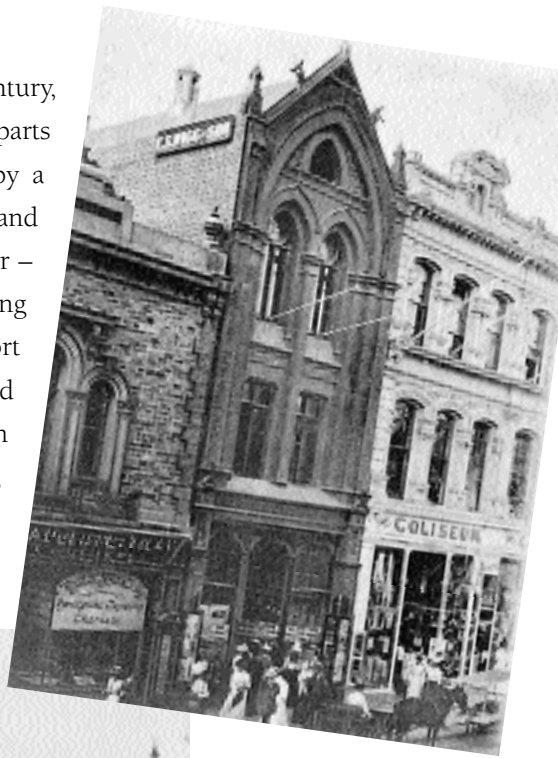
Index 101

ElectraNet SA's 275kV steel latticework transmission tower in the foreground of Northern Power Station
ElectraNet SA

~ *At the Beginning* ~
1897–1946

First Steps

Throughout the last decades of the nineteenth century, many South Australians – along with their counterparts throughout the western world – were gripped by a fascination with electricity. A subject of conjecture and debate, that vital spark – electrical light and power – was considered, by many, as the way of an exciting future, and its use received its fair share of support from enthusiasts, as well as opposition from vested interests.[1] First promoted by private enterprise in South Australia, with assistance from the Colonial, then later the State, Government, the establishment of a viable electrical generation and



Adelaide, South Australia, in the late nineteenth century – a bustling city whose inhabitants were fascinated by the experimentation with electricity. At the stage that these photographs of Victoria Square and Rundle Street were taken, telegraphic cables are evident, but street lighting was still fuelled by gas
Historical Consultants Collection

distribution company took many years to achieve. However, long before electrical supply became a reality in South Australia, a vast amount of scientific research in Europe and North America had gone into its development.

The discovery and utilisation of electrical energy had proceeded in earnest during the entire nineteenth century. As one learned contemporary noted, 'the fundamental laws of attraction and repulsion between electrified bodies' had been the substance of significant research and initiative among some of the best scientists of the time.[2] Discoveries flowed from these investigations and the basic means of generating electricity was established. The work of Volta, Cavendish, Joule, Faraday, Kelvin, Maxwell and a host of other scientists provided a cumulative rush to achieve a practical use of this new electrical energy. As early as 1810, Sir Humphry Davy, for example, applied electrical current to produce light for the first time. When generators were developed that could produce electrical current for use on a practical scale, there was a rush towards the creation of companies or utilities for the generation and transmission of this newly unleashed energy. By the late 1870s–early 1880s, the invention of simple and effective arc and incandescent lamps made electricity a major competitor to gas for the lighting of the major cities of the western world.[3] Certainly at that time, English politicians and North American entrepreneurs were already planning the installation of major public electricity supply systems in their nations. In February 1882, Brighton (England) saw the introduction of the first permanent public electricity supply. This move was followed shortly after, by the installation of a central power generating station in New York.[4] Australians, and particularly South Australians, were following close behind their northern hemisphere counterparts in rapidly adopting this exciting new technology.

The system of transmitting energy from the generators to the customer was based on the methods established for carrying telegraphy (telephone) signals that were already developed in the 1830s and 1840s. Both overhead and underground electricity supply lines made either of zinc-coated iron wire, or of copper wire coated with rubber, were

developed specifically for this purpose. Underground wires were additionally sleeved within cast-iron piping, to provide protection for the cables.[5] By such methods, it was envisaged that it might be possible to light the streets of all of Adelaide and its suburbs, and then even to transmit electrical power to thousands of private homes. For those who believed in the essential usefulness of electricity, and its apparent superiority to other forms of energy, it was the only way forward.

However, in South Australia at the end of the nineteenth century, mainly due to the uncertainty about what such a new enterprise would bring in its wake, there were suddenly many legal and social hurdles to overcome. Not the least of these obstacles was a lively debate about the ownership and control of the mode of transmission of electricity. As one member of Parliament of that time indicated, the cables and wires that transmitted the power were, to him, the primary issue. 'Control of the wires', said this politician, 'was a matter of the greatest concern'.[6]

Finally, in December 1897, the debates and the arguments over the right to form a privately owned electricity supply company were finally resolved and the South Australian Parliament passed a Bill to achieve that end – although at that stage, the company could only generate and transmit power in the Port Adelaide area.[7]

So it was that in early 1898, the South Australian Electric Light and Motive Power Company built a small temporary powerhouse in a stable, adjacent to the store of William Marston, at the corner of St Vincent and Lipson Streets in Port Adelaide.[8] These operations were managed by Henry Phipps Onslow, later to become the Mains Superintendent for the future Adelaide Electric Supply Company Ltd (AESCo). Onslow, too, was the uncle of Sir Thomas Playford – South Australian Premier from 1938 to 1965 – the man who was later to single-handedly revolutionise South Australia's electricity supply.

Within this temporary powerhouse were three Galloway boilers, two 25KW and two 50KW Alley and McLellan high speed/single action/non-condensing steam engines, which were joined with Johnson and Phillips Direct Current (DC) generators to produce electricity.[9] For

Top Left: The Nile Street powerhouse, Port Adelaide – the first step in pioneering commercial investment in South Australia's electricity supply
ElectraNet SA

Top Right: F.W.H. Wheadon, an engineer with much experience in Great Britain, who became the driving force for South Australia's electricity business in the early twentieth century
ElectraNet SA

some months, the reliability of that supply was hampered by the inefficiency of the generating equipment and the poor quality of the underground cables transmitting the power. Henry Onslow noted that the contract work for the cabling had been 'pretty badly bungled' and wrote of the single, lead-sheathed, steel-armoured cable that was laid straight into swampy silt and, as a consequence, leaked in every joint.[10] Nonetheless it was an important beginning.[11]

Even at this point, South Australia's electricity supply business had brought together a formidable team of young, dedicated enthusiasts. These included J. Leask, A.L. Pank, E. Joyner, R. Edwards, W. Russell, J. Turner, B. Coleman and S. Newberry, all of whom were to continue to work for the future AESCo. While their enthusiasm drove the fledgling enterprise, it was the arrival, in July 1899, of F.W.H. ('Freddie') Wheadon – a young British engineer – as the operation's Chief Engineer, that dramatically pushed the electricity business forward in South Australia.

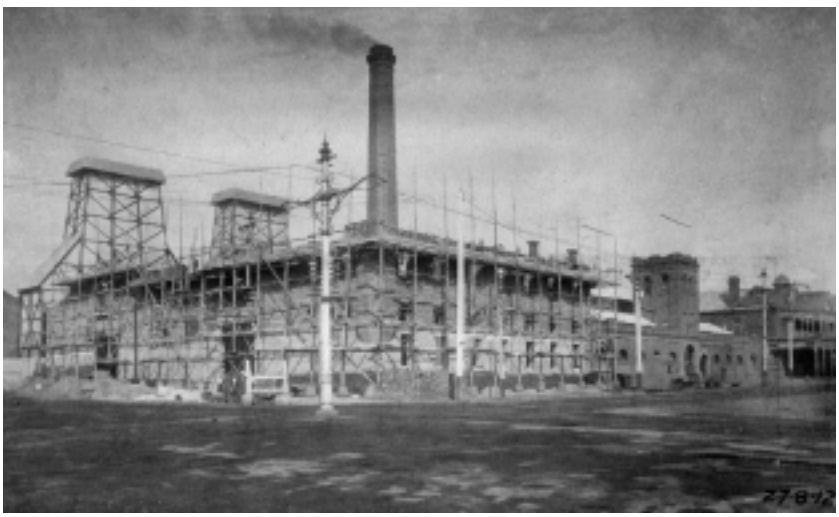
Electricity comes to the City of Adelaide

Wheadon's expertise and influence had almost instant effect. The Port Adelaide operation of the South Australian Electric Light and Motive Power Company took on a different, positive aspect. More importantly,

Wheadon's connections with British investors in electrical companies resulted in the purchase of the fledgling South Australian electricity business by the English Brush Electrical Engineering Company Ltd, during September 1899. Within a very short time, another firm, the Electric Light and Traction Company of Australia Ltd, whose investors had close association with the Brush Company and with Wheadon, saw the potential and purchased the Adelaide company as part of a move into the privately developing Australian electricity supply industry.[12]

Rather fortuitously, even before these sales, the Adelaide-based electricity company had already secured an agreement with the City of Adelaide to supply electricity for the purpose of providing street lighting in King William Street. Moreover, the agreement also allowed for the connection of private customers – something for which the company and Adelaide storekeepers soon eagerly enlisted. From that point, customer connection demand mushroomed. In time, this success began to lead to pressure for the construction of the necessary corridors for transmitting electricity at higher voltages to reach the outlying areas of Adelaide.

To supply these expectant demands for electricity, there was, of course, a need to provide a new generating plant within the City itself. It was decided that a new powerhouse was to be built at the intersection of



THE GRENFELL STREET POWERHOUSE UNDER CONSTRUCTION, 1901. THIS BUILDING BECAME A SIGNIFICANT LANDMARK
ELECTRANET SA

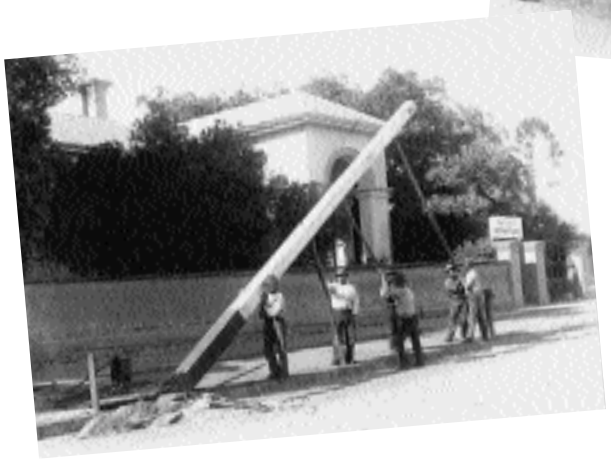
Laying electrical transmission lines underground in Adelaide, 1901–1902, stretching from Grenfell Street powerhouse, to Wakefield Street, to Victoria Square – passersby and traders take in the scene of labourers striving with picks and shovels. The Wakefield Street scene also shows boilers containing hot bitumen – the pitch was used for sealing joints in the cables and cable housing
ETSA Museum

Grenfell Street and East Terrace. While this new plant was under construction, a temporary generating plant was erected nearby in a galvanised iron shed at the corner of Tam O'Shanter Place and Devonshire Place, to meet the company's contracts for electricity with the City of Adelaide. The building of the Grenfell Street powerhouse progressed rapidly and it was subsequently opened on 19 November 1901. Indeed, the operation of the temporary plant in Devonshire Place only lasted for a few days beyond that date.

The new Grenfell Street powerhouse became a significant Adelaide landmark – driven by coal fired boilers and steam generators – and was soon distributing power from a DC generating plant with a capacity of 400KW through a network of newly installed underground and overhead cables. From that time, the streets of Adelaide – like those of most cities of the western world – were soon lined with timber posts topped with a maze of cables supporting the new technologies – telegraphy and electricity. However, even though the Grenfell Street powerhouse was a more efficient system than the Port Adelaide facility, there were still many teething problems in those early days, in the attempt to provide a reliable supply of electricity to many enthusiastic customers.[13]

Yet such disturbances did not hinder the spread of electricity delivery to Adelaide's suburbs and outlying townships, nor subsequently to the evolution of an electric tramway system in the Adelaide metropolitan area. The original supply of DC electricity began to be replaced by Alternating Current (AC), because of the ability to use transformers to simply raise the voltage to the levels which were needed for the transmission of electricity over longer distances. In 1902, North Adelaide became the first suburban supply – connected once again through underground electricity supply lines. Then, in 1905, a new company – the Adelaide Electric Supply Company Ltd (AESCo) – was incorporated, and almost immediately took up the challenge of meeting the demands of suburban customers.

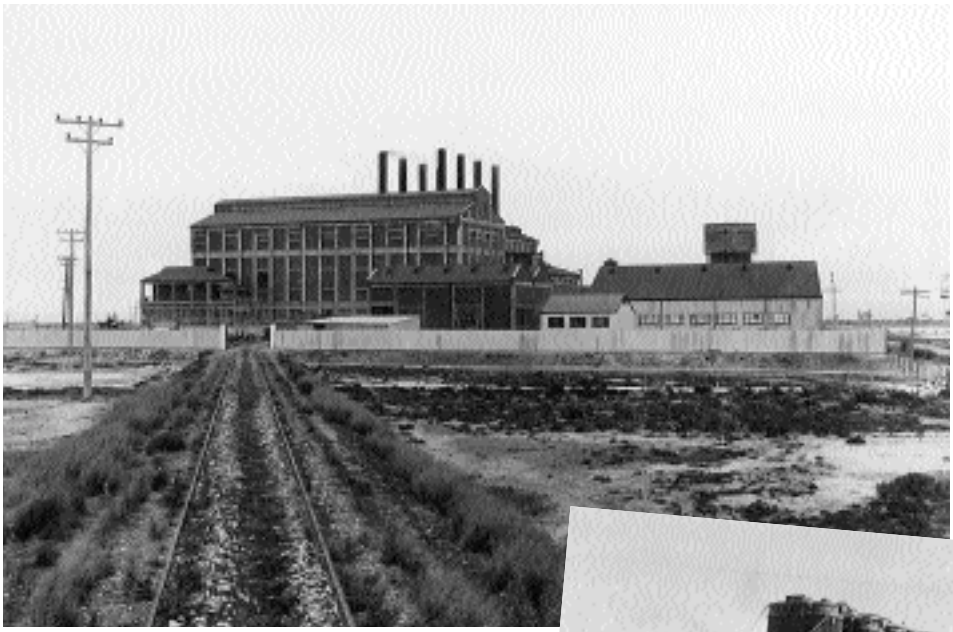
By the mid-1910s, electricity supply was being transmitted by 2,200 volt cables to more Adelaide suburbs – Norwood, Unley, Hindmarsh and Thebarton. Customer demand grew so dramatically that established lines, like that between Grenfell Street and Port Adelaide, had to be reinforced and increased in voltage, and in most areas the voltage of transmission was actually doubled to take extra customer demand.[14] By 1917, the demand on the Grenfell Street powerhouse had seen its generating capacity raised to 12,000KW.[15] At this time, the main building at this site also housed the AESCo's administrative offices – design, communications systems, switchboard, meter accounts and others.



Electrical transmission lines spread from the City of Adelaide to the nearby suburbs and villages. The first photograph shows the pole yard at which hardwood poles were stored for distribution by horse-drawn vehicle or, in this case, by motorised truck. Poles were manually unloaded and raised, which was labour intensive, tough and surprisingly successful
ETSA Museum

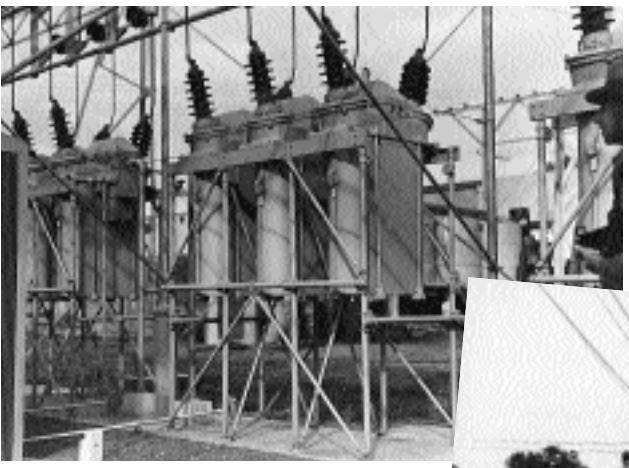
Osborne comes on-line

It became apparent to Wheadon, and other executives at AESCo, that customer demand would soon exceed the capacity of the Grenfell Street powerhouse. This decision, together with some environmental problems attached to that site (insufficient turbine condensing water supply, and problems with coal storage and ash handling and disposal, to name a few) necessitated the consideration of the construction of another facility in a more suitable, less populated location.[16] A site at Osborne on the Port River was chosen and planning commenced, just as the world witnessed the outbreak of hostilities in Europe in August 1914. With wartime demands and other headaches to deal with, AESCo put aside these construction plans for more certain times. Later, with the onset of peace in 1918, however, the plans were dusted off, and the London and local Boards immediately approved the proposal for the reclamation of the swamp site and the subsequent construction of the new powerhouse at Osborne.



Commissioned in August 1923, the coal fired Osborne "A" Power Station came on line with its 10MW turbo alternator generating directly into the newly constructed 33kV transmission system. In a real sense, Osborne provided the true beginning for South Australia's electrical transmission system. From there, two double circuit transmission lines hooked into substations at Birkenhead and Portland (later Port Adelaide) and then on to Adelaide, by way of lines passing through the suburb of Croydon. Another double circuit 33kV ring feed was taken off at Croydon and linked to substations at Richmond, Harrow, Unley and Norwood. These were all overhead transmission lines and, as Wheadon noted, 'this ring system of supply has proved a satisfactory method of ensuring continuity of supply at our main distribution centres in the metropolitan area'.[17] The electricity cables were suspended from wooden poles, including a number of cumbersome two-pole structures, that supported both the cables and main distribution transformers.

A view of Osborne "A" power station, 1924, from the west and, during the construction of the power station, on 21 May 1923, the hauling of massive transformers on a crocodile truck by horsepower
ElectraNet SA, ETSA Museum

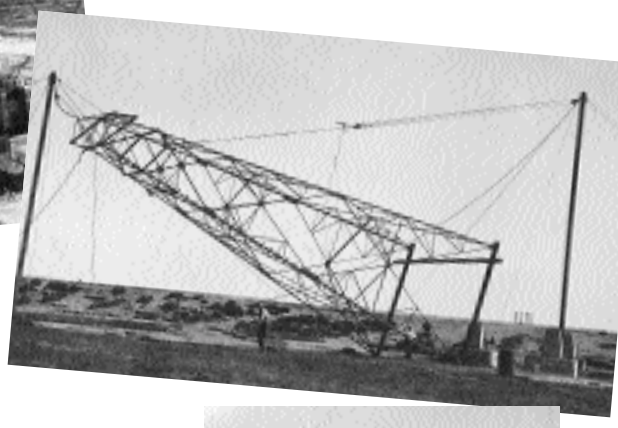


Top Left: Croydon substation, showing 33kV oil transformers
ETSA Museum

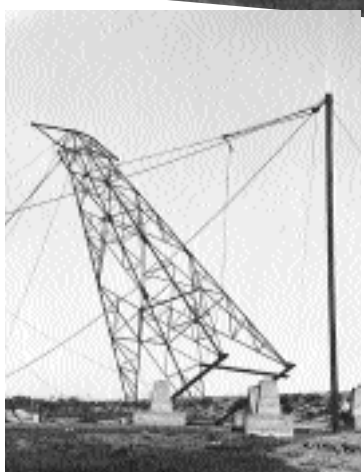
Top Right: 33kV lines at Port Road, Hindmarsh – typical of the network spreading to Adelaide from Osborne
ETSA Museum

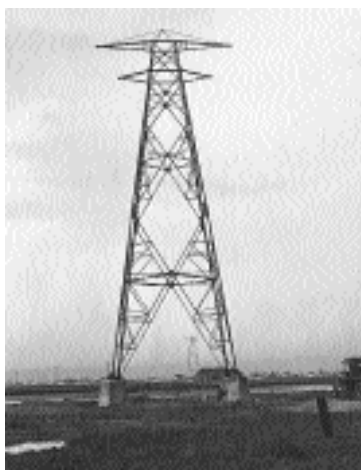
Not surprisingly, improvements to the power system, to keep up with customer demand, did not take long to arrive. In 1928 the third transmission line from the Osborne Power Station to the ring main supplying the metropolitan area to the Richmond substation was erected, and viewed as a major achievement of the time. One of the main reasons for this enthusiasm was the use of the newly designed steel and concrete 'Stobie' poles of various sizes, ranging in height from 15 metres to 25 metres, and in weight from 1.8 tonnes to 8.2 tonnes.[18] One of the line construction supervisors described something of the more difficult moments in constructing this particular line:

> Our experiences during the Port River crossing would make a novel in themselves. All material and gear required for the western side had to be floated across the river on a punt which was towed by a motor launch … On the eastern side things were not pleasant, as the site of the pole footing was below high water mark, and there was a very generous coating of mud over everything. Work to lay a 1.5 metre pipe



The crossing of the Port River by transmission lines was a difficult task. In August 1924, towers such as this one were erected. The span between towers was about 300 metres
ETSA Museum





was completed between high tides. A hard crust of rock about 2.5 metres below the surface delayed operations, but nevertheless, everything on this line was ready for switching on 21 May 1928.

About 75 per cent of the 286 poles comprising the line were concreted directly into the ground, requiring about 480 tonnes of concrete. On reflection, I get a headache trying to work out how many metres of reinforcing rod were used. The insulators were of the 66,000 volt type from Osborne to Tapley's Hill Road, and 45,000 volt type from there to Richmond.[19]

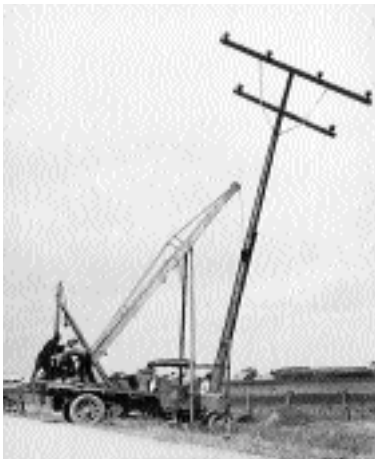
Stobie Poles and Rural Extensions

The new 'Stobie' poles used on this particular Osborne line actually revolutionised transmission line construction in South Australia – a State devoid of large tracts of native timber suitable for creating wooden power poles. The brainchild of James Cyril 'Cy' Stobie, it was described by him as

The number 4 line from Osborne, shown here from the railway bridge at Ethelton, used the newly designed Stobie pole in its construction. The Stobie pole was of enormous significance to the pace at which AESCo's system spread
ETSA Museum

> … an improved pole design adopted to be used for very many purposes, but particularly for carrying electric cables, telegraph wires … [it] consists of two flanged beams of iron or steel, preferably rolled steel joist of **I** or of channel sections, placed one beside the other with their flanges inward and preferably at a very slight angle one with the other and held together by means of tie bolts, the space between them being filled with cement concrete.[20]

Cheap and simple to manufacture and with a long life expectancy, these steel 'Stobie' poles were instrumental in the rapid expansion of AESCo's transmission lines. The new poles, coupled with the significant generation capacity of the Osborne Power Station, rapidly brought electricity supply to the outer metropolitan and near rural regions of South Australia.



Erecting poles on the Gawler to Templers transmission line
ETSA Museum

'Stobie' poles were also used on the main northern extension line that ran at single-phase 4,000 volts from Harrow substation to Gawler. Spaced approximately 185 metres apart, the poles carried steel reinforced aluminium cable on pin insulators. With plans to eventually run a 33kV supply to that area and beyond, to even further northern extensions, the system was changed to three phase and 7,000 volts after only twelve months operation, and was able to cater for increased customer demand for electricity. By that time, the town of Salisbury had been connected and an extension was rapidly planned to serve Nuriootpa, Angaston and Freeling. From September 1924, contractors erected a new line into the Barossa Valley and then on to Balaklava. The transmission line was then upgraded to 33kV direct from the Portland (later Port Adelaide) substation and was operational before

the end of July 1925. A testimony to the skill and dedication of those involved, the construction of the line caused much comment, humour and goodwill within the communities of the rural areas which it reached. A line construction manager remembered that:

> A hotel proprietor at one of the towns to be supplied had on several occasions made witty remarks about the slow progress of the job, and on this particular day during lunch,

Map showing AESCo's transmission system in 1926
Adelect Magazine

had made his little speech as usual. We advised him that he would have electric light in the hotel at 4.00pm, but he was prepared to bet he would not. A bet of drinks for all the employees on the job was made, that the hotel would be supplied by the time indicated, and the hotel proprietor accepted. He did not know that about that time, 30 thirsty linesmen would gradually drift into the hotel, some from Gawler, some from Greenock, and others from finishing up various duties on the final line construction. The electricity supply *was* turned on at 4.00pm, much to the dismay of the hotel proprietor, but he kept his word and paid up for the drinks for all the men.[21]

This first major extension into rural regions had begun in 1922 and was actually authorised by the passing of an Act of Parliament that allowed movement of electricity supply into country districts, and the spread of electricity then continued rapidly into these areas. By 1936, an enormous area of supply coverage had been achieved and F.W.H. Wheadon described with pride the move beyond the original Gawler electricity extension:

33kV lines in the mid-north town of Blyth, erected on Stobie poles
ETSA Museum

Eventually all the principal townships out to Jamestown, a route distance of 260 kilometres, were connected to the main power system. Later, extensions were carried out to Willunga in the South, 48 kilometres, and to Mount Pleasant, Kapunda, and Nairne. At the moment, our rural transmission system comprises 370 kilometres of 33kV lines, and 235 kilometres of 7.6kV lines, and embraces supply to practically all of the settled districts in what is known as the lower-north area of South Australia, with the exception of the Clare and Onkaparinga districts which are supplied by local private electricity generating and distribution companies. The country through which our rural power lines pass is very sparsely populated wheat land, and it is only by the most economical design of transmission lines and supporting structures that such an area could be justifiably served.[22]

Electric truck outside AESCo's building East Terrace, Adelaide. It was driven by 'Jack' Margitich between the late 1920s and early 1930s. 'Jack' worked for ETSA from 1918 to 1959. This electric truck had a speed of 20 mph, 3 tons capacity, a range of 40 to 50 miles and was used for deliveries around the City, to Port Adelaide and as far north as Salisbury. 'Jack's' grandson, Brian Margitich, works as a System Control Officer at ElectraNet SA in the System Control Centre
ElectraNet SA

In both the city and country, high voltage electricity cables were being rolled out and step-down distribution transformer stations built, with even more infrastructure being planned as demand grew rapidly from the South Australian domestic and industrial consumers.[23]

Maintenance and Control

The expansion of the electricity transmission system and the need to improve the reliability of the electricity network brought about the implementation of a year-round maintenance programme to avoid unnecessary breakdowns of the transmission system. In all of the drier Australian States, dust, coal ash and other material deposits on insulators frequently caused flash-overs and shutdowns of many electricity lines. In Victoria, for example, a major bushfire in the 1920s had placed an extensive layer of fine ash and soot on their transmission line insulators, triggering ongoing problems in maintaining a reliable electricity supply to

Maintenance was an essential part of AESCo's work. Staff are shown 'tapping up' Number 4 line at Ovingham
ETSA Museum

rural communities. Anxious to do away with as many of these problems as possible, the South Australian electricity authorities set about the periodic cleaning of all transmission line insulators, regular replacement of faulty insulators and tightening of all bolts and screws on the supporting poles. Naturally, maintenance was required more frequently on those transmission lines that ran adjacent to railway lines (due to coal fired trains) or near industrial sites such as cement works.

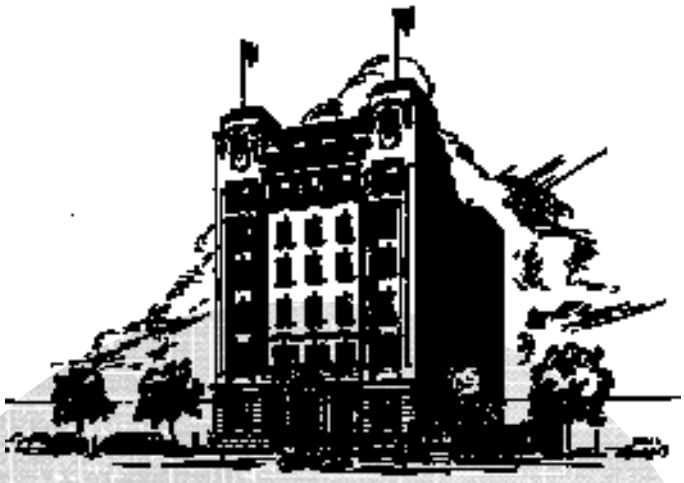
Clean-up line crews were deployed on a regular basis to all areas and employees became expert in a variety of situations, including the actual cleaning of live lines. It was no small task. The Gawler line alone required considerable resources to maintain, as this 1927 work summary account shows:

> Length of line overhauled, 40 kilometres; working time, 9 hours; number of men working, 100; insulators cleaned, 3,037; insulators changed, 70; pairs of straps bridged, 227; motor vehicles in attendance, 14.
>
> In addition, the men had to keep a sharp look out for cracks in insulators, burns on wooden crossarms, and defective poles, and report any unusual condition which came to their notice and which might subsequently lead to trouble on the mains.[24]

While the electricity cables, poles and insulators had to be carefully monitored to ensure a reliable supply of electricity, the control of the flow of electricity in the network was, itself, also of critical importance. In the first years of electricity generation and transmission in South Australia, such control was a rather haphazard affair. Gradually, by means of more efficient insulators and the use of copper as the main conductor in

transmission lines and cables, the power system became more reliable and manageable.

As F.W.H. Wheadon made clear, the control of the electrical power system and overhead lines and cables, in order to avoid overloading, was an important factor in improving customer service. He therefore encouraged both engineering and economic research into the subject of electricity load flow control and convinced his Board and staff of the necessity of achieving a properly managed power system, to achieve a high supply reliability and avoid overloading of lines and equipment. This vision was the precursor to the organisation's pioneering developments in supervisory control equipment, a leading edge position that has been maintained into 2000.



From 1926, when the Kelvin Building was completed for AESCo in North Terrace, Adelaide, a Mains Control Centre was established there. With subsequent developments, it was at the Kelvin Building that a Mains Control Officer oversaw, from 1940, an illuminated power system status diagram board, that was placed on top of a large, polished blackwood desk. The first of these specifically designated officers, Les Gill, had been appointed in 1936 – although others had been doing the job previously as part of their daily duties. At a glance, this officer was able to gain an understanding of the status of the entire South Australian electrical power system. That electrical system began at the Osborne Power Station and ran through the entire network of high voltage transmission lines with their associated substations.

Mains Control Officers, situated in the Kelvin Building, North Terrace, Adelaide, ensured the reliable supply of electricity
Jubilee Souvenir of public electricity supply in South Australia, 1949

Any part of that network could be disconnected at the direction of the Mains Control Officer by use of local circuit breakers or switches. Additionally, if a line became faulty, through a lightning strike or any other problem, a local circuit breaker would open automatically and isolate that

section of the network. The Mains Control Officer was then required to assess the alternatives for ensuring a rapid restoration of any disconnected customers. Again, if a section of any line in the network needed maintenance, the Mains Control Officer could arrange to disconnect it from the rest of the power system. This officer would then pass on, by telephone, accurate details of all parts of the power system which had been de-energised, to those preparing to work on it.[25] By this means, Mains Control and those involved with maintenance worked hand-in-hand to ensure a safe working environment, in addition to a reliable supply of electricity.

AESCo, as part of the war effort, extended transmission lines to places like BHP's Rapid Bay quarries. Shown here is the line before it descends to the quarry and substation
ETSA Museum

As F.W.H. Wheadon commented, all possible technical and safety arrangements were put in place 'to provide maximum reliability of supply for all consumers'.[26] Even if a fault occurred out of hours, a Mains Control Officer would be called to immediately attend to the matter and advise on the best and safest course of remedial action for resolving the problem.

Through the Second World War

By the time the Second World War broke out in September 1939, transmission lines extended far into the farmlands of South Australia. Also, in delivering electricity to industrial sites at places like BHP's quarries at Rapid Bay on the Fleurieu Peninsula, the South Australian power system began to use the best equipment that AESCo could purchase to ensure customer supply reliability.[27] The transmission and distribution lines had now spread throughout all of metropolitan Adelaide as well. By 1937, the Unley to Seacombe line had been constructed. Then, the year after, new substations were built at Port Adelaide, Woodville, Seacombe and Hindley Street, and the Brighton and Glenelg areas were connected to the 33kV power system. At Dry Creek, another substation was erected and

AESCo's Executive officers, 1946. Many of these were the pioneers of electrical supply in South Australia
Fifty Years of Progress

connected into a line running from Harrow through to the metropolitan abattoirs.

In 1940, as the serious demands of the Second World War began to impact on the community, new substations, lines and transformer stations were constructed to feed electricity to local munitions factories and important war-effort supply stores. The Port Adelaide to Penfield 33kV lines were excellent examples of the work of that time. In August 1943, a 66kV line to Morgan was completed to power the new Morgan–Whyalla water supply pipeline project. Numerous other transmission lines were urgently upgraded as part of this war effort.[28]

As the war drew to a close, the Adelaide Electric Supply Company faced pressure from the South Australian Government to pursue an even more rapid expansion than ever before. This Government also expressed its concern about the reliability of electricity supply as it was affected by difficulties in obtaining sources of good quality coal for the Osborne generating plant, due to on-going industrial disputes in New South Wales.

In response, the AESCo's Board and management continued to reflect proudly on the past record of the company. Indeed, from 1922, when AESCo had gained the authority to extend electricity supply to rural areas, the company had spent a total of £850,000 on the rural transmission system.[29] AESCo executives at that time looked at their results with some pride and believed that, in terms of assisting food and industrial production, they had made a significant contribution to this State. More than this, and despite the forces enveloping the company, the management actually had predicted that there would be a rapidly increasing demand for electricity after the war. The post-war outlook, they noted, would 'almost certainly involve further extensions to our generation, transmission, and distribution system in the near future'.[30]

The stage was obviously set after the end of the Second World War, for a major explosion of South Australia's electricity industry, in an environment of apparent concern by a progressive South Australian Government – that was not convinced that the AESCo had the capability or the financial backing to ensure the achievement of the needed rapid growth of a reliable supply of electricity for all South Australians in the future.

The grasping of the post-war opportunity, as it unfolded, would obviously occur under a very different scenario from that which had driven the development of electricity in South Australia during the first four decades of AESCo's existence.