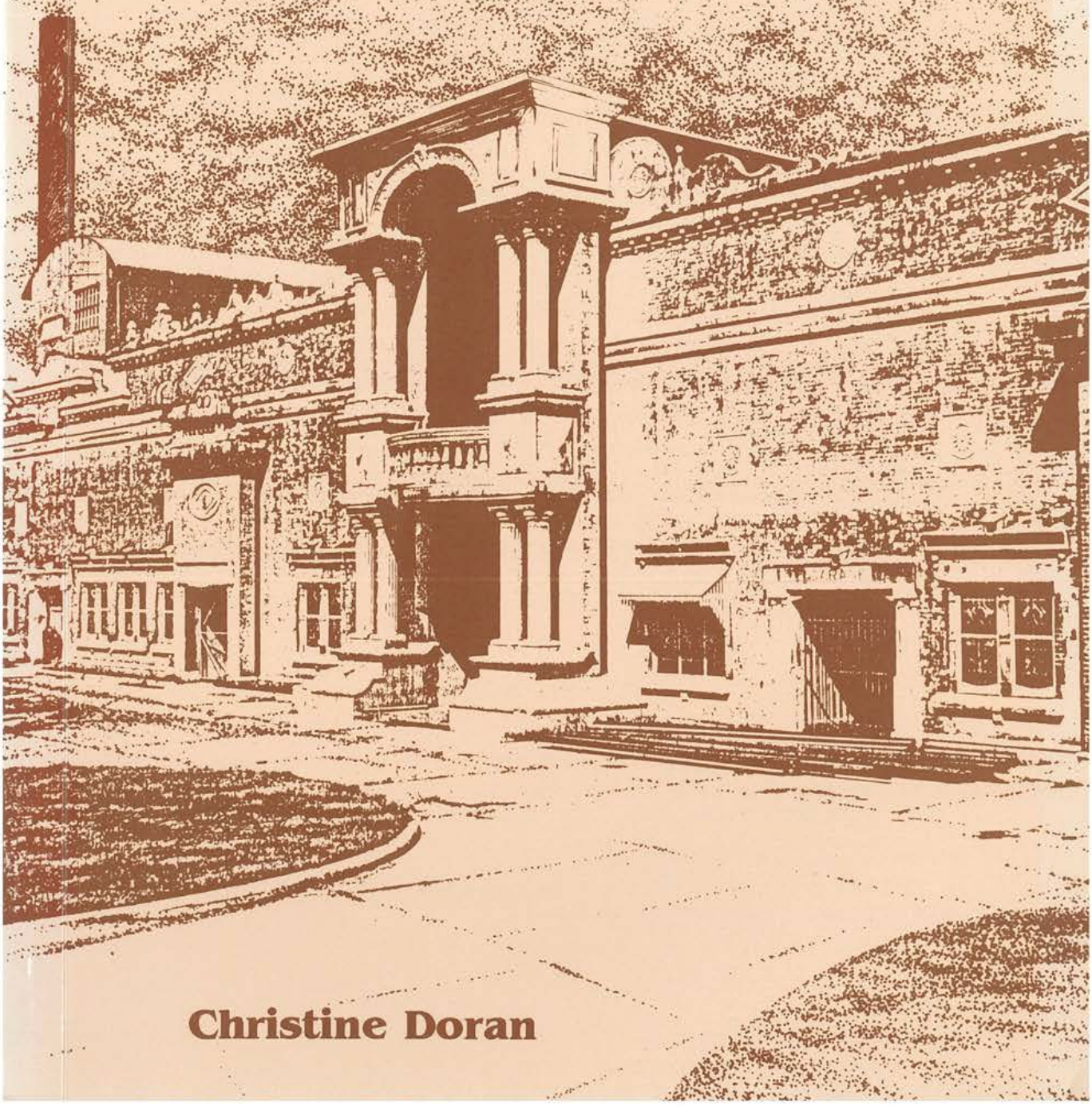
Partner in Progress

A history of electricity supply in North Queensland from 1897 to 1987



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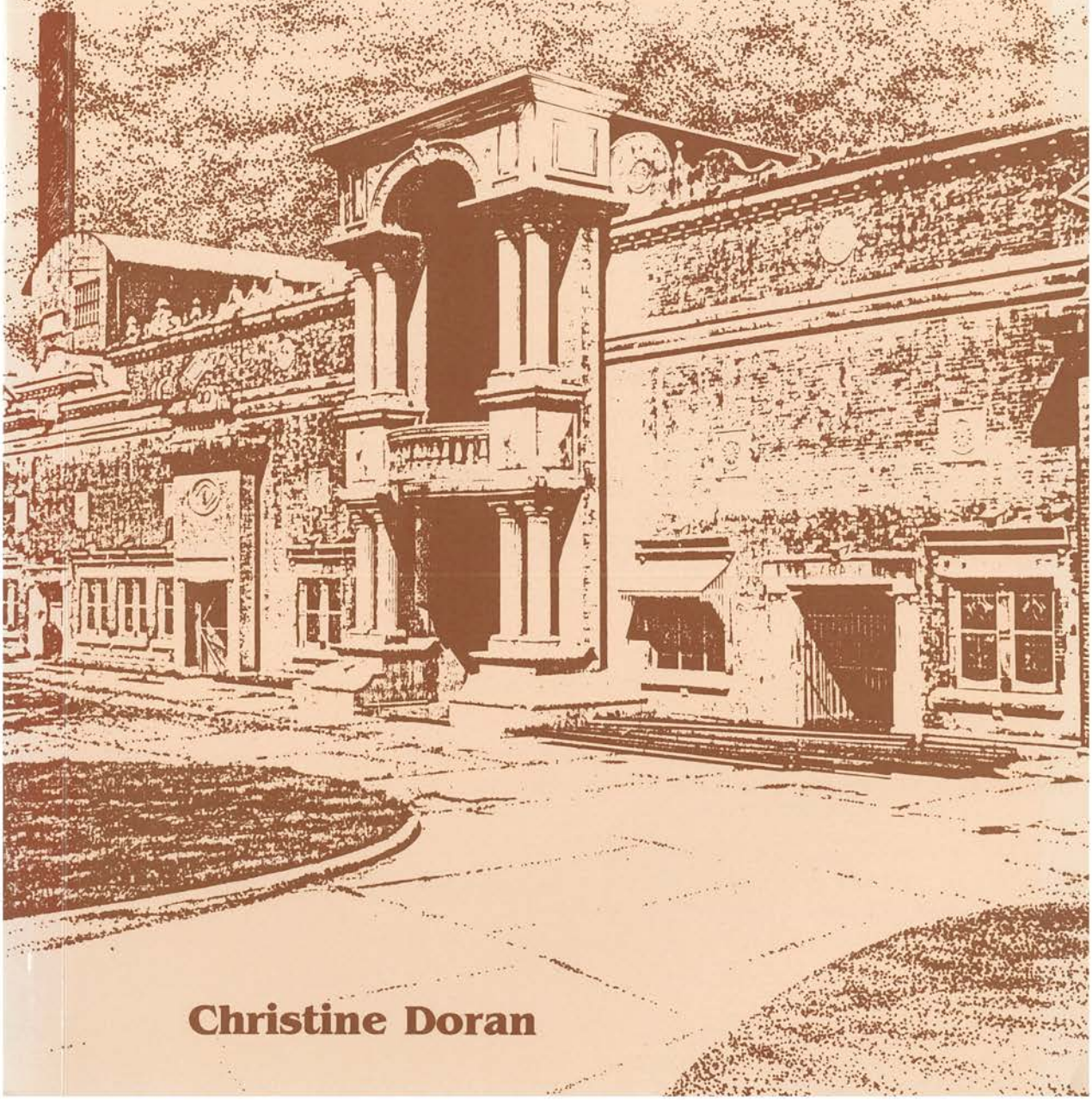

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A History of Electricity Supply in North Queensland from 1897 to 1987

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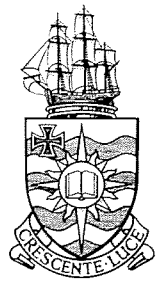

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FOREWORD

The history of the Electricity Supply Industry in Queensland and particularly North Queensland as portrayed in this book is most interesting and is a work that should be read by all as too much of our history is lost by not being recorded.

However, the reader should not be too quick to judge past events seen through an historian's eyes. Just as the author accepted a challenge to look back for information to complete her task, so did successive Governments and the power industry have to look forward at a challenge. That was to build a better quality of life for city dwellers and country people facing the hardships imposed by the isolation of our vast state.

Within these pages Dr. Christine Doran has presented a detailed account of how the sometimes colourful characters and events combined in the NORQEB area to meet the challenge.

She chronicles the electricity supply industry's remarkable achievements in making electricity widely available and affordable relative to other commodities.

For example, in 1922 electricity cost 8.78 cents per KWh in Townsville while a loaf of bread was 3.75 cents. Today, a family loaf of bread costs $1.34 and electricity for domestic use is just 8.47 cents per KWh on average.

The ultimate measure of success for the Electricity Industry in Queensland must surely be the price of electricity which is now on average the lowest in mainland Australia.

NORQEB and its predecessor utilities all recognised that electricity is fundamental to economic development and the quality of life. They can rightly look back with satisfaction at their contributions to North Queensland.

Readers of this book will find ample evidence to explain why today NORQEB still takes pride in its slogan 'A Partner in Progress'.

D.T.J. Gleeson, OBE
CHAIRMAN

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Finally I would like to make special acknowledgement of the help given throughout the project by a fellow researcher, Noel Warburton, who contributed both personal knowledge of the early outback power stations and unflagging enthusiasm for electricity history.

C.D.

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ABBREVIATIONS

FS&OS	TREB Financial Statements and Operating Statistics
LCD	*Debates of the Queensland Legislative Council*
LCJ	*Journals of the Queensland Legislative Council*
Mem.	NORQEB Memorandum
NM	*Northern Miner*
NORQEB	North Queensland Electricity Board
NORQEB Mins	Minutes of NORQEB meetings
QGG	*Queensland Government Gazette*
QPD	*Queensland Parliamentary Debates*
QPP	*Queensland Parliamentary Papers*
QSA	Queensland State Archives
RC	Report of Royal Commission on Electricity
SEC AR	*State Electricity Commission Annual Report*
TCC	Townsville City Council
TDB	*Townsville Daily Bulletin*
TREB	Townsville Regional Electricity Board
TREB AR	*TREB Annual Report*
TREB Mins	Minutes of TREB meetings

INTRODUCTION

Few people fail to be impressed by the immense display of natural power in lightning, or by the uncanny effects of a magnet, or the unfailing action of a compass needle. Our fascination for such electrical phenomena can be traced far back into antiquity: speculations about this mysterious force are scattered through the records of ancient Egypt and Phoenicia, the classical literature of Greece and Rome, the Norse histories, the writings of the Chinese and Arabs, and the scholarly treatises of medieval churchmen. More systematic research and experiment, following the scientific method, began in the 16th century, and over the following three hundred years an international community of scientists worked to advance our understanding of electricity; as a result it was gradually brought under human control. Although electricity has been used as a source of energy for little more than a century, it is today among the world's largest energy industries, employing highly advanced technology and in turn underpinning modern technological society. This introductory chapter provides a broad overview of the historical development of the industry overseas and in Australia, and outlines some important technical and economic characteristics of electricity production and distribution.

As early as 600 B.C. the Greeks knew that amber acquired powers of attraction when rubbed with a cloth. In the 16th century such magnetic phenomena became a focus of European scientific interest. One experimenter, William Gilbert, the Court Physician of Queen Elizabeth I, concluded that the power of attraction exerted by amber and several other substances was a manifestation of a force which he called "electricity" - from the Greek word for amber, "elektron". Among the scientists who made major contributions to the study of electricity were the Venetian Fra Paolo Sarpi, William Gilbert himself, Francis Bacon, Benjamin Franklin, Count Alessandro Volta, Andre-Marie Ampere, Georg Ohm and Michael Faraday - the range of nationalities involved demonstrating the international character of scientific research and discovery. The early experimenters mainly explored the fields of electrostatics and electrochemistry. Volta, Ampere and Ohm gave their names to the basic units of electrical potential, current and resistance.

Then in 1831 a major breakthrough occurred when Michael Faraday discovered the principle of electromagnetic induction: the principle behind all power generation and the basis of applied electricity. As Faraday wrote, expressing the aspirations of the scientific spirit: "The beauty of electricity, or of any other force, is not that the power is mysterious and unexpected, but that it is under *law*, and that the taught intellect can even now govern it largely."[1] Electricity, which for centuries had awed and intrigued, would henceforth be applied at human will.

Faraday's discovery was that an electric current is induced in a conductor when it is moved within a magnetic field. Hence electricity generators consist of two parts: a field system, which in the early machines took the form of simple or compound permanent magnets; and a set of coils in which generation takes place. Relative movement of the two parts is essential, but which part actually revolves does not

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1. Quoted by P. Benjamin, *A History of Electricity,* New York, 1898, p.444.

matter; rotation of coils within a fixed magnetic field was more common in the 19th century but in this century the position was reversed.[2]

Practical application of electricity has a relatively short history; the enormous technical progress of the last 100 years makes it difficult to realise just how short. The first application was the telegraph, developed by Samuel Morse in 1837; coded messages were sent over wires by means of electrical impulses. In 1876 Alexander Graham Bell invented the telephone; in this application, vibrations from sound were converted into electrical impulses, transmitted through wires and then converted back into sound.

A major development occurred in 1879 when two experimenters - Thomas Edison in the United States and Joseph Swan in England - independently and nearly simultaneously developed the incandescent carbon filament lamp, with the filament enclosed in a vacuum. The basic principle of the incandescent filament lamp is that when electricity passes through a conductor it becomes hot, and when heated to a sufficient temperature, it glows and gives off light. Arc lights had previously been invented, based on an observation in 1802 by Sir Humphry Davy; they were often used for lighthouses, for street lighting and in some factories, but their harsh flickering light was generally unsuitable for indoor use. The filament lamp gave a strong steady light, making possible both commercial and domestic lighting.

Around the same time as these developments in lighting, improvements in the field of generation reduced costs and increased capacity. The first generator was constructed within a year of Faraday's announcement of his discovery before the Royal Society, but it took many years to refine techniques so that widespread use of generators became possible. In the 1860s, for instance, experimenters discovered the principle of self-excitation: instead of using permanent magnets to provide a magnetic field, electromagnets were introduced and once the machine had been started, part of the electricity generated was used to activate them. It took another ten years before it was realised that the electromagnets retained sufficient magnetism to provide the field necessary to begin generation, which made generators self-contained. Through this and many other developments the efficiency of electric generators was gradually improved.

The demand for electric illumination was met at first by small private plants designed to supply individual factories or buildings, but within two years of the invention of the incandescent lamp the first public electric lighting systems were set up at Holborn Viaduct in London, at Godalming in Surrey, and at Brighton.[3] In Britain permanent electricity supply on a significant scale really began in London in 1889-92, after the early ventures of the 1880s proved to be economic disasters.[4] The first power station in the United States was opened in New York in 1882. In Queensland, not far behind the overseas pioneers in this instance, arc lights were demonstrated in Brisbane

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2. C.M. Jarvis, "The Generation of Electricity", in C. Singer, E.J. Holmyard, A.R. Hall & T.I. Williams (eds.), *A History of Technology,* Vol.5, Oxford, 1958, p.179.
3. G.F. Anderson, *Fifty Years of Electricity Supply: The Story of Sydney's Electricity Undertaking,* Sydney, 1955, p.3.
4. I.C.R. Byatt, *The British Electrical Industry 1875-1914,* Oxford, 1979, pp.15-25.

in December 1882,[5] only months after the first exhibition of electric lighting in Australia in Melbourne; the first public supply system in Queensland was set up in 1888 by Barton, White and Company. Thus in the 1880s the idea of a central generating station and distribution of electricity over a fairly wide area gained acceptance. Rapid expansion of reticulation was possible because of technology developed earlier during the spread of electric telegraphy.

During the 1880s and 1890s the respective merits of direct current (d.c.) and alternating current (a.c.) were hotly debated in the so-called "battle of the systems". The first machines made on the electromagnetic principle had produced alternating current - that is, the direction of flow continually reversed, at a frequency depending on the speed at which the machine was turned. Because this was regarded as a disadvantage, a device called a commutator was usually fitted to make the pulses of electricity unidirectional. Early advances in the field of generation were therefore mainly confined to direct current generators; development of alternators began later, in the 1860s and 1870s.

In the late 19th century there was great variation among electrical systems, not only between a.c. and d.c., but also in voltages and frequencies. Most of the early electricity systems of the 1880s used direct current of low voltage. However high transmission losses restricted the area which these power stations could serve; as demand increased and the systems grew, the problem of voltage drop became increasingly acute. Alternating current, on the other hand, was at first widely regarded as more dangerous, and for some time there was also a problem with synchronising alternators. As a result of a series of technical improvements in the period to 1900, a.c. gradually became predominant since it allowed generation at high voltage and thus economic transmission over greater distances. The development of three phase a.c. brought further technical improvement. Transformers, the principle of which had also been elucidated by Faraday in 1831, were developed to change the voltage of electric current, allowing the range of economic transmission to be extended by stepping up voltage for transmission and then reducing it for distribution to consumers.

However it took a considerable period before the superiority of a.c. was generally conceded, and in the meantime many d.c. systems were established. In Queensland many of the original electrical systems used direct current, even though they were installed decades after a.c. became predominant overseas. This left the laborious task of changeover to a.c. for a later generation. The last remaining d.c. system in north Queensland, at Winton, was not converted until 1959.[6]

The first electrical systems were set up mainly to provide lighting. Only gradually was the range of practical applications broadened. The principle of the electric motor was discovered by Faraday in 1821, but the a.c. motor was not invented until 1888 and was not widely used until after 1900. The electric motor has an enormous range of

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5. C. Dunn, *The History of Electricity in Queensland,* Bundaberg, 1985, p.20.
6. In this and other very small systems characteristic of western Queensland, problems of voltage drop - one of the main shortcomings of d.c. systems - did not become pressing until the great expansion of consumer demand which followed the Second World War.

applications including hand tools, cleaning equipment, fans and pumps, as well as varied uses in manufacturing. This was surely the most significant advance associated with the development of electricity supply:

> Electrical energy as a source of light and more recently of heat, as a means of communicating information, and as an agent in chemical processes, has clearly transformed industrial practice; but its chief significance has been to place power, great or small, in the workman's hands or at his elbow.[7]

During the last 100 years the discovery of new applications, especially through the invention of labour-saving devices, has continued apace. Electric lighting was gradually improved. At the beginning of the century tantalum and later drawn tungsten replaced carbon in filament lamps. The gas filled lamp was then introduced. The coiled coil pearl lamp in use today was introduced in the 1930s, and fluorescent or mercury vapour lamps were marketed for domestic use shortly after the Second World War. In addition to lighting, electricity began to be used for cooking, heating and cooling. Other applications emerged with the appearance of radios, television, record players, cassettes, compact discs and video recorders. Electricity has made possible a space-age technology with the electronic digital computer as its cornerstone.

In Australia the development of electricity supply was influenced by the high degree of urbanisation, as well as technical limitations on long distance transmission. When the electricity supply industry began at the end of the 19th century, Australia was one of the most urbanised countries in the world. Generating stations, which were usually steam powered, were constructed in the major cities where demand for electricity was greatest. Less often, power stations were located close to the source of fuel, like the hydro stations in Tasmania and steam stations in the Latrobe Valley, built to take advantage of Victoria's large deposits of brown coal; the first long distance transmission link in Australia was a 132 kV line from Yallourn to Melbourne, commissioned in 1922. When industries requiring large amounts of power were located in remote areas, they often provided their own electricity; an example in north Queensland was Mount Isa Mines, which still generates power both for its mining operations and for residents of the town. Despite these exceptions, electricity supply in Australia was mainly confined to urban areas until the Second World War. During the first four decades of this century, most Australian townships acquired their own power supply, but there was little development of rural supply to farms and pastoral properties.

After the Second World War locational patterns began to change: economic and environmental considerations encouraged the siting of power stations on coal fields, remote from urban centres. The cost of transporting fuel was thereby reduced and air pollution was kept away from heavily populated areas. This change was associated with the development of high voltage, long distance transmission systems and gradual interconnection of local systems. Since the war most rural areas of Australia have been incorporated into the supply networks. Interconnection has not been extended to the

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7. *Ibid.*, p.231.

various State systems, the major exception being the link between New South Wales and Victoria through the Snowy Mountains Scheme. There is, however, standardisation of voltage and frequency throughout Australia.

In Australia, as in Europe and America, the early electrical enterprises produced power mainly for lighting. Around the turn of the century electric tramways were introduced in several Australian cities. By the beginning of the First World War electric motors were making inroads in manufacturing, but not until after the Second World War was there an upsurge in the use of domestic appliances and a great expansion in commercial and industrial uses of electricity.

Though ahead of the southern colonies in some early initiatives, the development of electricity supply in Queensland was generally slower, largely because of sparse population. In 1883 the Government Printing Office in Brisbane installed electric lighting, the small system comprising 50 incandescent lamps, a steam engine, an 8.5 h.p. d.c. generator and batteries. Three years later power from the Printing Office was used to light Parliament House, by means of an underground cable. In 1888 Barton, White and Co. began public supply of electricity in the inner city. A successor of Barton, White and Co. formed in 1905, City Electric Light, eventually became responsible for a large part of the electrification of south-eastern Queensland. Brisbane municipal authorities entered the field of electricity supply in the 1920s. The first system in a rural area was set up in 1893 at Thargomindah in western Queensland, employing a novel approach to electricity production: a small hydro-electric station was operated by means of water from an artesian bore which provided the town water supply. The next system installed was at Charters Towers, the booming northern gold town, in 1897; its history is discussed in the second chapter of this study. Rockhampton followed in 1898. Development of the industry continued to be of a local, predominantly urban character until the State Electricity Commission was established in 1938 with the objectives of co-ordinating the many local systems and fostering rural extensions. The State transmission system was integrated only in the late 1970s.[8]

Today the electricity industry is the largest of Australia's energy industries, in terms of both capital investment and employment. For most of the period since the Second World War electricity consumption grew rapidly; capacity had to be doubled every eight or nine years in order to meet the increase in demand. The greater part of this increase was attributable to higher consumption per head, in addition to larger numbers of consumers. About 40% of electricity consumption is domestic; the rest goes to commerce and industry. Nearly 80% of electricity production still uses steam, and the remainder with very few exceptions is hydro-electric. Sources of fuel vary between States, depending on their resource endowments. Queensland and New South Wales use mainly black coal, of which they have large reserves. Victoria has large quantities of brown coal, which is the main fuel used for power generation; in 1919 the State Electricity Commission of Victoria was formed primarily to develop the State's reserves of brown coal in the Latrobe Valley. Tasmania's power requirements are met almost

8. For more information on the development of the Queensland industry, see C. Dunn, *The History of Electricity in Queensland*; M.I. Thomis, *A history of the electricity supply industry in Queensland* Vol.1, Brisbane, 1987; Neil Smith, *Electricity in Queensland*, Brisbane, 1988.

entirely by hydro-electric stations and Tasmania has the highest per capita consumption of electricity in Australia, mainly because it has attracted several electricity-intensive industries such as zinc and aluminium smelting. South Australia uses sub-bituminous coal and natural gas; Western Australia uses black coal and oil. Because of the dwindling supply of non-renewable energy sources, there has been growing research interest in alternative means of producing electricity; solar, wind, geothermal and biological sources of power are currently under investigation.

In the early 1980s the electricity supply industry became the focus of considerable public attention and controversy throughout Australia. In particular, rising electricity prices drew criticism from many quarters. Up to the late 1970s real costs of electricity production had fallen steadily, encouraging rising consumption. However, a number of factors brought an end to the idyll: a slowing in the rate of technological advance; increasing costs of equipment; rising prices of fuel; increasing labour costs; and a heavier burden of interest. The efficiency and public accountability of the various State instrumentalities came into question. As a result of both political pressure and economic recession, statutory bodies in all States now face the challenge of defining their priorities, streamlining their operations, and thus justifying their continued existence to their respective clienteles.[9]

The modern electricity industry is complex and highly sophisticated. In order to understand its organisation and operation, it is essential to be aware of technical and economic features which distinguish electricity supply from other industries.

Electricity is really a convenient way of using other forms of energy. Electrical generators use sources of energy such as coal, oil, gas, uranium and falling water to produce mechanical energy which is then converted to electrical energy; electricity is later converted back to other forms of energy, whether mechanical or heat energy, at the point of consumption. A great advantage of electricity as a form of energy is its mobility; by means of a pair of wires it can be transmitted to wherever it is needed.

Electrical energy is measured in kilowatt hours (kWh), or "units" as they are usually called in consumers' electricity accounts. A kilowatt hour is the amount of energy consumed in one hour by a device which uses one kilowatt of power continuously. The capacity of a plant and the maximum demand on a system are expressed in kilowatts, megawatts (MW, equal to 1,000 kilowatts) or gigawatts (GW, one million kilowatts); electricity consumption is expressed in kilowatt, megawatt or gigawatt hours.

Highly dependent on technological development, the electricity industry is capital-intensive with high capital costs. Electricity supply is also a unique industry in that the product must be produced at the same time that it is consumed. The instant a motor or light is switched on, the total electricity required by that appliance must be generated and transmitted to the point of use; existing technology precludes any

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9. See G.D. McColl, "Economic Issues Facing Electricity Supply Authorities", *Australian Economic Review*, 4th Quarter 1985, pp.28-36.

significant storage of electricity. Thus a supplier must be able to generate sufficient electricity to satisfy demand at any time, even though some capacity will be idle at times of less than maximum demand. Load curves can be drawn to illustrate variations in demand over a given period. For instance, Figure 1 shows some daily load curves for the North Queensland Electricity Board's coastal system. Demand is lowest from midnight to about 6 a.m. In most of Australia consumption is greater in winter because of the need for space heating, but this does not apply in north Queensland where artificial cooling is more often required; the noticeable change in the shape of the curve from 1975 to 1987 is attributable to the growth of commercial, and to a lesser extent domestic, airconditioning. The intensity with which generating capacity is used is measured by the "load factor", which is the ratio between average load and the actual maximum load. The higher the load factor the lower average costs will be.

In addition to cost, reliability and quality of service are two important criteria in assessing electricity supply. Reliability is measured by the number and duration of interruptions to service and the number of consumers affected. Eliminating all interruptions would require inordinate capital investment; in practice, electricity systems are designed to keep interruptions within tolerable limits. Quality of service is measured by the degree to which standard voltage and frequency are maintained.

Three distinct processes are involved in supplying electricity to the consumer: generation, transmission and distribution.

Generation involves the production of electrical energy from coal, oil, gas, uranium or falling water. It takes place at central stations, which may be thermal power plants using steam or hydro-electric plants where water drives the turbines. In the early days of electricity generation, steam engines fired by coal or wood were used to drive the generators, but gradually the high-speed steam turbine replaced the reciprocating steam engine. Nowadays a generating station usually includes a number of independent generating "sets" or "units" consisting of boiler, turbine, coupled generator and auxiliary plant such as water pumps, fans, coal pulverising equipment and so on.

There is scope for substantial economies of scale in electricity generation. As the size of plant increases, capital costs per unit of production fall because of geometrical relationships between volume and surface area, and operating costs per unit also fall because heat losses are reduced. This seems to suggest that the most economical way to generate electricity would be from one huge central generating unit. But if this unit breaks down or requires maintenance, generating units of equal capacity must be available to take its place in order to maintain reliability of service. On the other hand, if generation is spread over a number of units the probability of their simultaneous breakdown is lower, and standby capacity can be reduced. Taking into account both economies of scale and reliability of supply, it has been estimated that the optimal size of any generating unit is no more than one-tenth of the total capacity of an electricity system;[10] thus there usually should be at least ten separate generating units within a system.

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10. H.M. Kolsen, "The Economics of Electricity Pricing in New South Wales", in J. Dixon (ed.), *The Public Sector,* Harmondsworth, 1972, p.100.

Thus several advantages of interconnected, centrally coordinated systems are apparent: differences in demand peaks in various parts of the system (due to differences in industrial composition or even in times of sunrise and sunset) make for a smoother load curve and a higher load factor; greater demand justifies larger scale plants which can take advantage of economies of scale; a smaller reserve capacity is required in case of breakdown; and transmission losses are reduced. Each of these contributes to greater efficiency and lower costs.

At any time a modern interconnected system includes a number of generating stations of varying size, vintage and efficiency. In general newer stations are more efficient, partly because demand expansion makes progressively larger stations economic, partly because of technical progress. When demand is low, stations with the lowest operating costs are used; as demand rises less efficient stations are brought into operation according to their "order of merit". For this reason electricity made available at times of peak demand is more costly.

The sections of plant used most frequently are known as "base load" stations, while machines brought into operation for short periods of high demand are called "peak load" stations. Because rainfall and water flow are often highly variable in Australia, hydro stations, notably those within the Snowy Mountains Scheme, are usually employed to meet peak load. Base load is generally carried by steam stations located on major coal fields.

Transmission is the delivery of electrical energy in bulk to substations, from which distribution to consumers is effected. Large quantities of electricity are moved at high voltages from generating stations to substations. As electrical energy moves through the lines there are transmission losses due to resistance. These losses can be reduced by increasing voltage and reducing the current. However it is not feasible to generate electricity or to make it available to consumers at very high voltages, so transformers are used to step up voltages for transmission and then step them down again for use.

There are economies of scale in transmission because as the amount of power demanded increases, voltage can be increased. Transmission capacity increases in proportion to the square of the voltage, whereas construction costs are proportional to voltage. It is therefore cheaper to supply a unit of electricity to a large town than to a smaller one, though they may be at equal distances from the generating station. Of course, transmission losses and capital costs of transmission lines both rise in proportion to distance. Thus it is particularly expensive to supply small remote townships or isolated rural consumers.

From substations electricity is distributed at relatively low voltages to final consumers through a reticulation network of overhead or underground lines. Distribution costs depend on the density of consumers and the extent of their demand. Where consumers are further apart, the length of distribution line must be longer and distribution losses will be higher. In addition to transmission costs, higher distribution costs make rural supply more expensive.

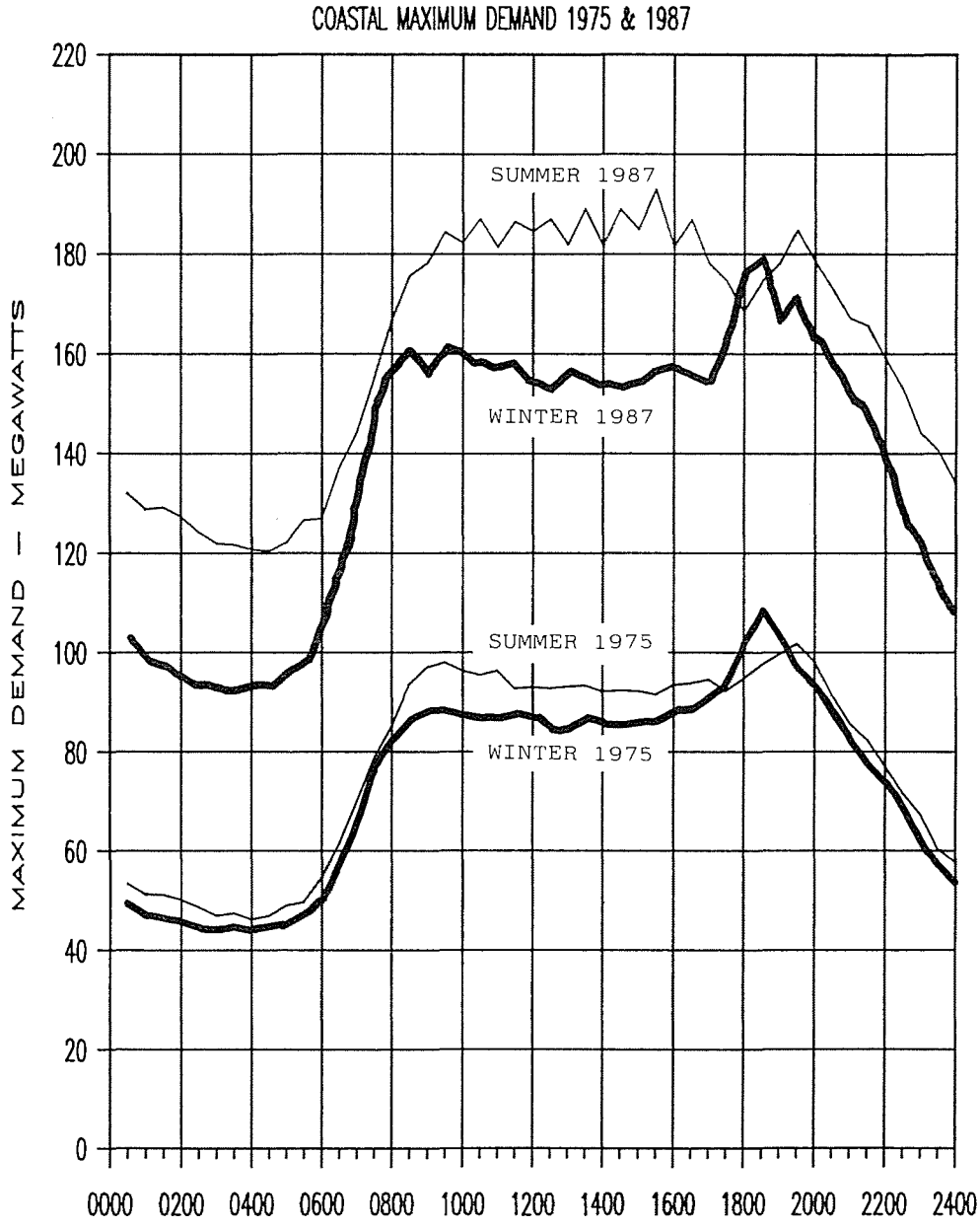

Fig. I: NORQEB demand curves 1975, 1987

An important issue raised by the development of electricity supply was the relative merits of public and private ownership. By the beginning of the 20th century the nascent electricity industry in both Britain and the United States comprised a mixture of public and private enterprise, though in differing proportions. In 1900 there were over 3,000 electricity undertakings in the United States, 80% of which were private. In Britain, on the other hand, more than half the 250 electricity suppliers were public enterprises, generally run by municipalities.[11] This pattern has persisted. Nowadays there are about 400 privately-owned electric utilities in the United States, which supply the greater proportion of units generated. Their operations are, however, regulated by a multitude of government bodies.

In Britain government involvement in the industry has been more direct and more extensive. In 1925 the Central Electricity Board was established to set up a national grid system and to rationalise supply. The industry was nationalised in 1948. In Australia the industry began as a mixture of public and private enterprise, with private firms predominating. All State governments eventually set up statutory authorities to conduct or control the industry.

The notion that electricity supply is a "natural monopoly" has often been used as a rationale for public regulation or ownership. It has also been offered as an historical explanation for public acquisition of the industry. For instance, Clem Lack Jr., in his thesis on the development of electricity supply in Queensland, first assumed economies of scale in generation and transmission, and from this drew the conclusion of natural monopoly, with large implications for the organisation of the industry.

> Since its early competitive days, electricity supply has come to be regarded as a "natural" monopoly. Indeed it is evident that for the efficient use of the resources needed for the generation and distribution of cheap electricity a position of monopoly is essential. This provides scope for exploitation of the consumer unless there is adequate regulation of the monopoly by the government, or unless there is public ownership in the interests of the consumers themselves.[12]

"Natural monopoly" is said to exist when production of an industry's output by a single firm is less costly than production by two or more firms; natural monopoly is therefore closely associated with economies of scale. The idea that electricity supply is a natural monopoly has been commonly accepted, and might appear to be borne out by experience in Australia and elsewhere. But recently economists have questioned whether the industry is indeed a natural monopoly, and even if it is, whether that justifies public intervention.

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11. T.I. Williams, *A Short History of Twentieth-Century Technology c.1900-c.1950,* Oxford, 1982, p.66.
12. C. Lack Jr., The Electricity Supply Industry in Queensland: Its Development, Structure and Control, with Particular Reference to South-eastern Queensland, 1930-1953, B.Ec. Hons, University of Queensland, 1967, p.15.

A recent investigation of the electricity supply industry in Victoria concluded that it probably is not a natural monopoly[13]; much of the evidence and argument put forward applies to other Australian States as well. Within the size range of modern Australian electricity systems, economies of scale are evident only in transmission. Although there are economies of scale in generation, for reasons discussed earlier, they are not unlimited, mainly because economies in power station size and in common ownership of several power stations are exhausted fairly quickly; diseconomies arise mainly from the problems of managing very large organisations. The Victorian report therefore suggested that generating stations could be operated more economically by several different firms. Economies of scale in transmission make that sector of the industry a natural monopoly, but this does not entail extending the monopoly to generation. There are several different ways of combining a monopoly transmission system with competing generating companies: generating firms could contract with the owners of the transmission system for use of the network; in the United States joint ownership of a transmission network by several generating firms is not uncommon.[14] Thus the report suggested that vertical integration of generation and transmission, in the familiar Australian pattern, is probably not economic. There is no evidence of economies of scale in distribution, though practical and aesthetic considerations suggest that monopoly is desirable in this sector, competition being limited to the boundaries of service areas and to the possibility of consumers moving between areas. Most importantly, the study rejected the simplistic characterisation of the whole industry as a natural monopoly.

The need for government involvement even in clear cases of natural monopoly has also been questioned, notably by W.J. Baumol, a distinguished American economist well-known for developing a branch of economics called "contestable market analysis". Baumol argues that if an industry which is a natural monopoly also qualifies as a contestable market, government intervention is both unnecessary and undesirable. Contestability refers to the extent to which there is a real threat of competition, which in turn depends on the extent to which costs in the industry are sunk: competitive entry is encouraged if an unsuccessful entrant can recoup his outlays quickly and easily. If an industry is a natural monopoly, one firm can supply the market more cheaply than several firms; competitive attrition will naturally eliminate rivals, so there is no need for government intervention to enforce and protect the monopoly. Moreover, if the market is contestable the threat of entry by potential rivals will restrain the monopolist from extracting excess profits, and make him behave in other respects as under free competition, with all the advantages this holds for consumers; hence government interference to protect the monopoly would actually be undesirable.[15]

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13. Centre of Policy Studies, *Energy Pricing Issues in Victoria*, Melbourne, 1982, pp.4.5-4.9. For the Queensland industry, see D. Wadley, "Cost, price and revenue differentials in electricity supply: Queensland and Australia", *Australian Geographical Studies*, Vol.19, No.1, 1981, pp.25-46.

14. Centre of Policy Studies, *Energy Pricing Issues*, p.4.7.

15. W.J. Baumol, "Natural Monopoly and Contestable Market Analysis", in Centre of Policy Studies, *State Enterprise and Deregulation*, Melbourne, 1983, pp.1-2. For further reading on this subject, see W.J. Baumol, "Contestable Markets: An Uprising in the Theory of Industry Structure", *American Economic Review*, Vol.72, No.1, 1982, pp.1-15; W. Baumol, J. Panzar & R. Willig, *Contestable Markets and the Theory of Industry Structure*, San Diego, 1982.

Can Baumol's argument be applied to the electricity supply industry? In the modern industry, capital costs are high and, to a relatively large extent, sunk; transmission lines and equipment have comparatively few alternative uses and this is true also of much modern generating equipment. It is doubtful therefore whether the modern industry would qualify as a contestable market, though a thorough economic analysis of the industry would be needed before a definitive statement could be made on this point. However, Baumol's argument is more applicable to the small-scale generating plants used in most of Queensland until quite recent times; in this earlier period the justification of government control and ownership in terms of natural monopoly was commensurately weaker.

Recent work by economists, then, undermines on both factual and logical grounds use of the natural monopoly argument as a justification for public intervention and as an explanation for the historical development of the electricity supply industry. This raises questions about whether public ownership was as inevitable and beneficial as has usually been assumed, issues addressed in more detail in the next chapter.

This history traces the growth of the electricity supply industry within the areas now administered by the North Queensland Electricity Board (NORQEB) - a vast region stretching along the coast from Ingham to Bowen, inland to the Northern Territory border, south to Boulia and north to the Gulf. For the purposes of the study, the term "north Queensland" refers to that large domain, excluding the far northern areas covered by the Far North Queensland Electricity Board. This regional history shows how the broad technological and economic themes sketched in this introduction were expressed in a particular Australian context. The book was written with a lay audience in mind, although it does include some technical information primarily of interest to specialists.

The organisation of the material is basically chronological, with a couple of exceptions. The first chapter outlines the legislative framework within which the industry evolved in Queensland, and suggests a broad interpretation of its development using concepts of political economy. Chapter 2 begins with the first electricity supply system in north Queensland in Charters Towers and traces the subsequent history of the industry in that city until it was absorbed by the Townsville Regional Electricity Board (TREB), the forerunner of NORQEB. The rest of chapter 2 and the following chapters deal in similar fashion with electrical development in Ayr, Townsville, Home Hill, Bowen, Collinsville, Ingham, Hughenden, Winton, Richmond and Julia Creek - all centres which were eventually incorporated within TREB. The early history of electricity in Mount Isa, Cloncurry, Boulia and Camooweal, which were never included in TREB but which currently form part of NORQEB, follows. The next two chapters discuss developments during the TREB era, spanning three decades from 1946 to 1977, and the history of NORQEB itself since 1977. A separate chapter is devoted to selected aspects of industrial relations in the electricity supply industry. Finally the main points are summed up in the Conclusion.

CHAPTER ONE

POWER POLITICS: PUBLIC CONTROL AND OWNERSHIP

This chapter analyses the legislative framework within which electricity supply developed in north Queensland. Given the prevailing assumptions about political economy, the economic and social importance of the industry meant that there was significant and increasing political intervention.

Virtually from the beginning electricity provision was under extensive government regulation; the rationale for and effects of this are examined below. The following discussion focuses on an important phase in the process by which the industry was brought under state control and ownership: the Royal Commission of 1936 which recommended public acquisition as an ultimate objective, and the subsequent legislation of 1937 which paved the way for government take-over. The aim is to discover the main arguments which the politicians put forward as their rationale, to assess the validity and force of these arguments, and to consider what might have been their real motives. Subsequent changes in the structure of the industry at the end of the war and in the 1970s and 80s are then outlined. Two enduring objectives of government intervention are highlighted: electrification of rural areas and uniform prices State-wide. These twin objectives were essential in determining the character of the industry: its ownership, regulation, organisation, policies, development and its continuing close involvement with politics.

The electricity industry in Queensland, as in Australia as a whole, evolved from a mixture of small private and public enterprises to a large, centralised public monopoly. The process of centralisation was in line with economic and technological changes, such as demand expansion and the development of technology for long-distance transmission. The process of increasing public control was a related but distinct phenomenon.

The earliest electricity suppliers in the region now administered by NORQEB were private firms - the Charters Towers Electric Supply Company (1897) and David Edwards in Ayr (1914). The first public authorities were set up by the Townsville Harbour Board (1919), the Townsville City Council (1920), the Inkerman Water Supply Board at Home Hill (1921) and the Bowen Town Council (1921). These pioneers were soon followed by other private companies and public enterprises, the latter usually run by local government bodies. These early electricity enterprises rested upon local, limited-period franchises granted by the Queensland government.

From the beginning government policy favoured local authorities as electricity suppliers. In the periods 1915-29 and 1932-36 Labor governments, in pursuit of the objective of ultimate public ownership, almost invariably restricted issue of franchises to local public authorities.[1] This policy was only briefly overturned by the conservative

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1. Forgan Smith, *QPD*, Vol. 171, 1937, p.1215.

Moore government in the 1929-32 interval. By 1936 there were 62 electricity undertakings in Queensland - 41 owned by local public authorities and 21 by private companies.[2] In north Queensland, where the Townsville City Council dominated production, private companies in Ayr, Charters Towers, Ingham and Mount Isa generated approximately 13% of total electricity production.[3] Despite government disfavour, there was a considerable private presence in the industry up to 1937 when the Forgan Smith government began moves for public acquisition.

The displacement of private enterprise and establishment of large-scale public monopoly were consolidated after the Second World War, the last surviving private company in north Queensland - at Charters Towers - being bought out in 1956.[4] The transfer from private to public ownership was consistent with the pattern of development in southern Australian States and in Britain. In Queensland, the antecedents of this transition can be found in the earliest legislation on electricity.

Early Legislation

Although there was growing interest in electricity supply in Queensland, especially Brisbane, from the late 1880s, parliament did not pass comprehensive legislation for the industry until 1896. In 1890 parliament briefly considered electric street lighting for Brisbane, but nothing came of it: a Bill to authorise the municipality of Brisbane to provide electric lighting was introduced, promptly referred to a Select Committee, and then allowed to lapse at the end of the session.[5] A Bill to empower the Brisbane Gas Company to provide electric street lighting was also considered, but was rejected.[6] It was feared that authorising a gas company would merely delay the advent of electric lights since it would be against the company's interests to promote electricity. This fear had an important effect on subsequent legislation: since a number of municipalities had been granted gas franchises, it was considered impolitic to give them a veto over the formation of local electric authorities. This developed into the most contentious issue of the debate in 1896 on the Electric Light and Power Act.

By 1896 both private companies and public bodies required legislative support. Electricity was by then being supplied in sections of Brisbane, and preparations were underway in Rockhampton, Warwick and Charters Towers. There was nothing to prevent private companies from starting up, but there were no safety standards or standards for equipment. In Charters Towers, for instance, where consumers were to purchase fittings for their premises from contractors, the electric company was anxious to obtain legislative authority to refuse supply if a consumer's equipment did not reach a certain standard; inferior wiring could jeopardise the company's plant, indeed the whole supply system. There were no standard arrangements to enable electric companies to break up streets, place equipment on streets or stretch overhead lines.

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2. Report of Royal Commission on Electricity (RC), *QPP*, 1936, Vol.2, p.1265.
3. RC, pp.1306-7.
4. Note, however, that this was not the same company that had initiated supply in 1897.
5. *QPD*, Vol.62, 1890, p.1356, p.1380.
6. *Ibid.*, p.1380, p.1392.

Nor was there any provision at all for local government or municipal bodies to undertake electricity supply; these bodies derived all their powers from parliamentary delegation and had not yet received authority to enter the electricity field. Several local authorities, most notably the Brisbane City Council, had been pressing the government for some time to bring in appropriate legislation.

The Electric Light and Power Bill was first introduced in the Legislative Council - a proceeding strongly criticised by democrats in the Lower House - because the Postmaster General, A.J. Thynne, calculated that the procedures of the Upper House would expedite the setting up of a Select Committee; this was considered essential since members could be expected to understand little about such a technical subject.[7] Electricity was regarded as a prerogative of the P.M.G.'s department, at least by the department itself, because of its association with telegraphy. In the Council Thynne emphasised the dangers of electricity and the need to protect the public as his chief rationale for government intervention.[8] The safety aspect was later taken up in the Legislative Assembly, where it was advanced as a reason for great urgency, justifying the government in pushing through the Bill at the tail end of the session, in a hot and weary December.[9]

In the Council a Select Committee to gather information was immediately suggested; the need for expert advice was generally conceded, and the committee took advantage of the temporary presence in the colony of a couple of British experts, including James Callender who was assisting the Charters Towers company to set up its system. The Bill was amended in light of the committee's findings. Among other changes, concessions were offered to companies who had either commenced electrical works (such as the Charters Towers company) or who had authority to do so; they were given a year's grace before they had to apply for an Order-in-Council to supply power.

Though care was taken to safeguard the interests of existing private companies, the Bill took as a general principle that local authorities should have the first claim to supplying electricity. No franchise for power supply would be given to a private company unless the local authority was consulted; but in exceptional circumstances, when the local authority refused a company's application but did not intend to supply electricity itself, the government could disregard the refusal. Among other speakers, A.C. Gregory, the well-known explorer who had had considerable experience in local government institutions, expressed qualms about giving them an outright veto:

> Local representatives, however good business men they may be individually, however straight forward and ready to do justice in ordinary transactions, when they congregate together and form a local authority, appear to leave conscience outside, and simply consider whether something will be to their gain or will prevent somebody else from gaining.[10]

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7. QSA WOR/104, in-letter 5967.
8. *LCD*, Vol.75, 1896, p.575.
9. *QPD*, Vol.75, 1896, p.1708.
10. *LCD*, Vol.75, 1896, p.632.

This aspect of the Bill - the government's power to override the local authority in certain circumstances - became the greatest source of opposition to it. As one of the most vocal opponents put it, it was "a Bill to protect certain companies, and to curtail the powers of local authorities."[11]

This charge arose out of complicated disputes then raging in Brisbane between the municipality and certain private companies.[12] But in fact local authorities were the principal beneficiaries of the legislation. Until it was passed, they could not enter the field of electricity supply at all; but private companies could, without hindrance or control, and could thus establish vested interests in the industry which the government would be loath to ignore. Several local authorities, including the Brisbane City Council and Croydon Council in the far north of Queensland, were waiting for empowering legislation. Despite the extreme statements of some opponents, the Act gave priority to the claims of local authorities in all but exceptional circumstances.

The Electric Light and Power Act passed in 1896 was modelled, in parts word for word, on previous British legislation: the British Act of 1882 with its subsequent amendments. Comprehensive legislation was brought in because it would avoid the need for separate Acts of parliament for each electricity supplier; this had been the pattern in legislating for gas supply, which had taken up parliamentary time and had resulted in a confusing welter of conditions and privileges in the various Acts. The Governor-in-Council[13] was empowered to issue Orders for electricity supply to local authorities or private companies for periods and under terms and conditions specified in the Order. It was declared illegal to supply electricity publicly without an Order-in-Council, although the Act did not prohibit the use of electricity by private persons on their own premises. An Order could authorise supply for a maximum of 42 years, following the British practice; at the end of the period specified, either the local authority had six months in which to purchase the utility if it wished or, if the local authority was already supplying electricity, the government could insist that the undertaking be sold off. 42 years was considered a reasonable period for the enterprise to obtain a profit from its initial investment; in Britain the time had been extended from seven to 21 to 42 years (1888) on these grounds. The Queensland legislators thought it important not to discourage investors by making the conditions too harsh.

An Order-in-Council did not establish a legal monopoly. Some of the early legislators insisted that the government should be able to grant authority to another electric authority in the same area. Queensland governments therefore could have allowed competition, could have refused to protect the monopoly power of existing incumbents. If this had indeed become the practice, then the absence of competition outside Brisbane would indicate the presence of natural monopoly.[14] But in fact government policy granted what the legislation refused: Orders bestowed a *de facto*

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11. McMaster (Fortitude Valley), *QPD*, Vol.75, 1896, p.1709.
12. M.I. Thomas, *A History of The Electricity Supply Industry in Queensland*, pp.32-6.
13. That is, the Executive Council, over whose meetings the Governor presides. The main function of this body is to give legal effect to ministerial decisions without specific parliamentary enactment.
14. Economists define an industry as a "natural monopoly" if production of the industry's combination of outputs by two or more firms costs more than if they are produced by a single firm.

monopoly.[15] Governments took a dim view of the potential effect of competition on the profitability and viability of incumbents, particularly if they were local government bodies. Shares in private electricity companies became virtually gilt-edged securities.

Orders could not be transferred, or bought and sold. Transferability would have improved the economic effectiveness of the provisions by enabling an innovative or potentially more efficient rival to buy the franchise at any price that would have allowed him a profit. Nor was there any official system of auctioning Orders-in-Council - of obtaining some recompense to the state in return for the privilege of what amounted to a publicly-protected monopoly. There was scope for informal auctioning, since local authorities could choose between rival candidates for electricity supply; in Ingham, for instance, bidding took place on the basis of supply price to consumers.[16]

Under the Electric Light and Power Act, strict regulations were laid down for electric utilities covering equipment, quality of service, inspectors, pricing and virtually every other aspect of their operations. Apart from municipal operation, regulation was regarded as a means of curbing abuse by electric authorities. The Act and regulations issued under it were administered for a short period by the Post and Telegraph Department; when responsibility for posts and telegraphs was yielded to the Commonwealth after federation, administration of electricity supply passed to the Department of Public Works. The original controls remained in effect with only minor modifications until October 1919, when a new set of even tighter regulations was proclaimed to take account of technical advances in the industry;[17] these were thoroughly revised again in 1930-31.

In addition to regulations of general application, the Orders-in-Council issued under the Electric Light and Power Act imposed specific controls upon each electric authority. One significant economic restraint was the setting of maximum prices by the minister; prices were one of many conditions which prospective electric authorities were required to specify for ministerial approval. Electric authorities could apply for an alteration of prices only after seven years. Nevertheless, the pricing conditions approved in the early Orders were not onerous. According to the Charters Towers Order, for instance, if the authority opted to charge according to the amount of energy supplied to a consumer, it could not ask more than one shilling per unit of electricity.[18] This upper limit was not niggardly - in 1882 the British Act had set 8d. a unit as a maximum price. Of course, population densities could be expected to be lower in Queensland, making costs of supply higher.

However, in circumstances of rapidly changing technology and in a variety of local conditions, the fixed maximum price was of limited effectiveness as an instrument of economic control. For this reason profit regulation was later introduced to work in

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15. Note however that actual market power was limited by the availability of substitutes, such as candles, kerosene and gas for lighting, and by the possibility of commercial users installing their own small plants.
16. J. Wegner, Hinchinbrook: The Hinchinbrook Shire Council, 1879-1979, M.A., JCU, 1984, p.383.
17. *QGG*, 31 October 1919, p.1523.
18. Charters Towers Order in Council, *QGG*, 15 October 1897, p.834.

conjunction with maximum prices. For instance, the Order granted the Townsville City Council in 1920 set a maximum profit of 5% per annum; if this was exceeded, prices had to be reduced to bring profits down to this limit.[19]

In 1934 these controls were centralised, and prices and profits made subject to periodic review. An Electricity Board was set up within the Department of Public Works to collect financial and statistical data from electric authorities and to revise prices in the industry; a return on capital of 7% per annum was established as a standard.[20] However this method of regulation had one glaring defect, which made it of dubious benefit to consumers:

> It does not sufficiently distinguish between undertakings which are efficiently conducted and those which are not...Thus, if an electric authority, by highly efficient methods and special efforts effects economies, the whole of those economies are reflected in reduction of prices and no additional reward is given to the electric authority. On the other hand, if an electric authority, by slip-shod methods, fails to keep prices as low as they might otherwise be, there is no penalty attached.[21]

Profit regulation left little or no incentive for efficiency. In addition, the Electricity Board were soon forced to admit that it was extremely difficult for an outside body to determine prices and costs of production for each category of consumer, let alone justifiable prices or costs.[22] For these reasons, amendments of the Electric Light and Power Act in 1933-34 to facilitate government supervision of prices and to provide for the abolition of meter rents aroused strong opposition from both private and municipal electric authorities.

A central feature of the 1896 Act was that it gave priority to local government bodies as electric authorities. Local government authorities were at that time well placed to operate as electricity suppliers. Electricity was at first used mainly for lighting, and only closely settled urban areas were suitable. Large distances separated towns in north Queensland and technical limitations restricted the range over which energy could be transmitted economically. So the limited area administered by a local authority suited the economics of the industry at the time. Moreover problems concerning use of streets could be solved simply within the institution. Freedom from company income tax, or any other tax, was an additional and increasingly important advantage. There also seemed to be an assumption, though this was nowhere spelled out, that basic utilities such as water, gas, sewerage and so on should be provided by municipalities; perhaps the tacit aim was to avoid the abuse of monopoly power. The Act was thus clearly part of the municipal trading movement sweeping Britain and the southern colonies at this time.

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19. *QGG*, 1 November 1920, p.1529.
20. *The Public Acts of Queensland (reprint) 1828-1936*, Vol.3, p.325, p.339.
21. E.S. Cornwall, Assistant Manager, City Electric Light Co., QSA ROY/26, Royal Commission on Electricity, Evidence Vol.1, 1936, p.21. Cf. C. Faine, Managing Director of Electric Construction Co. of Australia Ltd, Southport, QSA ROY/28, Royal Commission on Electricity, Evidence Vol.3, p.366.
22. A.C. Sorensen, Chairman of Electricity Board, QSA ROY/29, Royal Commission on Electricity, Evidence Vol.4, p.611.

The early encouragement given to municipal operation virtually ensured later public acquisition of the industry, when technical developments and demand expansion made larger supply networks economic. This was not because there were no alternatives to public ownership as a means of coping with these changes, but because no alternatives were investigated. One possible alternative to public intervention when the need became obvious for larger supply areas was the formation of generating companies to supply power in bulk to smaller distribution authorities, as occurred in Britain in the early 20th century. Another alternative was that small municipal electric authorities could be amalgamated or sold off. However, local authorities tended to define their function as providing their own ratepayers with a necessary service, an aim and ambit considered incompatible with merger and take-over in pursuit of profits. Although there was provision under the Local Authorities Act for joint administration of electric undertakings by contiguous local authorities, contracts between local authorities to allow interconnection of electricity systems were not considered before the Second World War, when they were adopted only as a defence expedient; by that time the impetus towards state ownership was already established.

Royal Commission of 1936

The 1896 Act remained the basis of government involvement in the industry until in December 1935 William Forgan Smith's Labor government appointed the Royal Commission on Electricity, consisting of John Kemp as chairman, Albert Axon, John Grier, Sidney Bryan, and S.F. Cochran as secretary. In appointing the Commission Forgan Smith stressed the need for co-ordinated, planned development of the electricity industry,[23] thus foreshadowing the main conclusion reached. The terms of reference gave the Commissioners unlimited scope to inquire into the laws relating to electricity, the conduct and management of existing authorities, a feasible system for co-ordinating generation and supply and any other matters relating to electricity. Evidence was taken through the following year in many Queensland towns and in southern capitals, and the Commission reported near the end of 1936.

The Report began with the immense social and economic importance of electricity: national productivity was linked directly to consumption of electricity. It was emphasised that the spread of efficient, modern methods in farming, for instance, depended upon electricity supply; the singling out of agriculture was not without significance, as will be argued below. Largely on the basis of the national importance of the industry, the Report recommended "that the ultimate public ownership of electricity supply is the proper objective to adopt." [24]

A few supporting arguments were included to explain this key recommendation. First, it was argued that technical advances in transmission and distribution were incompatible with the existing decentralised system, where electricity was provided in a multitude of small areas by separate authorities; instead, "a comprehensive system of

23. *Queenslander*, 12 December 1935. *TDB*, 6 December 1935.
24. RC, p.1263.

co-ordination and control" was said to be necessary.[25] Other countries which had adopted state ownership in electricity were cited as models; these included not only densely populated industrial countries like Britain, but also South Africa, New Zealand and the State of Victoria - agricultural countries with low population densities which were considered more appropriate examples for Queensland to follow. Finally, the need to subordinate private and local interests to the national interest was urged. For these reasons public ownership was advocated as "the best means of achieving an efficient, planned system."[26]

In retrospect at least, these explanations seem remarkably thin. It may be that in an industry long regulated under wide government controls the short step to outright public ownership seemed to require little justification. Moreover, in the wake of the Great Depression social attitudes were increasingly receptive to direct government involvement in the economy. It was these attitudes which provided such fertile ground for Keynesianism, for indeed this was the year of the *General Theory*. In Australia, and especially in Queensland, the efficacy of public expenditure in boosting economic activity had been widely accepted years before Keynes attempted a theoretical vindication. Of relevance to the electricity industry in particular, the massive project of the Tennessee Valley Authority in the United States, part of Roosevelt's New Deal package to curb unemployment, had captured the imagination of people throughout the world, not least the imagination of engineers. Beginning in early 1933, the TVA had implemented a vast and successful scheme in underdeveloped rural areas to produce cheap electricity, which was distributed at uniform prices to consumers near and far. During discussion of the industry's future in Queensland, the TVA scheme was frequently cited as an admirable achievement of government intervention in the electricity field, although in America itself there was always strong opposition to the nation's largest public electric utility, on both party and regional lines.[27] This serves to emphasise by contrast the consensus prevailing in Queensland on the desirability of public enterprise, which helps in turn to explain why the Royal Commission of 1936 gave so little attention to justifying their main recommendation.

In fact, the Commission's few supporting arguments were flawed. Their first argument was simply a *non sequitur*. Because a decentralised system had developed under an outmoded technology it did not follow that public ownership was necessary. If centralisation would indeed have been more economic, then a private company would presumably have been willing to implement it; in fact the City Electric Light Company in Brisbane was willing and able. The main impediment to centralisation was the government's own system of non-transferable local Orders-in-Council. On the other hand, if the new technology did not make for greater economy, then why should its higher costs have been forced upon consumers and taxpayers? This argument seemed to assume that technological advance was only possible within a large co-ordinated public system, yet in the United States electricity supply had always operated on a

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25. RC, p.1264.
26. *Ibid.*
27. A. Wildavsky, "TVA and Power Politics", *American Political Science Review*, Vol.55, No.3, September 1961, pp.576-90.

private basis and there had been no delay in introducing innovative technology.[28] There was no necessary connection between centralised generation and public ownership.

Notable here is the history of the City Electric Light Company, in particular the fate of the comprehensive scheme for electrification of south-east Queensland which the company put forward in 1936. This scheme was analysed in detail by the Royal Commission. On virtually every count the Commission lauded the company's proposal as a "technically sound and suitable plan."[29] But the fundamental obstacle was that the company's request for a franchise tenure of 42 years would have deferred "too long" the ultimate goal of public ownership.[30] So instead the Commission recommended the formation of a public body - an Electricity Commission along the lines of the State Electricity Commission in Victoria - to implement the company's commendable scheme.

Indeed, whereas the engineers in the Royal Commission were willing to allow the City Electric Light Company a brief reprieve if immediate public acquisition were financially impossible, so long as it was under strict control by their Electricity Commission, the trade union representative opposed even this leniency. Commissioner S.J. Bryan, who had helped to form the Queensland branch of the Electrical Trades Union in 1915, was then secretary of the union and president of the Trades and Labor Council.[31] In view of the policy of "all enlightened countries" to place electricity in the hands of the state, and the need to "prevent any exploitation of the people", he objected in a rider to the main Report to any proposal to extend "the life of private enterprise", despite the technical and economic merits of the company's plan.[32] How "the people" were to benefit from the higher cost and technically ill-considered alternative of the Brisbane City Council he did not explain.

The Commission's other arguments fare no better under examination. The fact that other countries had gone the way of state ownership is hardly conclusive. The implication - that public ownership was adopted elsewhere because it was the best policy - was unsupported; there was no analysis of actual political and economic circumstances, reasons or rationales. One salient counter-example, the persistence of private ownership in the United States, was ignored. Finally, the supposed antagonism between "private" and "national" interests implied a political philosophy by no means self-evident. In a pluralist society the "national interest" will be difficult if not impossible to identify, and the term will usually, as in this case, be a screen for particular sectional interests. The crucial national importance of the industry, used here and so often as a rationale for either ownership or extensive control by the state in a variety of industries, seems more a reason to find the best possible method of organisation - and the economic efficiency of competitive markets should weigh in the balance as well as any

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28. I.C.R. Byatt, *The British Electrical Industry 1875-1914*, p.197, p.209.
29. RC, p.1276.
30. *Ibid.*
31. For biographical details, see A. Dawson, *Points and Politics: A History of the Electrical Trades Union of Queensland*, Brisbane, 1977, p.40.
32. RC, p.1295.

benefits expected from planning. There was no evidence in the Report that potential costs of government interference were considered in addition to benefits; it was simply assumed, without inquiry or explanation, that national importance implied state ownership. In all, the Commission's scanty attempts to justify its main conclusion are not persuasive.

The composition of the Commission is significant, especially in view of recent theorising about the political bases of public enterprise.[33] The four-man Commission consisted of three engineers, two with bureaucratic backgrounds, and one trade union representative. John Kemp had long been a public servant in the Department of Public Works, and had an engineering training; from 1925 to 1949 he was Commissioner for Main Roads. J.J. Grier was the long-serving Chief Electrical Engineer with the Department of Public Works, where he had worked since 1916. Albert Axon was a prominent consulting engineer and for several years had represented the managements of the various electric authorities on the Electrical Workers Board. S.J. Bryan represented the Electrical Trades Union and was active in the labour movement generally. That such a Commission should have been selected reveals the government's view of the important interests within the industry; consumers and taxpayers were conspicuously absent.

It has often been observed that engineers have a tendency to sacrifice economic to technical efficiency.[34] This may be explained in part as a result of professional bias and natural inclination. More sinister in its implications is the view that the constant thrust towards the technical frontier provides extra employment for engineers and enhances their professional prestige; the establishment of centralised, co-ordinated systems may satisfy a mere craving for empire-building. The social status of the professional engineer, in common with that of many other professional groups, seems to depend less on the cost-effectiveness of the system under his charge, and more on its extent, its output, and its technological novelty. Public enterprise, especially public monopoly, provides a haven from competitive market forces where these motives can be indulged. Furthermore, management of public industries is often entrusted to those with technical expertise in the field; the Commission's Report argued strongly that this should be so.[35]

The tendency of trade unionists to support public enterprise, even when it is clearly more expensive, was illustrated above: S.J. Bryan was willing to sacrifice the well-designed, lower-cost proposal of the City Electric Light Company in favour of the alternative suggested by the Brisbane City Council. This tendency may be explained as a result of a doctrinaire commitment to socialist ideologies; certainly Bryan couched his view in these terms. However, the often-noted petit-bourgeois character of

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33. G.J. Stigler, "The theory of economic regulation", *Bell Journal of Economics and Management Science*, Vol.2, No.1, 1971, pp.3-21. G. Tullock, "Public Choice and Regulation", in Centre for Independent Studies, *The Economics of Bureaucracy and Statutory Authorities* Sydney, 1983, pp.1-12.
34. E.g., N. Butlin, A. Barnard & J. Pincus, *Government and Capitalism: Public and private choice in twentieth century Australia*, Sydney, 1982, pp.294-5; P. Swan, "The Economics of QANGOS: SECV and ELCOM", in Centre for Independent Studies, *Economics of Bureaucracy*, pp.26-8.
35. RC, p.1282, p.1285.

Australian trade unions, which applied particularly to the Electrical Trades Union, throws doubt on this interpretation. It seems more plausible that unions support public enterprise, especially when it takes the form of public monopoly, because it confers economic benefits on employees. Monopoly profits tend to be divided up between employees and managers of public enterprises, who desire a "quiet life" free of industrial turmoil. The absence of market pressures gives unions greater scope for extracting higher wages or improved conditions, and this in turn enhances the position of union organisers. Another consideration is that large, co-ordinated public enterprises provide easier conditions for union recruitment and organisation than markets consisting of many small operators. Significantly, the concept of a central co-ordinating body for the electricity supply industry was first inserted in the Labor platform in 1923 as a result of a resolution from the Electrical Trades Union, moved by S.J. Bryan, that "a board of electricity commissioners be appointed to organise electrical undertakings."[36]

In north Queensland the Commission's Report was criticised in a leader of the *Townsville Daily Bulletin* which expressed a consumer's point of view. It suggested that eliminating competition between suppliers was not to the advantage of electricity consumers and pointed out that rivalry between the two authorities in some parts of Brisbane had led to significant reductions in charges. However, since the electricity supplier in Townsville was already the local government body, the municipal council, the *Bulletin* foresaw no real change in the local situation; the editor could only question whether centralised control might not interfere with the prerogatives of local government. The *Bulletin* deplored an increase in political centralisation, "so generally lamented, yet so universally practised."[37]

In Queensland as a whole there was no concerted opposition from existing electric authorities to the principle of central control, although later there were numerous small skirmishes when the SEC began to assert its new powers. In New South Wales, on the other hand, legislation in 1950 to establish a co-ordinating Electricity Commission aroused fierce resistance from electric authorities.[38] One possible reason for the passive response in Queensland was that protest against centralisation had already been vented and subdued in 1933-34 when the government imposed tighter economic restraints on electricity undertakings.

In 1937 the Queensland parliament passed the State Electricity Commission Act. It closely followed the recommendations of the Royal Commission, and was based on the Victorian Act which in 1919 had established a body of the same name to control the industry and develop brown coal resources in that State. The first Commission consisted of a full-time Chairman, S.F. Cochran, and three part-time Commissioners, J.J. Grier, A.E. Axon and S.J. Bryan. W.H. Nimmo was appointed following Grier's retirement in 1943, and when Axon retired in 1945 H. Neil Smith was appointed part-time Commissioner in addition to his duties as Secretary.

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36. Official Record of 11th Queensland Labor-in-Politics Convention, March 1923, pp.52-3.
37. *TDB*, 3 December 1936.
38. G.F. Anderson, *Fifty Years of Electricity Supply*, pp.224-7.

Initially the SEC was to be a controlling body rather than an operating Commission. It was authorised to negotiate with the City Electric Light Company conditions under which the company would be allowed to proceed with electrification of rural parts of south-east Queensland; the outcome was that the Brisbane City Council continued to operate two stations in the Brisbane suburban area and the City Electric Light Company supplied parts of Brisbane and rural districts until 1952, when it was superseded by the Southern Electric Authority. This compromise with private enterprise was dictated by the government's lack of financial resources to buy off the company's franchises. An important consequence was that the SEC was left free to supervise developments in all areas of the State instead of focusing attention on the south-eastern corner.[39] The Commission was given wide powers over the operations of all electric authorities, including price fixing, capital investment and extensions of the supply network. Its avowed aims were to safeguard public safety, ensure an adequate supply of electricity, regulate plant and equipment with a view to the ultimate co-ordination and interconnection of the various local systems, and guide electric authorities towards economic efficiency.[40]

Increasing regulatory control over the industry was partly a response to the undesirable results of previous regulation. In 1937 Forgan Smith described the consequences of monopoly power and freedom from market discipline, and then proposed to remedy them by more of the same:

> ...the control of many of the existing electric supply undertakings in Queensland cannot be described as economical. I have visited undertakings where machinery has been bought that has never been used. That machinery has never been taken out of the packing case....
>
> All these things will be subject, in future, to the co-ordinating control of the central Electricity Commission.[41]

This shows an extraordinary optimism about the ability of a central planning organisation to supervise the day-to-day operations of a multitude of utilities spread all over the State. If local authorities had lacked incentive to run their electricity undertakings economically, what different incentives would face the administrators in the SEC? In parliament the Bill encountered no serious obstacles, the opposition concurring with the basic principle of state ownership,[42] thus showing again its widespread popular acceptance at this time.

Forgan Smith's role in the "nationalisation" of Queensland's electricity supply industry has been variously interpreted, depending on whether the commentator stresses the impetus towards public ownership given by the legislation, or the fact that private enterprise was allowed to continue for some time after the war. Brian Carroll argues that Forgan Smith's early convictions about the desirability of state enterprise were modified by the unhappy results of Labor's experiments in this field - the state butcheries, pastoral stations, coal mines and so on. These failures are supposed to have persuaded Forgan Smith that "control was more important than ownership" and that

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39. Interview with Neil Smith, 6 January 1987.
40. *SEC Annual Report (SEC AR), 1938*, p.9.
41. *QPD*, Vol.171, 1937, p.1152.
42. Moore, *ibid.*, pp.1153-4; Russell, *ibid.*, pp.1230-1.

state-regulated capitalism was a satisfactory alternative to state socialism, a policy which he proceeded to implement in the electricity industry.[43] However, the legislation initiated by Forgan Smith was a crucial step towards public acquisition and cleared the way to this ultimate goal. The government allowed some private electric authorities to continue simply because of the legal and financial obstacles raised by the Orders previously issued them; as soon as it was able, the government bought out these private companies. Though Forgan Smith did not remain in office to see the culmination of this process, he initiated and anticipated it.

Post-War Changes

Plans for reorganising the industry were interrupted by the Second World War, though the exigencies of war gave the SEC ample pretext for exercising their wide powers. Between 1938, when the SEC commenced operating, and 1944 the number of private electricity companies in Queensland was halved, falling from 21 to 11.[44] The acquisition of the remaining companies was accomplished gradually over the period to 1960.

In early 1945, before the end of the war, the Labor government enacted two Bills to restructure the electricity supply industry in Queensland: the Regional Electric Authorities Bill; and a Bill to enlarge the powers of the SEC to allow it, *inter alia*, to acquire, construct and operate generating stations. Introducing the latter, the Acting Premier, E.M. Hanlon, stressed that in order to "maintain our right to develop European civilisation" and to safeguard "the security for the white race in this country", it was imperative "to populate, settle and develop the northern and inland portions of the country". "Populate or perish", a slogan popularised by Arthur Calwell, was to be a recurring theme in post-war Australian politics, partly as a response to the recent experience of threatened invasion. In Queensland, said Hanlon, the Labor government "regard[ed] electricity as one of the major factors in that settlement and development."[45] Hanlon, as much as his predecessor Forgan Smith, stressed the importance of agricultural development, and considered it the government's responsibility to provide the necessary infrastructure including subsidised power, water and transport and regulated marketing structures.

Hanlon emphasised the need for rural electrification and no speaker questioned it, or the desirability of government subsidisation of uneconomic rural connections. The leader of the opposition, Nicklin, did not oppose the Bill. Only one speaker argued against it: John Chandler of the Brisbane electorate of Hamilton, who warned that the Bill gave the SEC sweeping powers - including powers over generation, borrowing, price-fixing and amalgamation of existing authorities. He argued that too much power

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43. B. Carroll, "William Forgan Smith: Dictator or Democrat?", in D. Murphy & R. Joyce (eds.), *Queensland Political Portraits 1859-1952*, Brisbane, 1978, p.401, p.424.
44. *QPD*, Vol.184, 1944-45, p.2015. The number of publicly-owned undertakings remained constant during this period.
45. *Ibid.*, p.2165.

would be taken out of the hands of the people's elected representatives, in parliament or in local government, and placed in the hands of bureaucrats:

> Make no mistake, it does not matter how good the Government servants may be - and I do not condemn them; I give them every credit for being in many cases very able and very ambitious men - very frequently they do put up proposals that are in the main based more on the desire to increase their own prestige, their own power, and their own pay than they are to serve the State.[46]

Chandler warned that the experience of increasing bureaucratisation in the federal sphere, which had been given great impetus and plausible rationalisation by war-time circumstances, had made people complacent about gradual erosion of parliamentary control. As a contemporary poet pointed out in response to the Chifley government's extensive post-war "planning":

> We hated the "bloated capitalist" once
> And his "blackleg, scabbing rat",
> We fall for his smug successor now,
> The Labor bureaucrat.[47]

Endorsed by the opposition, however, both electricity bills passed easily in parliament.

The Regional Electric Authorities Act led to the establishment of five Regional Boards along the eastern seaboard, centred in Cairns, Townsville, Rockhampton, Maryborough and Kingaroy (two more Regional Boards were added later). This was intended to promote centralised generation within the regions and thus to take advantage of economies of scale. Regionalisation was not extended at first to western Queensland because interconnecting the isolated generating stations was still uneconomic. Even after the regions delineated in 1945 became too small as a basis for efficient generation, the Boards were retained as distributing authorities; in 1964 the Northern Electric Authority took over generation and main transmission in the three northern regions, and it was superseded in 1977 by the Queensland Electricity Generating Board (QEGB), but the regional Boards remain. The persistence of regional organisation in Queensland distinguishes it from other Australian States.

In 1948 the SEC itself was reconstituted as a single Commissioner; S.F. Cochran was Commissioner until 1950, when he was appointed Chairman of the Joint Coal Board and H. Neil Smith, who had been Secretary since 1945, took his place. As Commissioner Neil Smith oversaw the rapid expansion of the industry from 1950 to 1972.

Organisation of the industry was not altered significantly until 1976. In 1972 the Queensland government set up an inquiry to consider re-organisation, and in 1974 it was decided that the industry would be conducted by nine bodies - the SEC as a central co-ordinating body; the QEGB which would be responsible for constructing and operating power stations and main transmission lines throughout the State; and seven Electricity Boards with responsibility for distribution to consumers. The Electricity Act of 1976 was the culmination of the policy of regionalisation, finally drawing the whole

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46. *Ibid.*, p.2179.
47. Quoted in A.J. Baker, *Anderson's Social Philosophy,* Sydney, 1979, p.125.

State within the compass of regional Boards. It also consolidated all the legislation pertaining to the industry, which was previously contained in six different Acts;[48] the Electric Light and Power Act of 1896 was finally superseded. In 1984 the Electricity Act was amended to allow the amalgamation of the SEC and QEGB to form the Queensland Electricity Commission (QEC).

During the post-war period the electricity supply organisation operated as a QUANGO (Quasi Autonomous Non-Government Organisation) formally accountable to the minister, but exercising a large degree of independence in practice. This along with personal qualities of Neil Smith, which included a high degree of political finesse, placed the direction of the industry largely in the hands of the Electricity Commissioner. While Neil Smith continued at the helm the situation remained basically unchanged, despite the decisive switch in the political complexion of the Queensland government following the Labor split in 1957. Smith's successors, however, were different men, confronted by rapidly changing circumstances.

Since the 1970s the industry has come under increasing scrutiny and has experienced greater interference from the Queensland government in both its organisation and operation. Nowadays there is close ministerial involvement in generation, transmission, regulatory functions, planning, fund-raising and pricing, with less direct involvement in distribution - the province of the regional Boards - through restraints on works programmes, budgets and staffing. This change coincided with and was in part a reaction to mounting public and political criticism of the industry throughout Australia, largely provoked by marked increases in tariffs in addition to recurrent plant breakdowns and blackouts. But there were also factors peculiar to Queensland.

The Bjelke-Petersen government became involved in the industry for a variety of reasons. Along with the reorganisation in 1976, which increased government control over the industry, the government took over the profitable electricity undertaking of the Brisbane City Council, over their protests at what they considered an attempt to undermine the Labor Council. In the late 1970s debate centred on the site of a large new power station for the southern network, the decision resting between Tarong close to the Premier's electorate and Millmerran. In 1978 Tarong was finally selected, but during the controversy National Party politicians cast doubt on the SEC's objectivity in evaluating the sites. A long series of power strikes in the 1970s also attracted the attention of government, and led to the Essential Services legislation of 1979 which removed the unions' power to strike. Continuing industrial unrest in the early 1980s was one reason for the government's growing inclination towards private generating stations; the unions on the other hand refused to countenance opening the industry to private enterprise.[49] The basic reason for the government's increasing involvement in the industry is its crucial importance for modern commercial, industrial and domestic life.

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48. *QPD*, Vol.296, 1984-85, pp.2079-81.
49. *QPD*, Vol.287, 1981-82, p.5515. R. Fitzgerald, *From 1915 to the Early 1980s: A History of Queensland* Brisbane, 1984, pp.337-40.

These recent changes are often described by those involved in the industry as a regrettable "politicisation". As this chapter shows, however, the industry has always been highly political. The consensus which prevailed among the political parties for over three decades on the desirability of public enterprise and certain other policy goals had given plausibility to the view that the SEC was somehow insulated from political forces. Like many QUANGOs, the Commission had used its supposed independence from political influences as part of its rationale. The best that can be said about this view is that it rests on an extremely narrow definition of politics.

Two Aims of Policy

Two main aims of the 1936 Royal Commission and of subsequent legislation were to extend electricity supply to rural areas of Queensland and to work towards uniform prices throughout the State. Because of their large consequences for the organisation of the industry, it is important to consider these objectives more closely.

Both these policies were to the advantage of country people, whose parliamentary representatives were vocal in support of the legislation, appealing strenuously to time-honoured agrarian myths about the superior virtue of rural production.[50] These policies were also to the advantage of the electricity industry itself, since they allowed for continuing expansion into new areas of supply. Assuming rural and urban consumers had identical demand curves for electricity, rural demand would have been more elastic because of the higher supply price. Uniform pricing policies allowed electric authorities to reduce prices for the group with elastic demand and increase them for those with relatively inelastic demand: a coveted objective of any monopolist attempting to maximise output or profit.

By 1938 67% of Queensland's population had been supplied with electricity,[51] but very few rural areas were connected. Higher costs of both transmission and distribution generally made it uneconomic to supply them. Ironically, an additional reason for the retarded development of rural supply in Queensland was the Labor Party's refusal to grant Orders to private companies; local municipal authorities rarely extended into rural areas and Shire Councils could not usually afford an electricity undertaking. Only when the conservative Moore government was in office from 1929 to 1932 was there some rural development by private companies in Brisbane, Ipswich and Toowoomba who took supply to areas adjacent to the cities.[52]

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50. On the importance of agrarian myths in the politics of this period, see M.A. Jones, The Government and Economic Growth in Queensland 1930-1940, B.Ec. Hons, University of Queensland, 1966, *passim*. In 1932 Forgan Smith said that "this state will continue for all time to be a primary producing state. It is desirable that it should be so. Primary production is the natural occupation of mankind". R. Fitzgerald, *From 1915*, p.181.
51. G. Allbut, *A Brief History of Some of the Features of Public Electricity Supply in Australia*, Melbourne, 1958, p.53.
52. QEC, C9/F/14.

The Royal Commission of 1936 concluded that the best way of electrifying more remote areas was to attach them to established urban networks.[53] In this way urban consumers would help to pay for rural connections through a process of cross-subsidisation (where one group of consumers is charged a price in excess of the costs of supplying them and the excess profits are used to subsidise another group of consumers, so that they pay a price less than the cost of supply). Thus the legislation in 1945 which set up Regional Boards throughout the State included a major urban area together with its rural hinterland within each region.

In addition to cross-subsidisation, other explicit government policies promoted rural electrification. A system of government subsidies operated from 1944. The government paid one-third of interest and redemption charges on Regional Boards' loans financing rural extensions; this subsidy was reduced in the 1960s and discontinued in 1964. In 1966 the Rural Extension Deposit Scheme was introduced whereby Regional Boards could contribute half the cost of rural connections up to a specified ceiling. The government paid half the cost of all capital works by publicly-owned authorities in western Queensland. In 1973 prices in a number of western towns were reduced to those of Barcaldine, with the government making up the difference between justifiable costs and revenue. In 1973-83 a new direct subsidy scheme was implemented. There were also schemes where electricity was supplied to rural consumers if they guaranteed to pay for a certain minimum amount of electricity; these guarantees were often well below costs of supply.[54]

Uniform pricing was a second aim of the Royal Commission and has since been a consistent objective of the SEC and QEC. The agreements negotiated with private companies in south-east Queensland in 1939 stipulated that rural prices were to be no more than 10% above those in Brisbane and Toowoomba. When the Regional Boards were set up in 1946, the pricing structure took the form of a uniform regional rate with percentage surcharges for rural districts; in 1954 Regional Boards reduced these surcharges to 10%. In its Annual Report for the year the SEC admitted that this surcharge was

> normally insufficient to meet the actual costs of supply to these areas, but by virtue of the subsidy of 33 1/3 per cent. of capital costs granted by the Government and the fact that the whole of the Region shares the cost of main transmission lines to all parts of the Region, this important benefit to rural customers has become possible.[55]

Tariffs charged by the three northern Regional Boards of Cairns, Townsville and Mackay were made uniform in 1968. The Act of 1976 acknowledged tariff equalisation as a major aim, making it the only legislation in Australia which explicitly recognises this objective, although similar policies are tacitly pursued in the other States. Equalisation of tariffs throughout the State was virtually completed by 1986.

Essentially these policies were made possible by the falling real cost of electricity over this period; rural consumers enjoyed a disproportionate share of the benefits.

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53. RC, p.1278.
54. *QPD*, Vol.257, 1971, p.1263.
55. *SEC AR, 1953-54*, p.18.

Whereas urban consumers may not have accepted an actual increase in the price of their electricity as a result of costly rural extensions, their failure to benefit from falling costs was more palatable because less apparent. Moreover, cross-subsidisation benefits a relatively small group of consumers whereas its costs are spread over a large number of urban dwellers; the gainers have stronger economic incentives to push the policy through the political system than the losers have to mobilise opposition to it.

The objective of uniform pricing was one of the major preoccupations of the Royal Commission yet, as with state ownership, little justification was given for the policy. Cross-subsidisation and uniform pricing depend on monopoly power, since a competitor could enter the low-cost segment of the market and undercut prices. There are two common arguments for uniform pricing or cross-subsidisation: decentralisation and income redistribution.

Of these two the Royal Commission referred only to decentralisation. "The extension of electricity to the rural areas of the State is one of the best agencies in arresting the drift to the cities", it claimed.[56] However, electricity represents such a small item in a firm's total costs (estimated at less than 3%)[57] that the effect of electricity prices on location decisions is usually insignificant.[58] Very large consumers of electricity, such as alumina refining and mining companies, generally negotiate special tariffs with electricity suppliers anyway.

The second common argument for cross-subsidisation is that it effectively redistributes income from one group of consumers to another. This was never mentioned as a justification for the policy, but it undoubtedly has this effect. Many economists have concluded that the ability of public enterprises to redistribute income covertly is one of the foremost reasons for their prevalence in Australia.[59] State governments, having lost the power to tax incomes, have had to seek alternative ways of redistributing income. However, there are a number of economic arguments against using cross-subsidisation as a means of redistributing income. The extra "income" gained by rural consumers has to take the form of electricity; they cannot dispose of it as they wish. People lose or gain depending on the amount of electricity they consume. The most isolated people who are not provided with electricity will not benefit at all. Finally, consumers gain or lose depending on their location, regardless of their actual income; both rich and poor gain in rural areas and both rich and poor lose in urban areas.[60] Compared to using subsidies from consolidated revenue, the policy favoured by the Labor Party in Queensland from the 1970s,[61] financing rural electrification by cross-subsidies is regressive, bearing more heavily on lower income

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56. RC, p.1268.
57. G.D. McColl, *The Economics of Electricity Supply in Australia*, Melbourne, 1976, p.23.
58. M.O. Harvey, *Electricity Pricing: Principles and an Application to the Queensland Price Equalization Scheme,* CEDA Monograph, 1982, p.47.
59. H. M. Kolsen, "Pricing, Marketing and Investment Policies of Public Authority Business Undertakings", in L.R. Webb & R.H. Allan (eds), *Industrial Economics: Australian Studies*, Sydney, 1982, pp.177-92. N. Butlin, A. Barnard & J. Pincus, *Government and Capitalism*, pp.238-9.
60. M.O. Harvey, *Electricity Pricing*, pp.46-7.
61. *QPD*, Vol.271, 1976-77, p.423.

earners. A political objection to cross-subsidisation is that, unlike open subsidies for example, it is covert; even the electricity authorities themselves do not know the precise nature and extent of the redistribution, and voters are largely unaware of the policy and its effects. Another difficulty with the policy is that it places distributional decisions in the hands of unrepresentative bodies like managements of public utilities.

Conclusion

In 1937 William Forgan Smith, generally remembered as a devotee of nationalisation on a broad scale, gave his vision of the future of electricity in Queensland:

> The ideal, of course, would be the grid system with all power stations interlocking with each other so that the whole State would be economically supplied by electricity under the control of an Electricity Commission. That is the objective.... [62]

Despite the changes of half a century and despite 30 years of continuous conservative government, the objectives of a Labor politician of the inter-war period continued to guide the industry. Forgan Smith's aim was realised with the establishment of the QEC in 1985, although the degree of direct government control over the organisation was greater than many in the industry had hoped for.

Public acquisition of the Queensland electricity supply industry was in line with moves towards greater economic involvement by governments of virtually all Western countries after the Second World War. A number of factors contributed to this widespread trend: popular acceptance of state economic controls during the depression crisis, and later either within totalitarian regimes or in war-time emergency; growing commitment to the goals of full employment and economic growth, and support for welfare policies; belief in the efficacy of central planning, the "rationality" of bureaucratic structures, and the authority of the scientific expert; and the need for government backing in raising huge amounts of investment capital for post-war reconstruction and development.

The development and persistence of public control and ownership in the electricity supply industry can also be explained by the support given the policy by cohesive interest groups. At first these included the private companies and local authorities favoured with monopoly power under the initial legislation, and employees and union groups who gradually began to press for a share of monopoly profits. Later the policy was promoted by engineers and engineer-managers, bureaucrats and employee unions - all seeking a haven from competitive market pressures. It is one of the basic tenets of the economics of regulation that "as a rule, regulation is acquired by the industry and is designed and operated primarily for its benefit."[63]

Another group who supported public ownership were the beneficiaries of cross-subsidisation - most notably rural consumers and their parliamentary

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62. *QPD*, Vol.171, 1937, p.1151.
63. G. Stigler, "The theory of economic regulation", p.3.

representatives. The policy was pushed by the Labor Party at a time when all major parties were wooing the country vote, and has been continued by conservative governments dependent upon country support.

CHAPTER TWO

PRIVATE PIONEERS: CHARTERS TOWERS AND AYR

The first electricity supplier in Queensland was a private company: Barton, White and Co. in Brisbane. In north Queensland the first two public supply systems were also set up by private firms: in Charters Towers and in Ayr. Like Barton and White, the Charters Towers company was formed in the era before the 1896 Electric Light and Power Act authorised local government bodies to provide electricity. In Ayr a local entrepreneur undertook power supply just before the accession of the first Labor government in Queensland in 1915. After this, the formation of private electricity companies was curbed by Labor policy, which promoted local government enterprise instead. Private undertakings were established in the north only during periods of non-Labor rule: before 1915 and during the 1929-32 conservative interlude. Despite the enactment of empowering legislation before the turn of the century, no government body established a full-scale public supply system in north Queensland before 1922, when an electric authority controlled by the Irrigation and Water Supply Commission began operating at Home Hill.

Charters Towers

The history of electricity supply in Charters Towers presents some remarkable features. This was the first town in north Queensland to receive an electricity supply, 19 years before the second electrical system was established in the region; a quarter of a century would elapse before the achievement was matched by Townsville, the regional centre. From a technical point of view also the Charters Towers undertaking was impressive, using alternating current, underground mains and the most sophisticated generating equipment then available: in its time it was one of the most advanced electrical systems in the world. Nor does the story end there, for when the company failed along with the fortunes of the gold mining industry, public supply of electricity ceased altogether for over a decade and most of the distribution system was actually ripped out. Supply was resumed by another private company, originally formed to process local wool, in the more favourable political climate of 1931. Nowhere else in the region did the industry exhibit such a complex history.

The Charters Towers gold field was discovered in December 1871 by a prospecting party under the leadership of Hugh Mosman. Little alluvial gold was ever extracted from the area. Initially the field comprised many outcropping auriferous veins which were easily worked by either individual miners or small local syndicates. However from the beginning there was a gradual trend towards company mining; by the mid-1880s the field was increasingly dependent on underground mining by large companies. As the mines went deeper and more difficult ores were encountered, greater inflows of capital were required, British investors supplying a large amount of the needed finance. During the 1890s, when depression hit northern agriculture and pastoralism particularly hard, Charters Towers experienced its "Indian summer" as the gold mining industry enjoyed a typical counter-cyclical boom. By the end of the 1890s

the prosperous inland city boasted a population of nearly 27,000, making it the second largest city in Queensland;[1] its arrogant inhabitants called it "The World". Like population, gold output reached a peak at the end of the century. The field then went into decline, losing its position as Queensland's most productive gold field in 1911. The long series of large gold finds, which had occurred mainly in parallel veins at increasing depth, and which had given the town a permanency unusual in the mining industry, came to an end.[2]

Even before public supply of electricity began in 1897, electric lighting had been installed at the leading mines and at several mills; a few managers' residences and an iron works had also been connected. Power was supplied by small generators driven by steam or gas.

The inauguration of public electricity supply coincided with the hey-day of the mining town. In mid-1895 the Charters Towers Electric Supply Company was formed with a nominal capital of £12,500 and with aims to

> carry on the business of an electric light Company in all its branches, and, in particular, to construct, lay down, establish, fix, and carry out all necessary cables, wires, lines, accumulators, lamps, works, apparatus, appliances, and machinery, and to generate, accumulate, distribute, and supply electricity, and to light cities, towns, streets, markets, theatres, buildings, and places, both public and private.[3]

The board of directors - C.F. Plant, E.H.T. Plant, J. Millican, G. Macfarlane and D. Winterbottom - comprised two local mining magnates, a mining agent, a mechanical engineer and a publican, all from Charters Towers.[4] C.F. Plant was the largest shareholder.

The company enlisted the services of an English consultant, James Callender, who ordered the latest generating equipment from Crompton & Co. of Manchester, one of the most successful pioneers of the electrical manufacturing industry in Britain. Callender began designing the Charters Towers system in early 1896 and supervised erection of the plant and laying of mains from August. The company applied for an Order-in-Council under the new Electric Light and Power Act (1896) in June 1897 and the Order, the second in Queensland after a Brisbane company, was granted in October.[5]

Generation began on 28 January 1897, without hitch, and the opening ceremony took place on the following day. Among the congratulatory speeches there was only one

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1. The population of Townsville at this time was approximately 12,000.
2. D. Menghetti, "The Gold Mines of Charters Towers", in K. Kennedy (ed.), *Readings in North Queensland Mining History*, Vol.2, Townsville, 1982, pp.49-118. G.C. Bolton, *A Thousand Miles Away: A History of North Queensland to 1920*, Canberra, 1972, Chapter 12.
3. Memorandum and Articles of Association of Charters Towers Electric Supply Company Limited, QSA, A/21649, No.73, Book 8.
4. *Northern Miner* (*NM*), 29 January 1897.
5. *QGG*, 15 October 1897. The first electricity Order in Queensland went to the Brisbane Electric Supply Company in June 1897.

sour note: John Dunsford, the local Labour member of the Legislative Assembly, said he thought essential utilities like water and light should be supplied by local government authorities rather than private companies. A fulsome editorial in the *Northern Miner* greeted "an epoch in the progress of Charters Towers".[6]

The plant at the power house in Dan Street, about a mile from the city centre, consisted of Cornish boilers made by Evans Anderson in Brisbane, and reciprocating steam engines and dynamo manufactured in England. The boilers were usually fired by wood but were adaptable for coal. The initial capacity of the plant was limited - about 40 kW.[7] Single-phase alternating current was generated at 2,200 volts and a frequency of 83.5 Hz, and supplied to consumers via an underground three-wire distribution system and underground transformers at 200/100 volts.[8] (Alternating current was first supplied in Brisbane only in 1913).

The distribution system consisted of approximately 19 kilometres of wires specially designed to withstand great variations in temperature. This was the forte of Callender's English company, the Bitumen Telegraph Waterproof Co. Ltd, London: instead of rubber insulation, bitumenised fibre was used and the whole cable was covered with lead. Laying the underground mains had caused some minor difficulties, such as a ruptured water pipe at a major city intersection and complaints from store and hotel keepers when footpaths were blocked, but the operation was completed without major disruption. Callender calculated that undergrounding of mains added only 20% to installation costs while it significantly reduced maintenance costs, particularly in view of the severity of lightning at Charters Towers; moreover, underground mains had safety advantages in that accidents from falling wires were avoided.[9] However a problem developed with breakdown of insulation, so that power was discharged into the ground.[10] In addition, mains were often damaged by the water authority and, more especially, by the gas company, the electricity company's great rival; there were rumours that this was not always accidental. The street lighting system comprised incandescent lamps and five carbon arc lamps; at this time arc lamps were still frequently used as street lights, despite their brilliant, flickering light, but within a few years they were superseded by more efficient incandescent lamps with metal filaments. The whole electrical system cost approximately £7,000.[11]

Consumers obtained domestic fittings either from the company or from private contractors. The company then inspected the premises to ensure safety. The first lamps installed were of the carbon filament type, but later metal filaments (tantalum or tungsten) were employed; because of the fragility of lamp filaments, extraordinary precautions were taken in packaging them for transit from England, but there was still a high rate of breakage before installation. The original household fittings were quite

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6. *NM*, 30 January 1897.
7. *Ibid.*
8. E. Spuler, The Development of the Electricity Supply Industry in North Queensland: A Study of the Development of Regional Organisation, M.Ec., James Cook University, 1976, p.7.
9. *LCJ*, 1896, Vol.46, Pt.3, p.437.
10. Interview with Ken Brice, conducted by C. Edmondson, 1985.
11. *NM*, 29 January 1897.

elaborate, including marble switchboards; guttapercha-insulated internal wiring laid in moulded wood casing; light switches with porcelain bases and fluted brass covers made locally in a small brass foundry at the power station. The market was rather exclusive, with lighting costs at least twenty times present day prices after allowing for inflation; under the Order-in-Council, the maximum price per unit supplied was one shilling. Some power was sold on a contract basis, especially to large consumers such as the hotels and theatre; domestic consumers were from the first charged according to amounts actually consumed as measured by individual meters, instead of the fixed annual charge levied by several early electric authorities. However, the original meters, which were manufactured in Birmingham, were found to be inaccurate with a tendency to creep forward so that consumers were overcharged.[12]

At this time electricity was used almost exclusively for lighting; with the exception of electric irons, domestic appliances were virtually unknown. Indeed the current produced by this early electrical system was unsuitable for power purposes, though satisfactory for lighting. Initially the system was capable of working about 1400 lights of 10 candle power. The supply of electricity was usually limited to the hours of darkness, between 6 p.m. and midnight.[13]

When generation began, applications for lighting nearly equalled capacity; many were forced to wait until additional equipment was installed. During the first five years of operation the plant and distribution system were continually augmented. In 1902 when it was decided to reconstruct the company, the nominal capital was increased to 15,000. C.F. Plant, by then described as a "gentleman" and resident in Brisbane, was still the largest shareholder. The plant was expanded to a capacity of 310 kW, supplied by two Crompton 80 kW reciprocating steam engine alternator sets and one 150 kW steam turbo alternator manufactured by Parsons, the 19th century pioneer of the steam turbine in Britain. By 1907, ten years after the opening, maximum demand had increased from the initial 40 kW to 102 kW. [14]

After 1905, however, the company's fortunes took a downturn; the number of shares and the total paid up capital remained stationary, whereas in the previous period growth had been the rule.[15] Demand began to fall, together with the fortunes of the gold mining industry.[16] In 1910 the company was finally liquidated and the Charters Towers Gas, Coke, Coal and Light Company Limited purchased its assets for the amount of its outstanding debts - £6,500.[17]

Established in the late 1880s, the gas company had been given authority in 1897, as part of a special Act of parliament, to provide electric lighting in Charters Towers, but they had not yet exercised this authority.[18] After buying out the electricity

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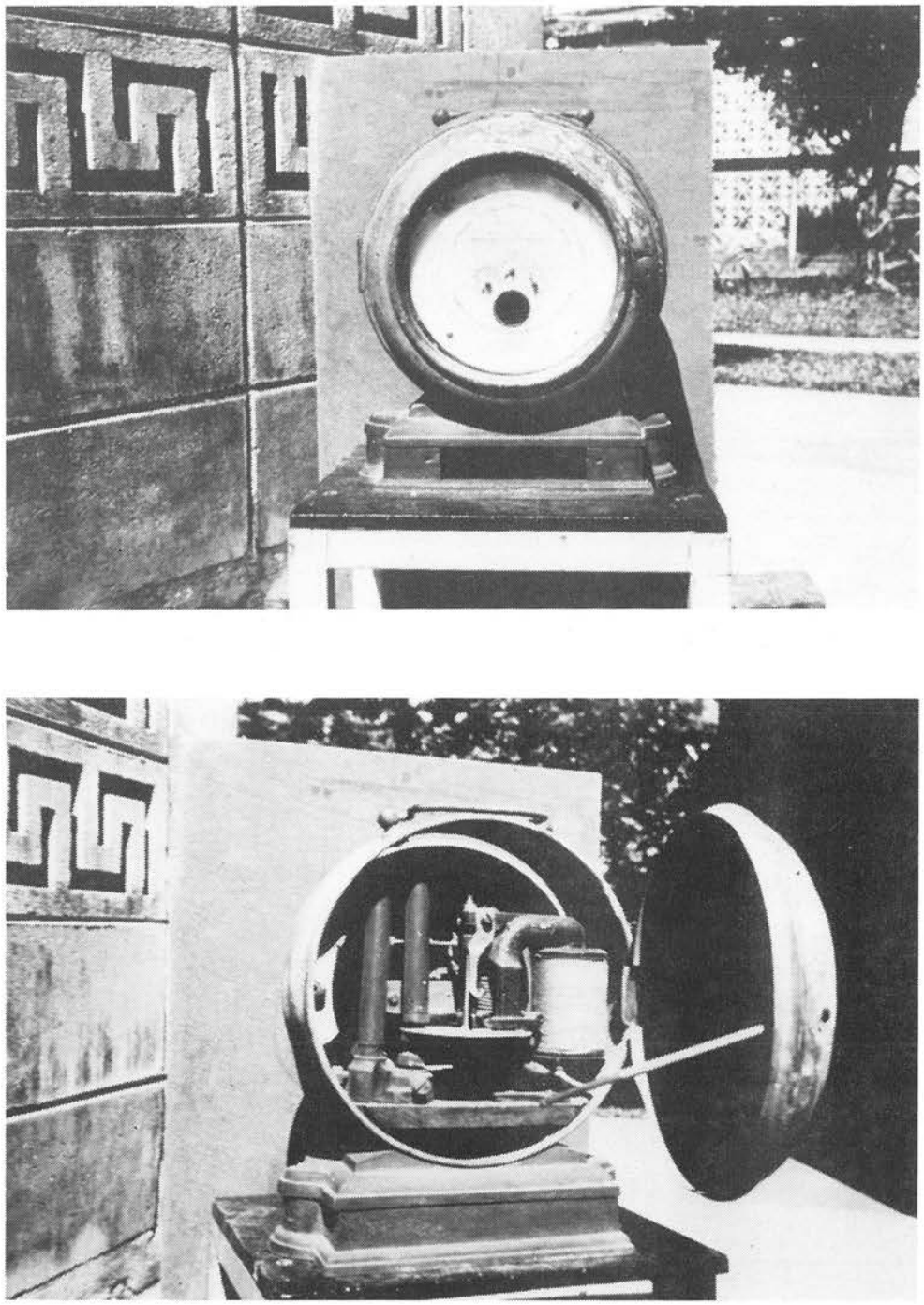
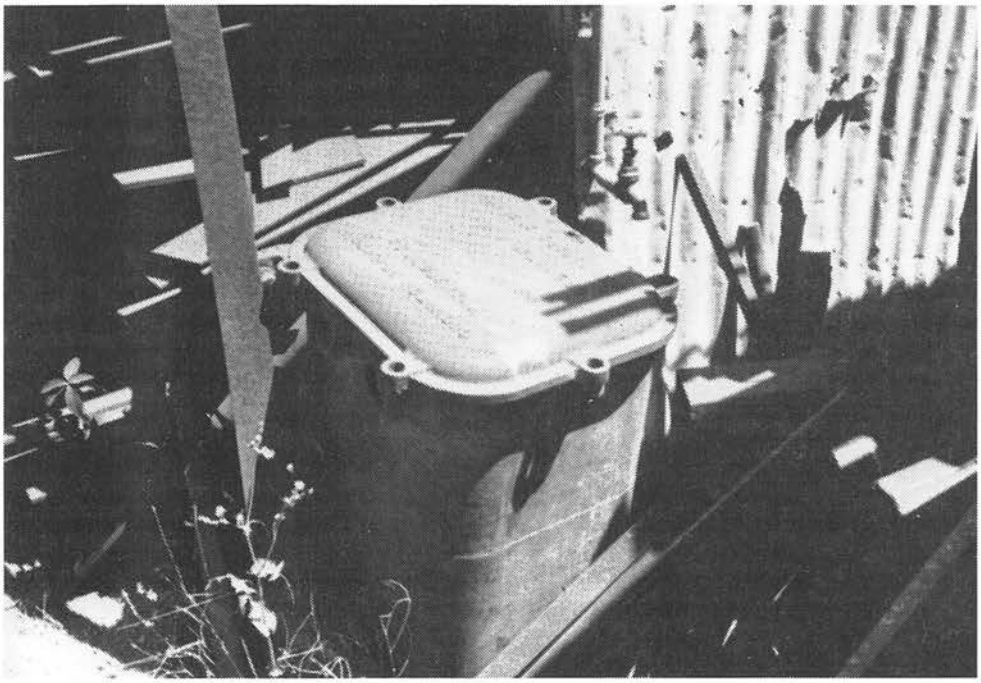
12. Interview with Ken Brice, 24 April 1986.
13. Interview with Miles McGrath, 25 November 1986.
14. *QGG*, January-June 1907, p.1656.
15. QSA, A/21800, No.4, Book 11.
16. *QGG*, January-June 1909, p.654.
17. QEC N25.
18. *QPD*, Vol.77, 1897, p.960.



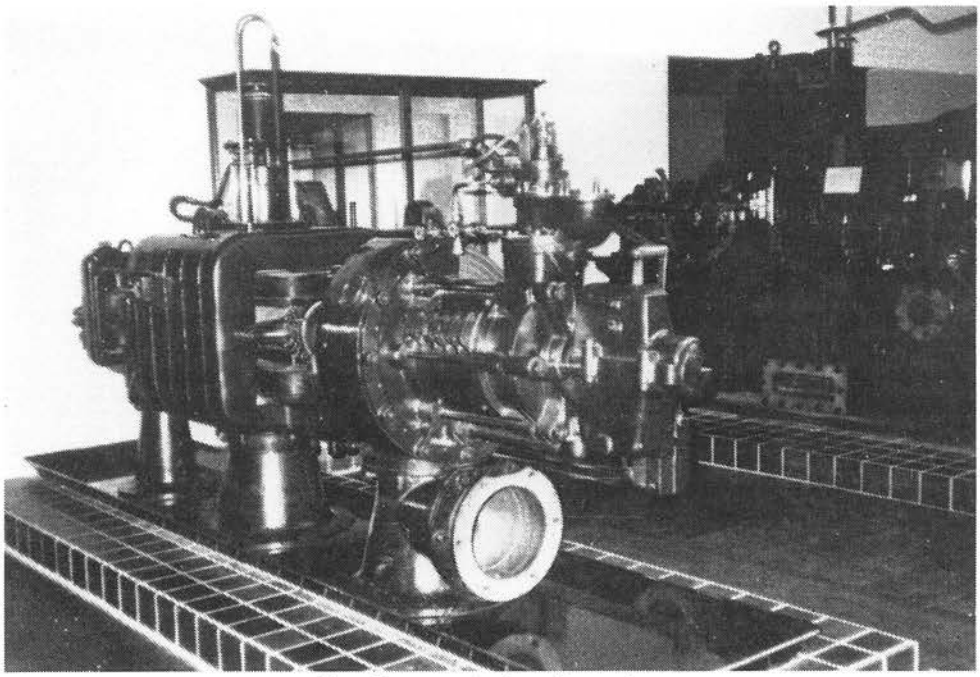
1. Meter used by Charters Towers Electric Supply Co.

N. Warburton photo



2a. Cast-iron transformer case: Charters Towers Electric Supply Co.

G. Matthews photo



2b. Parsons turbo alternator

N. Warburton photo

company in 1910 and taking over its Order-in-Council, the gas company continued to supply electricity for a number of years, taking a loss on this side of its business. It was certainly still functioning as an electricity supplier in 1913, when there were 220 consumers and the operation was managed by E. Smythe,[19] but during the First World War the company encountered severe financial difficulty; the electricity undertaking was shut down around this time. Nevertheless it was only in April 1920 that the Order was officially revoked, after the company had formally notified the minister that the undertaking could not be carried on with profit and should be abandoned.[20] Under an Order-in-Council an electric authority was obliged to supply electricity within its designated area; since the gas company had failed to meet this requirement for some time, a fine was imposed, despite protests from the company. After the gas company decided to abandon electricity supply, the electrical plant was disposed of. Most of the underground mains were dug up. The plant, transformers, cables and so on were broken up for scrap.[21] A local scrap merchant, Dave Tuckett, stored some of this equipment, and it was later used by the successor company in the 1930s.

During the early 1920s reticulated gas provided energy and lighting for Charters Towers, in addition to more popular and cheaper sources such as kerosene. The possibility of the local Council's undertaking electricity supply was raised periodically, but it was not until 1925 that electricity again became an issue. Then in 1926 it became very controversial indeed.

In late 1925 a member of the local City Council, Dr Leonard Redmond, moved that the Council should set up an electric authority; the voting was equal, five votes to five, but the motion was lost on the casting vote of the Mayor, who happened to be chairman of the gas company.[22] Redmond, a medical practitioner who had lived in Charters Towers for over 30 years, persisted in promoting the scheme, but he met with no success. In 1926 the Council actually applied for an Order-in-Council, but an objection was received from the gas company and the Council decided against pressing the application. A major reason for the Council's reluctance to take on electricity supply was that it was already heavily in debt to the government and hesitated to add to its outstanding loans. A local referendum was held to decide whether the Council should borrow over £33,000 to finance the electricity project: 971 votes were cast in favour of the scheme, but 1774 were opposed. The *Northern Miner* had been antagonistic, predicting financial doom for the enterprise.[23]

Since municipal supply had been rejected by the community, the Council, at Redmond's prompting, asked that the government either allow a private company to supply electricity, or undertake and finance supply itself. Redmond himself decided to organise a company and requested an Order, referring in his application to the way

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19. Spuler, Development of Electricity Supply, p.8.
20. *QGG*, January-June 1920, p.1704.
21. N.S. Warburton, Notes on History of Charters Towers Electricity Supply Company Limited, March 1986.
22. F. Bagnall, *Golden Heritage,* Charters Towers, 1983, p.47. Redmond to Premier (W. McCormack), 1 October 1928, QEC N25.
23. Bagnall, *Golden Heritage*, p.47.

Charters Towers suffered in the "avaricious grip" of the gas company.[24] However, the Labor government of the time was opposed to granting Orders to private firms and refused Redmond's offer.

In the meantime, other developments were leading towards a private electricity undertaking. In 1924 a company called the North Australian Worsted and Woollen Mills (Charters Towers) Limited was formed by a number of local merchants, graziers and professional people to set up a treatment plant for scouring wool, carding and top-making. In 1926 their equipment was installed: housed in a reinforced concrete factory building in New Queen Road, the power plant comprised a water tube boiler and a high-speed 112 kW Bellis and Morcom steam engine driving a 125 kVA alternator.[25] The whole plant, which was of English manufacture, cost over £33,000 and was new, the most modern available.[26] In the event the wool venture did not succeed, partly due to drought from 1926 to 1929, partly to a collapse of the wool market and lack of support from local graziers, agents and banks. The management then decided to make use of the equipment to supply electricity in the urban area, as well as continuing wool scouring on a contract basis.

The advent of the Moore government in 1929 signalled a new policy on electricity, encouraging private enterprise. Both Redmond and the woollen mills applied for electricity Orders. Redmond had previously asked the company to consider using their plant for power supply but at that time an approach to the Premier had been discouraging. Now there was intense rivalry between the two applicants. Redmond organised several objections to the woollen company's proposal, without effect, and wrote long imploring letters to the Department of Public Works. Letters to the local newspaper and printed circulars criticised the company's decision to depart from what Redmond considered its legitimate line of business. As a shareholder in the woollen company, Redmond clashed with J.W. "Bluey" Ward, the enterprising, energetic local grocery merchant who was its managing director; on one occasion Redmond came close to being forcibly removed from a general meeting of shareholders.[27] Because he had been advocating electricity since at least the early 1920s, Redmond believed he had a prior claim now that the government was willing to countenance private schemes.

The City Council refrained from taking sides, saying it would give its consent to the applicant favoured by the government. The decision finally rested with John Grier, the long-serving Chief Electrical Engineer of the Department of Public Works, who preferred the mills' application on the grounds that their plant was already partly established, that their floundering woollen enterprise deserved support, and that the mills themselves would provide a demand for electricity during the day, when town demand would be low.[28] Even after the decision was made, however, Redmond

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24. Redmond to McCormack, 1 October 1928, QEC N25.
25. *North Queensland Register*, 1 February 1926.
26. Memorandum of Agreement between L. Hinks & Co. Ltd and North Australian Worsted and Woollen Mills, August 1925.
27. *NM*, 27 September 1930.
28. QEC N25a - 48.

continued his campaign against the company, trying for several years to persuade the Council to take over what he portrayed as an ill-managed undertaking.

In October 1930 an Order-in-Council was granted, authorising the woollen company to supply electricity within the city of Charters Towers for a period of 30 years.[29] Albert Axon, who was to be responsible for constructing a large number of electricity systems throughout Queensland, was appointed as consulting engineer. He arranged for the installation at the rear of the company's main building of two Fairbanks Morse vertical two-stroke semi-diesels (one single cylinder, 30 kW, the other twin cylinder, 55 kW) purchased second-hand from New South Wales Railways at Campbelltown. These operated together with the steam engine of the wool scouring plant. When the wool plant was scouring, the Bellis and Morcom steam engine was run continuously to provide process steam for drying the wool and electricity for both plant and town.

Distribution began in November 1931. There was a heavy storm the night before the opening ceremony, at which J.W. Ward and Albert Axon officiated, and when "Bluey" threw the ceremonial switch he received a nasty jolt; Axon coolly produced a dry handkerchief and on the second attempt Ward succeeded in switching on the power.[30] The system generated three-phase alternating current at 50 Hz. Electricity was reticulated through two high voltage 2.3 kV feeders and five substations, delivering current to consumers at 415/240 volts. The overhead reticulation, which was at first confined to the inner city area, was installed by contractor W.P. Kerwick, who later built the original line from Barron Falls to Cairns. The cost of the entire scheme was £10,000.[31] The distribution system was later extended to Richmond Hill, to take in the load of the various colleges and nursing homes in the area.[32]

Charters Towers' second electricity undertaking began with only about 100 consumers, which rose to over 500 by the end of 1934. The original staff was also very limited, consisting of a manager, Robert Clarke, an electrical fitter with engine driving qualifications who had previously worked for City Electric Light in Brisbane; an engine driver, Robert McIntyre; and one apprentice, Ken Brice. Great flexibility was demanded of the staff, who had to perform a large variety of tasks.

Less auspicious circumstances in which to begin an enterprise could not be imagined: most of the mines were closed, population was being depleted and had already fallen under 7,000, houses were being shifted down to the coast, the depression was at its lowest ebb. Everything had to be done on a shoestring. To conserve meters, some consumers were placed on a minimum charge of 6s. per month. The only vehicle available was one Bedford truck. Post holes were sunk by hand using pick and shovel, with dynamite for especially stony ground. The manager canvassed from door to door trying to persuade people to put on the power. At this time domestic consumption was low, electricity still being used almost entirely for lighting. Conservative resistance to

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29. *QGG*, 30 October 1930.
30. Interview with George Matthews, 20 November 1986.
31. Axon's supplementary report on Townsville undertaking, 2 April 1932, p.3, p.18.
32. Interview with Ken Brice, by C. Edmondson.

domestic appliances was strong in Charters Towers; there were a few irons, jugs and toasters, but during the 1930s there were only two electric stoves in the town, on a special lower tariff. Gradually consumption began to increase as the depression eased. By 1937 there were just under 1,000 consumers and the company had paid its first small dividend.

The staff also increased gradually, though even in the late 1950s they numbered fewer than 20. Casual labour was frequently employed for specific projects, and was readily available during the depression years of the 1930s. All employees had to provide their own tools. Advancement depended on completing correspondence courses from Brisbane; no leave was given for study and all the expenses of the courses had to be met by employees. The electrical plant usually ran unattended for most of the day while consumption was low. An alarm system connected the plant to the manager's cottage close to the station in case of emergencies, which were usually caused by failure of the circulating water system. Robert Clarke also kept a voltmeter by his bedside so as to keep an eye on voltage fluctuations.[33]

The Fairbanks Morse engines continued to give good service; there were no major breakdowns, although they ran a little roughly when the load changed significantly. The twin cylinder engine was generally used for peak load in the late afternoon. As consumption increased, it became necessary to use the steam engine more frequently, but it was inefficient and expensive, and stopping and starting it was not economic, so it was decided to install a new engine. In late 1932 a Crossley four-cylinder horizontal engine was added from a bacon factory on Doboy Creek, Brisbane, and the power house building was extended to accommodate it. In 1934 Albert Axon as consultant, with the assistance of Joseph Heidecker who later returned as manager, installed a new six-cylinder National engine supplied by Snashall, Anthon Pty Ltd. In 1939 capacity was increased again with a new eight-cylinder National diesel. This was installed upstairs in the power station, and the six-cylinder engine was then moved upstairs as well. Expansion of capacity was financed by sale of the wool topping plant and by debenture loan; as the woollen plant was sold off, the electrical machinery gradually took over the whole building. The original steam plant was run for the last time in 1938.

Unlike electricity undertakings in other western centres which made use of suction gas engines, the Charters Towers company kept to diesel plant. Diesel engines were more easily managed, were cleaner and required less maintenance, although fuel costs were high because of the cost of transport. Diesel fuel was at first supplied in drums, but in the mid-1930s railway tankers were introduced.

In 1940 Joe Heidecker was appointed as manager, following a five year stint as manager of the Hughenden power station. Heidecker was born in 1905 at Pachten in the Ruhr district of Alsace-Lorraine. After a colourful early career as an electrical mechanic, including a position as third engineer on the private yacht of the king of Egypt, Heidecker jumped ship in Fremantle in 1927. By 1930 he was working as engineer in the Warwick power house and it was at this time that he became

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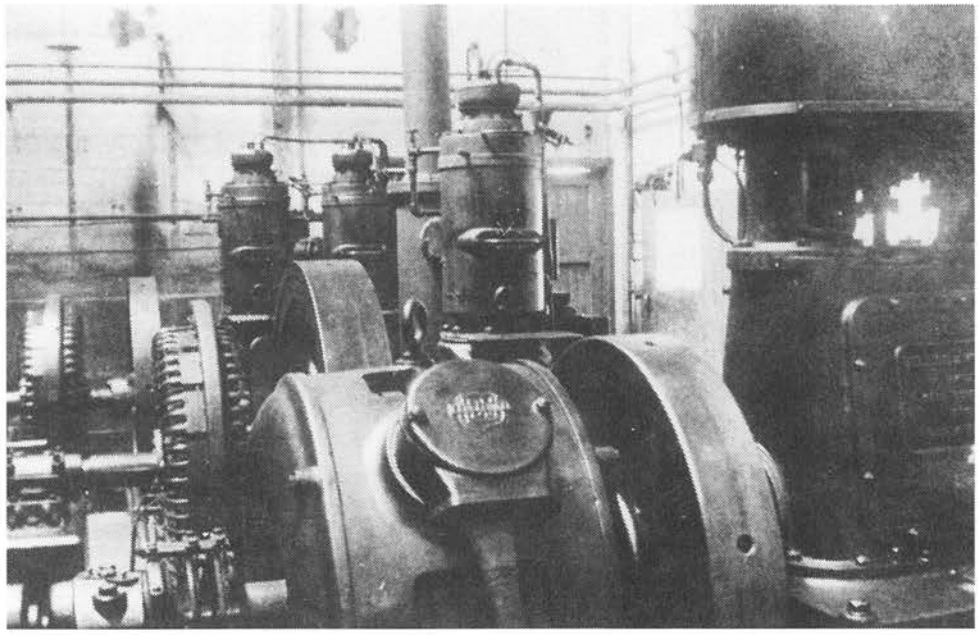
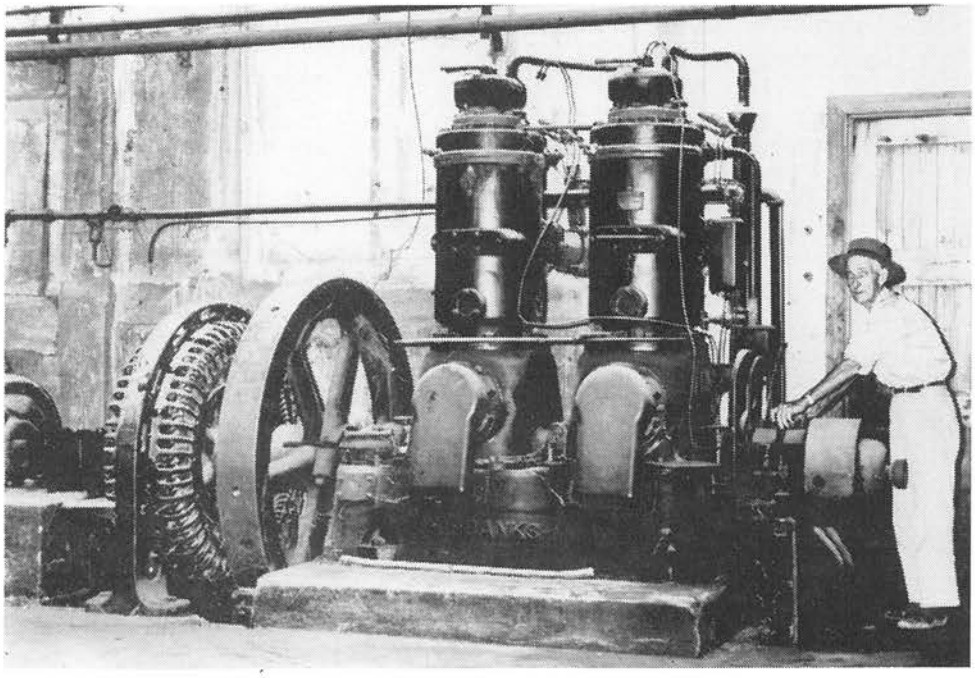
33. *Ibid.* Interview with Ken Brice, 24 April 1986.



3a. North Australian Worsted & Woollen Mills power plant: steam engine, Fairbanks Morse single cylinder & twin cylinder

G. Matthews photo



3b. Bill Deneen, engine driver, with Fairbanks twin cylinder

G. Matthews photo

4. Joe Heidecker

acquainted with Albert Axon, who was to make a distinguished career as consultant to a large number of Queensland electric authorities. Heidecker helped Axon with the erection of an engine in Warwick, so when Axon decided to put in a new National at Charters Towers in 1934 he requested Heidecker's assistance. Soon after Heidecker assisted Axon again with the installation of suction gas engines at Hughenden, which led to his appointment as manager after Jim Watts' departure. Then in 1939 when Robert Clarke resigned because of conflict with the managing director, Heidecker was appointed to run the Charters Towers undertaking, which soon after his arrival, in August 1940, changed its name to the Charters Towers Electricity Supply Company Limited. By all accounts Heidecker was a highly competent manager and a respected employer; his ability to combine both theoretical and practical knowledge was much admired.

Following the declaration of war against Germany, however, Heidecker's patriotic allegiance became suspect in certain official eyes. He was not interned, but was instructed in 1942 to leave the eastern seaboard; from this time until he returned to Charters Towers in 1947 he worked in Adelaide at a woollen mill at Onkaparinga, on secondment to the Commonwealth government at Broken Hill, and for the Bex chemicals company in Adelaide.[34] On his return to Charters Towers Heidecker faced a difficult task of reconstruction, as a result of the acute supply problems experienced during the war and because of poor management in the interim.

During the Second World War Charters Towers became an important military centre. Shortly after the Japanese entered the war an airport was rapidly constructed at Breddan just outside the town, and there were large army and air force bases, stores and workshops, both Australian and American, at Breddan, Sellheim, Macrossan, Corinda and Wellington; three colleges were also converted to army hospitals. Transmission lines had to be built quickly to feed these outlying bases and other military installations. As a result of the war, supply was extended to areas which would otherwise have remained without power; most of these lines were built by contractors.

As the population swelled with the influx of military personnel, demand for electricity soon outstripped supply; for some time the armed forces even took over part of the power station itself as a workshop and store, so working conditions became cramped and chaotic. There were also increasing difficulties with obtaining materials and plant. The Department of Interior procured an additional diesel engine, a seven-cylinder 750 h.p. Bellis and Morcom which had been destined for E.G. Theodore's Fijian mining venture when war broke out, but from the beginning it was a source of constant trouble, particularly because of crankshaft bearing faults. Despite the many problems encountered during the war, however, it did not prove necessary to resort to electricity rationing. In case of attack from the air, special precautions were taken to protect the power station from fire, measures were taken to ensure continuity of electricity supply, and the station was camouflaged.

When Heidecker was forced to leave, John St. John Robertson was appointed as his replacement. The very difficult war-time circumstances he faced were not wholly to

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34. Interview with Dagmar Heidecker, 2 September 1986.

blame for the degeneration of the electricity company under his control: though an able administrator and a highly gregarious man who enjoyed mixing with the transient military personnel, Robertson had little talent for industrial relations and soon alienated members of both his staff and the board of directors. The other side of the coin was Robertson's dissatisfaction with the job, which he expressed in a letter near the end of the war after the local Council had voted in favour of the government's absorbing the Charters Towers electric authority within the proposed Regional Boards scheme:

> I for one, am not inclined to push and work and worry to give these people here a proper service, when all I will get out of it will be that work and worry and ultimately, as has been my experience with the Dept. of Interior, the Government officials will take all the credit and I will be kicked with grey hairs and sorrow into my grave which is getting very near.[35]

When he returned in March 1947 Heidecker was critical of the careless way things had been run in his absence; although excess profits had been made because of the great increase in demand, costs of production had also been very high.[36] By the end of the war the company was in a very serious financial position, with a bank overdraft of £31,000 in early 1947 compared to £1,600 owing in May 1942; not all of the extra borrowing was attributable to purchase of additional plant.[37]

The company's financial status did not improve significantly after the war; as a result a number of staff were dismissed. The SEC, which was dedicated to phasing out private electricity companies and instituting regionalisation, controlled tariffs and thus limited the company's profit margin. To save money, and in anticipation of incorporation within the Townsville Regional Electricity Board (TREB), maintenance work was sometimes neglected and acquisition of new plant postponed.[38] During this period Heidecker as manager always kept the prospect of imminent takeover in mind in his planning, though in the event it was not until 1956 that Charters Towers was absorbed by TREB, partly because of delays in constructing the new Central Generating Station at Townsville. Reference to and communication with the SEC, and after about 1953 with TREB itself, were increasingly important; indeed the extent of the company's involvement with the SEC drew criticism from some representatives of private electricity in Queensland.[39]

Material supply problems continued well after the end of the war. Transformers, copper cable, meters, insulators and house service fuses were in especially short supply and it was often necessary to make parts and tools on the spot. In 1948 a desperate

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35. Robertson to Manager, Ruston and Hornsby Co., 13 July 1945.
36. Heidecker to Close, Inspector, Department of Works and Housing, 20 June 1947. The average revenue over the period from 1939 to April 1947 was 3.452p. per kWh sold, while average cost was 3.2794p.
37. *Ibid.* Heidecker to Inspector of Mines, Charters Towers, 10 July 1947. Heidecker to Miller, Department of Works and Housing, 12 June 1947.
38. SEC Electrical Inspector to Secretary, SEC, 19 January 1955. Heidecker's report to Charters Towers Electricity Supply Company, 29 July 1950.
39. Axon to Heidecker, 8 February 1950.

5a. Charters Towers Electricity Supply Co.

5b. Appliance showrooms, 1950s

6a. Ruston Hornsby engine transported from Breddan

G. Matthews photo

6b. Staff party, 1950s

for names, see page opposite

situation arose when the company was forced to relinquish a 11,000/415/240 volt transformer to the Long Range Weapons Project in South Australia; transformers were extremely scarce and the newly-electrified Venus State Battery was in danger of losing supply, but with the help of the Minister for Mines a temporary replacement was obtained from Brisbane.[40] Supply problems were exacerbated in 1951 when Heidecker decided to go ahead with the change-over of the distribution system from 2.3 to 11 kV; this had been started in 1944 with the construction of 11 kV feeders to the military establishments and the Council's water works, but had to be postponed because of the shortage of skilled labour after the war.[41] Even as late as 1952 it was necessary to emphasise the national importance of the work when ordering parts from overseas.

By the 1950s the company was supplying the Council's water authority, the hospital, nursing homes, six boarding schools, the Railway and the new mental hospital. These loads together with the post-war surge in domestic demand brought increases of 58% in electricity sales and 40% in generation in 1947-48, and continuing increases in the following years.[42] The burden on the company's plant was reduced somewhat after 1948, when dissatisfaction erupted over the high cost of electric pumping of the town's water supply for the Charters Towers City Council, the company's largest consumer after electrificaton of the pumps in 1944; the Council decided to return to a combination of electric and steam pumping.[43] [44]

Nevertheless, for a short period after the war restrictions had to be placed on installation of new appliances in order to curb load growth, though at this time domestic consumption of electricity was still very low by present day standards; the usual practice was to install two back-to-back points in each house - in the kitchen, perhaps for a jug and toaster, and in the living room for a radio. By 1950, however, the number of consumers had increased to 1,800 and consumption per consumer also began to rise as domestic appliances became more popular. In 1950 the company opened a new office and appliance showroom on the corner of Gill and Mosman

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40. Department of Works and Housing to Heidecker, 16 March 1948. Although most of the mines in Charters Towers had closed long before this time, some small operations continued; the Venus Battery, after 1919 a state-owned mill, was kept running to crush the limited quantities of ore produced.
41. Heidecker to Secretary, SEC, 3 April 1951.
42. Heidecker to Secretary, SEC, 28 May 1948.
43. Heidecker's report to company directors, 16 September 1948 - "Electricity Supplied to the City Council's Water-Works".

Back row: A. Bancroft, R. Verner, N. Carrington, D. McAllister, S. Hooper, W. Fellows, G. Matthews, W. Mead, G. Crow, J. Hedlefs.

Second row: R. Bourke, E. Williams, D. McLeod, Mrs. Williams, J. Miller, Mrs. Heidecker, Mrs English, J. English & Marilyn, Mrs McLeod, Mrs Perry, A. Heuir, Mrs Verner, Mrs Heuir, Mrs Partlett, H. Hinchey, Mrs Hinchey, G. Partlett, H. Nibbs, K. Partlett, J. Heidecker.

Third row: A. Shun, I. Mead, G. Shun, Mr Mead, S. Shun, M. Shun, J. Mead, O. Crow, M. Mead, B. Crow, Mrs Crow.

Front row: Mrs Shun, Mrs Mead, W. Mead Jnr, L. Bancroft, M. Bancroft, L. Mead, W. McLeod, B. Shun, J. Williams. *Information from Bill Fellows*

Streets, which proved a financial success, possibly because of the absence of local competitors. At the same time the power station itself was given a face-lift, with a new fence and landscaping.

By this time the plant was old and very overworked. In 1946 a 300 h.p. six-cylinder Ruston Hornsby diesel engine had been added from the RAAF at Breddan. The two Fairbanks Morse engines and the Crossley were retired. The seven-cylinder Bellis and Morcom continued to give trouble. In 1947 the crankshaft fractured and its replacement was delayed until the end of 1948 by the shortage of steel in Britain;[44] from October 1951 the engine operated on a very much reduced rating because of cracked pistons, when it proved very difficult to get replacement parts from England. In 1952, at a time when loan funds dried up throughout Australia, the company faced a financial crisis when its banks refused additional credit for extra plant and payment of accounts. The SEC helped in obtaining the necessary finance, and arranged for TREB to rent a generating set to the company.[45] Thus in 1953 a 500 h.p. six-cylinder Worthington set was hired from TREB, whose aim was to obviate the purchase of extra plant which would become redundant when Charters Towers was incorporated into the regional network; this set had originally been brought to Townsville by the U.S. Army and had then done service at Townsville's Hubert's Well power station. The SEC assisted in many ways with supply problems, applying pressure through the Queensland Agent-General for supply of parts from Britain, organising bulk orders of parts and fuel, and arranging swaps of material between various Queensland authorities.

TREB's acquisition of the Charters Towers company on 1 January 1956 aroused a good deal of controversy. The company itself was keen to expedite the transfer; their franchise was to run out in 1961, they lacked capital to augment the out-dated, overloaded and frequently troublesome plant in order to meet rapidly expanding demand,[46] and their indebtedness was still considerable, at £23,000.[47] However, this was the first time in ten years that expansion of TREB's territory had been proposed. A split developed within the Board between members from Townsville and those from Ingham and the Burdekin, who feared that if Charters Towers was incorporated at that time, system development in their own districts would be delayed.[48] Councillors Ford, Row and Wordsworth voted against the proposal, while H. Hopkins, J.A. Sherriff and the Electricity Commissioner, H. Neil Smith, voted for it; the takeover proceeded on the casting vote of the Chairman, J.A. Sherriff.

In parliament Tom Aikens conducted a vocal campaign against the acquisition. Aikens had taken a strong personal interest in the Townsville City Council's electricity undertaking during his time on the Council, had opposed its incorporation into TREB, and thereafter kept a vigilant eye on all of TREB's activities. On this occasion he alleged corruption, claiming that one member of the Board, Harry Hopkins, had a

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44. Manager, Rotherham Forge and Rolling Mills Co. Ltd to Agent-General for Queensland, 25 November 1947.
45. Heidecker to Neil Smith, 10 October 1952, QEC, Box 714/008, R157/8.
46. Heidecker to Secretary, TREB, 16 March 1954.
47. *QPD*, Vol.218, 1957-58, p.196.
48. Interview with J.A. Sherriff, 13 August 1986.

significant interest in the Charters Towers company; his father, Spencer Hopkins, was a director of the company and the Hopkins family held a considerable number of its shares. Aikens also asserted that the price paid for the company had been far too high, especially considering the size of the overdraft.[49] The amount finally agreed upon was £73,000, representing 25 s. per fully paid share, payment being made partly in cash and mainly in SEC debentures. None of Aikens' charges withstands close examination: Hopkins was legally entitled to vote on the issue, although his father was a director of the company and held a block of its shares; the price paid was arrived at through negotiation over a considerable period and was justifiable on the basis of the company's assets and revenue.[50] The Mayor of Charters Towers, Paul Wherry, who later became Charters Towers' first representative on the Regional Board, contributed to the debate by stating that the "old electricity company had reached a stage of hopeless collapse"[51] - clearly an exaggeration since the SEC regarded the undertaking as one of the most efficient in the State. Even after the transfer had been effected, the controversy did not die for there were problems over the company's distribution of the proceeds to its shareholders; thereafter the company continued to trade, but as a finance company.

When TREB took over, the Charters Towers undertaking had a staff of eleven and nearly 2,000 consumers supplied by about 120 kilometres of reticulation and 22 substations. In 1955 the capacity of the power station was 1,495 kW and maximum demand was 1,215 kW; nearly 3 million kWh of electricity were generated.[52]

The city of Charters Towers was connected to the Board's distribution system in August 1957 after the completion of a 66 kV transmission line from Woodstock substation by the contracting firm, Electric Power Transmission; the line was constructed alongside the Flinders Highway so as to ease access for maintenance and repairs. The diesel generating plant in Charters Towers was then put on standby for use in emergencies. The timing was fortunate, since the day before transmitted supply became available the Bellis and Morcom engine broke down yet again, which necessitated restriction of water pumping and some domestic load shedding. For most of the period since TREB's take-over the old plant had operated above its effective capacity. A second transmission line from Clare to Charters Towers was completed in 1971, providing an alternative source of power for the city and also supplying the district from Ravenswood to Pentland. The Charters Towers plant ran for the last time in December 1971 after cyclone Althea cut off supply from Townsville.

For the company's employees, all of whom went on working under TREB, the challenge was to adjust to a much larger, more complex, bureaucratic organisation. Joe Heidecker stayed on as TREB's Western District Engineer from 1956 to 1959, when he moved to Townsville. Gordon Fisher, who had begun his career with the company in 1944 as an apprentice electrician, was then appointed as district manager, and filled that position until 1987. From TREB's point of view the acquisition of the Charters

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49. *QPD*, Vol.214, 1956-57, p.125; Vol.216, 1956-57, p.1633, p.1720; Vol.218, 1957-58, p.196-7. *TDB*, 29 March 1957, p.1; 13 September 1957, p.1.
50. Neil Smith's report to the minister, 17 April 1957.
51. *TDB*, 13 September 1957.
52. SEC, Return of Statistics for 1955, at Charters Towers NORQEB office.

Towers district was undoubtedly a success, bringing in a considerable revenue. For the residents of Charters Towers it meant lower tariffs and a more secure electricity supply.

Ayr

Originally occupied in the 1860s by pastoral settlers grazing sheep and cattle, the Burdekin district began to attract sugar cultivators in the late 1870s, a period of enormous expansion of sugar growing along the northern coast. Though situated in a dry belt with an average annual rainfall of only about 40 inches, the district had the advantage of a supply of water from the channels and lagoons of the Burdekin delta; farmers later began to tap the seemingly inexhaustible supply of underground water. The township of Ayr was surveyed in 1882, named by Sir Thomas McIlwraith, the Premier of Queensland, after his birthplace in Scotland.

From the late 19th century electric lighting was used in the Burdekin district at John Drysdale's Pioneer sugar mill at Brandon. After he took over the Pioneer Estate, which had been established in 1882, Drysdale introduced innovative, scientific techniques, including irrigation, becoming renowned in the district for his progressiveness. Installed in 1895, electric lighting made it possible to crush cane both day and night; in the first decade of this century a Ruston Hornsby 185 h.p. charcoal-burning gas engine was in use at the mill.[53]

North Queensland's second public electricity supply, initiated like its predecessor by a private firm, was set up in Ayr in 1914. The Order-in-Council issued in February 1914[54] was held by David Edwards, a local businessman who played a prominent role in community affairs and local politics, holding office at various times on the Divisional Board and the Ayr Shire Council. Born in Scotland in 1864, he had arrived in Ayr in 1886, when he opened a small store; he later took up his trade as a carpenter/undertaker, gradually expanding his business interests.[55] In 1909 Edwards opened the Delta Theatre as a public hall, and in the following year he installed equipment for screening silent pictures, a new form of entertainment in Ayr which proved an instant success; among the equipment installed was an electric generator and it seems that from this the idea of public power supply originated.

The electrical system Edwards constructed in 1914-15 cost nearly £22,000.[56] Compared to the first Charters Towers system it was far less sophisticated, though still remarkable for a small township of about 600 people. A galvanised iron power house and small front office were built by George Lear on the corner of Graham and Young Streets. Initially a single 78 kW generator driven by a coke-burning suction gas engine was employed to produce direct current for commercial use and town lighting. The

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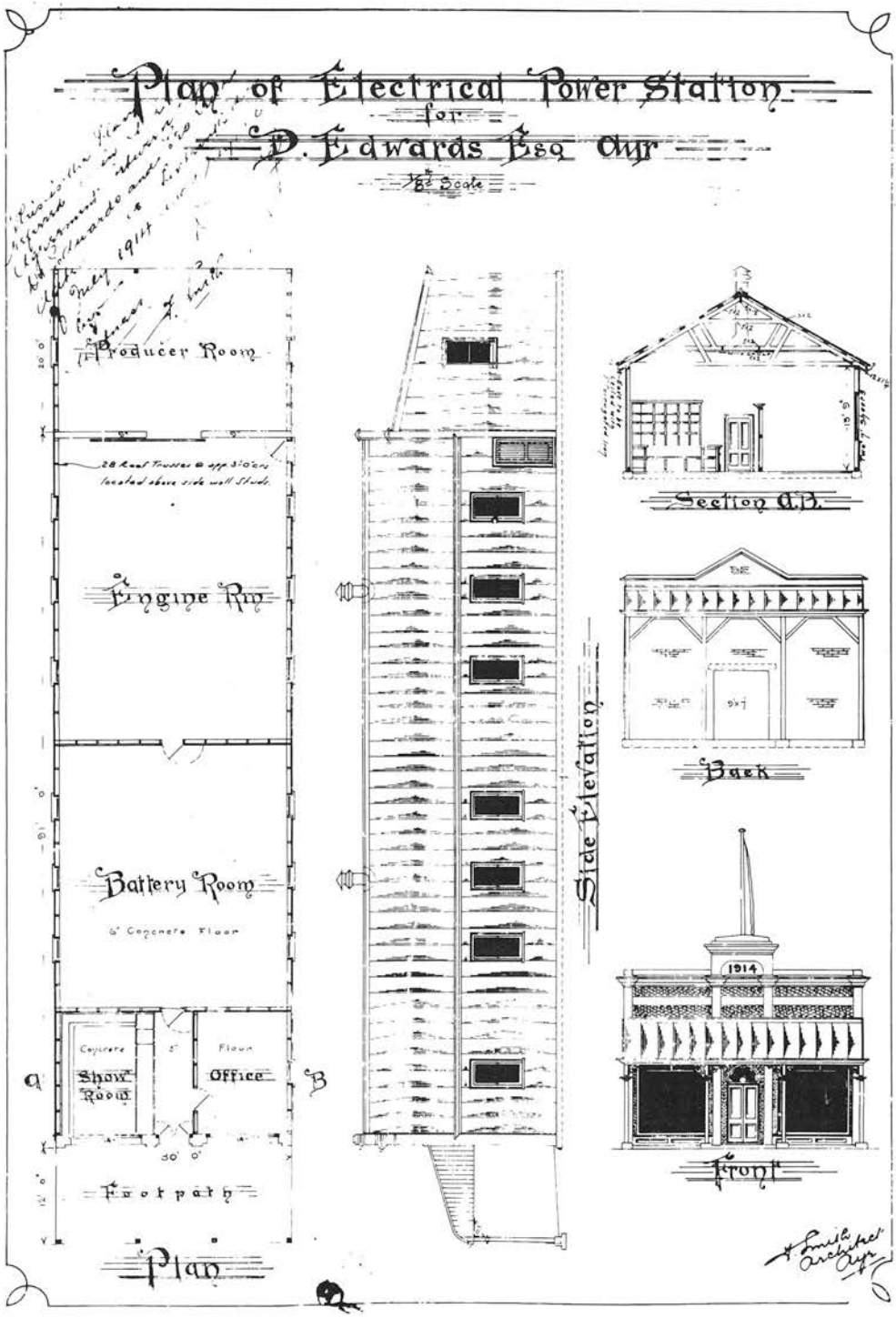
53. R. Connolly, *John Drysdale and the Burdekin*, Sydney, 1964, p.90, p.95. *Queenslander*, 7 August 1909, p.56.
54. *QGG*, 20 February 1914.
55. J.H. Peake, The Shire of Ayr, Townsville Municipal Library MSS, p.9, pp.16-8.
56. QEC N2-9.

7. Office of David Edwards, Ayr, after TREB takeover



8. Plan of David Edwards' power station

overhead, three-wire distribution system supplied 440/220 volts to consumers in the urban area.[57]

Owing to delays in receiving equipment, supply did not actually begin until September 1915. In early 1918 the firm's area of supply was extended to match the growth of the township.[58] By that time the enterprise had begun to return a profit, but for the first ten years it was far from flourishing.[59] At first there were only 20 consumers; this increased to 231 by the end of the first decade.[60] The initial price was 1/3 per unit for lighting plus 4d. per year for each watt of maximum demand, maximum demand being ascertained by connected load or a device called Wright's Indicator.[61] In October 1921 after the formation of the family company of David Edwards and Sons Limited, with a nominal capital of £20,000, the Order-in-Council was transferred to the new company, which owned the picture theatre and real estate as well as the electricity business.[62]

By 1934 the enterprise, which was run by David Edwards' sons Robert William and David Ronald after his death in 1927, had expanded considerably. Three diesel engines had been added to the original suction gas engine; total capacity had more than doubled. The number of consumers had risen to 470 out of a district population of about 3,000.[63] The staff numbered 13.

The company consistently provided reliable and efficient service. The Edwards brothers acquired something of a local reputation for generosity, showing a readiness to adjust electricity accounts according to the means of their customers. When the Electricity Board investigated the pricing methods of all electric authorities in 1934, there was only one complaint from the public in Ayr, which the Board quickly dismissed as unjustified, while the local Shire Council expressed nothing but satisfaction.[64] At that time there were no other private lighting or power plants operating in the township, another indication of general satisfaction with the company. The prices charged were deemed not excessive by the Electricity Board, though the company, like some other electric authorities, made voluntary reductions in tariffs in the following year.

By 1938 the number of electricity consumers had increased to 697, but the franchise granted by the Order-in-Council was about to expire. The company had attempted in 1931 to take advantage of the Moore government's leaning towards private suppliers so as to obtain an extension of the franchise, but the government was

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57. Spuler, Development of Electricity Supply, p.9.
58. *QGG*, July-December 1917, p.970.
59. *QGG*, January-June 1918, p.806 - Edward's statement to end of 1917. R.W. Edwards to H. Bruce, Minister for Works, 3 December 1934, QEC N2.
60. Peake, Shire of Ayr, p.17.
61. *QGG*, 20 February 1914, p.640.
62. QSA A/18945, p.367. *QGG*, July-December 1921, p.1043.
63. QEC N2-9.
64. *Delta Advocate*, 11 December 1934, QEC N2-25.

ousted before the necessary paper work could be completed.[65] In early 1938 negotiations began for the Ayr Shire Council to purchase the company.

Details of the purchase were finalised by the Chairman of the SEC, S.F. Cochran, in June 1938. A price of £18,590 was settled upon for the company's assets: the generating plant itself was valued at £8,000 and by then consisted of three Ruston Hornsby diesel sets of 75 kW, 80 kW and 90 kW capacity, a 50 kW National diesel set and a suction gas engine used as a stand-by.[66] As a precondition, the SEC required that the Council undertake to carry out extensions of the system in order to supply Brandon, a small township about eight kilometres north of Ayr, and outlying parts of Ayr itself; these extensions would necessitate conversion to alternating current as the existing d.c. system was not suitable for conveying power over any distance. To meet these requirements, the Council was forced to borrow £26,000 for the purchase and extensions.[67]

In January 1939 the undertaking was acquired by the Ayr Shire Council, who managed it during the difficult years of the Second World War until it was incorporated within TREB in 1946. The Order-in-Council was modified to cover an extended area of supply. Albert Axon was engaged as consulting engineer to draw up plans for the extensions, and R.M. Johnson was appointed as engineer-manager. However the new enterprise was barely under way when it confronted all the problems of war-time power supply.

In 1940 it proved necessary to borrow an additional £3,500 to finance extensions.[68] In 1943 conversion to alternating current was begun, a long, laborious process involving upgrading of wiring in premises, replacing all d.c. appliances with new ones, and changing over metering. This was not completed until 1956 after many delays as a result of war-time and post-war shortages of material. The d.c. system was severely limited in area; only after the conversion would extensions to the surrounding farming areas become feasible. Moreover direct current was not suitable for appliances such as stoves, refrigerators and washing machines.[69]

Although the Edwards' plant had been more than adequate for their restricted urban system, as distribution was enlarged and with pressing demands for power for military purposes, capacity was soon fully utilised. A plan was mooted in 1942 for the construction of a link between generating stations in Townsville and Home Hill to allow transfers of power, and Ayr was eager to be included in the scheme; although the Townsville-Home Hill interconnection eventually went ahead, Ayr was excluded, by decision of the Commonwealth government and despite protests from the SEC. As early as 1938 the desirability of connecting Ayr with the larger, more efficient generating station at nearby Home Hill had been discussed, but the work had been

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65. Secretary, SEC to Secretary, TREB, 1 July 1946, QEC 204/71/C. R.W. Edwards to Minister for Works, 9 December 1931, QEC N2-27.
66. Ayr Shire Council Minutes, 24-25 June 1938.
67. *Ibid.*
68. *Ibid.*, 21 March 1940.
69. Interview with Allan Wilkie, 18 June 1987.

postponed as a result of financial stringency with the onset of war.[70] Consequently the overburdened Ayr plant had to meet local demand as best it could during the war years. In mid-1945 plans to connect Ayr and Home Hill were revived, the project being financed by a loan of £10,000 and £2,000 in government subsidy.[71]

When Ayr was incorporated within the Townsville Regional Electricity Board in 1946, the local system supplied 1,340 consumers and there was a staff of 13 employees. On the original Board Councillor F.J. Woods represented the Ayr Shire Council, but following the local government elections in early 1946 he was replaced by C.G. McCathie, who served on the Board until 1951. The major task in Ayr in the post-war years was the continuing conversion to a.c. Until the conversion was complete, both a.c. and d.c. supply had to be provided, two a.c. motors being used to drive d.c. generators. In 1956 when the change-over was finished, moves to bring electricity to the neighbouring farmers began in earnest.

Among the outlying settlements which finally received power in the late 1950s was the small township of Brandon, just a few kilometres north of Ayr. As early as 1929 the Ayr Shire Council had proposed to buy electricity in bulk from David Edwards and Sons in order to supply 6-8 street lights in Brandon, but the Department of Public Works refused the application on the grounds that it would not be economic to build a transmission line from Ayr, or to install plant in Brandon, merely to supply a small number of street lights. Then in 1931, when H.J. Richards of the Crystal Iceworks in Brandon applied to the Department for permission to supply electricity in the town, his offer was also rejected.[72] In early 1936 David Edwards and Sons, with keen support from the Brandon Progress Association, requested an extension of their Order-in-Council to cover Brandon, but official consideration of the proposal was delayed for over a year because the government was reviewing policy following the report of the Royal Commission on Electricity; by that time negotiations were under way between the company and the Ayr Shire Council for purchase of the enterprise.[73] The SEC stipulated that the Council could go ahead with the acquisition only on condition that supply was extended to Brandon, so the Council borrowed additional money for this purpose. But as a result of delays in converting from direct to alternating current, Brandon did not receive supply until nearly 20 years later.[74]

The private electricity companies examined in this chapter were among the most successful electrical undertakings in north Queensland, though none was ever highly profitable. On the whole, they were efficiently run, provided a reliable service to consumers and maintained good relations with their clientele. Private electric authorities established later in Ingham and Mount Isa failed to reach the same standard. But efficient or not, all the private suppliers were eventually forced out of the industry, their returns squeezed by price and profit controls and taxation, their capacity for expansion restricted by lack of access to cheap finance and government subsidies.

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70. Ayr Shire Council Minutes, 5 June 1945.
71. *Ibid.*, 18 October 1945.
72. QEC N2/A.
73. QEC N2-76, N2-87.
74. Interview with Allan Wilkie, 18 June 1987.

CHAPTER THREE

MUNICIPAL SUPPLY: TOWNSVILLE

Townsville was a late starter among the major cities of Queensland. Whereas Brisbane, Toowoomba, Rockhampton and Charters Towers all received electricity supply by 1905, it was not until 1922 that the City Council inaugurated public supply in the north's premier city, though for many years small private plants had generated power for enterprises such as the several ice works and the picture theatres. In 1918-20 the City Council decided to augment pumping equipment at Hubert's Well in Aitkenvale, which included a small steam generating set, by adding two suction gas engines; the existing pumping station was thus transformed into a power station which became the basis of the city's reticulated supply. Initially the electric authority claimed only 43 consumers, Townsville people being hesitant at first to adopt the new form of lighting. Nevertheless, growth was continuous, in spite of managerial deficiencies in the 1920s, the Great Depression of the 1930s and acute problems with labour, materials and morale during the Second World War. The undertaking remained under Council control from 1922 to mid-1946, when it was included under the jurisdiction of the newly-formed Townsville Regional Electricity Board. With the exception of relatively small amounts of power transmitted from Home Hill, Hubert's Well was the city's only source of supply until 1953, when TREB opened a new power station in South Townsville and the original plant was closed down.

For 35 years before the Council's electricity venture was definitely decided upon - which was not until July 1919 - a great variety of private schemes were submitted for Council approval by both local and interstate firms. These were considered, reported on and, in some instances, accepted: but none came to fruition. The early electrical proposals were usually linked with a scheme for electric urban tramways, as had been adopted in several southern cities; indeed in some cases the tramway scheme took precedence and electricity was seen primarily as its motive force.

As early as September 1884,[1] only three years after the pioneer systems were set up in England, a proposal for electric street lighting was put forward. Schemes for electric tramways dated from 1889, when a Townsville Electric Tramway Company was formed; permission was sought and granted for the company to excavate the streets in order to lay tracks, but the project was abandoned in the economic depression of the early 1890s.[2] During the following three decades there were as many as 20 different proposals for electricity and/or tramways.

In 1892 the Council consented to a scheme put forward by a coalition of the Townsville Gas and Coke Company with the firm of Brand and Drybrough, proprietors of the Cleveland Foundry where machinery and engines were manufactured.[3] But by

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1. D.A. Shiels, Local Government in Townsville, 1879-1888, B.A.Hons, University of Queensland, 1964, p.70.
2. L. Wallis, Some Aspects of the Townsville Municipal Council, 1889-1901, B.A.Hons, James Cook University, 1972, p.V.19.
3. *Ibid.*, pp.V.20-1. See also QSA 11 THU/136(a).

1896 the Council's attitude had hardened; another applicant was told that his proposal would be considered only if he guaranteed that the price to consumers would be 50% less than the price of gas - surely an unreasonable demand.[4] This was probably because the Council was by then contemplating providing electricity itself. In March 1897, only months after the Electric Light and Power Act empowered local authorities to initiate supply and at the same time as a system was being installed at Charters Towers, information was sought about municipal supply in London and general enquiries were addressed to southern electric companies. For about two years the Council seriously considered introducing electricity; during this time at least two further private applications were rejected.[5] Following the failure of the latest private tramways scheme, the Council in 1901 also examined setting up an electrically-driven public transport system, but the Treasurer's discouraging reply to an approach for loan finance scotched the plan.[6]

Ten years later, after the abandonment of yet another private scheme in mid-decade,[7] Council interest in tramways and lighting revived, but on consideration the enterprise seemed too risky. At the same time two private proposals for electricity supply were weighed up, and that of real estate agent and former Mayor J.N. Parkes, which included tramways, preferred; however Parkes did not proceed with it.[8] In 1912 Brownhill Kirk's proposal for an electricity system was favourably received by Council, who offered the company a 30-year concession.[9] Then in the following year Minehan and Sons announced their intention to apply for an Order for electricity supply. Peter Minehan, who had been engineer with the Ayr Tramway Board,[10] had been commissioned by the Council in 1910 to examine tram systems in Rockhampton, Brisbane and Toowoomba with a view to designing a system for Townsville; the Council had dropped that project, but in 1912 granted Minehan an option for his own tramway scheme. In 1913 he proposed to branch into electricity as well and sought Council approval. Instead Council gave Brownhill Kirk and Company, a local general agency business, an extension of time to prepare their application to the Department of Public Works.[11] None materialised; nor did Minehan and Sons go ahead with their plans.

In March 1914 the City Council again took the initiative itself, this time in association with the Thuringowa Shire Council, but after discussing the idea several times decided not to proceed. The main reason was that the Council decided that other essential public works such as roads, bridges and, most urgently, water supply, had

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4. TCC Min (11), p.487.
5. TCC Min (12), p.68; (14), p.44. TCC Vote Book, 1896-1905, p.211. L. Wallis, Townsville Municipal Council, p.V.21.
6. *Ibid.*, p.V.20.
7. TCC Min (16), pp.373-4.
8. TCC Committee Reports (6), p.375.
9. TCC Min (18), p.251.
10. To supervise construction of the railway between Townsville and Ayr which received government approval in 1899, Minehan, the government Railway engineer, had been seconded by the Ayr Tramway Board, which had been formed jointly by local authorities in Townsville, Thuringowa and Ayr. Wallis, Townsville Municipal Council, pp.V.9-16.
11. TCC Min (18), p.300.

priority over an electricity project.[12] During discussion of the issue the Council learned of a possible legal problem: section 149 of the Local Authorities Act of 1902 seemed to require that before supplying electricity a local authority had to buy out any existing electric authority or gas company. The additional cost of purchasing the Townsville Gas and Coke Company, which had been established in 1879 to reticulate gas in the city, would have been a severe impediment. The Bundaberg City Council had been pressing for the amendment or removal of this section since 1912,[13] and in May 1914 the Townsville Council offered them every assistance.[14] An amending Act of 1917 eventually removed the troublesome requirement, but in the interim this obstacle did not prevent the Townsville Council from considering municipal supply several times.

Meanwhile two more applications were received from private companies and the Council decided to support that of Erle Huntley. All the necessary paper work was completed, but in September 1914 Huntley explained that he could not take up the franchise "in consequence of the altered conditions and general paralysis of business arrangements in connection with the European crisis".[15] An application received from Gordon Faine, director of the Electric Construction Company of Australia Limited, was also held over until the financial system settled following the outbreak of war.

In 1916 the Council again contemplated municipal supply. Influenced perhaps by their earlier unsuccessful appeal to Treasury for money, they canvassed local finance and insurance companies to underwrite a debenture issue of £100,000 for electric lighting and tramways.[16] The proposal attracted interest from the Commonwealth Bank, which had been established by a federal Labor government in 1911 as a "national bank" to compete with private banking; in July 1916 details of a financial agreement were settled.[17]

Nevertheless, when the Electric Construction Company renewed its application in early 1917 it was favourably received, provided certain conditions were met. As negotiations proceeded the Council's conditions became more and more stringent but, undeterred, Gordon Faine paid a personal visit to the Town Hall in November to advocate his scheme before a special meeting of Council. In February 1918 consent was given for the Brisbane company to apply for an Order, after a motion for the Council to undertake supply itself had been defeated by the narrow margin of five votes to four.[18] The company's proposal was favoured over that of J.S. Love, a prominent local entrepreneur; another offer had been received from F. Wylde Ball and Co. of Brisbane, but it too was declined.

Finally, however, in an interview with Gordon Faine and a Council representative, the Treasurer, E.G. Theodore, indicated that the Labor government opposed private

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12. TCC Vote Book, 1906-1914, pp.135-6.
13. Letter from Bundaberg Town Clerk, 5 March 1914 (in-letter 366 of 1914).
14. Town Clerk to Bundaberg Town Clerk, 13 May 1914.
15. TCC Min (18), pp.427-8.
16. TCC Min (18), p.564.
17. TCC Min (18), pp.575-6.
18. TCC Min (19), pp.95-6.

provision of electricity except where supply by the local government authority was not feasible.[19] Apparently the government had received information from Townsville that municipal supply was definitely feasible on the basis of the Hubert's Well plant. The Townsville City Council was thus forced back upon its own resources. It began in mid-1919 by seeking finance for its own electricity project.

This brief outline of the series of abortive attempts to begin electricity supply in Townsville illustrates but does not fully explain the tardiness with which the new technology was adopted in the north's largest city, at a time when its people prided themselves on their progressiveness. The viability of electrical undertakings in Ayr and in Charters Towers (at least until the mines began a rapid decline), suggests that the enterprise would not have failed; certainly there was no shortage of applicants expressing interest. Of course, the availability of gas lighting after 1879, when the Townsville Gas and Coke Company was established by a consortium of local businessmen, may have reduced the apparent urgency of introducing the innovation and limited its expected profitability. Entanglement with tramway schemes may have retarded the introduction of electricity, especially after 1910 when trams seemed to become an afterthought in electricity projects rather than vice versa. Without doubt the chaotic effects of the First World War and the accession of the Labor government in Queensland in 1915 delayed the advent of electricity supply in Townsville. Another clear cause of delay was the indecision of the various Councils about whether supply should be municipal or private; finally the Council's hand was forced by the Labor government. Local government in this period was dominated by conservative businessmen who did not always share the Labor Party's faith in public enterprise. Even in 1920 one of the city's more radical aldermen supported the venture in terms rather equivocal:

> Whilst it might be admitted that Council control was not always the best, still if the proposition was such a good thing for private companies, as evidenced by former proposals, the Council should be able to do something with it.[20]

After Theodore blocked private electricity supply, the City Council's so-called "Legislative Lighting and Tramway Committee", which had previously controlled the disposition of gas street lamps as well as reporting on the various electricity and tramway proposals, entered a period of extraordinary activity. The Treasurer had advised in September 1918 that he would consider favourably any application for the Council to finance an electricity project by issuing debentures.[21] In August 1919 a deputation from the Council was instructed to persuade Theodore to lend £45,000 for the venture or, failing that, to approve borrowing from outside sources on the security of debentures. Theodore preferred the latter option, so on the strength of the earlier negotations the Mayor, W.H. Green, approached the Commonwealth Bank. Finance for the project was found without apparent difficulty. After some negotiation the Council adopted a resolution in July 1920 to borrow £45,000 from the Commonwealth

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19. TCC Committee Reports (7), p.392. *North Queensland Register*, 5 June 1922, p.68.
20. J.E. Clegg, *TDB*, 21 April 1920.
21. TCC Committee Reports (7), p.389.

Bank for a period of 20 years at 5% interest,[22] which made the annual outlay for interest and redemption £3,600;[23] these terms were generally considered very favourable. The Council then obtained from Treasury an Order-in-Council to authorise the issue of debentures.

Their initial financial worries settled, the Legislative Lighting and Tramway Committee were ready by the end of 1919 to appoint consulting engineers to draw up specific plans. A reputable consulting partnership from Sydney, A.C.F.Webb and Burgess, was chosen from a large number of applicants; they had had considerable experience with electric lighting of small towns in New South Wales, but Townsville would be their most extensive and sophisticated project to date.

The consultants were instructed to prepare specifications, surveys and data, both technical and legal, necessary to obtain an Order-in-Council; to estimate the capital costs, operating costs, and expected revenue of the undertaking; to report on the suitability of the existing Hubert's Well pumping plant for supply of electricity; to call for tenders, report on them and draw up contracts; and finally to supervise and inspect all installation work, the erection of all machinery, poles, wiring and other equipment so that the whole plant could be handed over to the Council in perfect working order. There were two notable instructions in the terms of reference, neither of which was embodied in the final plans: the scheme was to cover both power supply and tramways; and the consultants were asked to consider V. Crowley's suggestion that Saltwater Creek Falls at Mount Spec might have hydro-electric potential.

The pumping equipment at Hubert's Well had originally been set up by the Council as part of the Townsville Waterworks project; pushed ahead despite controversy because of its high cost, completion of the scheme in 1882 had been the occasion for much celebration and self-congratulation. The plant was situated in Aitkenvale on the corner of West Street and Ross River Road, near the present site of the Cathedral School; the well was located on a former course of Ross River, marked by a deep gully. In 1914, on the suggestion of S.F. Roberts, Engineer for Water Supply, generating equipment was installed and the pumps were electrified; in the following years power from Hubert's Well also supplied three other pumping stations, two of them on Ross River.

The generating plant had recently been expanded by the Electric Construction Company for purposes of water pumping. The original equipment installed in 1914 had consisted of a 290 h.p. Bellis and Morcom steam engine, complete with condenser, direct coupled to a 200 kW alternator. To this were added two National suction gas engines, chosen because of their economy; the price of coal had reached a war-time high of about £3 a ton, whereas the gas engines were fuelled by charcoal. Widely used in industry at this time though virtually unknown today, suction gas engines employed a simple technology, taking advantage of the explosive force released when gaseous compounds are compressed and ignited. Recognisable by their enormous flywheel of

22. TCC Min (19), p.331.
23. *North Queensland Register*, 5 June 1922, p.68. Town Clerk to Under Secretary, Treasury, 5 October 1920.

perhaps two metres diameter, they ran on producer gas made from coal or charcoal. The equipment installed in Townsville consisted of a 316 h.p. engine driving a 200 kW alternator and a 250 h.p. engine driving a 150 kW alternator, the total cost being £15,436. The machinery was purchased second-hand from Goodlet and Smith of New South Wales, after testing in Sydney confirmed that it was in good order after about two and a half years in service. In 1918 the City Council commissioned G.B. McCulloch to report on the capability of the machinery at Hubert's Well to generate power for the city.[24] That report was unfavourable, but Webb and Burgess concluded in 1920 that the site and plant were suitable, and recommended extension of the power house.

Conversion of the Hubert's Well plant promised a number of economic advantages. Combining generation with water supply would mean that the electrical plant was assured of a large pumping load, which would help to reduce unit costs. Moreover pumping could be carried out after midnight when the lighting load was diminished, thus improving the load factor. Water for condensers was readily available; and avoiding duplication of staff would be an additional economy. One disadvantage was the location of the plant, some six kilometres from the centre of the city. Webb estimated the resulting distribution losses as high as 5%, at best.[25] As he pointed out, however, the city could be expected to grow towards the power station, which would gradually reduce these losses.

Though favouring conversion of the Hubert's Well pumping station, the engineers submitted several alternative proposals for an electricity scheme, and the Council adopted one which best suited the requirements of water supply, and which allowed for tramways in the future.[26] The Council continued to pursue the idea of tramways, writing to southern tramway companies and making enquiries to B.H.P. about the cost of rails.[27]

Webb and Burgess recommended that the plant at Hubert's Well be used to generate three phase alternating current, at 415 volts and 50 cycles; Roberts had had the prescience to provide for alternating current when the water supply was electrified in case the plant was later used for city supply. The pressure would be stepped up to 5,000 volts by transformers, transmitted overhead by means of bare copper conductors, and then stepped down for consumers. The system would provide 415 volts between phases for power and 240 volts from phase to neutral for lighting. Except in part of Flinders Street where mains had to be laid under the footpath because of balconies overhanging the kerb, distribution would also be by means of bare copper overhead lines. All poles and crossarms would be of hardwood, with insulators of vitrified porcelain or stoneware. Street lamps would be suspended from brackets attached to poles and lightning arrestors would be provided. The street lighting system was designed to be controlled from the main switchboard at the power house.[28]

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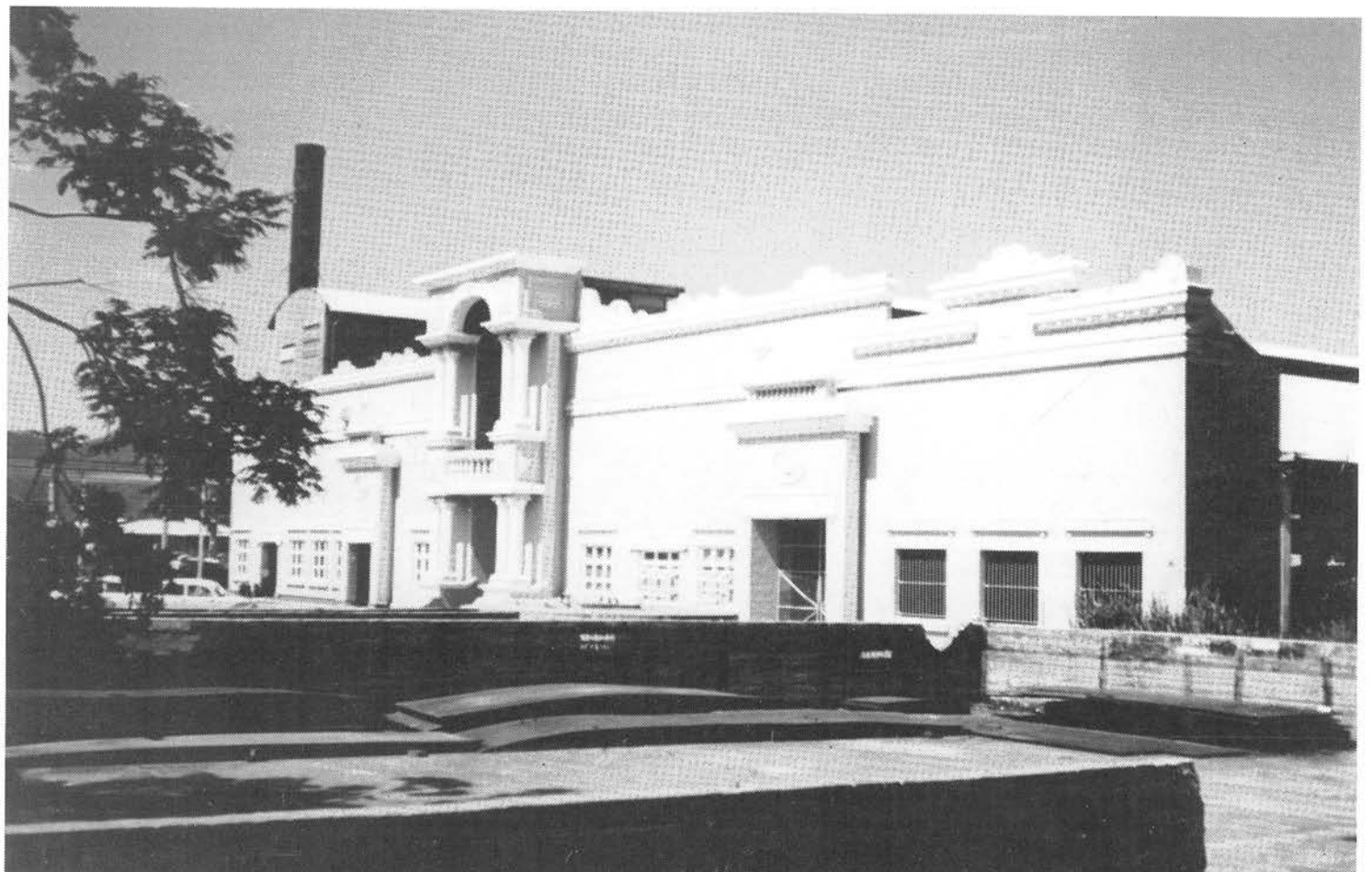
24. TCC Committee Reports (7), pp.383-4.
25. *TDB*, 21 April 1920.
26. *Ibid.*
27. E. Lewis to Town Clerk, 1 March 1921.
28. Webb and Burgess to Town Clerk, 26 July 1920.

9. Hubert's Well Waterworks, 1922



10. Hubert's Well power station

Council having adopted a concrete scheme, the engineers were instructed to prepare a detailed submission for the Department of Works in Brisbane; seven months later, in November 1920, the Order-in-Council was issued, after trifling amendments by the Department. The Order covered the whole of the area of the City of Townsville excepting Magnetic Island; this excluded the embryonic suburbs of Oonoonba and Stuart (then known as Stewart's Creek), which were part of Thuringowa Shire. The Order was for an initial period of 10 years and six months, after which time the government could require the Council to sell its electricity undertaking.[29]

By the end of 1920 the Committee turned its attention to tenders, those finally accepted having a total value of £39,000. On Webb and Burgess' recommendation, the main suppliers would be E.F. Broad and Co. for poles (£5,900), British Insulated and Helsby Cables Ltd. (Melbourne) for the cable (£7,300), Australian General Electric Company for street lighting fittings (£7,100), General Trading Co. (Sydney) for transformers (£3,900), Warburton Franki Ltd. (Sydney) for switchboards (£4,500) and McDonald Bros. for erecting poles and cables (£6,800).[30] The Committee drafted by-laws to cover the scheme and devised a schedule of prices for electricity, both of which had to be submitted to the Minister for Works for approval. Accommodation suitable for stores and workshop was secured in the sample rooms of the Market Reserve building in Flinders Lane.[31]

In the main, the successful tenderers managed to deliver materials by mid-1921. There were, however, some delays through material shortages and bottlenecks, three defective transformers and a main switchboard damaged in transit from Sydney causing particular anxiety. Nevertheless, in June 1921 the Engineer for Water Supply, S.F. Roberts, reported that there was plenty of material on hand, including cables, poles and insulators. British Insulated and Helsby had shipped 85 drums of cable to Sydney for trans-shipment to Townsville. Webb and Burgess had despatched quantities of poles north after inspecting them in Sydney. After testing in Sydney, the main switchboard had been dismantled and packed for consignment to Townsville.

In mid-1921 a start was made on the extension of the power house and construction of a building to house the transformers and switchboard.[32] In addition to the power station at Aitkenvale, there was to be a major transformer substation, conveniently coupled with a public urinal, at the intersection of Stokes and Sturt Streets in the city. McDonald Bros., the contractor for erection of poles, also commenced work. Benefitting from experience gained on electricity projects in New South Wales and Victoria, they made remarkably good progress, putting in about 300 poles a month - all by hand using crowbar and shovel. When about 600 poles were in place, they began running the cables.

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29. *QGG*, 11 November 1920, pp.1511ff.
30. Webb and Burgess to Town Clerk, 27 October 1920.
31. After Townsville's original corrugated iron market buildings were destroyed by fire in 1896, a new Town Hall - Market Reserve complex was built in 1901. The complex backed onto Flinders Lane, now called Ogden Street.
32. TCC Committee Reports (8), p.426.

One minor problem arose where the Council's mains encountered the Townsville Harbour Board's small electricity network, which supplied the harbour itself, Jetty Road and a few adjoining streets in South Townsville.[33] On the suggestion of Webb and Burgess, it was decided not to extend the Council's system beyond the point where the Harbour Board's mains crossed the Jetty Road. The Harbour Board system was not incorporated in the Council scheme until July 1928.[34]

In March 1922 S.F. Roberts, the Waterworks Engineer who supervised, unofficially, the implementation of the scheme, since Webb and Burgess remained in Sydney for most of the time, was officially given charge of the electrical system as well as water supply, becoming Engineer-in-Chief at a salary of £700 per year.[35] As work began in May on the installation of consumers' services, the Council emphasised in advertisements in the local papers that only those certificated by the Board of Electrical Examiners and with written permission from the Council could legally work on electricity reticulation equipment. The Council took advantage of its position to advertise the new service: circulars extolling the advantages of electric light were included with rate notices. Yet by the end of May, only 43 applications for connection had been received.[36] Canvassers had combed the city in late 1921 in order to estimate likely demand, but the response had been exasperatingly poor; notwithstanding, proponents of the scheme remained convinced that when a number of connections had been made, the obvious advantages would bring a surge of demand.

On the last day of May 1922 all was ready for the official ceremony to switch on the lights. The Mayor, W.H. Green, briefly reviewed the history of the enterprise and tried to assuage fears that the plant would not be able to produce sufficient power for both electricity and water pumping. Carried away, perhaps, by the occasion, the Mayor paid tribute to the industry of the consulting engineers and all the contractors, adding that the whole project had been completed without tension between the various parties involved. In fact, there had been much dissatisfaction with Webb and Burgess' handling of the commission, particularly with their remoteness in Sydney, so much so that in 1921 the Council took legal advice on their chances of bringing the engineers to

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33. In June 1918 the Harbour Board had applied to the Townsville City Council for permission to install a more extensive electrical system covering a larger area of South Townsville, but the application had been denied without explanation. (TCC Committee Reports (7), p.388). This was one instance where the government's power to override the refusal of the local authority was exercised, in the interests of the general public and of shipping at the port. (QEC N/89). In April 1919 the Board was granted an Order-in-Council to reticulate electricity in a restricted area in the vicinity of the harbour. (*QGG*, 3 April 1919, p.989).
34. Only in the late 1920s did the Harbour Board see advantage in taking power from the Council. By then producing electricity with its suction gas plant had become very costly; in addition, a 20-ton electric travelling crane was installed in late 1928 and the old plant, which produced direct current, could not supply the new piece of equipment. (H.J. Taylor, *The History of Townsville Harbour 1864-1979,* Brisbane, 1980, p.119). Therefore in July 1928 the Harbour Board reached agreement with the Council for electricity supply. (TCC Min (21), pp.208-9). The change-over from direct to alternating current required a complete reorganisation, so it was not until December 1929 that the harbour was actually connected to the city supply.
35. TCC Committee Reports (8), p.409.
36. *Ibid.*, p.404.

account in court; but the case would have rested on professional conventions about duties and responsibilities and the Council was warned against relying on strong testimony from other engineers.[37] In early 1922 the Lighting Committee again expressed "absolute disatisfaction [sic] at supervision of scheme and apparent callousness" towards the Council's interests; on that occasion, however, the delays appear to have been beyond the consultants' control.[38] The Council also had some tense moments with British Insulated and Helsby which were at least partly attributable to the dilatoriness of the Sydney engineers.[39]

For the opening ceremony a temporary main switch was fitted on the balcony of the Town Hall and decorated with streamers, which were afterwards cut up as mementoes. When the Mayor flicked the switch, the lights came on simultaneously in all the city streets. A reporter described the brilliant scene, as witnessed by the crowds who had gathered outside the Town Hall:

> The wonderful change in Flinders Street was most marked, the bright lights in sets of four springing out of the darkness, and Flinders Street from a dimly lighted street became a brightly illuminated avenue right into the distance.[40]

The completed scheme was based on a generating plant combining the original steam set of 290 h.p. with suction gas sets with a capacity of 560 h.p. The total capacity put into operation in May 1922 was therefore about 850 h.p.; this was well in excess of immediate requirements, since only about 50 h.p. was needed for street lights while water pumping, even with all wells operating at the same time, took 200 h.p. The lighting system provided for 358 lamps of various candlepowers and lighted 45 kilometres of streets, a very extensive scheme for the time. There was a total of 1,363 poles and 230 kilometres of cable; there were 2,800 crossarms, 7,500 insulators and seven transformer substations. The idea of electric tramways for Townsville was certainly not dead yet, as Alderman T. Lowth's speech at the opening ceremony showed; indeed the Committee which continued to oversee the Council's electricity undertaking retained "Tramway" in its title until 1927.[41]

In the next few years the main business of the Lighting Committee was deciding which applications for electricity connection could be accepted. The initial hesitation of Townsville residents quickly evaporated. As Roberts later reported, "when the lighting system was inaugurated, the public were doubtful and timid and one waited for the other to see what the result would be and it was 12 months or more before confidence was complete."[42] As demand grew, the Council used economic criteria to decide who would be connected. Petitioners for supply were required to list the number of residents in their neighbourhood who would guarantee to have light installed. Many were refused because there were not enough other applicants in the locality; some were

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37. A.E. Dean to Town Clerk, 18 August 1921.
38. Telegram Town Clerk to Webb and Burgess, 8 February 1922.
39. British Insulated and Helsby to Town Clerk, n.d. (received 2 May 1921).
40. *North Queensland Register*, 5 June 1922, p.68.
41. *Ibid.*
42. Roberts to Mayor, 2 March 1928.

accepted on condition that a guarantee was paid. By the end of 1922, when a total of 194 consumers had been connected, S.F. Roberts predicted "that the most optimistic expectations will be exceeded".[43] In the year after the opening, approximately 455 connections were made.

Lighting was the main domestic use of electricity at this time, household electrical appliances other than electric irons being very rare. Webb had estimated that the cost of the most modest light installation, five lights in a cottage at minimum expense, would be about £13.[44] At this time engine drivers and firemen at the power house were earning under £6 a week, and unskilled wages were lower again; the financial sacrifice involved in getting the electricity on can therefore be appreciated. Moreover, the cost of electricity itself was high, the initial charge being one shilling per unit for house lighting with a 25% discount for prompt payment. For most of the populace, therefore, the first noticeable results of the new technology were the nightly illumination of the Post Office clock and the gradual spread of street lighting.

In the first few months of operation, demand was boosted by inclusion in the scheme of a number of unexpected large commercial consumers. The Council was anxious to include the Railways as well, and after some haggling over prices they accepted reticulated power for their machine and boiler shops, and for lighting and fans, rather than installing their own electrical plant as had been planned.[45] Roberts estimated the Railways load at 330 h.p., about 40% of the capacity of the existing generating plant, and providing for this became important in his plans to expand capacity.[46] As a result of unforeseen events, however, the Railways were not actually connected to the system until 1925.

By the end of 1922 the Chief Engineer was insisting upon upgrading the plant: a gas holder (part of Roberts' plan to convert from suction gas to pressure gas engines, an idea later abandoned), an additional steam boiler, repairs to existing boilers and equipment for handling fuel such as mechanical stokers and conveyors, he considered essential. In fact Roberts had been agitating for some of these improvements for many years, but to no avail. By 1922 he recommended steam rather than further gas units because the price of delivered coal had fallen when supplies became available from the Collinsville State Coal Mine in August of that year, and because steam power was more reliable.[47] In early 1923 the Council applied to the Treasury for another loan of £30,000 for boilers, mechanical stokers, an extra 400 kW generating set and a railway siding for cheaper transport of coal to the power station.

Despite the optimism prevailing in Townsville, however, the Department of Public Works was not satisfied with the Townsville system. A report in March 1923 by J.J. Grier, Electrical Engineer with the Department, criticised the scheme on three fundamental points. He disagreed with the decision to install gas engines alongside the

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43. Roberts to Mayor, 4 December 1922.
44. *TDB*, 21 April 1920.
45. Roberts to Mayor, 2 May 1921.
46. Roberts to Mayor, 4 December 1922.
47. *Ibid.*

original steam engine on the grounds that the cycle variation was excessive; he also disapproved of Roberts' presumed intention to retire the gas plant eventually. That is, Grier considered the addition of the gas engines unwise, but thought that, having been installed, they should be retained for their economic life. Secondly, he criticised the location of the power station:

> It is reasonable to assume that the Power House should have been located at the nearest point to the coal wharf, which would also be near where the bulk of the electrical energy was consumed, thus obviating the necessity of building special roads or railway for conveying coal, also the transmission losses over the distance for the whole of the energy supplied to the town.

Grier also recommended that "competent engineers" draw up a "comprehensive scheme" providing for the next ten years, so that piecemeal addition of ill-assorted equipment could be avoided. With regard to the request for further loan money, Grier commented that the Townsville system had never been officially approved, although he had visited the plant unofficially.[48] In March 1923 Roberts answered Grier's criticisms to the satisfaction of the Council,[49] and government loan money for expansion was eventually forthcoming, but this was just a prelude to the avalanche of criticism which would come down upon the Engineer-in-Chief eight years later.

Sidney Fitzroy Roberts, who had the greatest influence on the first decade of electricity supply in Townsville, was initially employed by the Council in an entirely different capacity. In March 1909 Roberts answered an advertisement in the Rockhampton newspapers calling for a "practical engineer" to take over the Waterworks in Townsville, and he was soon informed of his appointment. His career with the Council was to be long, but full of conflict.

Though lacking formal qualifications, Roberts had work experience as a marine engineer. Already in his 30s when he arrived in Townsville, he was not tall, but stockily built, and of florid complexion. His personality was forceful, choleric with a tendency to domineer, and none of his subordinates considered challenging his authority. Undoubtedly his character contributed much to the turbulence of his career.

Roberts began in 1909 with a salary of £240 per annum, which was increased subsequently in each period of re-employment until in 1922 the contract giving him charge of electricity as well as water supply nominated a salary of £700 per annum. Despite his lengthy period of employment with the Council - over 22 years in all - and evidence of his employers' satisfaction in rising salaries and widening responsibilities, Roberts' career was punctuated by controversy, reaching a climax in April 1932 when his contract was terminated for negligence and incompetence.

During Roberts' period in charge of the electricity department, numbers of consumers and output of electricity constantly increased. (See Table 1). In 1923 the peak load on the station was about 300 kW; by 1931 this had grown to about 1040 kW. By the late 1920s expansion began to taper off because of approaching saturation, but more importantly because of the onset of severe depression.

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48. Report of J.J. Grier, Electrical Engineer Department of Public Works, 13 March 1923.
49. Roberts to Mayor, 29 March 1923.

Table 1: TOWNSVILE ELECTRIC AUTHORITY STATISTICS, 1923-31[50]

Year	Consumers	% Increase in Consumers	Peak Load (kW)	Units Generated Approx.	% Increase in Units Generated
1923	751		300	1,118,260	
1924	1274	69.7	375	1,423,261	27.2
1925	1764	38.4	465	1,833,322	28.8
1926	2290	30.2	545	2,184,977	19.1
1927	3016	31.7	700	2,864,799	31.1
1928	3519	16.6	850	3,680,030	28.4
1929	3866	9.8	940	4,240,440	15.2
1930	4242	9.7	1030	4,505,580	6.2
1931	4525	6.2	1005	4,696,390	4.2

The one major development in generating capacity during Roberts' administration occurred in 1927, when two 500 kW steam sets were finally brought on line. Their history had been long and tortuous. In early 1923 the Council had applied for loan finance for a 400 kW set and a new boiler, but Grier's scathing report for the Department of Public Works stood in the way. Notwithstanding, in September 1923 the Treasurer gave permission for the Council to purchase equipment through Coward and Company of London, including two Thompson boilers and two 500 kW generators. The Council grasped what seemed an excellent offer, highly recommended by Cowards, but the transaction led to many problems which delayed installation of the plant. The Treasurer had not approved the total sum required for installation of the machinery, so the work had to be done as funds became available from revenue.[51] Because the offer was made by cable, there were also misconceptions about what was included in the purchase and the characteristics of the equipment; as a result considerable additional expense (over £1,500) was necessary to complete the plant and adapt it for conditions in Townsville.

Table 2: CAPITAL EXPENDITURE ON TOWNSVILLE UNDERTAKING, 1922-30[52]

Year	£	% Increase
1922	47,067	
1923	55,462	17.8
1924	60,434	9
1925	65,811	8.9
1926	69,710	5.69
1927	76,918	10.3
1928	87,036	13.2
1929	160,492	84.4
1930	192,402	19.9

50. From Roberts' reply to Axon's report, 29 Feb 1932, pp.32-3.
51. Robert's reply to Axon's report, 29 February 1932, pp.26-7.
52. From Fadden's report to Council meeting, *TDB*, 17 Apr 1931, p.11.

Table 3: AVERAGE PRICES OF ELECTRICITY, 1922-31[53]

Year	d. per Unit	
1922	10.54	}
1923	6.99	}
1924	7.14	}
1925	7.22	} excludes sales to water authority
1926	7.44	}
1927	7.19	}
1928	6.70	}
1929	4.17	}
1930	3.59	} includes sales to water authority
1931	3.21	}

The 1923 purchase included two secondhand Thompson boilers, each with a heating surface of 5,200 square feet. They gave good service with the exception of the superheaters, which Roberts had insisted on buying despite warnings from London; these were incapable of producing sufficient heat, which reduced the efficiency of the boilers and of the power plant in general. In June 1927 the two Bellis and Morcom 720 h.p. engines, direct coupled to 500 kW alternators, began operating. Soon after, the old suction gas engines were retired and sold. In 1926 Roberts had also purchased a 250 kW Bellis and Morcom engine, and in 1929 he bought a secondhand Allen 1360 kW turbo-alternator, again by cable, but neither of these was used before he was dismissed. Roberts was later criticised because there was no obvious relationship between the station's peak load and the capacity of the plant at any given time.[54]

One persistent problem in the early years of the undertaking was the delay in installing consumers' fittings. At the end of 1923, when popular demand for electricity began to take off, there were only two contractors working in Townsville. Many people complained that they could not obtain quotes for installation work within a reasonable time, some that they could not get quotes at all. One firm reported waiting six months for wiring to be put into their premises. There were also allegations that the contractors were colluding on prices, and Roberts suspected that these were well-founded. Certainly the contractors were charging excessively high prices for lamps, up to 100% more than the landed cost. Roberts took a serious view of these practices, fearing that they would damage the electricity department and play into the hands of the gas company; he recommended that the contractors be warned that if there were more complaints the Council itself would sell lamps to the public at a reasonable charge.[55] Roberts' threats showed a leaning towards municipal encroachment in areas occupied by private enterprise, which was to arouse considerable antagonism towards him in later years.

53. From Fadden's rough notes, Townsville City Council Archives.
54. Axon's report, 19 September 1931, p.8.
55. Roberts to Mayor, 5 November 1923; Roberts to Mayor, 7 December 1925.

Another serious problem appeared in 1925 when it was first discovered that many of the original poles were rotting below ground level so that in some cases poles were held upright only by the cables. As this sometimes became apparent only when a linesman climbed the pole to carry out repairs, serious risk to life was involved. Roberts considered himself vindicated in that he had disagreed with Webb's use of poles imported from the south; from this time local timbers were given preference. In May 1925 the Chief Engineer estimated that 84 poles needed replacing immediately and 135 more within six months, at a cost of about £70 each (the poles themselves cost only £2). This was a massive task considering the primitive equipment used for pole erection, especially since the work could only be done on Sundays when a shutdown of the power house would cause least inconvenience to consumers.

From the beginning Roberts advocated a vigorous campaign of publicity and advertising. As early as 1921 he had stressed the need for special efforts to overcome the resistance of Townsville people to the novel technology and their ignorance of its manifold applications:

> In my opinion the use of Electricity and its adaptability for all purposes should be well advertised in a practical way and to do this ocular demonstrations should be given in public. As soon as current is available in the main street a show room should be instituted showing the various uses to which same can be applied including grillers, fans, irons, washers, floor cleaners, knife cleaners, potato peelers and numerous other appliances. It will be found that the public of Townsville will have to be educated in things Electrical before any serious demands will be made on the available current.[56]

In 1924 Roberts first organised an exhibit of electrical appliances for the Townsville Show. He saw this as a means of combating competition from gas, the electricity department's entrenched rival. This Show exhibit probably gave Townsville people their first glimpse of the recent advances in appliances for electric cooking, although more than a decade would pass before these began to be used in any numbers. Roberts was ahead of his time in using advertising to promote the use of electrical appliances in order to build loads.

In 1928 Roberts addressed the problem of providing for a domestic load, particularly for domestic cooking; it was mainly this which prompted him to purchase the 1360 kW Allen turbo- alternator in 1929, which was far in excess of immediate requirements, and which was later presented by his critics as a clear example of "over-capitalisation". A domestic load would require improved continuity of supply, since shutdowns on Sundays or public holidays which were possible with lighting and industrial power supply would then become unacceptable. On the other hand, Roberts wished to encourage domestic consumption because by boosting overall demand it would reduce unit costs. He decided that in order to promote a domestic load in Townsville, a better way of retailing electrical cookers was essential. Since most consumers could not afford to pay for the appliance in cash, some system of time payment or hiring was needed. In view of experience in southern Australia and overseas, Roberts strongly recommended the Council's introducing such a scheme and

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56. Roberts to Mayor, 5 September 1921.

retailing cookers itself.[57] This suggestion immediately aroused a great deal of animosity towards the Chief Engineer among the business community in Townsville, since it would have involved the Council in direct competition with established business houses.

In 1923 Roberts had faced a significant challenge in Grier's adverse report on the Townsville electricity scheme. The next round of criticism originated within the City Council: in 1927 a John Shearer[58] was elected to Council, and soon began expressing disquiet about the management of the power house. Shearer drew attention to the rising cost of electricity from Hubert's Well, and argued that the steam engines then being installed should be replaced by crude oil diesel plant.[59] Roberts in reply defended certain aspects of his pricing policy which Shearer had questioned and guaranteed that costs of production would fall markedly when the new generating plant was brought into operation. The Council decided to give Roberts an opportunity to prove himself, to wait until the plant was completed and then to check the operating results. In July 1929 Roberts was pleased to report that the average cost per unit of electricity had fallen from 2.64d in 1926 to 1.36d in 1928, and he added patriotically that the good results had been achieved "without the aid of foreign oil".[60] Again Roberts seemed to have weathered the crisis well, but dissatisfaction with his management did not end there.

Criticism became more serious at the end of 1930, when there was dissension within the Council over Roberts' decision to import Newcastle coal following a sudden increase in the price of coal from Collinsville; the issue was determining the acceptable cost of supporting local industry. Aldermen Mindham and Fadden were most vocal in offence, but at this stage some members of Council still defended him spiritedly.[61]

In 1930 and early 1931, members of Council became increasingly disgruntled about Roberts' management of the electricity undertaking. One of the main sources of complaint was that Roberts had placed what was considered an expensive and unnecessary facade on the Hubert's Well station largely for cosmetic purposes, and without proper authorisation from Council. The majestic facade seemed quite inappropriate for a power station:

> The highlight of the red brick and cream painted concrete frontage was a magnificent central entrance with a large first floor curved balcony all complete with fluted columns and topped by an impressive lookout. The main entrance was flanked by rows of ornate windows with other grand entrances and concrete rosettes. The whole frontage (facing West St) was topped by an attractive parapet almost like old time battlements.[62]

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57. Roberts to Mayor, 6 February 1928; Roberts to Mayor, 2 March 1928.
58. This was not John L. (sometimes known as "Jack") Shearer who as Mains Superintendent had been Roberts' assistant since June 1923.
59. Shearer to Mayor, 9 June 1927.
60. Roberts to Mayor, 15 July 1929.
61. *TDB*, 22 August, 19 September 1930.
62. Alan Nott, Notes on Hubert's Well Power Station. In possession of author.

In addition to the elaborate frontage, Roberts beautified the approaches to the power house with concrete roads, garden plots, fountains and an ornamental concrete fence; the whole project cost nearly £8,000 whereas Council had authorised only £2,000 based on Roberts' estimates. He justified the expense by the need for the Council to set a high standard in civic pride[63], and by the necessity to prevent dust from damaging expensive new machinery; yet behind the facade the floor of the power house was only partly concreted and the dirt floor had to be watered continually in an attempt to lay the dust. At a time of deepening depression Roberts' apparent extravagance called forth great vituperation from the Townsville community.

Arthur Fadden, a local chartered accountant and auditor, was the protagonist in the ensuing campaign for Roberts' removal. Underlying the conflict between Roberts and Fadden was a clash of personalities, for both were men of powerful character. For Fadden it was also a means of attracting political support which proved useful in early 1932 in his bid to enter the Queensland parliament as member for Kennedy. The Townsville City Council was to serve as a springboard for Fadden's elevation to the Queensland and later the Federal parliaments, and was the beginning of a long political career culminating in "40 days and 40 nights" as Prime Minister after Menzies' fall from power in August 1941; Fadden became federal leader of the Country Party from 1941 to 1958.

At a meeting of the Townsville City Council on 16 April 1931, Fadden reported that he had uncovered several inconsistencies in the Council's balance sheets for 1930, especially those concerning electricity. Neither Roberts nor his assistant, John Shearer, was adept at financial accounting, whereas Fadden was a meticulous and gifted auditor. He moved that a Select Committee of five members of Council be appointed to examine "the capitalisation, capital expenditure and general administration" of the electricity undertaking. The Select Committee consisting of Aldermen Fadden, Mindham, Melrose, Gill and Hackett, after some investigation, reported to Council on 29 June 1931. Their report was based on Fadden's reading of Roberts' monthly reports from 1922; he had never visited the power station itself. In view of the unfavourable conclusions of the report, the Council decided to appoint a consulting engineer to investigate fully. Grier had made the same proposal in 1923, as had Shearer and his supporters in 1927, but on those occasions esteem for Roberts had been sufficiently high to make this seem unnecessary to a majority of the Council.

At Fadden's instigation, the Brisbane consulting engineer, Albert Axon, was appointed at the same meeting and given broad terms of reference; no applications were sought from other consultants. Axon's achievements as a consulting engineer were impressive, including work on electricity schemes at Ingham, Mount Isa, Charters Towers, Cloncurry, Bowen and other towns in southern Queensland. Like Fadden, Axon was on the threshold of a distinguished career which would make him chairman or director of several large Queensland companies, Chancellor of the University of Queensland in 1957, and bring a knighthood in 1959.

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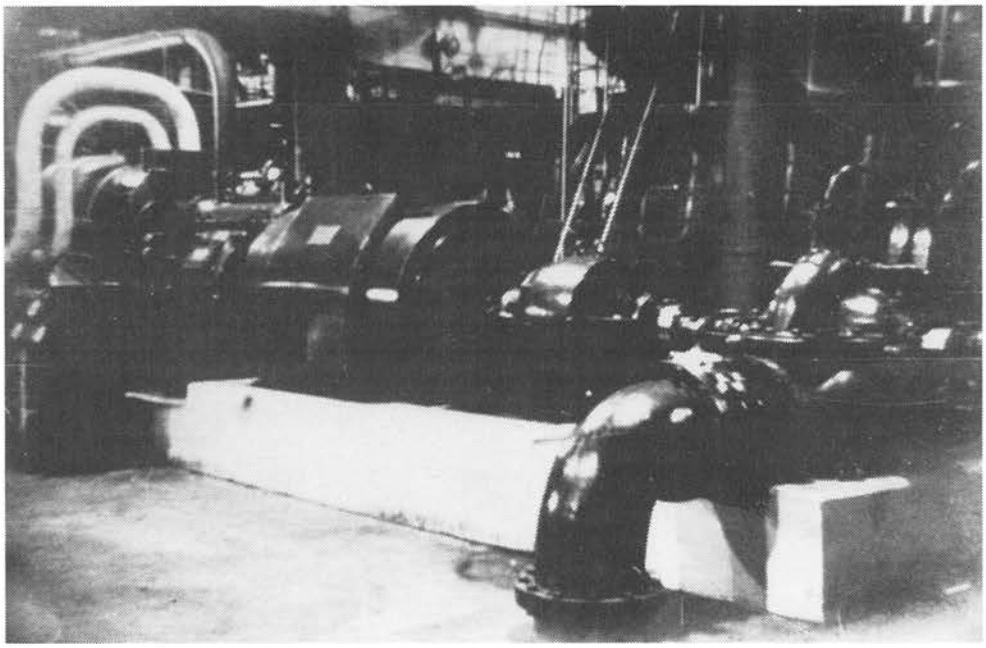
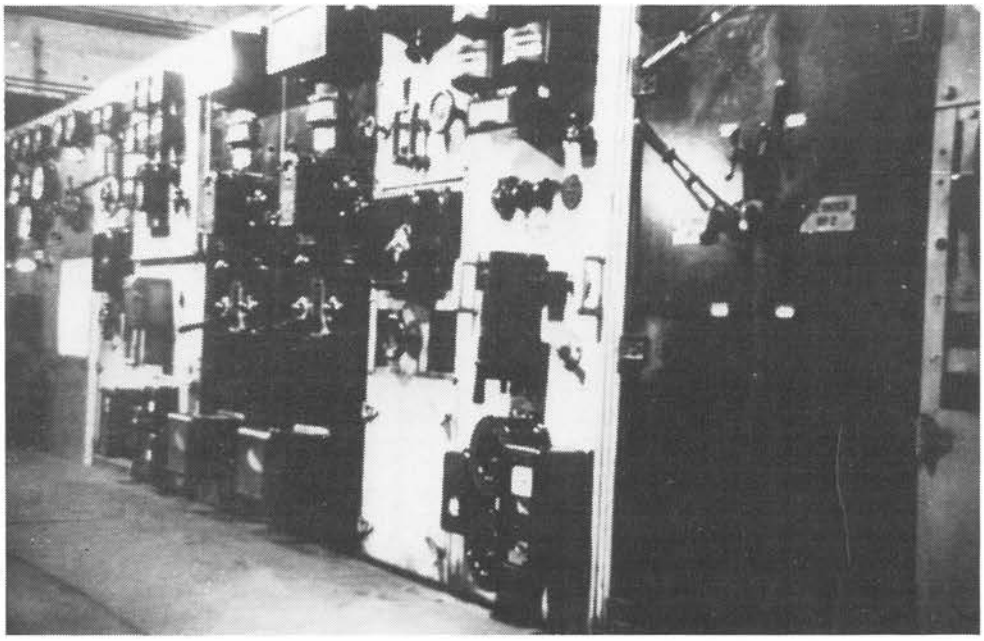
63. The arch over the main entrance to the station bore the inscription PRO BONO PUBLICO (for the benefit of the people).



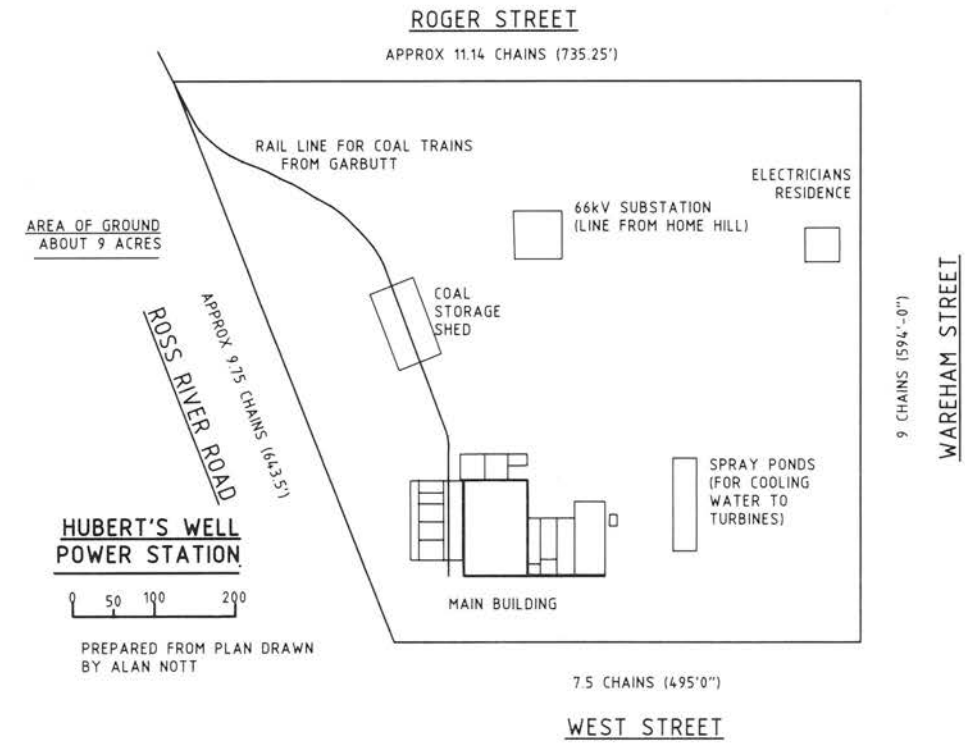
11a. Metro Vickers alternator: Hubert's Well

A. Nott photo

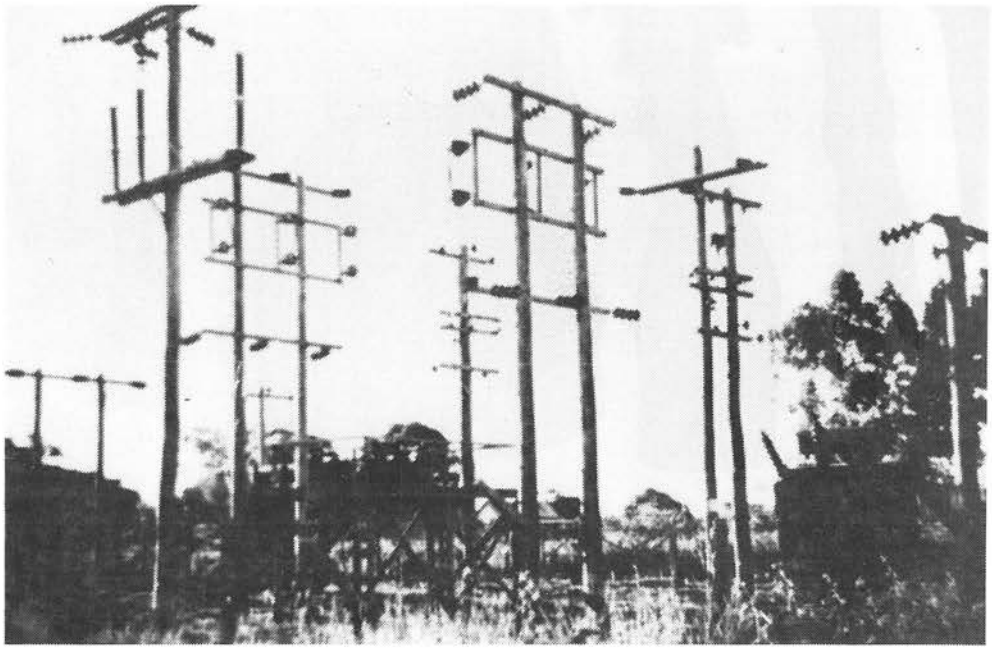


11b. Main switchboard: Hubert's Well

A. Nott photo



12a. Ground Plan of Hubert's Well station



12b. Terminus of 66kV line, Home Hill - Hubert's Well

When Roberts was told of Axon's appointment he protested on the grounds that he had not been given an opportunity to answer the report of the Select Committee, that Axon had been appointed without applications for the position being called, and that under his employment contract his recommendation was necessary before any officer could be appointed "in and about the works".[64] Roberts' stand was supported by his solicitors, Roberts, Leu and North,[65] but the investigation went ahead. On Axon's arrival, Roberts refused to arrange for him to visit the power house and instructed employees not to provide any information. When the Council insisted that Roberts help Axon with his enquiry, Roberts' solicitors replied that Axon should request any information in writing, a suggestion to which the Council strongly objected;[66] nevertheless Axon was forced to proceed on this basis.

Axon spent about two weeks in Townsville and submitted his report to Council on 28 September 1931, when Roberts was given three weeks to reply. Several extensions proved necessary because Roberts fell ill with a serious case of pneumonia, so it was not until 29 February 1932 that he submitted his reply. Axon then wrote a supplementary report, and these documents were considered at a special meeting of Council on 12 April 1932.

Fadden presented the case against Roberts at length, speaking for an hour and a half and showing his close study of all the relevant reports and correspondence. After long discussion in front of a large gallery of public spectators, the Council decided to terminate Roberts' employment "in view of the wilful breach and continued neglect by Sidney Fitzroy Roberts ... of the duties imposed in him".[67] There was only one dissentient, Alderman J.A. Hackett, a member of the Council's original Select Committee and manager of Samuel Allen and Sons; Anthony Ogden, who had been Townsville's first Labour member of parliament, did not vote. In July 1931 Hackett had asked the Mayor to reconsider the decision to appoint Axon because Hackett had information that Axon was "personally antagonistic" to Roberts;[68] in 1932 both Hackett and Ogden implied that Axon's report was biased, thus supporting similar allegations from Roberts himself.[69]

Axon's reports had been unrelievedly critical. On the power plant he commented that "a large amount of machinery" had been purchased which had been used for only a very short period or not at all. In the former category he put the gas engines, which had cost £15,436 and had been retired after five years' use; on Axon's reckoning about £10,000 out of a total capital expenditure of £130,000 had been unproductive. Roberts' preference for secondhand plant was criticised for resulting in "obsolete and inefficient machinery". The method of purchase "by means of cables, without any guarantees and without inspection or test by a representative of the Council" was condemned, not without justification. Axon concluded that the time taken to install plant had been

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64. Roberts to Town Clerk, 7 July 1931.
65. Roberts, Leu and North to Town Clerk, 13 July 1931.
66. Town Clerk to Roberts, Leu and North, 15 July 1931.
67. TCC Min (22), pp.561-2; Town Clerk to Roberts, 14 April 1932.
68. Hackett to Town Clerk, 3 July 1931.
69. *TDB*, 13 April 1932.

excessive, and implied that the use of day labour as opposed to contract labour was at least partly to blame; the issue of day labour was politically sensitive at the time, conservative opinion favouring contracts.[70] The layout of the power house was described as "a hopeless jumble of machinery". Regarding the controversial facade, Axon deplored money "needlessly expended on outside show". Roberts' reports to Council were characterised as "vague", "lacking in essential information" and "misleading". Finally, Axon pointed out that consumers in Townsville had been charged higher prices than elsewhere as a result of "the inefficient and costly operation of the Townsville Undertaking".[71]

There was truth in the report but there was also considerable distortion. Axon took it as part of his brief to delve into the early history of the undertaking, but his research was often skimped and his findings always unfavourable to Roberts, who was made a scapegoat for decisions in which several others had taken part. One example was the location of the power house at Hubert's Well, for which A.C.F. Webb and the Council of 1920 were more responsible than Roberts.[72] Roberts was also blamed for many shortcomings of the system designed and set up by Webb and Burgess. Axon took without exception the darkest view of Roberts' management, failing to mention any of the pressures and problems with which the Chief Engineer had had to contend. On the other hand, the report was effective because it focused attention on Roberts' weak points and some clear errors of judgment. The changeover from gas to steam, the many delays in installation work and the purchase of equipment by cable were difficult to defend. Roberts' reports had sometimes been unclear, and at times in the later years rather perfunctory.

An editorial in the *Townsville Daily Bulletin* disagreed with the Council's "surprising severity" in dismissing Roberts. Conceding that mistakes had occurred during Roberts' administration, it raised a number of points in Roberts' favour. It emphasised that at no time during the enquiry had Roberts' honesty or integrity come into question, although many thousands of pounds had passed through his hands. It also drew attention to the difficult circumstances in which the undertaking had been built up, the financial constraints which had operated for most of the time, and Roberts' achievement both in providing adequate capacity to meet demand at all times and in making an annual profit from the enterprise after 1926.[73] (See Table 4). It should also be remembered that in addition to running the electricity department during the 1920s, Roberts was also responsible for water supply. As an administrative consultant from Sydney, G. Christie, pointed out in 1922, this placed special burdens on the Chief Engineer, subject as he was to two different Council Committees;[74] moreover, water supply in Townsville was always difficult, highly controversial, and a largely thankless task.

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70. See, for example, A. Fadden, *They called me Artie: The Memoirs of Sir Arthur Fadden,* Brisbane, 1969, pp.31-2; report of Council meeting, *TDB*, 13 April 1932.
71. Axon's report, 19 September 1931, pp.3-6.
72. *TDB*, 21 April 1920.
73. *TDB*, 14 April 1932.
74. G. Christie's report, 27 June 1922, p.3.

Table 4: TOWNSVILLE ELECTRIC AUTHORITY ACCOUNT, 1921-30[75]

Year	Surplus (£)	Deficit (£)
1921		667
1922		2,244
1923		1,034
1924		1,513
1925		471
1926	3,925	
1927	5,198	
1928	15,612	
1929	19,730	
1930	14,682	

The day after Roberts' contract was terminated, his solicitors notified the Council that he intended to take action against them. Roberts claimed about £3,300, the amount of salary he lost under his contract of employment as a result of what he alleged was wrongful dismissal. However, in 1932 and early 1933 Roberts failed to bring the case to trial, and from February 1933 there were hints of a negotiated settlement. Still recuperating from his illness in the south, Roberts was less keen to pursue the matter, and there were also signs of softening among the aldermen. In mid-March his solicitors proposed to discontinue the action if the Council resolution of 12 April 1932 was expunged from the records and replaced by a neutral resolution stating merely that his contract had been terminated, and if Roberts were paid three months' salary under his contract, each party to meet its own legal costs.[76] This offer was accepted by the Council's solicitor on the following day, and the required resolution was passed by Council on 16 March, with four dissentients.[77]

However this compromise did not end the affair. Fadden, then in Brisbane, expressed by telegraph his emphatic opposition to the arrangement and prepared to return to Townsville. Through his solicitors he took exception to the Council resolution of 16 March, claiming it was *ultra vires* because of insufficient notice and insufficient numbers, and threatening legal action if a meeting was not called to reconsider the question. Fadden's protest was supported by three aldermen - Mindham, Maddison and Keyatta - who had opposed the resolution at the previous meeting.[78] At a special Council meeting on 31 March, the previous resolution (of 16 march) was rescinded but then re-adopted on the casting vote of the Mayor, W.J. Heatley;[79] Fadden, Mindham, Maddison, Keyatta and Rooney voted against it. A new Council took office in April 1933, so this was Fadden's last act as alderman of Townsville.

75. Roberts' reply to Axon's report, 29 Feb 1932, p.14.
76. Roberts, Leu and North to A.E. Dean, 16 March 1933.
77. TCC Min (22), p.652.
78. Connolly, Suthers and Walker to Town Clerk, 22 March 1933.
79. TCC Min (22), p.654.

Just as Australians have tended to spurn existing governments during depression or war, often reversing established voting patterns in the hope that the opposition could improve the state of affairs, so local authorities and electricity departments received harsh criticism during such trying times. As in Townsville, the management of the electricity department of the Mackay City Council was challenged in the early 1930s, with allegations of poor administration and extravagance; however the manager there, George Wellerd, fared better than S.F. Roberts.[80] The challenge to Roberts' control also coincided with the advent of the Moore government in Queensland, with its policy of fostering private electricity supply. The exposure of maladministration within one of the State's largest public electric authorities undoubtedly helped to justify this change of policy. Whether this was the intention of those involved is open to conjecture. Certainly Arthur Fadden was closely associated with private electricity companies which were being formed at this time in Charters Towers and Ingham; Axon was the consultant employed by both these firms.

One of the themes running through Axon's criticisms was that Roberts' methods were casual and unprofessional - that plans and specifications were not always drawn up, statistics were not gathered, cost-benefit analysis of each new project was not made explicit. Axon himself had had an outstanding academic career culminating in a First Class Masters degree in engineering, and his approach showed an academic training. Roberts in his defence declared that his methods were those of the "practical" engineer who worked according to rules of thumb learned from long experience. The clash between the two men and Axon's ascendancy reflected the increasing sophistication of the electricity supply industry by the 1930s and the growing professionalism of engineering. Discord had first erupted between "practical" and "professional" engineers in the early nineteenth century; not until the 1920s did the latter emerge as an increasingly powerful element within the field of electrical engineering in Queensland, as the development of university courses and a concerted campaign by engineers' societies gradually established the professional status of engineering.[81] The ardour with which Axon condemned Roberts' regime was in part a reflection of this broader movement.

To some extent Roberts had been a victim of changing economic and political conditions, and of trends within the industry and in the engineering profession generally. But on a thorough examination of the evidence there can be no doubt that

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80. R. Williams, *An Electric Beginning: A History of Electricity Supply in the Mackay Region 1924-1983*, Mackay, 1983, p.13.

81. The University of Queensland offered degree courses in engineering from its inauguration in 1911, but instruction in electrical engineering did not begin until 1920. A major milestone in the development of the profession was the formation in 1919 of The Institution of Engineers, Australia as a result of amalgamation of ten existing societies; it set standards for admission to the profession, becoming the recognised national source of accreditation for both engineers and engineering courses, a guardian of qualifications and course standards. From the 1920s there was a concerted effort by The Institution and kindred bodies to achieve public recognition of engineering as a profession and to promote scientific education of engineers at tertiary level. See B.E. Lloyd, *The Education of Professional Engineers in Australia,* Melbourne, 1968, pp.53-5, p.219. B.E. Lloyd, *Engineering Manpower in Australia*, Melbourne, 1979, pp.29-31.

there were grave defects in his management and that these existed from the beginning of the electricity undertaking: he was directly responsible for poor planning and for many serious and costly errors of judgment. It took ten years before the Townsville City Council became aware of and responded to the many flaws in Roberts' management of its electric authority. It is doubtful whether such problems could have persisted under any competitive regime; monopoly power gave Roberts wide managerial discretion which he exercised without qualm. Roberts succeeded so long in shielding himself from serious criticism largely by force of personality, a combination of bluster and charisma; the Council possessed neither the technical expertise nor the management skills which might have produced a real challenge. The success of Fadden's attack showed the ignorance of the City Councillors about the operation of the electric authority over many years, or their susceptibility to political pressure; either way, it highlights the difficulty of political administration of an economic enterprise. Revelations about the inefficiency of the Townsville electricity department were later given prominence during consideration by Royal Commission and parliament of public acquisition of the industry in 1936-37, when they became, ironically, justification for increasing government control; Axon was one of the Royal Commissioners and an original member of the State Electricity Commission subsequently formed.

After Roberts' removal, the electricity department settled down to a period of accelerating growth during which many of Axon's recommendations were implemented. In July 1932 Alfred McCulloch, who for the previous six years had been engineer-manager of the Rockhampton City Council's electricity department, was appointed Chief Engineer in Townsville. Axon in his reports had repeatedly drawn unfavourable comparisons between Townsville and Rockhampton as regards capital expenditure, prices of electricity, fuel consumption and so forth. Therefore it was probably not a difficult decision for the Council to appoint McCulloch, from among 74 applicants for the position, as Roberts' successor.

The growth of demand began to accelerate in 1934, bringing a relatively early end to the depression for the electricity supply industry. In this "year of remarkable progress" electricity generation increased by more than 15%, peak demand rose from 1175 kW to 1430 kW, and sales increased by 19%, excluding those to the Council's water authority. (See Table 5). The main source of growth was domestic demand, domestic power increasing by 25% and lighting by 10%; industrial power demand rose by only 1%. Despite the re-introduction of all-night street lighting in May 1934, street lighting fell as a component of revenue. In January 1934 tariffs were lowered, reducing the average price from 4.33d in 1932 to 3.56d in 1934 (excluding sales to the water authority). Because of rising consumption, revenue showed only a slight decrease despite the large price cut and the abolition of meter rents.[82] By 1935 the undertaking was flourishing, bringing in a surplus of about £10,000, some of which was transferred from the electricity account to the Council's general account.[83]

82. McCulloch to Mayor, 8 March 1935.
83. Under Secretary, Treasury to Minister for Transport, 22 December 1936, QEC N90-75.

Table 5: TOWNSVILLE ELECTRIC AUTHORITY STATISTICS, 1932-43

Year	Maximum Load (kW)	Units Generated
1932	n.a.	430,810
1933	1050	430,810
1934	1430	596,140
1935	1550	525,690
1936	1730	592,080
1937	2150	814,020
1938	2350	944,730
1939	2600	1,028,270
1940	2900	1,147,940
1941	3150	1,266,770
1942	3950	1,661,930
1943	4150	2,047,900

Axon had stressed the need for additional boiler capacity; McCulloch soon recommended installing a new boiler at a cost of £7,300.[84] By October 1933 the new boiler together with the Allen turbine were taking the entire load. In early 1934, with consumption beginning to pick up as the depression eased, McCulloch proposed that a new self-contained, geared turbo-alternator should be purchased with a loan of £12,000.[85] As the Chief Engineer commented in his annual report for 1934:

> As a result of the sudden increase in demand, urgent steps had to be taken to extend the plant and contracts have been placed for another turbo set, a new crane and the necessary switchgear. We also have in hand now the work of extending the cooling pond and running the circulating water pipes.[86]

By November 1935 a new 1,250 kW Metropolitan Vickers turbo- alternator had been installed. Demand continued to rise; by mid-1936 McCulloch was planning to increase the generating plant with a much larger engine.[87] A Treasury loan of £35,000 was sought to finance general expansion of the undertaking.[88] In January 1937 a tender was accepted for a 2,750 kW BTH turbo-alternator, at a cost of £14,200,[89] and it was installed by June 1938.[90] This completed the generating plant which, because of shortages of money and machinery, had to see Townsville through the war years.

At the end of Roberts' time a start was made on converting the power station system to 5,000 volts to allow the Allen set to generate at 5,000 volts and obviate the need for stepping up by transformers. High tension wires were gradually extended over the distribution area. At the same time gradual progress was made on a long-term

84. McCulloch to Mayor, 5 January 1933.
85. McCulloch to Mayor, 6 April 1934.
86. McCulloch to Mayor, 8 March 1935.
87. McCulloch to Mayor, 9 June 1936.
88. TCC Min (22), p.1036.
89. TCC Min (23), p.1061.
90. *TDB*, 2 June 1938.

project to upgrade the reticulation system with heavier copper mains in order to provide for increasing domestic load and voltage correction.

Since the late 1920s there had been pressure from local Progress Associations, branches of the Labor Party and from the Thuringowa Shire Council to extend reticulation to Oonoonba and Stuart. In 1933 McCulloch did not favour an extension to Oonoonba because of the press of other financial demands; in any case these suburbs had not been included in the Council's area of supply under the 1920 Order-in-Council because they were in the Thuringowa Shire. After negotiation, a new Order was proclaimed in December 1936, allowing the Townsville City Council to supply electricity within an extended area taking in Oonoonba, Stuart and parts of Aitkenvale for a period coinciding with the original Order.[91] A high tension line to Oonoonba was started in October 1936 and completed before the end of the year. Electricity was supplied to Stuart in June 1938, and by August there were 35 consumers in the area.[92] These extensions were made in response to political pressure, since revenue from them was not expected to cover costs in the foreseeable future.

In the early years of the electricity undertaking the streets of Townsville had been lit for only six hours a night, the lights being shut off from the power house at midnight. In 1924, when the street lighting in Flinders Street was improved, the Council considered all-night lighting for the first time, but it was not until 1928 that the decision was taken.[93] All-night lighting was introduced on 1 January 1929, but in September it was discontinued one week before and one week after full moon, as an economy measure. As the depression began to lift in 1934, night lighting was reintroduced. Both Roberts and McCulloch had persistently advocated it, for reasons of safety and security. During the Second World War, when electricity became more scarce, all-night lighting was again restricted.

McCulloch instituted a programme of re-inspecting consumers' installations, which had been neglected under Roberts. A surprising number of consumers proved unco-operative and much time was wasted in return visits to check whether defects had been corrected; sometimes more than one return visit was necessary. In some cases extreme measures proved necessary and supply was disconnected until repairs were carried out.[94] In 1938 this work was brought under central control when a regulation under the Electric Light and Power Act provided for mandatory re-inspection of consumers' installations every five years by an officer approved by the State Electricity Commission.[95]

The condition of poles also continued to cause anxiety. The two major enemies of the poles were fungus growths which caused dry rot, and white ants; the latter were generally the less troublesome. The most common method of combating dry rot was charring the poles, but this was expensive. In 1934 a new process was adopted using an

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91. *QGG*, Vol.147, 7 December 1936, pp.1901-3.
92. Shearer to Mayor, 7 July, 5 August 1938.
93. TCC Min (21), p.216.
94. McCulloch to Mayor, 15 June 1933, 8 March 1935.
95. Shearer to Mayor, 13 February 1939.

oxy-acetylene flame to put a layer of charcoal on the pole, and then applying creosote poison to curb the white ants.[96] Notwithstanding, early 1935 saw "our worst attack from the Termite",[97] showing the need for continuing treatment and attention. In many cases the hardy white ants simply ate their way around the poisoned sections of the pole.

In 1934 an Assisted Wiring Scheme was introduced to allow owner-occupiers to pay the cost of electricity connection over a period of five years, at an interest rate of 5%. The Council paid selected contractors for installation and consumers made repayments to the Council. The scheme was not a great success. In its first year, only 16 consumers took advantage of it; at the end of three years 54 installations had been made under the scheme, about 5% of the total number in the period.[98]

The pre-war years saw a gradual increase in the use of electrical appliances. In 1933 provision was made for a reduced tariff for hot water systems, although at that time only one had been connected.[99] In an effort to compensate for the free installation offer of the gas company, an allowance of £6 off electricity charges was granted from December 1934 on the installation of an approved electric range.[100] In 1935 advertising was stepped up with a large electric sign promoting domestic electricity outside the Town Hall, and advertisements on the department's trucks and on radio. In the following year the electricity department began a concerted promotion campaign for electric stoves, with notable success: during 1934 only four ranges were connected, in 1935 it was 22, and in 1936 this was boosted to 77.[101]

The possibility of municipal retailing of electrical appliances had been raised from time to time during Roberts' era; Roberts himself had advocated it and several union groups had suggested it to the Lighting Committee, but the idea was always shelved. In 1936 the issue was revived and became immediately a point of sore contention.

In 1936 the ebullient Tom Aikens, whose career in Queensland politics was to be long and varied, was first elected to the City Council. His biographer argues that Aikens' policy was "to initiate municipal competition in a great many lesser fields traditionally reserved to private enterprise; in short, to inaugurate a bold, thoroughgoing and, in many respects, novel programme of municipal socialization".[102] The possibility of the Council's establishing a retail outlet for electrical appliances, particularly stoves, was discussed at length in 1936, and in mid-1937 a motion to implement the proposal was lost only on the casting vote of the Mayor. His appeals more emotional than logical, Aikens contended that excess profits were being made on stoves in Townsville, and that high prices and exorbitant interest rates under time

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96. McCulloch to Mayor, 4 May 1934.
97. McCulloch to Mayor, 8 February 1935.
98. McCulloch to Mayor, 8 March 1935, 5 March 1937.
99. McCulloch to Mayor, 9 June 1933.
100. McCulloch to Mayor, 5 November 1937.
101. McCulloch to Mayor, 5 March 1937.
102. I. Moles, *A Majority of One,* Brisbane, 1979, p.57.

payment schemes put electric cooking beyond the reach of ordinary working people. An electric stove cost approximately £30, or more than six weeks' wages for an unskilled worker. At this time over 20 private electrical outlets sold appliances in Townsville. There was no evidence that prices were higher than in Brisbane or Sydney after allowing for extra freight; indeed one local retailer charged Brisbane catalogue prices and allowed his customers to pay the freight themselves, to show that there was no deception. Nevertheless, because it was a local authority, exempt from tax and with access to low-interest loans, the Council would be able to reduce retail prices by a margin and offer better terms for hire purchase. It was this that the business people of Townsville feared, and called unfair competition.

Alfred McCulloch strongly resisted the establishment of a trading department, maintaining that it was outside the functions of the Council to compete with private enterprise. It is interesting to note that McCulloch supported private enterprise in electricity supply as well, arguing before the Royal Commission in 1936 that "control by persons elected by popular vote is not necessarily conducive to the best management of a technical and important business";[103] after leaving Townsville he became manager of the City Electric Light, one of the longest-surviving private enterprises in the industry. In Townsville, he resisted Council encroachment into appliance retailing, presenting figures to show that local retailers were not making excess profits. A scheme for assisted purchase of appliances, similar to the Assisted Wiring Scheme, was as far as he was willing to go in interfering with private retailing. Instead of competition he advocated co-operation between the electricity department and private retailers, and recommended that funds continue to be channelled into advertising, which by promoting sales of appliances would also increase demand for electricity.[104] Once in control of the Council, Aikens and his supporters quickly saw that advertising benefitted private retailers as much as the Council, and this was one of the first items they cut.[105]

Retailing became the principal issue in the local government election of 1939, and following the Labor victory an electrical trading department was opened to sell stoves. Tom Aikens together with newly-elected communist alderman, Fred Paterson, were instrumental in setting up the venture, which quickly proved an outstanding success, to the chagrin of local business people. However, the scarcity of stoves during the war soon brought trading to a standstill.

By early 1937 the City Council's electricity department employed a total of 67 people. At the power house there was a staff of 38, comprising a storekeeper, 16 shiftmen, 10 tradesmen, nine labourers and two apprentices, under the supervision of Arthur H. Price, who handled the operation and maintenance of the station and any new construction work. The Distribution Department was run from a city office opposite the Wintergarten Theatre in Sturt Street by John Shearer, the Assistant Electrical Engineer, who supervised all contruction work, carried out inspections and estimating, and assisted with publicity. Shearer had had wide experience in the

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103. QSA ROY/29, Royal Commission on Electricity, Evidence Vol.4, 1936, p.841.
104. McCulloch to Mayor, 11 January, 30 June, 10 December 1937.
105. Moles, *A Majority of One*, p.60.

electricity industry, first in Brisbane, then in Sydney, the United States and England; he had been working locally as an electrical contractor when engaged by the Council in 1923. In 1937 his staff included two installation inspectors, a senior meter reader with two meter readers under him, two clerks and an engineer's office assistant, a line foreman, seven linesmen and 10 labourers.[106]

Working conditions were sometimes difficult and dangerous. Linesmen often handled live wires and worked on poles with little or no protective insulation. The most arduous jobs, however, were at the power station. In the boiler house it was always hot, steamy and almost deafeningly noisy. Under these oppressive conditions, firemen and trimmers carried on the essential work of steam raising. The plant operated continuously and the men worked a 44 hour week on a changing shift roster. Firemen were responsible for maintaining steam, cleaning fires and assisting trimmers when necessary. Trimmers emptied coal trucks, loaded, wheeled and weighed the coal, shovelled it into the stoker hoppers, hauled ashes from the ash tunnel, and swept the boiler house floor, for an eight-hour shift. Working in the ash tunnel was especially unpleasant because of fumes and fine dust. From the mid-1930s the Federated Engine Drivers' and Firemen's Association, which covered firemen and trimmers, campaigned actively to alleviate these conditions - by means of better ventilation and fans, for instance.

An important change took place near the end of McCulloch's term, in October 1937 when, on the recommendation of the Chief Engineer, the water and electricity departments were separated.[107] Water supply was taken over by the City Engineer, F.H. Brazier. Then, when McCulloch resigned in December 1937, John Shearer, who had been Assistant Electrical Engineer since 1932, became Electrical Engineer in charge of distribution, and Arthur Price, who had been Power House Superintendent, was named Mechanical Engineer in charge of generation. To these men fell the task of guiding the electricity department through the exigencies of war.

With the entry of Japan into World War II at the end of 1941, Townsville became a strategic post for the Pacific war. In addition to the Australian forces, large numbers of American servicemen poured into the town and congregated in sprawling encampments on the outskirts. With the exodus of townspeople to the south, many to shelter behind the "Brisbane line",[108] the supposed line of defence, the natives who remained were far outnumbered by the influx of military personnel.

The sudden increase in population, as well as the demands of the war effort, strained Townsville's resources to the limit. There were shortages of virtually every essential commodity: food, fuel, water, ice, accommodation. The civilian population became increasingly resentful and embittered, a combination of several different currents: the frustration of the ration queues; indignation at the army's ability to

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106. McCulloch to Mayor, 3 March 1937.
107. TCC Min (23), p.1140.
108. On the controversy over the Brisbane Line in 1942-43, see P. Hasluck, *The Government and the People 1942-1945,* Australia in the War of 1939-1945 Series, Australian War Memorial, Canberra, 1970, Appendix 4, pp.711-7.

commandeer essential supplies; the suspected profligacy of the military establishments; the Americans' reputation for violence and immorality; ordinary xenophobia. Residents felt that the army had taken over the town and that their basic needs were being ignored. So strong and persistent were these reactions that the federal government considered it necessary in January 1943 to commission an enquiry into civilian morale in Townsville, and the subsequent report was far from reassuring.[109]

Unprecedented demands were placed on essential services in Townsville. Water supply reached a crisis in 1943, when it became necessary to cut off supply at the mains at regular intervals. There were constant problems with electricity supply as well; electricity as a security industry became a focus for many of the problems of the war-time economy, exacerbated in isolated and increasingly militarised Townsville.

Even before the military influx, continuing growth of demand had made extra plant necessary. The extension of sewerage throughout the city created a large new demand for electricity. Then the population swelled with the flood of service personnel, reaching 90,000 in mid-1943, and demand for electricity rose accordingly. On top of this, there were special military demands. In 1940-41, for instance, the Council extended reticulation to the RAAF aerodrome at Garbutt, and built lines to beacons on Castle Hill and Mt Louisa to guide incoming aircraft; military use of electricity increased dramatically in 1942-43. From June 1942 to June 1943 generation of electricity increased by 35%, and the maximum load rose from 3,250 kW to 4,500 kW.[110]

Moves to obtain finance for a new boiler, to bring boiler capacity in line with generating capacity, had begun before the war, in early 1939. The Council accepted a tender for a Babcock and Wilcox boiler in August 1939 - only weeks before Britain declared war on Germany. However, the new equipment was not installed until October 1940, delivery having been delayed by war-time conditions, and in the meantime there were several interruptions of supply as a result of deficient steaming in the old boilers. This was merely a foretaste of the problems which would be encountered over the following years.

By the beginning of the next year, the need for extra capacity was again pressing. When the Loan Council Co-ordinator General of Works was asked for permission to borrow over £60,000 for a 3,000 kW turbo-alternator, an additional boiler and a number of smaller items, only £44,000 was approved. At the end of 1941 National Mutual Life offered the loan, over a period of 21 years. The transaction almost fell through when the federal government fixed lower interest rates; but the City Council was allowed to proceed on the basis of the earlier higher rate because it had accepted the company's offer before the new regulations were gazetted. Tenders were called and considered, but purchasing the new machinery was then postponed until the proposed interconnection of the power stations at Townsville and Home Hill was fully considered. First raised in December 1942, this scheme was not accomplished until August 1944, and in the interim the electricity department faced some anxious times.

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109. R.D. Wright & I. Hogbin, Report on Civilian Morale in North Queensland, 1943, Mitchell Library A3117.

110. Price to Mayor, 15 July 1943.

As the available generating plant became increasingly overburdened, the armed forces were repeatedly requested to curb their consumption of electricity,[111] but reports and rumours of excesses were common.[112] There were other, less important, but nonetheless irritating, frictions between the electricity department and the services. The Council dealt severely with two instances of unauthorised connection to the mains. They were even more incensed when military personnel removed from a suburban house a stove under hire purchase from the Council.[113] Such incidents fed Townsville people's resentment of the military.

By the end of 1943 several other problems absorbed the attention of the electricity department in Townsville. As the war continued, labour problems became increasingly severe. With men leaving to join the forces, labour for civilian services was in short supply. In mid-1942 there was only one applicant for a position as electrician; by the middle of the following year shortage of labour at the power house had become acute.

Under the National Security Regulations (1942), an employee could not leave the protected electricity industry until a replacement was available, except in special circumstances such as leaving to join the services, to work in the seasonal sugar or meat processing industries, or for medical reasons, and then only with official permission. Replacements being difficult to find, many dissatisfied employees were forced to remain in jobs which for one reason or another they wished to leave. As a result, absenteeism was rife. At the end of 1943 Price reported on labour problems at the power station:

> Great difficulty is experienced in maintaining service because of manpower problems, which include absenteeism, refusal to work overtime and inability to obtain sufficient labour to fill vacancies...Council endeavour to obtain labour saving devices is so far unproductive of result.[114]

It was particularly difficult to recruit labour for the boiler house, and aspirants to the position of trimmer were especially rare. In late 1943 staffing allowed one man per boiler, shovelling coal direct from railway wagons to boiler hopper at an average rate of one ton per hour.[115] In general, employees at the power station were not interested in over-time work;[116] with shortages and rationing restricting the availability of most goods, extra income held little attraction. Council's efforts to obtain mechanical coal handling equipment were unsuccessful.

Industrial conflict also intensified, the Federated Engine Drivers' and Firemen's Association in particular becoming increasingly militant; their demands included improved working conditions in the power house, increased allocations of labour to jobs, longer breaks, and better wage and holiday provisions. This was perhaps to be expected during a period when scarcity of labour increased the bargaining power of

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111. E.g., special meeting W&ESC, TCC Committee Reports (18), 12 August 1943.
112. Shearer to Town Clerk, 28 December 1943.
113. W&ESC, TCC Committee Reports (18), 14 July 1942, 9 March 1943.
114. Price to Mayor, 15 November 1943.
115. Price to Town Clerk, 24 December 1943.
116. Price to Town Clerk, 7 July 1943.

unions. Also, shortage of labour at the power house put extra burdens on those who remained, which provoked resentment and resistance. Labour relations reached a crisis on Christmas Eve 1943, when many employees at the station refused to work over the holiday or simply did not present themselves for their shift. Finally a team including the workshops foreman, boiler house foreman and Price himself loaded coal for use in the boilers.[117]

In March 1944 a conference was held between the Water and Electric Supply Committee of the Council, union representatives, the National Service Officer, and representatives of the War Organisation of Industry and the Department of Labour and National Service; thereafter a concerted effort was made to reduce absenteeism by stricter disciplinary measures.[118] Nevertheless, it continued at a high rate throughout 1944, as Price noted: "Absenteeism is more pronounced than ever and the greatest difficulty is being experienced in manning the boiler house department."[119] In mid-1944 interruptions of supply directly attributable to absenteeism became an almost daily occurrence, and of increasing duration. Other members of a shift sometimes refused to work if one was absent. On one occasion shift workers in the boiler house who lived at the camp of the Civil Construction Corps refused to work on the grounds of insufficient food, as a result of a cooks' strike.[120] In mid-1945 the labour shortage was still serious; the City Council warned that because labour was being released for seasonal work, the power station might have to discontinue supply.[121]

There were also recurring shortages of coal through the war years. In mid-1939, early 1940, and again in early 1944, supplies were cut as a result of industrial disputes at the Collinsville mine. In early 1944 the position became so serious that the Townsville public were warned that the power station might have to close down because of lack of fuel.[122] In 1940 part of the Hubert's Well plant was temporarily converted for wood burning, and part conversion to fuel oil was also investigated. Some coal was obtained from Mt Mulligan, but it was found to be inferior. Newcastle coal was also imported, but it differed significantly from Collinsville coal, so that adjustment of the plant was necessary each time it was resorted to, if efficiency was to be maintained. Towards the end of the war, the quality of Collinsville coal itself declined, finer particles causing difficulties with the machinery. In addition to industrial strife, breakdowns of machinery and lack of labour made it difficult for the coal industry to maintain supply. Other hazards for the Townsville authority were the seasonal curtailment of rail supplies when the Burdekin flooded, closing the low-level rail bridge, and the war-time scarcity of shipping.

The Council's newly-established retailing department was soon curbed by a lack of appliances. In late 1941 the State Electricity Commission rejected an application for

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117. Price to Secretary, SEC, 28 December 1943.
118. Special meeting of W&ESC, TCC Committee Reports (19), 8 March 1944.
119. Price to Secretary, SEC, 13 June 1944.
120. Price to Secretary, SEC, 16 May 1944.
121. W&ESC, TCC Committee Reports (19), 8 May 1945.
122. W&ESC, TCC Committee Reports (19), 8 February 1944.

a loan of £9,000 to purchase 300 electric stoves for sale over a three year period.[123] No action was taken on a proposal to sell appliances other than stoves, mainly because washing machines and vacuum cleaners would not add sufficiently to loads to justify the Council's financial outlay.[124] By mid-1942 stoves were no longer obtainable. Even in early 1946 there was a long waiting list.

War broke out soon after the debut of the State Electricity Commission in the role of manager and overseer of the electricity supply industry in Queensland. In 1938-39 the Commission introduced extensive controls over electric authorities throughout Queensland, requiring detailed reporting, instituting frequent inspections, and taking responsibility for major decisions. The arrival of the SEC considerably increased the volume of paper work; indeed in Townsville an additional clerk was hired for that reason.

The novelty of outside interference led to some initial tensions between the Townsville Council and the Commission, centring on the question of shifting the power station. The SEC insisted that alternative sites should be investigated as soon as possible. The Council replied that they were not persuaded of the economic advantages of such a move, and took umbrage when the SEC suggested that they were not considering the best interests of their constituents.[125] In the event, the investigation was postponed as a result of the war.

Relations between the Commission and the Townsville electricity undertaking were again strained in the latter part of 1943, when ever-increasing demand, inadequate plant, recurrent boiler failure and endemic absenteeism caused almost daily disruptions of supply. In the summer of 1943-44 there were also problems with cooling the plant because of seasonal conditions and shortage of water; this reduced efficiency and put extra stress on the machinery. The only bright point was the introduction of daylight saving in October 1943, which helped by separating the industrial and lighting peaks. An effort was made to reduce the evening peak by re-scheduling pumping and seeking co-operation from large users such as the Railways, but the reductions achieved were insignificant. Finally, the expedient was adopted of turning off the main feeders in rotation to bring the load within the capacity of the overtaxed and ailing plant - a procedure resented by certain important consumers, such as the Railways, and military authorities concerned to protect their airconditioners.[126]

In December 1943 the SEC expressed concern and embarrassment that the operation of the Townsville electric authority had become unsatisfactory, with consumers frequently being cut off without warning. "Altogether, the operation of the scheme seems to have got quite out of hand so that it is now being run in a more or

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123. W&ESC, TCC Committee Reports (17), 14 October 1941.
124. W&ESC, TCC Committee Reports (17), 10 June 1941. For a list of appliances in use in Townsville in 1945, see Table 7.
125. Town Clerk to Secretary, SEC, 23 May 1939, with in-letter no.1243 of 1939; Secretary, SEC to Town Clerk, 8 June 1939, and Town Clerk's reply, 21 June 1939 accompanying it.
126. Secretary, SEC to Town Clerk, 3 September, 9 September (telegram), 18 October, 16 December 1943.

less haphazard way without adequate direction." The Commission identified two main causes of these problems: the City Council's refusal to accept the SEC's advice in 1939 to install extra plant; and the managerial system of separate control of generation and distribution.

> The system of divided control is dangerous and unsatisfactory even when the two officers co-operate and attempt to run the undertaking as a unified whole but when, as would appear in your case, no such co-operation exists, the situation is nothing short of disastrous.[127]

Therefore the Commission recommended the appointment of a qualified manager to run the electricity department as an integral concern, adding that in their view neither Shearer nor Price was qualified for the position. Shearer and Price, in turn, denied that divided control was the difficulty, and denied that there was any rift between them. They attributed their problems, in part, to the Commission's lack of drive in obtaining federal approval for electricity rationing and a link with Home Hill. Price offered to resign, but the Council did not take up the offer.[128] There was some discussion of a full investigation of the Townsville undertaking by the SEC, but under the prevailing conditions the notion was soon abandoned.

In late 1943, when pressure on the existing equipment had reached crisis point, the Commonwealth Controller of Electricity Supply finally adopted the suggestion of Price and Shearer, advising the Council to refuse any extra loading and to refer all further applications, especially from the services, to the SEC.[129] This required a relaxation of the City Council's Order-in-Council, which obliged it to supply electricity unless the expected revenue would not provide a reasonable return on capital costs. Neither the Council nor the SEC had authority to introduce rationing, except in the event of war damage; only the Commonwealth Controller had rationing powers.[130] Later, from mid-1944, all service applications were directed to the Allied Works Council and the City Council itself handled civilian applications for new connections or additional loading. Approval had to be obtained to install small motors, commercial refrigerators or toasters, or domestic stoves, and it was often refused; bath-heaters were prohibited. Bureaucratic control over installation of appliances with a loading over 2 kW continued well into 1946.

A transmission link between Townsville and Home Hill was first proposed at the end of 1942, when it became clear that military demand would overload the Townsville station. Tenders recently received for new plant had quoted prices three times as high as pre-war; moreover, delivery would be delayed and uncertain. On the other hand, the steam plant at Home Hill, which operated an average of only 220 days per year for 12-14 hours per day, was not fully employed and consequently had high maintenance costs. Most of its demand was for irrigation, and fairly flexible; pumping could be shifted to other periods of the day so that Home Hill could supply Townsville at its peak time - 4.30 p.m. to 6.30 p.m. Furthermore, Home Hill on the south bank of the

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127. Cochran to Town Clerk, 22 December 1943.
128. Price to Mayor, 19 January 1944; Shearer to Mayor, 19 January 1944, both letters with in-letter no.4460 of 1944.
129. Cochran to Town Clerk, 29 November 1943.
130. Secretary, SEC to Town Clerk, 20 October 1942.

Burdekin would not be affected by seasonal disruption of coal and other supplies. Another advantage was that sugar mills along the line could be supplied with power when necessary, and surplus electricity produced by the mills during the crushing season could be absorbed by the interconnected system.

Linking power stations together in pairs was part of the defence policy implemented in Queensland, where stations were generally too far apart to form an interconnected grid; usually the purpose was to provide back-up in case of war damage, but in Townsville the desperate need to supplement generating capacity was paramount. The Commonwealth government would bear most of the cost of the link.[131] Ayr was also included in the original plan because the Ayr station had no spare capacity yet local defence works required more power; it was also hoped to release diesel plant from the Ayr station for use elsewhere. The plan was to construct a subsidiary line off the Townsville-Home Hill 66kV link to connect with the Ayr system, but this was later omitted from the scheme.

In December 1942 the Home Hill station was advised to ready itself for more extensive use - to repair equipment, obtain extra staff and increase coal reserves. A conference was held in Townsville in December to discuss the scheme in detail. However, not until September the following year did the SEC advise that the Commonwealth government had decided to go ahead with the project. Materials were ordered and plans made to carry out the work, but at that stage the route was still undecided, and the financial arrangements remained indefinite.[132] The financial details were settled in July 1944: the Queensland government would contribute £25,000 to the cost and be repaid by the Townsville City Council and Inkerman Irrigation Board.

Interconnection was achieved in August 1944, but by that time increasing demand had overloaded both plants. By September supply was no longer available on a regular basis from the Home Hill station, whose capacity was fully absorbed by its own customers. Nevertheless, intermittent supply from Home Hill boosted Townsville's capacity during the remainder of the Second World War, indeed until 1953 when a new station was built in Townsville.

Although there were many complaints, both official and unofficial, about its lack of preparedness for an emergency, the electricity department took considerable trouble to plan and implement war-time precautions. In early 1941 a practice "blackout" was organised as part of air raid precautions. In 1942 measures were taken to protect the power house: the building was camouflaged with suitably coloured paint, the cooling ponds were covered with wire netting and hessian, and Roberts' "conspicuous concrete roadways" in front of the building were covered with soil to encourage grass to grow over and obliterate them. The plant was dispersed to make it less vulnerable to a direct hit; as an emergency back-up, a diesel engine provided by the U.S. Army was installed in a shed at the corner of Ross River Road and Anne Street.[133] As much inflammable material as possible was removed, and precautions were taken for the safety of staff,

131. Secretary, SEC to Town Clerk, 7 December 1942.
132. Cochran to Town Clerk, 17 September 1943.
133. Interview with Alan Nott, 18 November 1987.

including slit trenches and underground shelters.[134] Military guards were posted at the station, although when labour was short they were sometimes put to work in the power house; identification passes were introduced to restrict admission.

It was difficult to obtain clarification about the role of the power house in an emergency. This was only one instance of clashes of opinion between the many different authorities directing the war effort. The SEC insisted that electric authorities continue to provide electricity during an air raid for as long as possible, in order to supply essential and emergency services such as hospitals, police, water and sewerage, and defence. A local military commander, on the other hand, issued instructions for a complete shut down during a raid.[135] On this occasion the Commission's view prevailed.

In early 1941 special provision was made for controlling street lighting during night air raids. Townsville was fortunate in that most street lights could be switched off at the power station. However lighting in Oonoonba and Stuart and in a few other small sections of the town was not centrally controlled; some parts were brought under central control, switches were installed at control points in Oonoonba and Stuart, and it was decided to leave some areas permanently extinguished during an emergency.[136] When orders were issued "Prohibiting and Regulating the Display of External Lighting - Queensland" in December 1941, the month in which the Japanese attacked Pearl Harbour, a number of mercury vapour street lamps in Townsville had to be replaced by incandescent filament lamps.[137] Early the following year special screened street lights were placed at crucial intersections; less easily detected from the air, these were designed for use during an air attack so that traffic accidents could be avoided. In April 1942 orders were received to reduce street lighting by approximately 50%; and in the following month the "brownout" was intensified. Despite the precautions, however, weaknesses in planning showed up clearly under the stress of attack. When Japanese bombers raided the city for the first time in July 1942, the lights of the harbour stayed on, pointing out an obvious and strategic target. It seems that in fear and confusion the harbour was deserted, the lights left ablaze, to be "smashed or shot off" eventually by the American Army.[138] Luckily the bombers missed the harbour, but only narrowly.

In February 1943, when the immediate threat from Japan had passed, an amending order was received which removed the previous restrictions, and street lighting was restored.[139] However in November 1943 the Commonwealth Controller of Electricity Supply issued new regulations designed to conserve electricity. After consultation between local electric authorities and police departments, street lighting was to be reduced to a minumum, there was to be no lighting of shop windows in

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134. Price to Mayor, 6 January, 12 January 1942.
135. Secretary, SEC to Town Clerk, 8 April, 8 May 1942.
136. Shearer to Town Clerk, 14 March 1941.
137. Shearer to Town Clerk, 11 February 1942.
138. Quoted by Moles, *A Majority of One*, p.108.
139. W&ESC, TCC Committee Reports (18), 9 February 1943.

day-time, and no lighting at all for advertising or outdoor sports events.[140] These restrictions were revoked only in November 1945.[141]

The trials of Townsville's residents did not end with the war, for in March 1946 the city experienced the worst flood in its history. Although the power house and reticulation system suffered no serious damage, many minor repairs were necessary.

By early 1946 the Council was occupied with reconstructing the electricity department - calling tenders for extra machinery and applications for employment - and preparing for take-over by the new Regional Board. The transfer of authority to TREB was not accomplished without a good deal of ill-feeling in Townsville. The City Council was jealous of its electric authority and worried that within a regional organisation Townsville's interests would be sacrificed to those of smaller outlying centres.[142] Initially there was also considerable popular antagonism towards the Board, the main reasons for which were succinctly explained by the *Townsville Daily Bulletin* in 1946:

> Accounts will be rendered every two months instead of monthly under the old authority. The sum which will be debited on the new statements will be net - no discounts being allowed. Under the new tariff it will cost Mrs. Townsville, with an electric stove, more to cook her Sunday joint.[143]

Nevertheless the transfer was effected in July 1946; thereafter the Council's responsibilities were limited to planning and paying for the city's street lighting. Under SEC supervision, plans were laid and arrangements made for the construction of a new power house in Townsville, which would end the era of the Hubert's Well station.

Table 6: NUMBER OF CONSUMERS, 1931-46

		Number of Consumers	Annual Increase
December	1931	4525	
	1932	4738	213
	1933	4988	250
	1934	5297	309
	1935	5651	354
	1936	6010	359
	1937	6429	419
	1938	6888	459
	1939	7320	432
	1940	7678	358
	1941	8006	328
	1942	8181	175
	1943	8232	51
June	1945	8367	
July	1946	8671	

140. Cochran to Town Clerk, 17 December 1943.
141. Cochran to Town Clerk, 21 November 1945.
142. Aikens, *QPD*, Vol.189, 1946, p.1637.
143. Newspaper cutting with QEC 204-76.

Table 7: APPLIANCES IN TOWNSVILE, 1945[144]

Appliances in Use	
2945	Jugs
339	Kettles
5369	Irons
2576	Toasters
1087	Stoves
77	Stovettes
242	Grillers
82	Bath Heaters
28	Hot Water Systems
73	Washing Machines
28	Wash Boilers
1143	Domestic Refrigerators
206	Commercial Refrigerators
216	Radiators
4214	Radios
165	Immersion Heaters
1168	Fans
590	Vacuum Cleaners

144. With in-letter no.2879 of 1944.

CHAPTER FOUR

COASTAL SUPPLY: HOME HILL, BOWEN, INGHAM

Most of the larger towns in north Queensland acquired an electricity supply during the 1920s, a generally prosperous decade which supported a surge in electricity production and sales throughout Australia. During this period electric lighting was brought to two major coastal townships in addition to Ayr and Townsville: Home Hill and Bowen. Under unusual circumstances, Home Hill actually received supply shortly before the much larger city of Townsville. Ingham followed at the beginning of the next decade, during the brief efflorescence of private electricity supply associated with the Moore government. Of the three systems, that installed at Home Hill was undoubtedly the most impressive, in size, technology and efficiency.

The electrical undertaking at Home Hill differed significantly from its predecessors at Charters Towers and Ayr in that it was initiated by a government body: the Queensland Irrigation and Water Supply Commission. In 1916 the Queensland government decided to investigate the possibility of a large irrigation scheme for the sugar cane farms in the Burdekin area. Experimental wells proving successful, the government went ahead with an ambitious plan which included an electricity supply for pumping purposes and for lighting the township of Home Hill, established in 1913. Completed at a cost of nearly £600,000, the scheme was opened by the Premier, E.G. Theodore, in February 1922.[1] An Order-in-Council authorised the Inkerman Water Supply Board, constituted in 1917,[2] to supply electricity in the Inkerman Irrigation Area and in a portion of the town of Home Hill designated as the compulsory area (the area in which the holder of an Order was obliged to give a continuous supply of power). However this Board never functioned; in 1926, when it was dissolved, the Commissioner of Irrigation and Water Supply, who had actually run the undertaking since 1922, was given formal control.

At the power station, located adjacent to the present site of NORQEB's Home Hill depot, the electrical plant consisted of two 14,500 lb. boilers, a 1,500 kW British Westinghouse turbo-alternator, a 60 h.p. Marshall crude oil engine belt-driving a 40 kVA American Westinghouse alternator, and a battery. Three-phase alternating current was produced at 50 cycles and 6,600 volts, and reticulated at 415/240 volts. There were two separate distribution systems: the irrigation supply consisting of 165 kilometres of high tension and low tension cable, and the town supply made up of about three kilometres of reticulation.[3] This modern system took advantage of the latest technological developments:

> Advances in high voltage transmission were a pre-requisite for the supply of such a large, dispersed system. The development of 3-phase techniques provided capital savings in the transmission system because this system utilises less conductor material than any other supply systems. The

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1. Peake, Shire of Ayr, p.45.
2. *QGG*, 20 September 1921.
3. *Tait's Electrical Directory of Australia and New Zealand*, 1929.

consumers benefitted further from the development of 3-phase induction motors, because these cheap and reliable motors could be used to drive the pumps.[4]

Notwithstanding these advantages, the load characteristics of the Inkerman system caused significant problems: there were really two entirely different supply systems of such incompatible character that it was difficult to work them efficiently together. The pumping load had a peak of about 2,000 kW, electricity being supplied in large amounts to each consumer all day and part of the night during the dry season only: about 200 days each year. By comparison the town load was small, about 40 kW; supply was given throughout the year, but it was not continuous over 24 hours.[5] The large steam turbo-alternator was operated during pumping, and the oil engine was used for town load.

By 1929 there were 174 consumers of electricity for irrigation purposes and 137 town customers; at this time the total population of the district was about 3,000. By far the larger proportion of the power generated was used for irrigation; in 1928, for instance, 1,587,000 units were used for pumping, while only 37,000 went to town lighting.[6] Tariffs paid by farmers were considerably cheaper than those for residents of the town. The staff for this extensive system was large compared to other electrical undertakings of the time. During this period Arthur Howie, an electrician trained in Newcastle, was in charge of the operation of the scheme. James Watson, who had previously worked at the Mungana mines, was engineer-manager from 1922 to 1932.

In mid-1932 the Moore government, in accord with its policy of privatisation, arranged for the irrigation scheme to be purchased by the farmers, who set up the Inkerman Irrigation Board to manage it. The Board was a semi-government body financed by public loan money and exempt from income tax; the government appointed one of its five members. The chairman was Frederick J. Woods. An Order-in-Council granted the new body authority to supply electricity to both farmers and townspeople, and the previous Order of 1921 was revoked on the ground that continuous supply had never been given in the compulsory area of Home Hill. Albert Axon was appointed as consultant, but development of the system was slowed by the difficulty of raising finance during the depression. Only in 1935 did supply in the town of Home Hill become continuous. By the end of 1934 capacity had reached 2,718 kW and there were 265 consumers.[7]

By 1939 the plant, which had been expanded considerably, consisted of seven generating sets. These comprised three large steam turbo-alternators with a total capacity of 4,500 kW and four smaller diesel sets. The four largest engines were run during the day from 7 a.m. to 9 p.m. while the smaller engines took the night load. Although the staff had been reduced after the formation of the Board, when farmers

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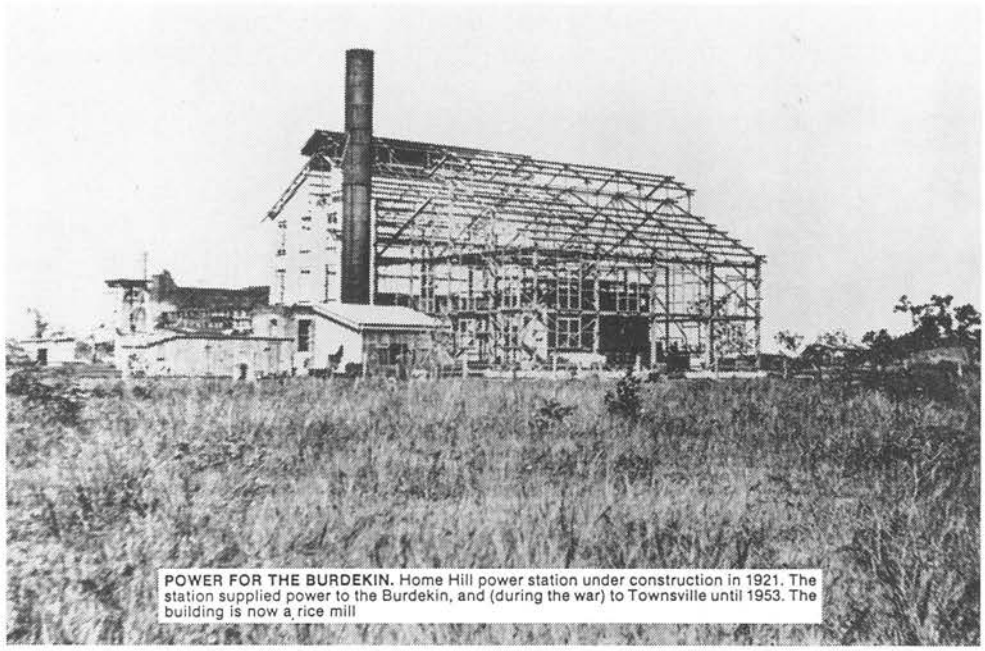
4. Spuler, Development of Electricity Supply, pp.9-10.
5. Axon to Under Secretary, Department of Public Works, 5 May 1932, QEC N43-16. Interview with N. Warburton, 6 April 1986.
6. *Tait's Electrical Directory*, 1929.
7. QEC N43-60.



POWER FOR THE BURDEKIN. Home Hill power station under construction in 1921. The station supplied power to the Burdekin, and (during the war) to Townsville until 1953. The building is now a rice mill

13a. Home Hill power station under construction, 1921

POWER FOR THE BURDEKIN. First electricity supply pole goes up at the corner of Eighth Avenue and Eighth Street, Home Hill early in 1922. The wooden tower on the solid rubber-tyred wagon was especially built for the job

13b. Erecting the first supply pole: Home Hill, 1922

POWER FOR THE BURDEKIN. The Hon. E. G. Theodore, Premier and Treasurer of Queesland, officially opens the power station at Home Hill on May 1922.

14a. Opening the Home Hill power station, 1922

POWER FOR THE BURDEKIN. The old and the new, as electricity began to put real power behind the Inkerman irrigation scheme, which had begun in 1915, using mechanical well-diggers and gas engine-driven pumps

14b. Power for the Burdekin: the old and the new

took responsibility for maintaining their own pumps, it was still large by contemporary standards, numbering about 40.[8] F.S. Murphy, who had had previous experience in Sydney, Brisbane and Mount Isa, was the engineer-manager.

During the Second World War a tie line was constructed to allow exchange of electricity between the Home Hill power station and the overloaded station at Hubert's Well in Townsville. The Home Hill steam plant was not being utilised fully, since it still operated for only about 220 days each year, and usually for only 12-14 hours at a stretch; this operating schedule made maintenance costs high in relation to output. Interconnection made extra power available in Townsville, particularly for the military establishments there, and obviated the need to purchase plant from overseas at inflated prices; in addition, the fact that Home Hill is situated on the southern side of the Burdekin River meant that its fuel supply, unlike that of Townsville, was not vulnerable to wet season flooding. The scheme was also part of a general defence strategy of interconnecting isolated generating stations where feasible; other examples of interconnection in Queensland during the war included the linking of two major Brisbane stations, the connection of the Barron Falls system with Innisfail power station, and the incorporation of Toowoomba into the supply system of the City Electric Light Company.[9]

The Townsville-Home Hill proposal was discussed from December 1942 but as a result of official delays, Ricketts, the contracting firm, did not complete the line until August 1944. By that time local load on the Home Hill plant had reached its capacity. Nevertheless, the Home Hill station did at times supply power to Townsville during the remainder of the war, and up to 1953 when the Hubert's Well station was under intense pressure.

Home Hill was brought into the network of the Townville Regional Electricity Board in January 1947, following lengthy discussions between the Irrigation Board and TREB about valuation and distribution of assets. Special legislation was found necessary to allow the acquisition because the Regional Electric Authorities Act had not provided for the peculiar circumstances of the Inkerman Irrigation Board: an electricity supplier which was not a local authority nor a private company.[10] At the time of TREB's take-over there were approximately 500 consumers in Home Hill and 186 in the rural area. After the war efforts were made to extend electricity to farmers' homesteads; previously only their irrigation pumps had been supplied. The Home Hill station continued to run until the opening of the Central Generating Station in Townsville in 1953; thereafter it was retained as a standby unit and later used as a store. In July 1969 it was converted into a rice mill for the rice growers' co-operative, a function it still performs.

The township of Bowen was established in 1861 as north Queensland's first settlement and centre for pastoral occupation. Despite its residents' high expectations, Bowen failed to develop as rapidly as its northern rival, Townsville; in the 19th century

8. Interview with Allan Wilkie, 18 June 1987.
9. QEC B25F.
10. Memorandum to Under Secretary, Chief Secretary's Department, 24 July 1946, QEC, 204/71/a.

its ambitions to be capital of a new northern colony were thwarted. Nevertheless, by the early 20th century the local economy was progressing, partly as a result of diversification into coal mining and small crop farming in addition to cattle grazing and meat processing.

At about the same time as the Townsville City Council was installing its electricity system, the Bowen Town Council also decided to build a power station. However it took rather longer for the Bowen plans to come to fruition: although the decision was taken in 1920, it was not until 1925 that electricity was made available. Minor causes of delay included a switch in consulting engineers, disagreements with the Department of Works over pricing and difficulty in raising loan finance, but the major reason was the need to accommodate a new crane being installed at the Bowen jetty in expectation of a significant coal export trade.

The Council obtained an Order-in-Council in May 1921, which provided for electricity supply in the town of Bowen and in part of the adjoining Shire of Wangaratta.[11] Originally the Council accepted plans and specifications drawn up by W. Counsell, a consulting engineer from Warwick, but set them aside in 1922 in favour of a scheme put forward by the Brisbane consulting firm of Harding and Bridger, who also designed the Mackay power station along similar lines to that in Bowen; their proposal was preferred because it was cheaper.[12]

The overhead distribution system was begun in 1922, Kerwicks and Crombie of Ipswich furnishing and erecting poles and cross-arms. But progress came to a halt when it was decided to provide power for the Harbour Board's new electric crane - a sophisticated piece of equipment costing £14,000 and capable of loading 350 tons per hour. As well as requiring a large increase in capacity, the crane made it necessary to re-design the whole system. The electricity scheme accepted by the Council had been based on suction gas engines, but the crane required steam power; gas engines would have been unable to cope with the sudden huge increase in load whenever the crane was operated. In addition the crane required alternating current whereas the proposed system would have produced direct current. The authorities concerned also found it difficult to calculate exactly how much power the crane would consume.

Modifying the plans caused delay and added to costs. The Council made fresh applications for loan assistance, but encountered resistance at first. Finally in 1924 Treasury granted additional loan money and the Harbour Board agreed to contribute £11,000 towards the extra expenses.[13] In later years the crane continued to cause problems for the electric authority, putting heavy pressure on the engines at the power station whenever it was brought on line, which provoked nearby residents to complain of excessive noise and caused lights to flicker all over town. Because it operated only intermittently, mainly to bunker coal-burning ships, the Harbour Board paid the Council a maximum demand fee in addition to charges for electricity consumed.

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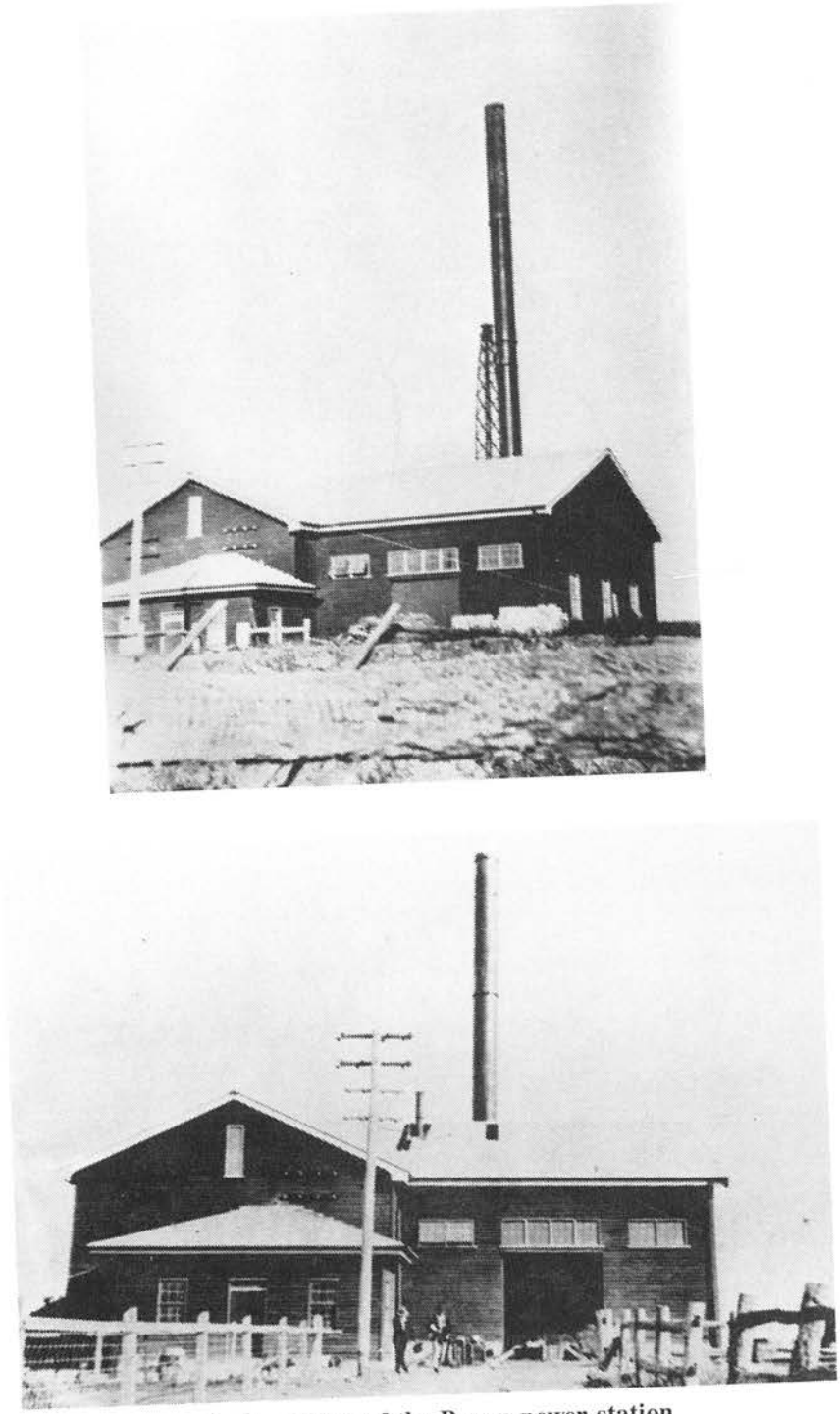
11. *QGG*, 3 May 1921, pp.1411 ff.
12. Bowen Town Council Minutes, 11 May 1922.
13. *Ibid.*, 24 November 1924.



15. Two views of the Bowen power station

Bowen Historical Society photo

In late 1924 J. Maddison of Townsville was directed to commence construction of the power house, the Council favouring a wooden structure rather than iron because of the possibility of cyclone.[14] The station was completed in 1925. E.S.C.A. supplied the power plant, which consisted of two Babcock and Wilcox coal-fed boilers, and two 145 h.p. Bellis and Morcom reciprocating steam engines each direct coupled to a 100 kW Peebles alternator. The system produced three-phase alternating current at 50 cycles; power was generated and distributed at 2,200 volts and consumers' voltages were 415/240. The original system cost about £28,000. J.G. Thomas, who had been second in command at the power station in Mackay, was appointed engineer-in-charge at Bowen.[15]

The switch-on function took place in October 1925. Before a large crowd, the Lady Mayoress pressed the ceremonial switch and "behold the town immediately became a blaze of light". The *Bowen Independent* reported that "some of the croakers who prophesied that there never would be a culmination of the scheme in their time, could hardly believe their eyes". After the ceremony "the people enjoyed the stroll home in the powerful light".[16]

Five years later, in anticipation of a further increase in coal exports, the station was extended and an extra generating set - a 365 h.p. Bellis and Morcom engine coupled to a 250 kW alternator - was added, at a cost of over £5,000.[17] The initial loan of £16,000 had been obtained from the Commonwealth Bank and further finance came from Treasury loans amounting to £25,000 by 1930. Prices compared favourably with those of undertakings of similar size, the cost for an average consumer amounting to about seven shillings per month. Some of the largest consumers were the salt works, which were supplied from 1926; the hospital; the government coke ovens, which were connected in 1932, though tariffs continued to be a source of acrimony for many years; the water pumping station and the Harbour Board. In the late 1930s an unusual feature was added to the system: for cooling purposes, saltwater was taken from the harbour, circulated through the power station and then discharged into the Council's swimming baths, which also served as an emergency reservoir for the station.

As in other northern centres, the Second World War placed unprecedented pressure on generating facilities in Bowen, where approximately 500 Air Force personnel were stationed. Shortage of labour was a major problem, especially in 1942-43, and conflict among the staff exacerbated the situation.[18] Because of the shortage of accommodation in town, some members of staff actually lived in the power station store. Security guards and a nightwatchman were appointed to protect Bowen from the "enemy within".[19] A steam siren at the power house, originally from an old coastal

14. *Ibid.*, 11 November 1924.
15. *Ibid.*, 21 August 1925.
16. *Bowen Independent*, 17 October 1925.
17. QEC N13.
18. Bowen Town Council Minutes, 14 August 1940, 1 August 1942, 4 October 1943.
19. *Ibid.*, 3 September 1939.

steamer and previously used as a fire alarm, was used during the war as a warning signal.[20]

As demand grew the plant was enlarged. By the 1950s there were, in addition to the original machines, a 500 kW Metropolitan Vickers steam turbine installed in 1939, and a 150 kW generator driven by a five-cylinder Crossley diesel which had come from Thursday Island.[21] The Metropolitan Vickers turbine was run continuously as the backbone of the station; the Crossley engine was mainly used during peak load periods and as standby plant to provide circulating water to other engines in emergencies; the original small Bellis and Morcom engines were seldom run. It had been suggested that Bowen should obtain power from the proposed hydro-electric station at Burdekin Falls, but the project was abandoned in the early 1950s for lack of loan funds. A new 1,000 kW Metropolitan Vickers turbo-alternator purchased in 1949, together with associated boiler plant, were finally commissioned in 1955;[22] at the same time a new switchboard was installed and the power house was extended.

In the early 1950s the engineer-manager at the power house was Joe Turner while the Town Clerk, A. Tidbury, ran the administrative side of the enterprise. The staff consisted of over 20 employees and there were nearly 1,500 consumers.[23] From 1930, when the station was expanded, Albert Axon acted as consulting engineer to the electric authority.

During the 1950s reticulation was extended to the outer suburbs of Bowen and the distribution system was gradually changed over from 2,200 to 11,000 volts; hindered by the difficulty of obtaining transformers, completion of the conversion was delayed until TREB acquired the undertaking.[24] Until then residents of outlying areas such as Queen's Beach, who were first supplied shortly before the war, endured poor voltage conditions and rationing of new appliances.[25]

During the 1950s the financial position of the Bowen electric authority deteriorated steadily, the accumulated deficit amounting to over £24,000 by June 1956. In that year, when it became clear that further substantial increases in tariffs would be necessary to stabilise the authority's finances, the SEC undertook a full investigation. The study concluded that the cost of production at Bowen was high and was not covered by revenue; that only 66% of the power produced could be sold because operation of the station itself consumed large quantities; and that new plant which would soon be required was beyond the financial resources of the undertaking. After careful weighing of available options, the investigation recommended transmitted supply, preferably from Townsville rather than Mackay. Following discussions in Bowen, TREB and the Bowen Council agreed that the undertaking should be taken

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20. Interview with Henry Darwen, 15 December 1987.
21. *TREB 1946-1976* Townsville, 1976.
22. *SEC AR, 1954*, p.13.
23. *Bowen Independent*, 1 March 1957.
24. *Ibid.*, 19 July 1957.
25. *Ibid.*, 5 July 1957.

over by the Board; the local Council was apparently "pleased to be relieved of its obligations in this matter".[26]

After TREB took over in July 1957, a 66 kV line was constructed from Home Hill, bringing Bowen into the regional network. This was intended to supplement rather than to supplant the Bowen power station. In both 1958 and 1959 cyclones struck Bowen and TREB was forced to take emergency measures: although the station itself was unroofed and partly destroyed in 1958, there was no mechanical damage and electricity was supplied for the hospital and for water pumping within 24 hours. In 1960 the local station was finally closed down and thereafter power was transmitted from the Central Generating Station in Townsville.

At the same time a 66 kV line was constructed from the major substation at Merinda to Proserpine in order to supplement electricity supply in the area of the Mackay Regional Board. Before its connection with the Bowen station in the mid-1950s, the small settlement at Merinda had received direct current supply from Borthwicks meatworks; after converting to alternating current, the meatworks became TREB's largest consumer in the Bowen district.

In another section of Wangaratta Shire, situated on one of the State's most productive coal fields, was the township of Collinsville; ironically, it was among the last towns in north Queensland to receive electricity supply. After a series of unsuccessful efforts to obtain supply, the Wangaratta Shire Council finally decided in 1947 to meet the town's growing power requirements by purchasing bulk electricity from the Collinsville State Coal Mine, which for some time had provided power for the Collinsville hospital on a contract basis.

Electricity for the mine and town was produced by two Bellis and Morcom steam engines - one of 625 kW and the other 550 kW capacity. An 11 kV distribution system was designed by A.E. Axon and constructed by the contracting firm, Ricketts. In 1949 the neighbouring town of Scottville also received supply from the mine under the supervision of the Shire Council. Because of insufficient capacity, however, electric stoves were banned in the early years, and in peak periods the town load was often switched off so that mining operations could continue uninterrupted.

In 1957 an SEC investigation concluded that to meet growing town and mine demand, it would be more economic to extend TREB's transmission network to Collinsville rather than to install extra plant at the Collinsville or Scottville mines, or to set up a local generating station. In the following year agreement was reached between the Department of Mines, Bowen Consolidated Coal Mines Ltd, the Shire of Wangaratta and TREB for the Board to supply transmitted power to Collinsville, Scottville and the two major coal mining concerns on the field. A 66 kV steel tower line constructed by Electric Power Transmission from Dalbeg to Collinsville made transmitted supply available in September 1960, and the Wangaratta Shire's undertaking was then absorbed by TREB. From that date the Board's rural tariffs applied in the

26. Neil Smith to Minister for Mines, 8 July 1957, QEC, 204/7/d.

area, a substantial benefit to the local mining industry as well as domestic consumers.[27] Soon after, plans went ahead for the construction of a major thermal power station on the Collinsville coal field. After the commissioning of the first stage of the station in 1968, a 33 kV line was built to take supply directly to the two nearby towns.

Although the area was originally settled by pastoralists, from the 1870s the economy of the Herbert River district was dominated by sugar growing. The township of Ingham was established as the region's service centre in that expansive decade. As in the Burdekin, sugar mills in the Herbert district used electricity from the end of last century, and by 1920 there were also a number of small private generating plants for the hotels and stores in town. However, within the northern region now administered by NORQEB Ingham received a public supply of electricity relatively late: in 1931 and, by an arrangement unique in the region, from a private company.

The possibility of an electricity undertaking by the Hinchinbrook Shire Council was discussed long before they decided, in 1924, to apply for an Order-in-Council to supply Ingham and the small neighbouring township of Halifax. Their dilatoriness continued even after government permission was obtained, mainly as a result of shortage of finance after a disastrous flood in the aftermath of a cyclone in early 1927. During this period at least one private company expressed interest in setting up an electricity business, but the Labor government denied their application on the ground that the Council had already been given authority.[28] When, as a result of Queensland's depressed economy and mounting unemployment, the McCormack Labor government was swept out of office in 1929, the new ministry announced its willingness to allow private entrepreneurs to provide electricity if local Councils failed to go ahead with such projects. Almost at once two private syndicates applied for an Order-in-Council to supply Ingham.

The Council was at first indecisive, requesting the Department of Public Works to choose between three possibilities: a syndicate formed around F.A. Blucher, an electrical engineer from Cairns; a rival group including V. Swayne; and the Council itself. The department declining to intervene, the Council finally decided in November 1929 to negotiate an agreement with Blucher's company. This syndicate comprised Blucher himself; three prominent Townsville businessmen - John Bartlett, Ernest Garbutt and Talbot Heatley; and John Ward, the Charters Towers merchant who was managing director of the wool processing firm which became the electricity supplier there in 1931. There appears to have been a good deal of political intrigue surrounding the contest,[29] but the Council eventually awarded the prize on the basis of the price at which the rival groups offered to supply consumers.

The Hinchinbrook Shire Council, which had been authorised to generate and supply electricity by the Order-in-Council of 1924, entered into an agreement whereby the company, known as the Ingham Electrical Authority Limited, would supply

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27. QEC, 204/7/e.
28. QEC N107.
29. For example, see V. Swayne to E.B. Swayne, M.L.A., 9 August 1929, QEC N107-4.

electricity for a period of 20 years, at the end of which the Council would have an option to purchase. This was a novel arrangement, which probably would have been impossible at any time but during the term of the conservative Moore government from 1929 to 1932.

The electrical plant was installed during 1930, so that by the end of the year a temporary supply from 7 a.m. to midnight was available. Once again, Albert Axon acted as the company's consultant electrical engineer. The small diesel plant consisted of a modern but very noisy three-cylinder, 30 h.p. German Deutz engine, a 100 h.p. Hornsby and alternators, all housed in a tin shed; further engines were added later. The system used three-phase alternating current, 50 cycles. Power was generated at 415 volts and reached consumers at 415/240 volts. The company's domestic installations of lead-covered wiring were rather crude, and were later condemned.[30] By the end of 1933 there were 320 consumers out of a population of 8,500 in the area covered by the Order-in-Council.[31] The manager lived in a small cottage on site at the power house; this was later converted to a storeroom. Frank Blucher, who provided the energy and technical know-how behind the venture, together with Jackie Jackson, a local businessman who sat on the Shire Council, eventually bought out the other original shareholders, but the enterprise was never highly profitable.[32]

Immediately after the company began operating, there was criticism of its management within the Council, especially from Labor representatives. In particular George Jesson, a commission agent and investor, mounted a trenchant campaign against the management of Frank Blucher, attempting to persuade the Council to terminate the agreement with the company and take over the enterprise. Jesson's criticisms were wide ranging. Soon after the company had obtained Council approval, on the basis of their supply price as already mentioned, they applied to the government for a price increase; Jesson complained of this and of the allegedly excessive minimum charge of six shillings.[33] Jesson also accused Blucher of using his position as Installation Inspector to drive rival electrical contractors out of town by refusing to pass their work.[34] There is no evidence to confirm such allegations, and Jesson's attacks had a strident tone which may have been due to political and/or personal animosity. Nevertheless, one continuing source of public complaint against the electric company was the noise from the power station, which was unfortunately located in a central position in Palm Terrace, an extension of the main street.[35]

Throughout the 1930s the Council negotiated desultorily with the company for acquisition of the undertaking. In 1937, under a new Labor Council keen to effect public ownership of essential services, a price of £16,270 was finally agreed upon. By that time the company faced the need to purchase additional plant in order to supply the Council's much-delayed water scheme; in addition, the recommendations of the

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30. Interview with Lex Fraser, 21 May 1987.
31. QEC N107-69.
32. Inteview with Lex Fraser, 21 May 1987.
33. G. Jesson to P. Pease, M.L.A., 12 July 1933, QEC N107-64.
34. QSA ROY/29, Royal Commission on Electricity, Evidence Vol.4, 1936, pp.888-9.
35. QEC N107-50.

1936 Royal Commission had dimmed the prospects of private electricity suppliers in Queensland.

Under the new Council regime there were some significant changes, which succeeded in building up a thriving business. Henry Hutchings from Ayr was appointed as engineer-manager, though Blucher was retained on the staff temporarily and Axon continued as consultant. By the end of 1937 the Council obtained authority to supply an enlarged area covering the whole shire, and new connections were soon underway; extensions reached the outlying townships of Halifax and Macknade within the next four years. The minimum charge was abolished, prices were reduced by 35% by the end of 1939, and special tariffs were set to build commercial demand. To increase domestic load, special schemes were introduced, similar to those adopted by Alfred McCulloch in Townsville; these included interest-free loans for house wiring and free installation of stoves. When the Council acquired the enterprise in 1937 there were about 570 consumers; this grew to 1,194 by 1945, the last year of Council operation before TREB took over. In the same period generation increased over five times.[36] During the war the plant consisted of five diesel engines - two Deutz engines of 110 h.p., a Fairbanks Morse of 80 h.p. and two 350 h.p. Ruston Hornsby engines. The staff numbered seven comprising four engine drivers and three electricians, and industrial relations were generally harmonious.[37]

Like most other Queensland electric authorities, the undertaking encountered severe difficulties, both technical and financial, during the Second World War. Inadequate generating capacity was probably the most pressing problem: a vessel carrying new plant from Britain was sunk, and another engine coming from New South Wales was commandeered by the Commonwealth government.[38] An unsuccessful search for replacements went on throughout the war and for some time after; many alternatives and all avenues were considered, but to no avail. As a result some rationing of large users proved necessary; immediately after the war there were restrictions on new connections and on the use of larger appliances, though rationing was never as drastic as in Townsville. The overburdened plant began to use excessive quantities of fuel oil, and at the same time prices of oil and other materials increased. Consequently the financial position of the undertaking deteriorated markedly. These stresses produced conflict between the Shire Council and Hutchings, the engineer-manager, which led to his replacement by W. Smith in 1945.

Bill Smith, who had lived in Ingham for many years, had worked under Hutchings; he was one of the old school of practical engineers with a variety of engine driving qualifications. In the post-war period he ran the generating station with commendable efficiency, though the administrative side of the business was never his

36. Wegner, Hinchinbrook, pp.425-9.
37. Interview with R.J. McSherry, 16 July 1987.
38. J. Wegner, "Hinchinbrook Shire During World War Two", in B.J. Dalton (ed.), *Lectures on North Queensland History No.4*, Townsville, 1984, pp.214-5.

forte.[39] Smith stayed on as local manager after TREB took over the undertaking, until 1954 when he left to set up his own electrical business in Ingham.[40]

When TREB was formed it was decided that a 66 kV line should be built to connect Ingham with the new power station planned for Townsville. The Hinchinbrook Shire Council did not accept incorporation of its electric authority within TREB without protest; the idea of a hydro station on the Herbert River, a dream cherished by local residents since the 1920s, resurfaced as a reason why Ingham should not be tied into a network based on Townsville.[41] However, with reassurances from the State Electricity Commissioner that inclusion within TREB would not rule out hydro development, and the promise of lower tariffs based on larger-scale central generation, the Shire Council finally approved the regional plan. When the Townsville Regional Electricity Board met for the first time, Ingham was represented by Shire Chairman, Larry Kelly, a man of strong character and organising ability who became the second Chairman of the Board in mid-1946.

The local power station continued to operate, despite overloading, until it was connected to the Central Generating Station in 1953. It was then put on standby until 1957, when the Tully Falls line was completed and it was decided that the plant should be dismantled. With the opening of the line from Kareeya, Ingham secured a guaranteed supply. Major subsequent developments in the district included supply to the bulk sugar terminal at Lucinda and to the industrial project at Greenvale.

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39. Interview with J. Caldwell, J. Mackney and A. Ward, 21 May 1987.
40. Interview with W. Smith, 21 May 1987.
41. Wegner, Hinchinbrook, p.429.

CHAPTER FIVE

WESTERN SUPPLY

It is not surprising that communities in the pastoral and mining areas of western Queensland obtained electricity relatively late: population was sparse, local demand meagre, expected returns low compared to capital costs, and until recently there were technical obstacles to long-distance transmission. There were exceptions such as Charters Towers, where a large concentration of gold miners made electricity supply feasible as early as 1897. In the west it was also common for some parts of a town or certain residences to be supplied from generators at mines or mineral processing works before public supply was officially begun. Nevertheless, western townships generally acquired electricity at least a decade after those on the coast: in the late 1920s or 1930s, and in some cases much later.

In Queensland, the first western township to obtain electricity supply had been Thargomindah in 1893; hydro-electric power was generated by means of artesian water until 1951, when water flow from the bore diminished and diesel plant was substituted. Roma was the first major inland centre to receive supply, in 1916. By the Second World War, 24 large western towns had an electricity supply, either from a private company or a local government authority. Supply was usually restricted to the town limits; development was isolated and unco-ordinated. After the war extensive reconstruction was undertaken in the west, a major task being conversion from d.c. to a.c. supply. Despite these efforts, almost without exception the small, outback power stations ran into difficulty in meeting the post-war upsurge in demand for electricity, both domestic and commercial, so that incorporation within the spreading network of the Regional Boards was usually accepted with relief. Until recently western supply was almost entirely urban; only in the 1960s did Regional Boards undertake to connect outlying pastoral homesteads, though once begun this programme progressed rapidly.

In the north-west there was a great diversity of equipment and technique; piecemeal acquisition of secondhand plant and improvisation prevailed, necessity being the mother of invention. Sources of fuel and characteristics of plant varied according to local conditions. These enterprises were always hamstrung by lack of finance; managers were usually satisfied merely to preserve them from crisis to crisis. Assorted machinery was kept running by constant patching, employees working in an atmosphere swinging between panic and fatalistic resignation. Among the staff formal qualifications were unusual; they were required to fill a multitude of roles, very often in contravention of the Electrical Workers' Act of 1923.

Management was highly variable in quality, ranging from gifted to execrable. Referring particularly to the Hughenden electric authority, although his comments applied equally to other isolated stations in the west, Neil Smith remarked:

> Undoubtedly one of the greatest difficulties with a small undertaking such as this is to secure efficient and continuous management of a satisfactory order... [1]

These positions tended to attract men of stern character, practical engineers who had learned by experience, and who often wielded autocratic power in their isolated stations, whether by force of personality or through the authority of expertise. The ability and personality of the engineer-manager largely decided the success of the enterprise. If a manager was weak, incompetent or overbearing, he could make life nearly intolerable for his employees, which accounted in part for the considerable movement of staff along a circuit of western power stations.

Hughenden

On the arid plains of western Queensland, about 350 kilometres from Townsville, the town of Hughenden began as a gold mining centre and developed in the 1880s servicing the surrounding pastoral properties. After two unsuccessful attempts to introduce electric lighting - one municipal, in association with Queensland Railways, the other private - the Hughenden Town Council finally decided to initiate supply. The earliest proposal was in 1920, when discussions took place between the Hughenden Town Council and Queensland Railways Northern Division on a scheme whereby the Railways would produce electricity for the Hughenden railway station and sell surplus power to the Council for lighting;[2] the plan did not go ahead. In 1922 a private scheme was suggested by the owner of the local ice works, Tom Page, an alderman and former Mayor of Hughenden; Page applied to the Council to install electric lighting in town, but there was no further mention of the proposal in the Council minutes.[3]

It took a change in the law regulating hotel closing hours to stimulate the Council to reconsider electricity supply. In October 1923 the Mayor, T. Reyment, commented that "in view of the public houses now being closed at 8pm he thought it would be advisable for the Council to consider lighting the town up with electric light".[4] The Council then began to investigate seriously the provision of electricity.

The Council considered several consultants' recommendations for an electricity scheme in 1924 and applied for an Order-in-Council in early 1925. Two years went by in planning, J.J. Grier, Electrical Engineer with the Department of Public Works, acting as consultant to draw up plans and specifications. In 1927 the Engineering Supply Company of Australia was commissioned to install generating equipment, consisting of two Vickers Petters semi-diesels manufactured in England, with Bruce Peebles generators and auxiliary equipment. Costing about £4,600, this machinery would produce direct current. A number of different contractors, most notably W.H. Jeffrey, laid out the distribution and street lighting systems under Grier's supervision.[5] The

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1. H.N. Smith to Secretary, TREB, 17 June 1959.
2. Hughenden Town Council Minutes, 10 August 1920.
3. *Ibid.*, 11 October 1922.
4. *Ibid.*, 10 October 1923.
5. *Ibid.*, 3 May 1927.

d.c., three-wire, 480/240 volts. A local construction firm, Munro and Company, contracted to build a power house in McLaren Street on the outskirts of town, on the same site as the present power station and stores depot. It was a wood and corrugated iron building with a concrete floor; this was favoured over an alternative iron and steel design because of its cheapness. The whole electrical scheme cost about £14,000,[6] a loan from the Queensland Treasury financing the project. In early 1928 Jim Watts was appointed as manager and G.W. Grant as the first shift engineer. Amidst much jubilation, the Hughenden station was officially opened at the end of March 1928 by the Mayor, J. Leonard.[7]

As in Townsville, people in Hughenden were reluctant at first to adopt the new technology; the Council was forced to use advertising and canvassers and to subsidise cooking demonstrations in an effort to popularise electricity. Nevertheless, within a short time of the station's opening there were nearly 200 consumers. The charges for lighting were 1/1d. per unit for the first 15 units, 11d. for the next 15 units and 9d. thereafter. The rate for commercial power was 6d. per unit up to 200 units and thereafter 4d. For all domestic power purposes, during daylight hours only, a flat rate of 3d. per unit was set.[8] In 1928 a five-year contract was negotiated with the Railways for power supply by the Council. After 1930, when pumps at the town bore were converted from steam to electricity, a reliable part of the station load was for pumping the artesian water supply, which took nearly half the units generated; sinking of the bore had been organised by the Irrigation and Water Supply Commission at the same time as the electricity scheme was installed, at a cost of over £4,000. The electrical plant was expanded within the first two years as the load gradually increased.

Nevertheless, operation of the plant was fraught with difficulty. The Petters engines were not suited to Hughenden's hot climate, and there was continual trouble with their lubrication systems, the engines requiring excessive amounts of oil. The power house was discernible from afar by the clouds of blue smoke which hovered over it, and it was said that in the end the plant consumed more lubricating oil than diesel fuel.[9]

Jim Watts stayed on as manager from 1928 to 1935, but in response to continuing difficulty with the diesel plant, the Council in the early 1930s engaged Albert Axon as consultant. By this time there were 310 consumers, but the enterprise was running at a loss.[10] As well as supervising extensive alterations and repairs, Axon recommended suction gas engines. Two new National engines, rated at 100 kW and 15 kW respectively, were installed in 1934 after a loan of £6,500 was obtained from the government.[11] Together with the gas engines, wood-fired Commonwealth gas producers were installed, to take advantage of local sources of fuel wood. Gas engines

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6. *Ibid.*, 8 December 1926, 19 February 1927.
7. Flinders Shire, *100 Years of Development in Hughenden and District 1863-1963,* 1963, p.52.
8. Hughenden Town Council Minutes, 25 August 1927.
9. Interviews with Noel Warburton (Townsville, 24 April 1986) and Hector Hunter (Hughenden, 3 September 1986).
10. QEC N42-40.
11. QEC N42.

were common in western areas in the inter-war period, partly because of the high cost of transporting diesel fuel. Local coolibah and bloodwood timber was felled at a rapid rate to feed the producers, which consumed six cord or about three truck-loads of wood every day. As local timber was exhausted, diesel became increasingly economic.

Axon had previously worked with Joe Heidecker in erecting an engine in Warwick and installing a diesel engine at Charters Towers, so he again asked for Heidecker's assistance at Hughenden. This was the beginning of the association with north Queensland of one of the industry's most respected engineers. Heidecker, who was then engineer at Warwick power house, visited Hughenden twice in 1934 and was appointed manager of the undertaking in the following year.[12] He operated Hughenden station for over four years, until 1939 when he moved to Charters Towers.

From 1939 to 1942 the station was run by Pat Finimore, who came to Hughenden from Beaudesert. During this period the plant was augmented with a Crossley horizontal gas engine of 90 kW capacity which came secondhand from Helidon near Toowoomba. When Finimore became ill, Arthur Drew from Bundaberg replaced him as manager. Drew confronted all the problems of war-time supply, including material and labour shortages. Of necessity, maintenance of the plant and distribution system was neglected, and makeshift arrangements were often required.

Drew's successor was Walter Seymour, who had begun working at the power station as an engine driver in the 1930s. Post-war material shortages made it extremely difficult to cope with the rising demand for electricity as electrical appliances became popular. There were frequent supply problems and often blackouts; the problems of maintaining water supply were especially acute. By this time there were over 400 consumers. In 1949 the SEC arranged for additional equipment to be brought from Brisbane; a small Ruston Hornsby diesel engine which had been the house set at Parliament House was installed at Hughenden while the largest National gas engine was being repaired.

In October 1949 Hughenden was struck by hurricane, which severely damaged the distribution system. Power was cut off for several days. Hurricane lamps and candles were used for lighting; people cooked with wood in their backyards; a fortunate few used primus stoves or spirit stoves. When news of the disaster reached Brisbane, the Electricity Commissioner, S.F. Cochran, immediately offered assistance, making electricians and equipment available from Townsville. "Sam is really a great scout," commented Hughenden's Town Clerk.[13]

In order to meet the continuing growth of demand, a new four-cylinder gas-cum-oil engine was purchased in 1952. When Walter Seymour became seriously ill in 1954, George Beuttell was appointed as manager on a temporary basis. In 1956 the next permanent appointment was given to Sam Needham, a young man who had previously managed the power house in Blackall. Needham remained in Hughenden as

12. Interview with Dagmar Heidecker, Charters Towers, 2 September 1986.
13. *TDB*, 25 October 1949.

manager until TREB took over the station in 1959.[14] During his time a new piece of equipment was added: a National five-cylinder gas-cum-oil engine which had done service during construction of the Tully Falls project.

The piecemeal acquisition of equipment, much of it secondhand, was a common practice in western areas and was especially apparent at Hughenden. This was not without its hazards. In particular, the combination of gas and diesel engines caused many headaches for the operators. Moreover, the layout of the plant was haphazard and there was no organised maintenance programme. It was a constant struggle to keep each piece of equipment working, and consequently interruptions of supply were frequent.[15]

A major achievement during Needham's period was the conversion from direct to alternating current. In 1953, on the recommendation of the SEC, the Hughenden Town Council decided to begin the conversion in order to cater for certain heavy loads, to improve voltage conditions and to allow greater use of electrical appliances;[16] only a limited range of appliances could be used with d.c., which precluded jugs and frypans, for instance. During the change-over the power station generated both d.c. and a.c. In 1954 new a.c. plant was purchased, and in 1956 improvements were made to the cooling water system and other auxiliaries.

Sam Needham and Ken Brice were responsible for organising the conversion, in conjunction with the SEC. There were many defects in the distribution system, so along with the conversion a completely new overhead reticulation was installed. A Longreach contractor, Vic Freeman, was commissioned to do the line construction work, to remove old consumers' services and to remove poles and cables from the centre of the streets, but the contract was relinquished before the work was completed; it was finished by the Council using day labour. Every consumer's meter had to be changed over, and motors in appliances, such as refrigerators, had to be switched, a long and laborious process. All d.c. equipment and appliances were replaced at the Council's expense. A Longreach firm, Westco, changed over the switchboard to suit a.c. metering. The station tried to maintain continuity of supply, but interruptions were frequent; in fact, during this period there was one blackout which lasted a week.[17] Though delayed by limited staff, limited funds and frequent breakdowns, the conversion to a.c. was completed in 1957.[18] By this time there were about 480 consumers in Hughenden, and the electric authority had eight employees - a manager, four engine drivers on continuous roster, a foreman/linesman, one apprentice and one labourer. In 1958-59 the station's maximum demand was 310 kW, with an installed capacity of 475 kW.

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14. The successive managers of the Hughenden power station were Jim Watts (1928-35), Joe Heidecker (1935-39), Pat Finimore (1939-42), Arthur Drew (1942-49), Walter Seymour (1949-54), George Beuttell (1954-56) and Sam Needham (1956-59).
15. Interview with Ken Brice, Townsville, 24 April 1986.
16. *SEC AR*, 1953, p.25.
17. Interview with Ken Brice, Townsville, 24 April 1986.
18. *EC AR*, 1954, p.14; 1956, p.20; 1958, p.17.

When the local Councils of Hughenden and Flinders amalgamated in 1958, the Flinders Council took over the undertaking. The ill-assorted and troublesome plant then became a drain on the finances of the Flinders Shire as it had been previously on the Hughenden Council, who had also lacked the resources to reorganise and modernise it. At the end of the financial year 1958-59, there was an accumulated deficit of nearly £8,000 in the Electricity Fund of the Flinders Shire Council.[19] As the Commissioner for Electricity Supply, Neil Smith, admitted in 1959, the Hughenden undertaking had had "an unfortunate history" plagued by poor management and a crippling burden of debt.[20] Repeatedly the town had been left without power and water because of mechanical failure. For several years the local authorities had been requesting the government to incorporate the undertaking into TREB.

By arrangement with the SEC, control was transferred to TREB in 1959. A new power station, about twice the size of the old, was opened in 1963. Gas engines had long operated at Hughenden in combination with diesel plant, but after TREB took over it was decided to retire the gas plant; thereafter Hughenden was shaped into one of the most efficient diesel power stations in Australia, centre of an extensive western 33 kV network.

Winton

About 550 kilometres south-west of Townsville, Winton, like Hughenden, developed as a pastoral centre. Situated at such a distance from Townsville, Winton and its surrounding district have long been a bone of contention between north Queensland and central Queensland. In order to claim it for the north, a branch of the northern railway line was sent down from Hughenden to Winton in 1899, though even now there is no sealed road from the Flinders Highway to the town; it is, however, on the Capricorn Highway which runs inland from Rockhampton.

Winton received a public supply of electricity one year before Hughenden, in 1927, on the initiative of the Winton Shire Council. The subsequent history of electricity in Winton shows many parallels with that of Hughenden. The most striking difference was that the Winton plant generally ran smoothly and efficiently during 41 years of Council operation before it was taken over by TREB; electricity supply was adequate, reliable and without major interruption. Winton was very fortunate in the quality and continuity of management it was able to attract, although the undertaking did not escape a few teething problems.

Prior to 1925, when the Winton Shire Council obtained an Order-in-Council for electricity supply, a private scheme was mooted: in 1921 the Council granted permission for F.H. Cooper to provide electric lighting in town, but the undertaking was apparently of very limited scope.[21] Meanwhile the Council had been investigating electricity

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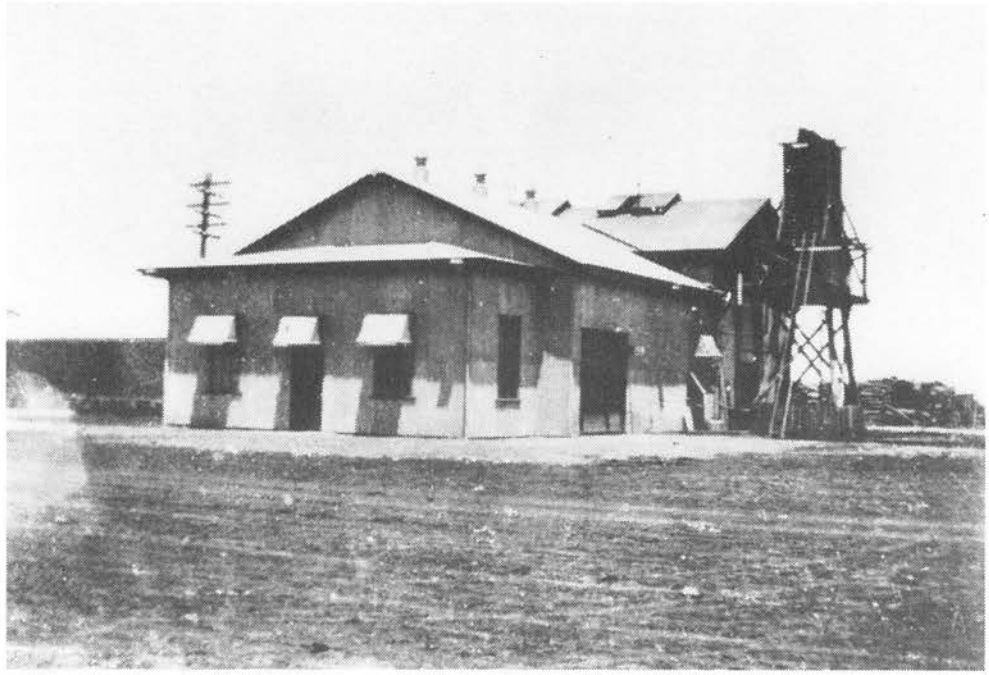
19. H.T. Priestley's report, 24 August 1959, TREB File 2-14-9.
20. H.N. Smith to Treasurer, 27 April 1959, TREB File 2-14-9.
21. Winton Shire Council Minutes, 14 September 1921.V.T. Corbin (ed.), *Winton: One hundred years of settlement 1875-1975,* Winton, 1975, p.71.



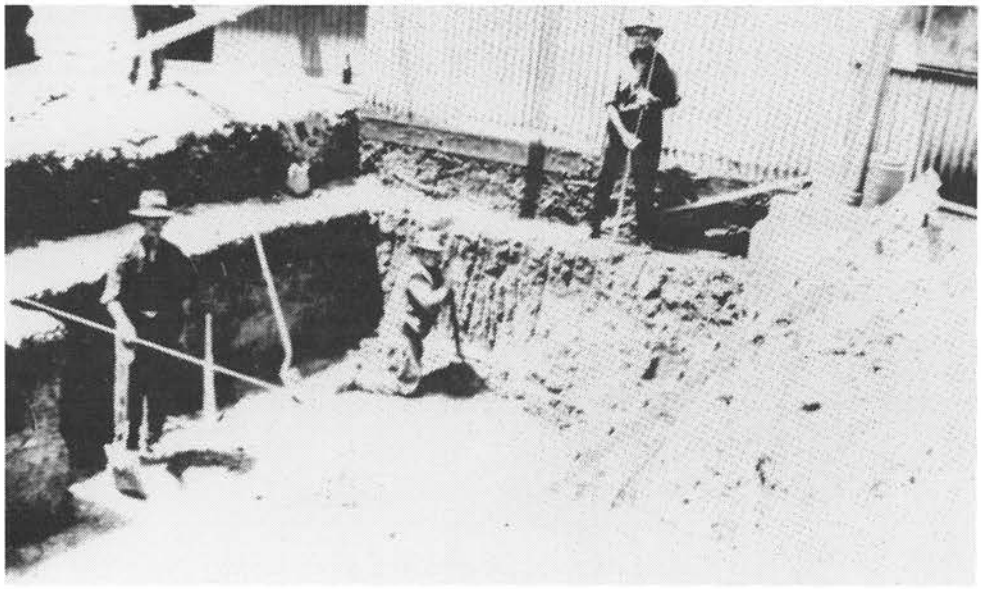
16a. Original power station, Winton

F. Warden-Hutton, Jr. photo

16b. Bagged charcoal for suction gas producers; the lorry itself ran on gas

F. Warden-Hutton, Jr. photo

17a. Ladder truck in use during extension of station, c.1930
F. Warden-Hutton, Jr. photo



17b. Excavation for Ruston Hornsby twin cylinder, c.1930
F. Warden-Hutton, Jr., photo

supply since 1919. In 1924, when a report was received from the Brisbane engineering firm of Harding Frew, the Council decided to go ahead with their proposals. Although the population had by then reached 1,600, there was no gas supply and the predominant form of lighting was still kerosene lamps.

To finance the electricity venture, the Council borrowed £12,000 from the A.M.P. Society.[22] Willett and Company were then offered the contract for construction of a power house on the outskirts of town. The distribution system, which was d.c., three-wire and delivered 480/240 volts to consumers, was installed by Kerwick Bros. The original plant, designed by Harding Frew, consisted of two small single-cylinder National suction gas engines driving two 30 kW generators, producing direct current; there were also two small charcoal-burning Commonwealth gas producers. The power was switched on in January 1927 by Winton Shire Chairman, Councillor L. Irving. Initially there were approximately 200 consumers.[23] The charges for electricity for lighting were 1/6 per unit for the first 20 units each month and 1/3 thereafter; electricity for power purposes cost 9d. per unit for the first 200 units and 7d. thereafter.[24]

Operation of the plant soon revealed serious problems. The two small gas producers were inadequate for the system, and in addition the foundations of the plant were unstable, so that the engines rocked and swayed alarmingly during operation; this was attributed to the consultants' failure to research local soil conditions. Norman Franks, the first engineer appointed to run the station, did not stay long and failed to bring the badly designed plant to working efficiency.

The plant was re-shaped by the second manager, Thomas Frederick Warden-Hutton, who came directly from managing a similar small undertaking at Goondiwindi in late 1927; he had previously worked at power houses in Southport, Port Moresby, Barcaldine and Gladstone.[25] His experience and versatility proved to be great assets in the small, isolated station. Under his capable management it was transformed into an efficient, progressive enterprise.

By 1928 the plant was already overloaded although only about half the town was reticulated; applications for lighting were still coming in regularly. In 1930 capacity was doubled with the installation of a new 60 kW twin-cylinder Ruston Hornsby gas engine set, which gave excellent service for over 25 years. The need to purchase new plant meant that the undertaking consumed far more money than originally anticipated; by 1930 an additional £24,000 had been spent.[26]

In the early 1930s concrete was poured around the foundations of the original gas engines, which stabilised the machinery. At the same time Warden-Hutton replaced the original small gas producers with larger equipment, consisting of one wood-burning

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22. Winton Shire Council Minutes, 11 March 1926.
23. Corbin (ed.), *Winton*, p.71.
24. Winton Shire Council Minutes, 16 September 1926.
25. F. Warden-Hutton to N. Warburton, 12 April 1987.
26. QEC N93.

gas producer and one charcoal-burning producer from the recently abandoned Hampden mine at Kuridala on the Cloncurry copper field. Charcoal producers were considered more efficient than the wood-burning variety. Charcoal was usually obtained from contractors who burnt wood about 20 kilometres south of the town; for a time wood was also burnt in pits near the power station. Following the closure of the Hampden mine in 1928, Warden-Hutton also brought from Kuridala an electric motor to operate the wool scour, equipment for a fell-mongering works, a motor for the ice works, a motor-generator set for a picture theatre and heavy aerial copper cable to supply the wool scour, fell-mongering works and the booster pump on the artesian water supply - all this in an effort to promote electricity consumption.[27]

The pride of the power station was the white marble switchboard, and Warden-Hutton insisted that the equipment was maintained in gleaming good order. He also showed initiative in building the load, persuading the local ice works, the Alba wool scouring plant and the tanning works to accept reticulated supply. By the end of 1935 there were 254 consumers,[28] but the enterprise was still struggling financially under a heavy burden of debt. During the 1930s the staff was small: in addition to the chief, there were an engine driver and linesman, two apprentices, and a number of casual employees. Because of the limited staff, all were required to handle many different facets of the work. Warden-Hutton, an old-time largely self-taught engineer, is remembered as an exacting but fair overseer. He left Winton to take on the task of remodelling the troublesome Barcaldine station in 1939, when he was replaced by Jim Gaffney from Mount Isa.

Gaffney ran the station until 1972, staying on after it was taken over by TREB in 1968. Like Warden-Hutton, Gaffney was a demanding boss, but under his direction the plant continued to run efficiently. He maintained the station as a showcase: floors and engines were cleaned continuously and all equipment was subject to regular maintenance. Despite war-time shortages of labour and materials, Winton experienced very few blackouts. In the early 1940s a meatworks began to operate, which made extra plant necessary, so in 1944 a twin-cylinder 160 h.p. Ruston Hornsby was purchased from Dittmer Mines, near Proserpine - a troublesome engine which was never used unless absolutely necessary. At the same time the power house was doubled in size. As the load continued to grow, a new three-cylinder National 95 kW diesel set was installed in 1952, and a high speed 60 kW diesel engine was purchased from St. George in 1956.

Operation of the small power station was very much attuned to the life of the community. One engine ran unattended from midnight to 4 a.m. when load was light. Operators on morning shift knew it was imperative to start the second engine before 5.30 a.m. when the local baker and butcher opened for business. If not, the overloaded night-duty engine would make a great noise, rousing an annoyed engineer from his residence adjacent to the station. At night, there would sometimes be a sudden increase in load when people returned home from the "pictures" and switched on lights and jugs,

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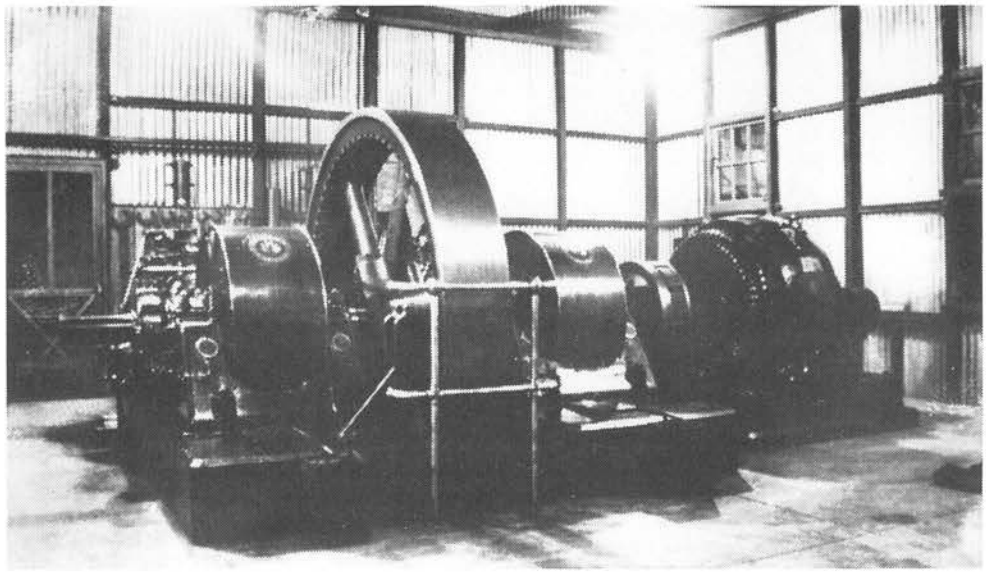
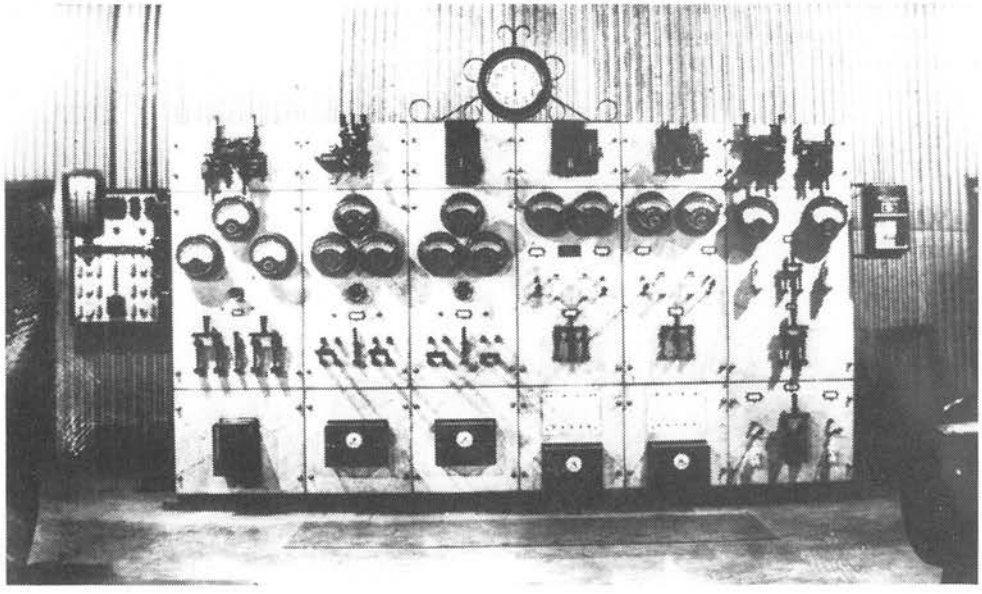
27. Interview with N. Warburton, 3 April 1987.
28. QEC N93-51.



18a. Ruston Hornsby plant, Winton
N. Warburton photo



18b. Marble main switchboard, Winton
N. Warburton photo

19. Winton Electric Authority staff, c.1937

J. Ewan, engine driver-linesman, F. Warden-Hutton, engineer-manager; T. Shanahan, Chairman, Winton Shire Council; N. Watkins, apprentice; F. Warden-Hutton, Jr, apprentice; W. Parker, engine driver-mechanic

N. Warburton photo

so the operator might relieve the situation by turning off some of the street lights from the power house.[29]

In the late 1950s, partly in order to cater for increasing demand, notably as a result of the re-opening of the meatworks, the system was converted from d.c. to a.c. Following investigation, the SEC had recommended the conversion in 1955; in early 1956 the Winton Shire Council decided to proceed.[30] The conversion was completed by 1959, following a temporary delay because of lack of loan funds. With informal assistance from the SEC, funding was finally obtained from a combination of loan and government subsidy.

In December 1957 Underwood and Company of Brisbane were awarded the contract for the overhead reticulation; they were also undertaking electrical work in Emerald, Springsure and Charleville in association with the SEC. The SEC obtained materials and called tenders on behalf of the Winton Shire Council. There were over 400 consumers and a large number of appliances needed to be converted to a.c. At the same time new a.c. equipment driven by diesel engines was installed at the power house; improvements to the cooling water system included a new cooling tower. A new stores building was also erected on site at the power house. The original gas engines were in use until the change-over. The installation of 135 kW and 170 kW generating sets, and the addition soon after of a 215 kW set released from Ingham, brought the station's total capacity to 820 kW by 1962, when the system maximum demand was approximately 350 kW. During the 1960s increasing demand necessitated further expansion, which brought total capacity to 1265 kW by 1968;[31] by then 530 consumers were being supplied.

The power station at Winton was controlled by the Winton Shire Council from January 1927 until May 1968. Despite some opposition from the local Council, the township was then connected to Hughenden on TREB's 33 kV western grid. However, because of the high incidence of lightning storms in the district and the long stretch of line from Hughenden, interruptions of supply were not uncommon; accustomed to uninterrupted supply from their local power house, some residents found it difficult to appreciate the new regime. For many years the old power plant continued to be run occasionally during outages or line maintenance, but it has now been closed and converted to a museum.

Richmond and Julia Creek

Westward of Hughenden along the Great Northern Railway lie Richmond and Julia Creek, small isolated townships serving extensive but thinly-settled pastoral districts. Electricity was made available to these communities only in the 1950s under the SEC's "small townships scheme", first elaborated in 1951-52. This scheme was devised for small towns with no immediate prospects of obtaining power supply, lying

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29. Interview with Vince Nelson, Winton, 4 September 1986.
30. SEC to Shire Clerk, Winton, 4 December 1957.
31. *SEC AR*, 1956, p.22; 1957, p.22; 1958, p.20; 1962, p.15; 1965, p.20.

outside the regions of the established electric authorities, too remote for connection to existing systems, but with populations between 250 and 1,000 and with more than 50 potential consumers. High capital costs and labour costs were identified as the main obstacles preventing such small western towns from obtaining electricity. A government subsidy of up to 65% of capital costs helped overcome the first problem and, with the co-operation of the unions, schemes were designed to economise on labour costs by allowing unattended operation in the initial stages. Richmond and Julia Creek were among the first four schemes implemented in the State in 1952.[32]

All the schemes were virtually identical; standardisation helped to reduce costs. They were powered by units of three or four slow-speed, single-cylinder diesel engines; these were coupled to self-excited alternators, chosen as most suitable for unattended running. The equipment was specially designed for easy installation and maintenance and to allow continuous operation under single-handed supervision.[33] Equipment was ordered in bulk and distributed by the SEC. The supply system was 415/240 volts a.c., three-phase, 50 cycles, and each scheme cost about £25,000. Continuous 24 hour supply was provided. The plants were housed in prefabricated steel-framed buildings specially adapted to western climatic conditions. They were owned and operated by local government authorities with the assistance and supervision of the SEC.[34]

The Richmond undertaking was commissioned in June 1952, beginning with four 16 kW generating sets and 180 consumers.[35] At first there were restrictions on the use of some electrical appliances because of limited capacity, but these were lifted by the end of the decade. Because of foundation problems on the original site, it soon proved necessary for the Richmond Shire Council to build a new power station. The capacity of the plant was gradually expanded. By 1956 a fifth generating set was required and in the following years the capacity of the station was built up to 300 kW in 1963; in that year the system maximum demand was 200 kW.[36] When the Richmond authority was incorporated into TREB in July 1964, the population was about 1,000 and there were 280 consumers supplied by 1.5 kilometres of 6.6 kV and eight kilometres of low voltage reticulation.

Julia Creek also received the benefits of electricity through the "small townships scheme". Operated by the McKinlay Shire Council, the power station was commissioned in October 1952. By 1957 a fifth set was installed; after the commissioning of the extra set, an engine driver was employed to assist the superintendent. In 1963 total capacity was 335 kW and maximum demand 210 kW.[37] By 1964 there were 240 consumers supplied by about eight kilometres of low voltage reticulation. Together with Richmond, Julia Creek joined TREB in July 1964, and was connected with Hughenden via Richmond by means of 33 kV transmission line. The switching-on ceremony for the

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32. *SEC AR*, 1958, p.29.
33. *SEC AR*, 1954, p.13.
34. Dunn, *The History of Electricity in Queensland*, pp.91-4.
35. *SEC AR*, 1954, p.15.
36. *SEC AR*, 1963, p.15.
37. *Ibid.*

Hughenden-Richmond line took place in December 1964, and Julia Creek was connected by the end of 1965.

Mount Isa

Today Mount Isa is the principal city of north-west Queensland, but for a large portion of its history its prospects were far humbler. The Mount Isa mineral field, which is now known to have contained massive ore bodies combining silver, lead, zinc and copper, was discovered by John Campbell Miles in 1923, but its development was retarded by a multitude of problems: lack of finance, fluctuations in world mineral prices, isolation, low grade ores which were difficult to treat, flooding of the mine shaft and other setbacks. Though launched in 1923 and the dominant company on the field by 1925, Mount Isa Mines Limited did not make a profit until 1937 and did not pay a dividend until a decade later.[38]

Early in the field's troubled history, electricity reticulation was begun by Harry J. Smith, who in 1928 undertook to supply four blocks in the centre of town. Born in Liverpool, Harry Smith had worked as a navvy on the Queensland Railways and had carried mails in the west before going into business. In 1923 he was among the first to arrive in Mount Isa, coming from the moribund copper field at Kuridala, where he had owned a hotel and picture theatre. Smith embarked upon similar ventures in Mount Isa: the Isa Hotel on the corner of Marian and Miles Streets, the Star Theatre on the corner of Marian and West Streets, and an ice works adjacent to the theatre. It was mainly to provide power for these enterprises that Smith sought an Order-in-Council to supply electricity in a very limited portion of town.[39]

Smith's power station was a corrugated iron shed at the rear of the ice works in West Street. The enterprise started on a shoestring, using odd bits of equipment. Initially the plant comprised two small generators driven by a 30 h.p. Crossley diesel engine run in conjunction with the ice making plant; at first the system produced direct current. As the number of customers gradually increased, enlargement of the system began to seem commercially viable. In February 1931 H.J. Smith and Sons were granted an Order-in-Council to supply the whole town.

After the Order was obtained, Albert Axon was appointed as consulting engineer. His first task was to supervise the installation of new equipment. Alternating current was to be produced at a refurbished power house on the same site in West Street, where a 105 h.p. Crossley engine and 64 kW alternator had been installed; supply to consumers was 415/240 volts. At the rear of the plant was a cooling tower, with diesel storage at the back of the allotment. Costs were high because of the isolation of the mining field. Diesel fuel was railed out to Mount Isa and as a result was very expensive;

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38. For a full account of the history of the field, see G. Blainey, *Mines in the Spinifex: The Story of Mount Isa Mines,* Sydney, 1960.
39. Interview with Jim Smith, Mount Isa, 7 January 1988.

poles were transported from Maryborough and were also very costly. The price set for lighting was 1/4 per unit with a 25% discount for prompt payment.[40]

By the end of 1932 Arthur Fadden as auditor reported that the company's financial status was satisfactory.[41] In 1934 the hospital was brought on line, and by the end of that year there were 130 consumers. In 1935 expansion of the generating plant proved necessary: a three cylinder Ruston Hornsby and an eight cylinder Allen diesel were added. Thus by 1937 the modern, up-to-date plant included three generating sets.

During the early years there were numerous complaints about the management of the undertaking. In June 1934 the Electricity Board within the Department of Public Works received a complaint from the Mount Isa Progress Association that it was "a common occurrence for the lights to go out, plunging the town into darkness".[42] Among other complaints lodged with the Department, Harry Smith was accused of using his position as electricity supplier to damage a rival theatre proprietor, threatening to cut off supply if business people used other electrical contractors, refusing to give rival electricians general licences as contractors and employing unqualified labour.[43]

Nor were industrial relations Harry Smith's strong point. One employee described him as "a ruthless person who was such a sadist at times". An apprentice, relieved to be leaving his employ, called upon Smith to pick up his indentures and subsequent events reveal much about the character of industrial relations:

> He would not give them to me but agreed to give them to me at the railway station on my departure. He made me wait till the train was pulling out to give them to me which made it quite awkward for me as I was on crutches with a broken leg. He was also on crutches with gout. I had the last laugh as I accidentally knocked his crutches as I hurried away and he fell heavily.[44]

Harry Smith's son, Norm, who was born in Brisbane in 1901, joined his father's business on a full time basis in 1934. After several years of study, Norm Smith obtained the qualifications necessary for him to take over supervision of the ice works and power plant in 1939. He was later elected to the Cloncurry Shire Council and then became Labor member for the district in the State parliament, holding the seat for 20 years before retiring in the early 1960s.[45]

Because of continuing increases in demand during the 1930s, the electricity company reached an agreement with Mount Isa Mines Limited for MIM to supply bulk

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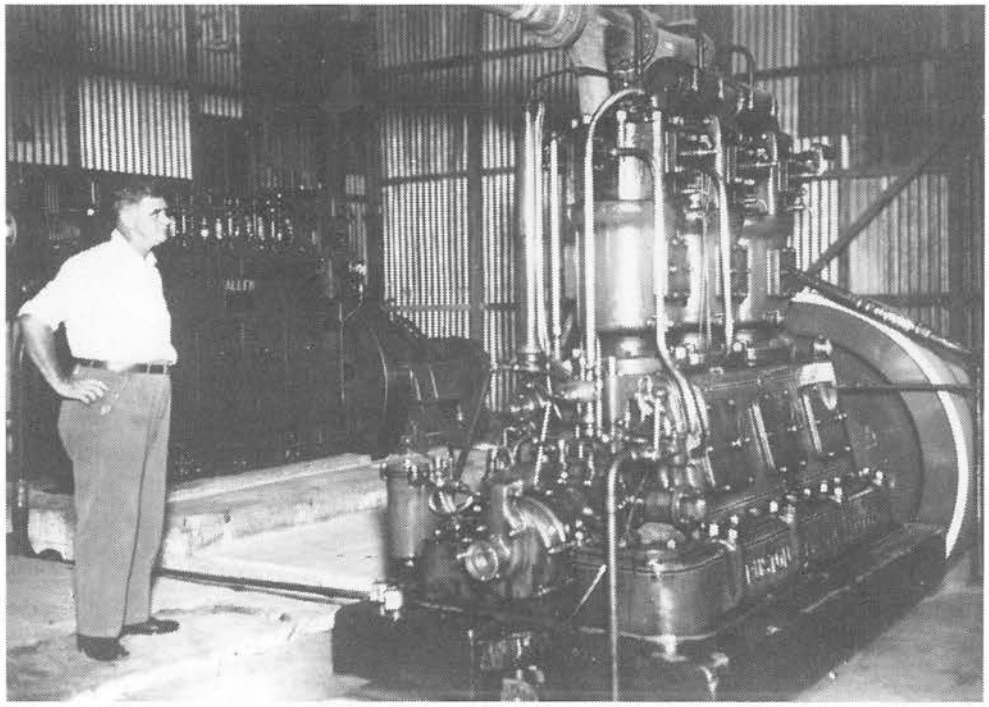
40. H. Smith to Under Secretary, Department of Public Works, 25 May 1931, QEC N149-15.
41. Fadden's report on finances of Mount Isa Electric Authority to December 1932, QEC N149.
42. Secretary, Mount Isa Progress Association to Manager, Electricity Board, 22 June 1934, QEC N149-45.
43. A.H. McNicol to Minister for Public Works, 29 September 1932, QEC N149-25.
44. Private letter. Copy held by author.
45. *North West Star*, 11 July 1983.

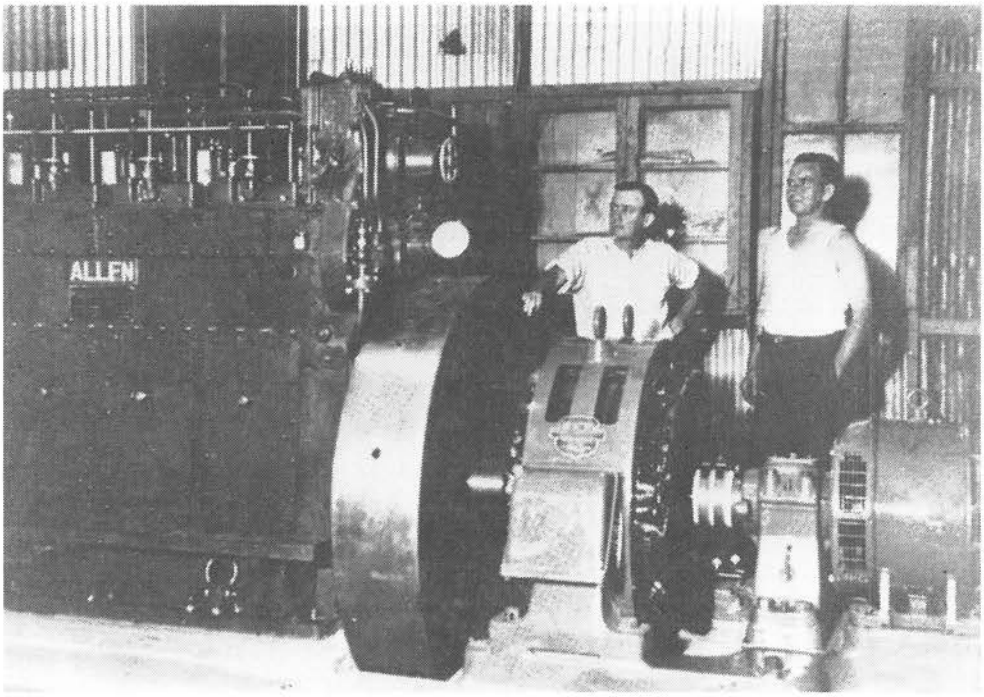


20a. Harry Smith with Mount Isa power plant, late 1930

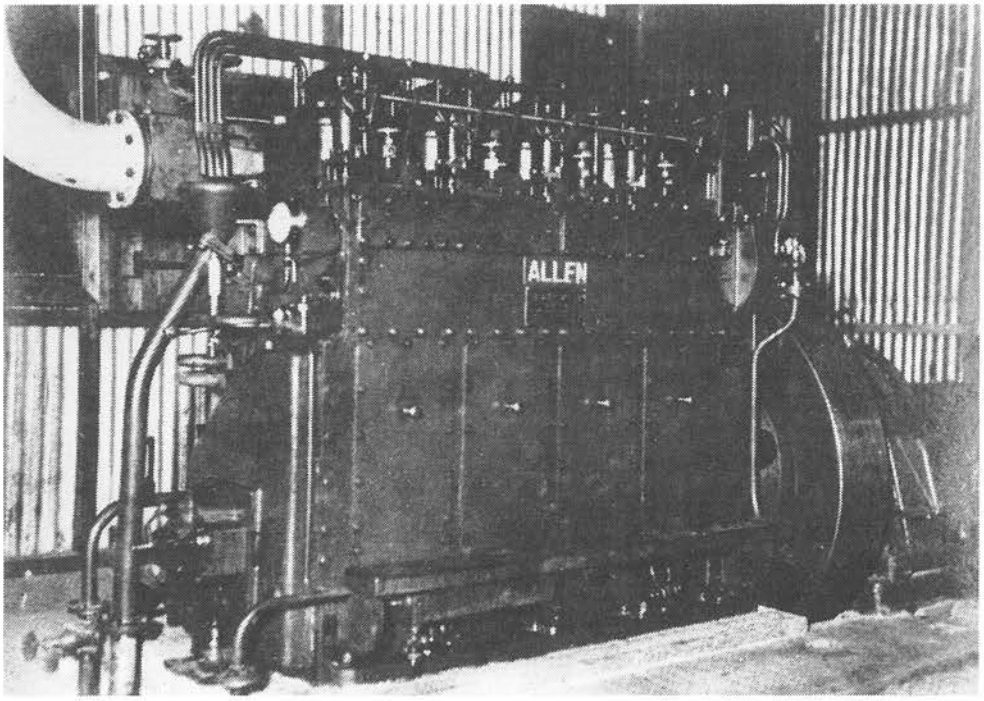
J. Smith photo

20b. MIM Power house, 1937 or 1938

N. Warburton photo



21a. Allen engine: Norm Smith on the left



21b. Allen diesel engine

power from 1938. The area at the back of the ice works was simply too small for further expansion of the company's plant. The Mines generating station, which consisted of a 150 kW Ruston Hornsby diesel, had been built in 1930 when power was urgently required for pumping water out of flooded mine shafts; it was later expanded in 1934-35. From 1938 electricity was fed by means of underground cables from the Mines power house to a substation adjacent to the railway station. Supply was 3.3 kV and was reticulated to substations at West Street, May Street, Fourth Avenue and the hospital. Additional substations were later built on West Street to feed the Council's bores and on Stanley Street to supply new housing in that area. After bulk supply was received the electricity company's staff was reduced; the original generators were retained as standby plant for the central business district and hospital.

During the 1940s, after Norm Smith's move into politics, the staff ran the electricity enterprise. At this time the staff comprised a foreman, three engine drivers on rotating shift, and two apprentices who were expected to operate the picture theatre as well as doing electrical work. All employees were required to work in the ice works and in Smith's other businesses in addition to the power station. "As well as the ice works in this period any spare time had to be spent making up switchboards, pendants for lights, drilling of wood blocks and keeping all machinery spotless".[46] Although there were army bases at Mount Isa during the Second World War, there were no interruptions to power supply because Mount Isa Mines produced adequate electricity.

In 1949 Jim Smith, Norm's son, took over management of the power supply. The following period was one of demand expansion and extension of the distribution system well beyond the franchise area as the township of Mount Isa grew. The old plant was still intact and the Allen engine was sometimes used in emergencies. The staff was limited. There was one meter reader, who lived in a tent house in Fourth Avenue which is now preserved by the National Trust as an example of a style of housing once common on the mining fields.[47] The office staff who administered the hotel and theatre handled the electricity business as well. There were no full-time linesmen; MIM staff worked for the Smiths at weekends. The major problems facing the enterprise were financial: the town was growing constantly, there was little loan money available for expansion, and prices were fixed by the government.

Mount Isa's electricity supply remained a private undertaking until 1955 when, under the auspices of the SEC, the Cloncurry Shire Council successfully negotiated with H.J. Smith and Sons for purchase. This was part of the Commission's overall plan of bringing the electricity industry under public ownership; by this time there were only three remaining private electricity companies in Queensland - at Charters Towers, Roma and Dirranbandi. When the Cloncurry Shire Council acquired the undertaking there were approximately 800 consumers. The generating plant on the site in West Street was not included in the purchase, but was sold off piecemeal to private buyers.

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46. Private letter. Copy held by author.
47. Interview with Romualda Scarpelli, 6 January 1988. A "tent house" consisted of a tent protected by a permanent and separate roof structure.Nearly 200 of them were constructed in Mount Isa.

With technical assistance from the SEC, the Cloncurry Shire Council undertook a major programme of reconstruction and improvement to meet the rapidly increasing demand for electricity at the booming mining centre. The reticulation network required substantial reconstruction to improve voltage conditions, and extensive new capital works were also necessary. Five new substations were constructed. Most of the work was carried out by the Council on a day labour basis.

As before, power was purchased in bulk from Mount Isa Mines Limited and distributed by the electric authority. In 1958 Mount Isa Mines erected 11 kV overhead lines to a new substation near the railway, and the 3.3 kV reticulation was converted to 11 kV. The manager of the Mount Isa electric authority for most of the period from 1955 to 1962 was Jim Smith (no relation to the former owners), who had previously worked for Mount Isa Mines. From 1962 to 1966 Howard Stapleton managed the authority. System growth was rapid during the 1950s and 1960s: by 1963 there were about 3,500 consumers.

As the town grew in size and importance, Mount Isa's residents were increasingly dissatisfied with remote control under the Cloncurry Shire Council. In 1963 the newly-constituted Mount Isa Shire Council assumed responsibility for electricity supply in Mount Isa, as well as in Cloncurry and Camooweal, under the title "North Western Electric Authority". In 1968 a new stores and office building was opened at Mount Isa. From 1965 to 1969 the number of units of electricity purchased from Mount Isa Mines rose from 25 million to 35 million, showing the continuing rapid expansion of consumption in these far-western areas.[48] After Stapleton's resignation in 1966, Jim Kastrissios took over as manager until 1977 when he left Mount Isa to manage the newly-formed South West Queensland Electricity Board. The North Western Electric Authority then came under the aegis of NORQEB.

Cloncurry

The Cloncurry River was named by Burke and Wills during their ill-fated expedition to the Gulf of Carpentaria in 1861. Reports of gold and copper discoveries attracted the first European settlers to the district in the late 1860s. In 1866-67 Ernest Henry followed up John McKinlay's observation that there was copper ore in the area, finally coming upon a rich outcrop which he named the "Great Australia"; gold was also found in the nearby Selwyn Range in 1867. Located 120 kilometres east of Mount Isa and 800 kilometres west of Townsville, the township, situated on the Cloncurry River, was surveyed in 1876. Over the years its fortunes fluctuated according to movements of world metal prices. The mining boom ended with the collapse of metal prices after the First World War; beef cattle grazing is now the major industry.

By the 1920s many townspeople and pastoralists in the area were using petrol engines to generate their own power, but there was no public supply. In December 1929, on the initiative of Norm Smith, the Mount Isa entrepreneur, a group of local businessmen formed the Cloncurry Electric Light and Power Company, with a capital

48. *SEC AR*, 1965, p.18; 1969, p.21.

22a. Cloncurry power house: the gantry

22b. Cloncurry power house: gas producers & the author

of £20,000. Albert Axon was engaged as consultant, the Shire Council gave its approval, and the government was approached for an Order-in-Council, but the depression intervened leading to the abandonment of the venture.[49]

During the early 1930s there were several approaches to the Department of Public Works for Orders or licences to supply electricity, but all proposals fell through. Finally in 1935 the Cloncurry Shire Council decided to go ahead with its own project to supply power for water pumping and for the town. At first it was proposed that the Council purchase bulk electricity from the local ice works, but in September 1935 Council decided to generate its own power by augmenting the existing pumping equipment; from 1921 two small suction gas engines had driven the pumps for the Council's reticulated water supply.

Funding for the electric authority was granted in the form of a £5,000 government subsidy and a £5,000 loan; in 1937 a further subsidy of £500 and loan of the same amount proved necessary because of increasing costs, freight and numbers of consumers.[50] Axon as consultant recommended an electrical plant consisting of suction gas engines and alternators, and a wood-burning gas producer. The equipment, mainly supplied by Snashall, Anthon Pty Ltd, comprised a National 107 h.p. three-cylinder suction gas engine and a Crossley 40 h.p. single-cylinder gas engine previously part of the waterworks scheme, both coupled to Brush alternators, and a 150 h.p. Akroyd wood-burning gas producer.[51] The power station, reconstructed from an old corrugated iron shed which had been part of a copper plant near Mount Oxide, was erected near the main well in the river bed;[52] recurrent flooding subsequently played havoc with the machinery. A gantry was constructed to hold the wood which fed the gas producer; a conveyor raised wood from the ground to the gantry floor. The distribution system was 2,200 volts, three phase a.c., 50 cycles, with consumers' voltages of 415/240.

Electricity was first reticulated in January 1937, and supply became continuous over 24 hours from April of that year. Jack Schwabe was appointed as the first engineer-manager. Domestic tariffs were on a graduated scale ranging from 1/6 per unit for the first six units to 3d. per unit over 24 units.[53] By the end of 1937 there were about 250 consumers, which far exceeded original expectations.[54] The waterworks and hospital were the largest consumers. During the Second World War, when an army base and medical hospital were constructed at Cloncurry, townspeople suffered a number of blackouts because of inadequate capacity, lack of materials and shortage of labour.

Following the war, there was a growth spurt in electricity consumption at Cloncurry, as indeed throughout the region. Les Windridge capably managed the

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49. QEC N144.
50. QEC N136.
51. *Tait's Electrical Directory of Australia and New Zealand*, Melbourne, 1936.
52. *North West Star*, 11 February 1986.
53. QEC N136-22.
54. Axon to Under Secretary, Treasury, 28 September 1937, QEC N136-50.

undertaking during this expansionary period. After the local ice works was closed, the Council introduced a scheme whereby refrigerators could be purchased on easy instalments, which added to electricity consumption. In the 1950s there were several additions to plant - mostly gas engines.[55] As new plant was installed the power station was extended to accommodate it. In 1955, when the Council purchased the Mount Isa electric authority, a complete reconstruction of the systems in both Cloncurry and Mount Isa was undertaken.[56]

In 1959 agreement was reached between the SEC and Mount Isa Mines for the company to supply bulk electricity from its new outdoor power station at Mica Creek for Cloncurry and intervening consumers. On the recommendation of the SEC, a 66 kV transmission line was built by Electric Power Transmission from Mount Isa to Cloncurry at a cost of £350,000. When the 115 kilometre link was finished in 1962, the Cloncurry power house was retained on standby. Cloncurry was incorporated in the North Western Electric Authority from its inception in July 1963, though the Cloncurry Shire Council continued to perform many functions associated with the undertaking on an agency basis.

Camooweal

The Barkly Tableland was first occupied by pastoralists in the 1860s. The town of Camooweal, close to the Northern Territory border, soon sprang up as a service centre, essential supplies being brought in from Burketown on the Gulf of Carpentaria.

Electricity for the township was first supplied in bulk by the Department of Civil Aviation by means of generators at the airfield. During the Second World War the Camooweal airport had been upgraded; power needed for the workshop, residence, runway lighting, transmitting station and beacon was supplied by two small Ruston Hornsby diesel sets. After the war control of the airport facilities was transferred from the RAAF to the Department of Civil Aviation (DCA), who made power available to the town in 1953 using two Dorman diesel sets. The DCA sold bulk electricity to the Barkly Tableland Shire Council, the supply authority. Under the supervision of the SEC, a distribution system was installed; Len Bright erected overhead lines and Vic Freeman wired premises. The switch-on ceremony in April 1953 was an occasion for great celebration.

After negotiation between the DCA and SEC, generation was taken over by the Barkly Tableland Shire Council in 1957. The DCA gave the Council a 20 year lease over the power station and adjacent residence. Two 16 kW National sets were installed to replace the Dorman sets, and these together with another National purchased in 1952 and a Ruston Hornsby stand-by set carried the Camooweal load; as demand grew a further two engines were added in 1960 and 1964.

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55. *SEC AR*, 1953, p.24; 1955, p.16.
56. Interview with Jack Scott, Cloncurry, 5 January 1988.

In 1963 when the Barkly Tableland Shire Council was dissolved and Camooweal reluctantly joined the newly-created Shire of Mount Isa, responsibility for power generation and distribution passed to the North Western Electric Authority. By this time there were about 65 consumers; maximum demand and installed capacity were 43 kW and 76 kW respectively.[57] The Barkly Tableland Shire Council's electric authority had faced recurrent financial difficulties because of the sparsity of population, so that electricity had to be subsidised each year from general account; nevertheless, local residents strongly, though unsuccessfully, resisted what they considered the hasty expedient of incorporating the district with Mount Isa.[58] In the event, the change was merely formal as regards electricity supply: because of its remoteness and small loading, Camooweal continued to depend on local generation. In 1967 the National sets were retired and replaced by two 75 kW Caterpillar diesel sets. By the time the station was incorporated within NORQEB in 1977, there were 23 commercial and 41 domestic consumers; maximum demand had grown to 70 kW. Under NORQEB, a major overhaul and upgrading of the system was undertaken.

Boulia

Boulia, the capital of the Channel Country, is located west of Winton and south of Mount Isa. It became part of NORQEB when the Board was formed in 1977, but was never part of TREB. Established in 1883, the town of Boulia first obtained electricity in 1936. Robert Brook owned the power plant, in addition to the local iceworks, but only supplied the Fielding store, Royal Hotel, the Shire Hall, hospital and street lights. Supply was discontinued during the Second World War because of fuel shortage; the equipment was sold and removed.[59]

Boulia regained electricity supply only in January 1957 under the SEC's "small townships scheme". Operated by the Boulia Shire Council, the scheme began with two 16 kW generating sets; by 1969 the installed capacity had reached 220 kW.[60] The Boulia Shire, together with the North Western Electric Authority and Burke Shire, was included under the control of NORQEB when it was launched in 1977.

In the early 1950s a new era in rural electricity supply began with experiments on the single wire earth return (s.w.e.r.) system. First developed in New Zealand, this system was based on a single wire for transmission and used the earth to complete the circuit. It was suitable for areas where three phase or the standard single phase system would be too costly. In 1952 the Cairns Regional Board set up two trial installations at Atherton and Malanda, supplying 20 and 12 farms respectively. This was probably the first time the s.w.e.r. system was used in Australia. Since long distances had to be covered, fairly high voltage (11,000 to 19,000 volts) was used for transmission. The success of the experiment in the Cairns region persuaded the SEC to approve the system and encourage its introduction for rural supply.

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57. *SEC AR*, 1963, p.12.
58. L.A. Miller, *The Border and Beyond: Camooweal 1884-1984*, 1984, p.34.
59. Boulia Shire Council, *Souvenir Book of the Min Min Festival,* Boulia, 1976, p.73.
60. *SEC AR*, 1969.

Not until the 1960s was s.w.e.r. implemented in the TREB region, beginning in the Flinders district. Gradually a network of s.w.e.r. lines was constructed, radiating from isolated generating stations and main transmission lines. Tiny townships and isolated pastoral properties could now enjoy the benefits of electricity supply. Special subsidy and deposit schemes were formulated to finance these expensive extensions. Some initial problems were experienced with the system. Because of the long distances, line capacitance was considerable and, with fluctuating load, voltage became difficult to control; the installation of shunt reactors along the lines helped to reduce these effects. By the 1980s the s.w.e.r. system had made it possible to supply electricity to a very high proportion of the population of north-west Queensland.

CHAPTER SIX

TREB

The Townsville Regional Electricity Board was set up in 1946 under the Regional Electric Authorities Act of 1945. Initially it took in the electrical systems formerly operated by three local government bodies - the Townsville City Council, and the Shire Councils of Hinchinbrook, centred in Ingham, and of Ayr - together with the area surrounding Townsville controlled by the Thuringowa Shire Council. TREB was the largest of the five Regional Boards set up in 1946, the other four being the Cairns Regional Board, the Wide Bay and South Burnett Boards, and the Capricornia Regional Board, based in Rockhampton.[1] Over the following three decades, the jurisdiction of the Townsville Board was extended further, finally incorporating the Home Hill area, Charters Towers and Dalrymple Shire, Bowen and district, Hughenden, Flinders Shire, Julia Creek, Richmond and Winton - a vast expansion which will be described later in the chapter. TREB met for the first time in January 1946, but did not begin operating until July.

TREB began in 1946 with an ambitious development plan. A considerable amount of maintenance work had been deferred during the war years, which became an additional burden on the new Board. In both Townsville and Ingham worn-out plant was barely capable of meeting current demands. The distribution system taken over in the Home Hill area in 1947 was 20 years old and in poor condition, requiring extensive reconstruction. In Ayr there were problems in converting from d.c. to a.c. in order to relieve the overloaded d.c. plant by transmitting power from Home Hill.

Post-war conditions made it extremely difficult to achieve the new management's early targets. Beginning operations in the unsettled period immediately after the war, TREB faced the economy-wide problems of scarcity of materials and skilled labour. Equipment such as copper conductors, insulators, switchgear and transformers was in very short supply. Prices of materials rose swiftly, in some cases by 30% in 12 months.[2] Scarcity of transformers probably caused the most serious problems, holding up distribution work in the Ayr, Home Hill and Ingham areas; after waiting four years for transformers to be delivered, TREB was forced in 1951 to ration additions to loading in Ayr.[3] Shortages of smaller items also retarded developmental work; these included nuts and bolts, stay rods, cross-arm straps, pole caps, stay wire and meters. It took time to find alternative sources of supply; not until 1949 was it possible to import some materials from overseas. Substitution and improvisation were therefore the order of the day. For example, bolts and insulator pins were made from scrap ends of steel rods used in the foundations of the new Townsville power station.

Post-war industrial unrest compounded these problems. The Queensland Railways strike (1948), in addition to the perennial northern problem of wet season

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1. The Wide Bay and Burnett Boards were amalgamated in 1951. The Mackay Regional Board was added in 1957, and the Central Western Board, with headquarters in Barcaldine, in 1966.
2. *TREB Annual Report (AR), 1946-47*, p.12.
3. TREB Mins, January 1951-June 1952, pp.551-2.

isolation, disrupted supplies of materials, notably coal and poles. Disputes in the coal industry caused difficulties for electricity suppliers in particular, making power restrictions necessary on some occasions and increasing the cost of fuel supplies. From July 1946 to July 1949 the price of coal delivered at Townsville increased by over 50%, and coal delivered at Home Hill rose by 64%.[4]

In addition to industrial trouble, output from the Collinsville state mine was limited by inefficiency, particularly because of the lack of mechanisation. When Collinsville could not meet TREB's demands, the Board was forced to seek alternative supplies from Blair Athol, Callide or Mount Mulligan at significantly higher cost because of the longer rail haulage. At the end of 1953, for instance, the cost of coal delivered to the Board ranged from 105 shillings per ton ex Collinsville, to 161s. ex Mount Mulligan, 162s. ex Callide, and 187s. ex Blair Athol.[5] Continual vexation over coal supplies prompted TREB to propose opening its own mine at Collinsville and running it according to modern, mechanised techniques.[6] Although the Board was persuaded to shelve the plan in mid-1951, mollified by the Minister's assurances of adequate supplies from Collinsville,[7] it was not long before problems re-emerged and TREB's grievances flared.[8] In 1952 and 1953 agreements were reached with the Mines Department whereby TREB contracted to take a proportion of its needs from Mount Mulligan, even though Collinsville was then producing coal for export; these terms brought severe criticism upon the Board from the local press.[9] Technical problems continued to bedevil the Collinsville mine through the 1950s, a disastrous accident in 1954 prompting a Royal Commission which reported critically on mining practices. Persistent problems with coal supplies encouraged TREB to turn to hydro-electric power by the middle of the decade.

Despite these major obstacles, a five-year plan for transmission and distribution was implemented in 1947. 66 kV transmission lines were erected to connect the Townsville power station with Ingham, Giru, Ayr, and Home Hill. When the line was put across the Burdekin River in 1948, ship's rockets were used to erect the spanning wires so as to avoid cutting tropical jungle on the river bank. 66kV/11kV substations were built at Ingham, Giru, Ayr, and Home Hill. The Townsville-Home Hill line constructed during the war was purchased from the Commonwealth. Supply networks were gradually extended - to Lucinda, Inkerman and Pallarenda, for instance.[10]

One of TREB's first priorities was the construction of a larger generating plant in Townsville. The new plant, officially known as the Central Generating Station though popularly called simply "the power house", was built on reclaimed land in South Townsville. The site near the mouth of Ross River was usually referred to as the "Old Rifle Range". J. Shearer and others had favoured a location at Pallarenda, but it was

4. *TDB*, 15 July 1949.
5. TREB Mins, July 1953-June 1954, p.1072.
6. TREB Mins, January 1951-June 1952, p.598.
7. *Ibid.*, p.636.
8. TREB Mins, July 1952-June 1953, pp.824-5, p.846.
9. *TDB*, 27 June 1953.
10. *TREB AR, 1946-47*, p.12.

never seriously considered; from the time that electricity production had begun at Hubert's Well, South Townsville had always been regarded as the best alternative. The mangrove flats had to be filled in, over 2,000 timber piles were driven to form a foundation for the station, and a stone sea wall was constructed around the site extending to the oil depots of the Townsville Harbour Board; access roads and a rail siding were also built. Reclamation work commenced in TREB's first year of operation and the plant was originally expected to be ready by the end of 1948, but it was not until May 1953 that it was finally opened, after many delays and setbacks.

The new station progressed slowly, mainly because of lack of materials. The scarcity of Australian steel made it necessary to import steel sections from England. On behalf of the Regional Boards, the SEC had placed orders overseas shortly after the war, but the shortage of steel was world-wide and delays inevitable. Later, the outbreak of the Korean War exacerbated supply problems. Material shortages led to bottlenecks and problems of storing those materials which did arrive. Difficult decisions had to be taken about whether to install generating equipment intended for the new station at Hubert's Well in order to meet rising demand and to protect the equipment from the elements; in the event some equipment was left out in the open and required expensive re-conditioning before being installed. Uncertainty about deliveries reduced planning to guesswork. The reclamation work suffered inordinate delays as contractors failed to meet their schedules. During this period TREB was also plagued by management problems, so there was neither the efficiency nor continuity needed to deal with these problems.

In the meantime demand continued to grow rapidly with the onset of the nation-wide post-war surge in demand for electricity. In 1946-47 about 23 million kWh of electricity were generated and sold by TREB[11]; by 1952-53 it was nearly three times that amount - 68 million kWh.[12] Several measures were taken to meet the ever-increasing demand: additional generating capacity was installed, power stations in Townsville and Home Hill were interconnected so as to even up loads, and radio communication was established between the stations to allow co-ordination. Nevertheless, by 1952 peak demand at Townsville and Home Hill exceeded existing capacity, making load shedding necessary in both areas during breakdowns or routine maintenance. Public tolerance was strained to the limit when an explosion at Hubert's Well station in early 1953 blacked out most of Townsville for several days.

At the same time there was a serious shortage of loan funds throughout the country in the early 1950s, which threatened to curtail work on the new power station. TREB was also under financial pressure because of continuing increases in the cost of materials, especially coal; increasing electricity tariffs by 25% in early 1951 and by 15% in late 1952 brought only temporary relief. As a result, in early 1952 TREB was forced to defer all extensions of the transmission and reticulation network, to cancel or defer contracts, to dismiss staff, and to channel the limited funds available towards

11. *Ibid.*, p.5.
12. *TREB AR, 1952-53*, p.1.

completion of the new station.[13] Dissatisfaction with government funding priorities was frequently expressed in Townsville, not least among Board members themselves.[14]

The financial crisis was relieved in 1953 after the SEC, which had been given legislative authority to obtain loan funds from the public in March 1952, floated five public loans on behalf of the Regional Boards, and also helped to raise supplementary finance through private loans. Previously Regional Boards had authority to seek their own loan finance; in 1952 this power was transferred to the SEC. State Electricity Loans offered the public a secure investment, guaranteed by the State government, at competitive interest rates - about twice the prevailing savings bank rate; the term of five years was not excessive. They were promoted vigorously by local Boards and by the SEC, and were generally well-subscribed. The first four public loans floated in 1952-53 raised £2.5 million, and the total amount raised in that year, including private loans, was £3,905,000.[15] A system was introduced whereby funds subscribed could be ear-marked for expenditure within a particular region. The resulting inflow of funds enabled TREB to complete work on the new station, which was brought into operation in May 1953, at a total cost of £2,296,000. By the latter part of 1953 TREB's financial position was quite reversed; by then the Board was considering how to dispose of surplus loan funds, some of which were chanelled into short-term investments. After this financial crisis in 1952, TREB had no further serious problems with availability of loan finance, although 1961-62 and 1966-68 were periods of temporary stringency.

The new power station was designed by the SEC along similar lines to new stations in the Capricornia and Wide Bay regions at Rockhampton and Howard. About 40 principal contractors and 90 sub-contractors worked on the project. When opened it was among the most technologically advanced stations in Australia. It was equipped with six Babcock and Wilcox water tube boilers - each with an evaporative capacity of 40,000 lb. of steam per hour at 415 lb. per square inch gauge pressure and a temperature of 750 degrees F. There were chain grate stokers for use with coal and provision was also made for firing two units with fuel oil, if and when required. The generating units consisted of three Metropolitan-Vickers 7,500 kW turbo generators generating at 11,000 volts, and a smaller Metropolitan-Vickers 750 kW turbo generator - a total capacity of over 23,000 kW. The ancillaries included evaporators, feed pumps, circulating water plant, fuel handling plant, ash handling plant and automatic boiler control. The circulating water system took salt water from Ross Creek, circulated it through the plant and expelled it into Ross River. Steam plants require a plentiful supply of condensing water, so the availability of circulating sea water was one of the prime advantages of the site.

Nevertheless, this progress was not without its penalties. Like the Hubert's Well station before it, the Central Generating Station produced a considerable pollution nuisance for residents in the neighbourhood, spreading a dark layer of soot over their homes, furnishings and gardens. Within weeks of the opening of the station, large petitions were sent to the City Council and the Board complaining about soot and

13. *TREB AR, 1951-52*, p.1.
14. *TDB*, 7 January 1952, 13 February 1953.
15. TREB Mins, July 1953-June 1954, p.1002.

smoke.[16] Tom Aikens, the local member, wrote to the Minister for Mines describing his visit to the area in company with a deputation of residents:

> The deputants had claimed that their homes and furniture had been ruined, or threatened with ruination, and their lives made miserable by the continuous shower of ashes, soot and unburned coal-dust that is spewed forth from the smoke stacks of the Power House. My own examination of many houses in the area, clearly established the fact that they had ample cause for complaint. It is necessary to keep all doors and windows shut in order to prevent, as far as possible, the furnace refuse getting into the houses, and you can readily understand what living in a closed house will mean in the summer months here. Where a window or louvre had been left open, the furniture and bedding was covered with a fine coating of black dust ....[17]

The residents considered staging a demonstration at the official opening ceremony, but were discouraged by Aikens. Aikens continued to press the issue in parliament over the following 15 years.

Grit arresters and other equipment were later installed, but the problem was never eliminated; approximately $250,000 was spent in an effort to curb grit emission during the period when TREB controlled the station.[18] Installation of such equipment had been considered during construction, but had been rejected because of the expense. Eight grit sampling stations were set up throughout the city. In later years complaints were received from the Trades and Labor Council, the Australian Railways Union and the Country Women's Association. A survey of 106 households in the vicinity of the station showed that 47% were inconvenienced by soot or dust, and another 23% said they were inconvenienced a little; 51% reported a light film daily on furniture and floors.[19] As late as 1962, after electricity generation at the Townsville station was significantly reduced, there were still numerous protests about soot and grit, and the Minister for Mines, E. Evans, after inspecting the residential area, admitted that when a south-easterly blew the residents did suffer very considerably from grit from the power house.[20] Priestley as Manager agreed with the minister in attributing the problem to poor planning in choosing the site.[21] In the late 1950s there were also protests about noise from the station. TREB repeatedly argued that the Railways and the harbour were partly to blame for noise and soot in the vicinity.

When the new plant was opened the old Home Hill and Hubert's Well stations were closed for normal operation; operating staffs were transferred to the Central Generating Station. The Home Hill plant was retained as a standby unit, and in March 1956 in the aftermath of a cyclone the diesel engine was able to provide emergency power for the hospital and other essential services. The plant at Hubert's Well was

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16. *Ibid.*, p.1000, p.1009.
17. Tom Aikens to E.J. Riordan, Minister for Mines, 12 July 1953. NEA File 3-16-4.
18. TREB Mins, January 1965-June 1966, p.3244. For details, see Priestley to Chairman of TREB, 1 June 1962, NEA File 3-16-4.
19. Secretary, TREB to Secretary, SEC, 19 January 1961, QEC 204(21) 16/2, Box 513/763, R 157/64.
20. *TDB*, 21 May 1962, p.3.
21. Priestley to Chairman of TREB, 1 June 1962, NEA File 3-16-4.

gradually sold off. It had ceased as a water pumping station in the 1930s when the Black School Weir was completed. At the end of 1956 Evans Deakin and Co. purchased the land - an area of about eight acres - the buildings and the remaining equipment. The Ingham power station, overloaded despite several additions to capacity, continued to operate until the local system was connected to the new Townsville station in 1953. It was then put on standby and used occasionally to carry the local load while maintenance was undertaken on the 66 kV line from Townsville.

During its first few months, operation of the new system was full of difficulty. Many teething problems were experienced with the plant; it was more than a year before coal consumption was brought down to normal. There were frequent complaints from the Ingham district about interruptions of supply. This was partly a result of trees falling across the transmission line, which had been inadequately cleared; TREB instituted a project to clear vegetation around the line, and during this time the Ingham station was temporarily put back into service. In addition, vandalism on the Ingham line was endemic, the main problem being shooting of insulators; line gangs sometimes found that insulators replaced on their way north had to be replaced again on their return trip.

Then on 10 December 1953 the No.1 Metropolitan Vickers turbine broke down. Though caused by the absence of a crucial steam stop valve, the fault was largely attributed to carelessness on the part of operating staff, and the supervision of the newly-appointed Mechanical Engineer, E. Larter, and of other officers was called into question. The Commissioner for Electricity Supply, Neil Smith, reprimanded TREB staff for their "gross failure to recognize the importance and seriousness of the incident":

> all officers concerned from the Manager down to the turbine engineer must bear some responsibility for what had happened. They had all failed in their respective duties.[22]

Townsville alderman, H.H. Hopkins, added that he was "alarmed at the lack of discipline throughout the organization. The slowness in producing the reports on the incidents and in controlling operations seemed to indicate a slackness in the station".[23]

The Board considered this incident together with a report by the SEC on the more general problem of retaining engineering staff within TREB. Various suggestions were made to reduce the relatively high turnover among the Board's technical staff: fortnightly conferences between the Manager and engineering and administrative staff to explain policy and discuss problems; the appointment of a senior mechanical engineer to run the power house, the general opinion being that because of his long experience A.H. Price, then Construction Engineer, should take the position; the appointment of a Chief Engineer to oversee both generation and distribution; and rationalisation of organisation, staffing and allocation of duties.[24]

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22. TREB Mins, July 1953-June 1954, p.1100.
23. *Ibid.*
24. *Ibid.*, pp.1087-92.

Soon after this, an outage on Christmas Day aroused indignation among consumers in Ayr, Clare and Home Hill. A well-attended public meeting at Ayr on 5 January resolved to request the Minister for Mines to recommission the Home Hill power station and set up a Burdekin Electric Authority. Construction of a duplicate transmission line from Stuart to Giru was already underway, though retarded by shortage of staff; the work was pushed on with assistance from the SEC, but it was another year before the line was opened. The persistence of district surcharges on tariffs was an additional grievance aired at the meeting.[25] In response the Board decided in January 1954 to reduce surcharges to a uniform 10%. It was during this crisis over turbine failure, high staff turnover and supply interruptions that the health of Manager H. Sleeman also began to break down. In early 1954 J.C. Saint-Smith replaced Sleeman as Manager, which brought a period of more efficient management.

In 1954, just one year after the long-awaited opening of the Townsville generating station, the first steps were taken to interconnect the TREB system with the Tully Falls hydro-electric project - a plan originally intended to make the Townsville station redundant. In this period demand was escalating so rapidly that no sooner was a generation project completed than it was obsolescent. In the event, however, the variability of output from Tully Falls, due to its dependence on highly variable rainfall in the catchment of the Tully River, extended the operating life of the Townsville station. Accordingly, by 1957 the plant was augmented, at a cost of £1,600,000, with a 15 MW Brush turbo alternator and two additional Babcock and Wilcox boilers, together with extra circulating water pumps and boiler feed pumps as ancillaries; the coal handling and ash handling plants were also extended to serve the new boilers. These additions brought the station's total capacity to 37,500 kW.

The Kareeya power station at Tully Falls, which was commissioned in 1956 after many delays, initially supplied the Cairns region. The project had been planned jointly by the Cairns Regional Board and the SEC, work commencing in 1949. Water held in a weir upstream of the Falls was diverted to an inclined pressure tunnel, along which it descended to the turbines which drove generators in the underground power station. The Kareeya station consisted of four 18 MW Pelton wheel-driven alternators, each set comprising two water turbines coupled to a generator. Rain falls mainly in the first few months of the year in the catchment area, so it was later found necessary to build a dam at Koombooloomba above the Falls. The need to build costly dams to store water for dry seasons meant that hydro-electricity was not cheap in north Queensland. The 132 kV transmission lines from Kareeya were erected on steel towers, the first time this type of transmission network was used in Queensland.

A number of gains were expected from interconnection of the Cairns and Townsville regions and joint supply from Tully Falls. Because of transport costs, coal was expensive in Townsville compared to other generating centres in Queensland; hydro-electricity had long been considered a better option. After the Second World War the Burdekin Falls scheme, a project fated to an inordinately long and disappointing history, was expected to meet Townsville's requirements, but by the early

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25. *Ibid.*, p.1096. *Ayr Advocate*, 6, 11 January 1954. Complaints about surcharges had also been made in parliament. See, for example, *QPD*, Vol.205, 1952, p.1347.

disappointing history, was expected to meet Townsville's requirements, but by the early 1950s shortage of loan money had placed it in jeopardy. At first the Tully Falls interconnection was regarded as part of a broader scheme including the Burdekin project, but in 1955 the Queensland government announced that due to curtailment of loan funds, Stage 2 of the Burdekin project would be suspended. Attention then switched to Tully Falls. There would be advantages in connecting thermal and hydro-electric stations, since the thermal station could make up any shortfall during dry seasons; TREB's continuing problems with obtaining adequate coal supplies would be alleviated; greater, earlier and more efficient use could be made of the installed plant at Tully Falls; and total standby requirements would be reduced by interconnection.

Therefore a contract was placed with the Electric Power Transmission Co. Ltd to construct 132 kV transmission lines connecting Kareeya and Townsville, via a substation at Ingham. In 1956 work began on substations at Ingham and Garbutt (Townsville), and the link was completed in late 1957, at a cost of about £2 million. In January 1958 the Ingham substation was transferred from the 66kV feeder from Townsville to the new line from Kareeya; it was then decided that the old Ingham station should be dismantled. The new line from Kareeya greatly improved the reliability of supply in Ingham.

In February the Cairns and Townsville regional networks were fully interconnected by high voltage transmission line. The line was owned and operated by the Cairns Regional Board, an arrangement which had required amending legislation to permit an electric authority to own transmission lines outside its area of supply. The Central Generating Station in Townsville continued to operate, but on minimum load with an output of approximately 100,000 units of electricity per day, the balance of the region's requirements being supplied by Kareeya. The changeover to, and operation of, the interconnector went without major problems, although some load shedding was necessary in Townsville because of brief interruptions of transmission.

The amount of power supplied to TREB from Kareeya depended upon water flow in the Tully River. Towards the end of the dry season the Townsville station often had to be operated on a high load, but it was reduced to minimum load during the rest of the year. In 1958-59, 37% of TREB's requirements was supplied from Tully Falls; in 1959-60, when there was a more regular flow in the Tully River, it was 60%.[26] The completion of Koombooloomba Dam on the Tully River in 1960 reduced the problem of inconstancy of rainfall but did not eliminate it. Nevertheless, by 1963 it was apparent that consumers in both the Cairns and Townsville regions had benefited from the interconnection; it was estimated that in the absence of interconnection tariffs in the Cairns region would have been 15% higher and tariffs in the Townsville area 11% higher. Total annual savings were calculated to be £1 million.[27]

As regards electricity generation, there was an important change in July 1964 with the creation of the Northern Electric Authority of Queensland (NEA). A statutory corporation formed under legislation passed in 1963, the Authority included one

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26. *TREB AR, 1959-60*, p.2.
27. Report of Conference on Formation of NEA, Appendix 1, p.3, TREB File 2-38-2.

representative from each of the three northern Regional Boards of Cairns, Townsville and Mackay, a full-time Chairman recommended by the SEC, as well as two members chosen for their knowledge of engineering, finance or industry, and the Electricity Commissioner. E.D. Murray, who had been a distribution engineer with the Southern Electric Authority under Alfred McCulloch and who later became Electricity Commissioner, was appointed as the first Chairman. The original members of NEA were E.D. Murray, J.A. Sherriff (TREB), T.G. Newbery (Mackay REB), C. Holdcroft (Cairns REB), J. McIntyre (consulting engineer), D.H. Stark (chartered accountant) and Neil Smith.

In September 1962 a major project for interconnecting the three regional networks with the Kareeya hydro-electric station had been completed with the commissioning of a line between Merinda and Proserpine. Thus Mossman in the north was linked with Sarina in the south - a distance of over 700 kilometres; the interconnected system covered an area greater than that of the British Isles. In 1963 a new 60 MW hydro station had been commissioned at Barron Gorge to supplement the Tully Falls station, and at the same time the small, outmoded Barron Falls station, which had been one of the pioneers of hydro-electric supply in Queensland when it opened in 1935, was closed down. In 1962 planning had begun for a thermal power station at Collinsville to supply the interconnected system. But although the three northern Boards had established an interconnected network and common sources of power, control of the system remained divided:

> The combined operation of thermal and hydro-electric power stations feeding into one system to ensure the supply of electricity to consumers at the lowest possible cost is a complex and difficult problem, and could become impracticable if control of operations is divided between a multiplicity of authorities.[28]

Another example of the trend towards centralised control, NEA was formed with the avowed aims of promoting efficiency and avoiding duplication.

An objective long held by the State Electricity Commission, the change in organisation had been recommended in a report by the SEC's consultants, Merz and McLellan, a distinguished British firm of consulting engineers; they argued that the separation of generation and distribution was desirable because economies of scale in generation were greater than in distribution and because generation was increasingly a highly technical process.[29] Distribution, on the other hand, was regarded as a field in which local knowledge and local contacts were essential. However, the proposed reorganisation aroused opposition from both the Cairns and Mackay Regional Boards; local rivalries, always strong in north Queensland, came to the fore, with the Cairns Board in particular keeping a jealous hold on its Tully Falls development. This called for delicate negotiations, Commissioner Neil Smith's forte, and eventually all opponents were disarmed.

Setting up NEA offered a number of challenges. Time was short. In only six or eight weeks the executive members had to assemble a staff of over 500, almost all

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28. SEC, Report on Electrical Development in North Queensland, October 1962, p.5.
29. *Ibid.*, p.7.

recruited from the existing northern Boards; to negotiate with the Boards on transfer of assets, staff and records; and to arrange temporary accommodation in the old School of Arts building in Townsville. Dividing up assets was difficult, since records had not been kept to facilitate rapid separation of generation and transmission facilities. Some staff members who had developed strong loyalties to their Regional Board resisted transfer to the new Authority. Nevertheless, the reorganisation proceeded smoothly on the whole, with no disruption of supply.[30]

Thus in 1964 NEA took over all generation and bulk transmission facilities in the coastal areas of the three Regional Boards (including the Townsville power station), leaving to the Boards the retail distribution of power within their domains. TREB also retained the diesel generating stations at Charters Towers and Hughenden, and the western sub-transmission network. However, from this date most of the task of electricity generation passed out of its hands. Thereafter TREB purchased bulk electricity from NEA at the Garbutt, Stuart, Ingham, Clare, Guthalungra, Gumlu and Merinda substations and at the Townsville power station.

The SEC set the prices of electricity supplied by NEA. The initial prices were: Cairns Board - 0.99d per unit; Townsville Board - 1.57d per unit; and Mackay Board - 1.79d per unit.[31] These charges did not simply reflect costs of supply, but were determined after taking account of factors such as the financial commitments of the Boards.[32] One of the Authority's principal objectives was to equalise bulk supply tariffs to the distributing Boards. At the conference which set up NEA, it was stipulated that no electricity consumer should be adversely affected as a direct result of the reorganisation, but that savings and surpluses achieved should be divided "equitably" between the Boards, keeping in mind the objective of equalising tariffs.[33] Again, consumers of higher cost electricity would gain disproportionately from the cost savings effected. In parliament, Tom Aikens drew attention to what he considered the "iniquitous system" whereby Townsville with its low distribution costs subsidised the other two Boards, but then went on, with characteristic inconsistency, to demand equalisation of tariffs between northern and southern Queensland.[34] By 1975 prices of power supplied to the Mackay and Townsville Boards had been made uniform.

NEA commissioned the first stage of the Collinsville thermal power station in 1968 to serve as a base load station for the northern network. Experience had shown hydro-electric supply in north Queensland to be too unreliable; hydro schemes on the Herbert and Burdekin Rivers had been considered as alternatives to Collinsville, but had been rejected because of high capital and operating costs. Although designed to operate as a base load station for most of the year, the Collinsville station could be operated on peak load during the wet season so that maximum use could be made of hydro stations. The station was supplied with steaming coal from the nearby mines and

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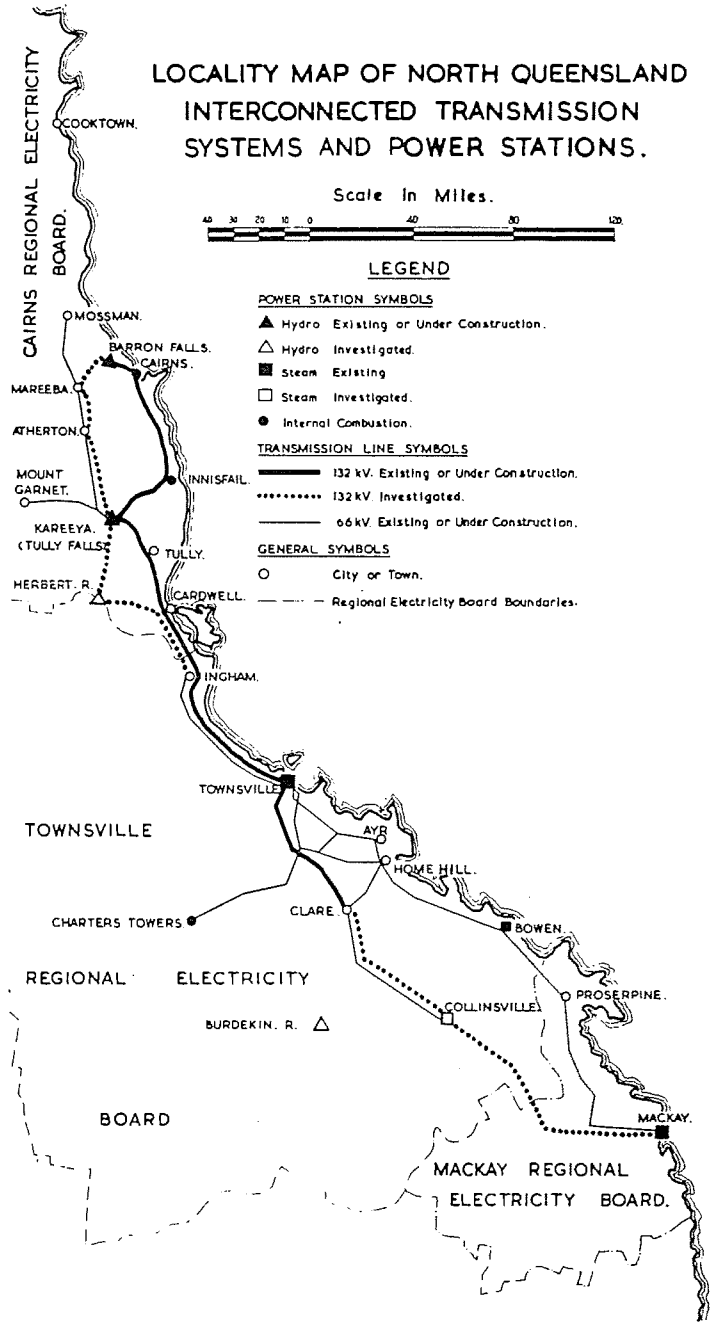
30. Correspondence with E.D. Murray, 9 May 1987.
31. TREB Mins, July 1963-December 1964, p.2949. By 1970 the Townsville bulk rate had decreased to 1.413c per unit.
32. TREB Mins, January 1965-June 1966, p.2998.
33. Report of Conference on Formation of NEA, Appendix 1, p.12, TREB File 2-38-2.
34. *QPD*, Vol.254, 1970-71, p.768. See also *QPD*, Vol.258, 1971, pp.1718-9.



Map No.1: North Queensland Interconnected Transmission Systems and Power Stations, 1964

the Eungella Dam on the Broken River provided water for cooling the plant, as well as for irrigation and town supply. 132 kV lines were constructed from Clare to Collinsville and from Collinsville to Mackay, via Proserpine.

In the early 1970s NEA generated power at Collinsville (180 megawatts), Kareeya (72 megawatts), and Barron Gorge (60 megawatts), with Townsville (37.5 megawatts) on standby. Small amounts of electricity (less than 4% of total demand in the coastal section of TREB) were also supplied by sugar mills during the crushing season; TREB had experimented with interconnecting sugar mills from the 1940s and by the 1960s technical obstacles had been largely overcome.[35] NEA conveyed electricity to main substations by 132 kV steel tower transmission lines. These high voltage lines were constructed under contract by private firms, since it was cheaper to allow firms expert in the construction technique to undertake the work. The transmission network, or grid, allowed electricity generated at any station to be directed to any bulk supply point according to demand; thus maximum use could be made of the most economical generating plants. In 1977 when there was a State-wide reorganisation of the industry, NEA was superseded by the Queensland Electricity Generating Board (QEGB).

While major developments in generating capacity were taking place under the auspices of NEA, TREB was engaged in continuous extension and development of the distribution network. This side of TREB's work was severely limited before 1953 by the lack of money and materials, but after the opening of the Central Generating Station, with ample loan funds available, extensive development plans were drawn up and implemented.

One large project of the first decade was the conversion from d.c. to a.c. in Ayr. This work had begun in 1943 but was protracted because of the difficulty of obtaining a.c. motors and other equipment in war-time and in the immediate post-war years. Lack of materials made it impossible to complete the conversion in any one area, so for a time both a.c. and d.c. mains had to be provided in many streets, which considerably increased costs. Excessive load on the old d.c. plant made it essential to convert to a.c. so that power could be transferred from other stations in the region. In fact in 1946-47 397,240 kWh were transferred from the Home Hill station to Ayr,[36] and transfers gradually increased as the conversion proceeded.

In the meantime, rearrangement of the Ayr plant resulted in considerable savings. An oil engine which had driven one of the d.c. generators was replaced by a 100 h.p. a.c. motor; an 80 kW generator set was arranged for inverted running so that it generated direct current. Even so, electricity produced at the Ayr station was markedly more expensive than that from any other station in the region. In 1946-47 the average cost per kWh at Townsville was 1.6d., at Home Hill 3d., and at Ingham 3.8d., while in Ayr it was 5.2d.[37] When the Central Generating Station in Townsville was opened in 1953, the Ayr power station was de-commissioned. The conversion to a.c. was finally completed in 1956.

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35. QEC 204-38.
36. *TREB AR, 1946-47*, p.5.
37. *Ibid.*, p.26.

There was constant upgrading of the distribution system in all districts, to extend supply to new areas and to improve efficiency. For instance, a major project of the early years was the complete refurbishment of the Home Hill reticulation network. As demand steadily grew, it was often possible to reduce the costs of upgrading by transferring equipment within the system. For example, dismantling of the Ingham power station made available one generating set which was transferred to Hughenden and another set which was sold to the Winton Shire Council. As it became necessary to install larger transformers, older smaller transformers were freed for placement elsewhere. In 1959-60 two 7 1/2 MVA transformers replaced two 4 MVA units at Stuart, and these in turn were overhauled and installed at Ingham, releasing the 2 1/2 MVA units there for use at Collinsville.[38] By the 1970s underground reticulation systems were being introduced, in an effort "to combat visual pollution".[39] Lines in the Townsville city area were gradually put underground, and underground mains became the norm in new real estate subdivisions, where the costs were incorporated in the price of land.

In the Townsville area major milestones included the extension of supply to Magnetic Island in December 1955; introduction of fluorescent street lighting in Flinders Street in the following year; the commissioning of a second 66kV feeder connecting the Townsville station and Garbutt substation in 1960; upgrading of the city distribution system from 5 kV to 11 kV, a project begun in 1960 and completed in the mid-1960s; and provision of electricity to the Copper Refinery, which on beginning full-scale operation in 1960 became TREB's largest customer, and a convenient supplier of copper cable.

Supplying Magnetic Island with electricity had been discussed from the 1930s; several investigations had been undertaken but all proved abortive. For some time R.C. Schrock & Sons supplied electricity on the island under licence. In order to finance an extension, TREB began collecting guarantees from island residents in the early 1950s, but encountered a "free rider" problem in that many residents waited for others to shoulder the burden of putting up initial guarantees. This together with shortages of loan money and materials, particularly copper cable, led to the postponement of the scheme.

In 1955 the connection was finally made by means of two 11 kV submarine cables laid from Kissing Point to a landfall between Picnic Bay and Cockle Bay - the first submarine connection between a tropical island and the mainland. Another novel feature, for that time, was the use of galvanised steel poles because of the virulence of white ants on the island. Partly as a result of this, the cost of the reticulation system far exceeded expectations. Because no guarantees had finally been sought from prospective consumers, and because completion of the project coincided with a temporary stringency in the flow of loan funds, some self-examination on TREB's part seemed called for, particularly as regards estimation procedures and the practicability of TREB's other plans for expansion. The fact that no guarantees had been requested

38. *TREB AR*, 1959-60, p.4.
39. TREB Mins, January 1971-October 1972, p.4279, quoting E.D. Murray, Commissioner for Electricity Supply.

from the 300 island consumers, unlike rural consumers, was resented by Board members from districts outside Townsville; the capital cost of reticulation per consumer had been estimated at just under £120, which was the Board's cut-off point for demanding guarantees.[40] The island tariff was equivalent to the Townsville base rate plus the 10% surcharge applied to rural districts in TREB's region; residents complained that as a suburb of Townsville the island should be supplied at the base rate, but TREB argued that the need for a high tension transmission line justified the extra charge.

In addition to the expense, the submarine connection soon raised technical difficulties. When several breaks occurred in the cable in mid-1957, the supply company refused to pay the full cost of repair, alleging that the line had been incorrectly laid and inadequately maintained. J.C. Saint-Smith, who had been Manager at the time, was called to account. On inspection of the cable, divers discovered several more faults and it was necessary to remake some joints and to cut out damaged sections. Another inspection at the end of 1958 "revealed the condition of the cable to be no worse than previously reported, and although some of the loops and bends still exist[ed] in both cables and may [have been] points of weakness it was considered prudent not to disturb them".[41]

It may be concluded that TREB's phenomenal growth over the period 1946-76 was not achieved without major difficulties, especially in the early years. One source of trouble, again especially in the formative period, was poor management. Without doubt the Townsville Board suffered greater problems with management than any other Regional Board in Queensland. The competency and continuity brought to it by one extremely able and fortunately long-serving Manager from 1956 to 1969 were therefore all the more important.

During the TREB era, management of the electricity industry was closely supervised by the State Electricity Commissioner, who demanded detailed reporting and who took part in all meetings of the Regional Board. Relations between the SEC and the Board were generally harmonious. Nevertheless, there were recurrent complaints in north Queensland about the degree of SEC control over TREB. When the Regional Boards were being set up, Townsville aldermen, like their counterparts in Ingham, were concerned about losing control of their power station and felt that their interests had been swept aside in the Commissioner's haste to form the new organisation.[42] In 1955 Alderman H.H. Hopkins publicly expressed the opinion that a member of a Regional Board was just "a bunny", with no real influence; no other Board member contradicted his statement.[43] During the 1950s and 1960s the New State for North Queensland Movement was active, and resistance to SEC control became mixed with opposition to control from Brisbane.[44]

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40. Interview with J.A. Sherriff, 13 August 1986.
41. TREB Mins, January 1959-June 1960, p.1986.
42. Aikens, *QPD*, Vol.184, 1944-45, p.2216. *QPD*, Vol.189, 1946, p.1637.
43. *TDB*, 6 July 1957, p.2.
44. *Ibid.*

23. Submarine cable to Magnetic Island

24. Administration building, Townsville, 1970

Although the Commissioner was only one member of the Board, his influence was great, both through the power of moral suasion and, after 1953, through his ability to direct loan funds. The men who filled the position during the TREB era - S.F. Cochran, Neil Smith and E.D. Murray - were of strong character and commanded universal respect. They made a point of attending Board meetings in person whenever possible. This combination of factors gave the Commissioner such power that in some circles his title was changed to "commissar".[45]

The Regional Board was composed of members from local authorities within TREB's region, plus one member representing the SEC; Board members were appointed for a term of three years. The initial distribution was two members from Townsville, and one each from Ayr, Hinchinbrook, Thuringowa and the SEC; this was altered as TREB's area of supply was extended. Members of the Board could be from a single local authority or from a group of local authorities within the region. (See Appendix 1 for a list of Board members).

There was always some sense of grievance that Townsville was not adequately represented on the Board, in keeping with its population and its capital contribution to TREB's enterprise.[46] Frequently there was a split within the Board between Townsville representatives and those from the outside areas; to some extent this reflected entrenched local loyalties and rivalries which dated from the very beginnings of settlement in north Queensland.

In addition, the Board immediately became a ground for party political contests. In 1946 conflict centred on the appointment of a Chairman: a stalemate developed with three members supporting and three opposing the appointment of a Labor representative, J.L. Kelly of Hinchinbrook. It is an indication of the keenness of the contest that one Board member, C.G. McCathie of Ayr Shire, whose car suffered a blow-out on his way to Townsville for the meeting, completed the journey from Woodstock to Townsville on the wheel rim.[47] Tom Aikens in parliament grasped the political opportunity: "The Labour Party is concerned only with regional boards as a political bludgeon and a political instrument".[48] The tie was finally broken with Kelly's appointment by the government, an outcome not quietly accepted by his opponents.

TREB's Managers were subject to overall supervision by the SEC. The Board also required comprehensive monthly reports from Managers, covering general and financial aspects of the enterprise. The Board's Secretary and Accountant were also sources of power within the organisation; they provided an extra check on Managers. In addition, there was scrutiny and frequently criticism from the press, politicians and public. The activities of TREB's Managers were therefore quite closely circumscribed, yet there was still scope for gross managerial faults.

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45. Aikens, *QPD*, Vol.271, 1976-77, p.443.
46. Aikens, *QPD*, Vol.189, 1946, p.1637.
47. *TDB*, 29 June 1949.
48. Aikens, *QPD*, Vol.189, 1946, p.1638.

Before the first Manager was appointed in late 1946, J.L. Shearer, formerly Electrical Engineer with the Townsville City Council, acted as Manager for several months, but he was unsuccessful in his application for the Manager's position. TREB was in some respects fortunate in its first Manager, Thomas C. Beynon, who had previously worked in the industry in New South Wales and who had then worked briefly as an Assistant Electrical Engineer in the SEC, where he showed impressive engineering ability. A man of energy and initiative, Tom Beynon confronted the many problems of founding TREB: the formidable task of setting up a whole new organisation; the backlog of work from the war years; the economic hazards of the immediate post-war period; the tensions and resentments associated with TREB's take-over of established electricity authorities in other districts. Though hampered by post-war shortages of appliances, he gave special attention to the development of TREB's merchandising section. By the time Beynon left in 1950, most of the initial difficulties had been overcome, and TREB was securely established.

Strong leadership may have been necessary to deal with these initial problems, but the impression grew that Beynon was starting to overstep his authority. Unaccustomed as he was to the prerogatives and perquisites of managerial power, Beynon took every advantage of his opportunities. His career foundered in late 1949, when his relationship with the Secretary, Rupert V. Coglan, began to deteriorate noticeably. Previously employed in the Auditor-General's department, Coglan showed a minute knowledge of the legislation and regulations governing TREB and always considered it his duty to point out transgressions. The Commissioner for Electricity Supply, S.F. Cochran, compiled a report in January on the administration of TREB, referring pointedly to Beynon's tendency to overreach the prerogatives of the Manager and to usurp the powers of the Board. The SEC was acting on information from various sources that the Board's administration had become inefficient, uneconomical and unstable, and was giving rise to staff discontent.[49] These problems continued, and were considered at length at a series of meetings of the Board from June to August 1950, when the Board finally decided that the situation could not be allowed to continue. But by that time Beynon had resigned after a long period of absence due to illness. From the Board's point of view, his resignation ended the problem.[50]

After Beynon resigned, and before a new Manager took over in November, Shearer was again acting Manager. His application for the Manager's position again refused, Shearer was at least made Deputy Manager on the appointment of H. Sleeman in January 1951. Despite his long experience, Shearer lacked formal qualifications, a fact to which his subordinates sometimes resentfully drew attention. Shearer continued as Commercial Engineer until he retired in 1963 at the age of 70, after 40 years' service in the electricity supply industry in Townsville.

Self-styled "Colonel" Hector Sleeman was reputed to have been one of the pioneers of aviation in Australia and to have worked as an electrical engineer in Burma during the Second World War, when he held officer's rank in the Burma Volunteer Rifles; after helping to build a power station near Rangoon, he was forced to destroy

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49. QEC 204-50.
50. TREB Mins, January-December 1950, p.426, p.450.

it before the evacuation. Though often taken for an English gentleman, Sleeman was an Australian. However, his adjustment to the Australian working environment was full of difficulty; attitudes and methods suitable to British colonial rule in the Far East did not transpose well to post-war north Queensland. Like Beynon, Sleeman soon ran into conflict with R.V. Coglan, the Board's Secretary. His health failing, Sleeman was forced to resign at the beginning of 1954. His resignation coincided with a crisis involving widespread power failures, breakdown of plant at the South Townsville station, and dissatisfaction among engineering staff. It was apparent that he had lost control of the organisation, and the Board and SEC exerted pressure for his resignation.[51]

Sleeman's successor, J.C. Saint-Smith, came to TREB from the Wide Bay - Burnett Board, where he had been Chief Engineer. He stayed with TREB for only two years, leaving in mid-1956 to become manager of the newly-formed Copper Refineries Pty Ltd. Shortly before leaving TREB, Saint-Smith negotiated a special low electricity tariff with MIM Ltd for supply to the copper refinery. G.D. Moffett, the Chief Engineer who acted as Manager of TREB after Saint-Smith resigned, soon followed him to the Copper Refineries, along with some other members of staff. At this time TREB had continual difficulty in retaining technical staff - engineers and draughtspersons in particular. Queensland's burgeoning industrial economy provided many sources of employment for those with technical qualifications. In response to competition in the labour market, TREB tried to attract staff by providing extra benefits such as accommodation and by introducing engineer cadetships and training programmes. The need for engineering graduates was an important motive in the decision to establish a college of the University of Queensland in Townsville in 1961. When the North Queensland University Association was formed in 1960 to promote a regional university, TREB's Manager, H.T. Priestley, was chosen as president, Rupert Coglan as treasurer, and Fred McKay, a senior TREB engineer, as secretary, demonstrating TREB's close association with the scheme.[52]

At the end of 1956 Saint-Smith was replaced by H.T. Priestley, a graduate of the University of Queensland who had worked for the City Electric Light Company, and who came to Townsville after a short period as manager of the electricity department of the Mackay City Council. Tom Priestley initiated a thorough reorganisation and rationalisation within TREB, reviewing stores, ordering procedures, administration, accounting methods and the distribution section. Priestley also invited a complete investigation of the organisation by a group of management consultants, W.D. Scott and Co., and arranged for an analysis of the whole transmission system by the Victorian SEC. He introduced many modern innovations, including programmes to promote the personal development of employees through management training and human relations courses. He was one of those instrumental in the establishment of the James Cook University of North Queensland, of which he was Deputy Chancellor when he died in 1979. Perhaps because he had worked in Mackay, Priestley had a wider, regional view of the industry; it was during his period as Manager that the interconnected northern grid was set up. He also supervised the enormous westward expansion of TREB's area. During his long service with the Board, Priestley brought it both stability and flexibility,

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51. Neil Smith to Acting Minister for Mines, 21 January 1954, QEC 204-55.
52. TREB Mins, January 1959-June 1960, p.2191.

although like his predecessors he experienced serious conflict with the Secretary, Rupert Coglan.[53] Priestley resigned in mid-1969 to become Manager of the Capricornia Regional Board. He was succeeded by R.D. Waldie, Senior Planning Engineer with the SEC. After a year's field experience with TREB, Waldie returned to the SEC as Deputy Commissioner following the death of Harold Clacher.

On Waldie's resignation, George Partlett was appointed from within TREB, the first Manager appointed from the staff. Partlett was respected for his ability in his own field, production engineering, but there was considerable dissatisfaction with his overall management. He had been popular as a staff engineer, and showed certain qualities of a charismatic leader, but relations with some of his staff deteriorated after his promotion. Partlett retired in mid-1975, after 23 years' service with the Board, five of those as Manager.

B.M. Hammond was appointed as his successor. An engineer-manager of wide experience, Hammond had ably managed TREB for only about two years when he was killed in a tragic plane crash near Townsville on 26 May 1977. Other victims of the crash were Councillor W.O. Garbutt, the long-standing Chairman of the Board, Alderman B.H. Bloom, Deputy Chairman, and Dr L.F. Power, a member of the newly-formed North Queensland Electricity Board. TREB felt deeply the loss of some of its best organising talent, particularly as it came just a few weeks before the reorganisation of the industry and inauguration of NORQEB. The task of guiding the organisation through this transition was left to Col Harris and David Pearse as acting Managers.

Lack of adequate accommodation was one of the more obvious repercussions of the industry's rapid expansion during the period of TREB's stewardship. Planning and design barely kept pace with the Board's requirements.

Until December 1946 TREB conducted its administration from the Townsville City Council building; the administrative section was then moved to offices at the corner of Stanley and Walker Streets, leased from the Council. This had previously been the School of Arts building and extensive renovation was needed before it could be used. Because the City Council needed space previously allotted to its electricity department as a store and depot, TREB obtained the use of the Naval Drill Hall Reserve in Perkins Street, South Townsville. The Drill Hall itself was suitable as a store, and TREB also purchased some army huts for conversion to garages. Within the first few years District Offices were opened in Ingham, Ayr, Giru and Home Hill. However, these arrangements very rapidly became inadequate, especially as a result of showroom expansion in most centres.

During the early 1950s existing accommodation became steadily more overcrowded, with little hope of relief because available funds were channelled towards expanding generation and distribution facilities. When the financial situation eased later in the decade, TREB set up a sub-committee to consider accommodation. Finding a

53. *Ibid.*, p.2068.

site suitable for a new administration building proved very difficult, though many alternatives were considered. By 1962 staff and equipment were distributed among six different buildings throughout the city, which often caused inconvenience. In April 1963 a new era in TREB's history began with the opening of a new administration building at the corner of Sturt and Stokes Streets, Townsville. Even then extensions soon became necessary.

In 1971 TREB installed an electronic computer at a cost of $170,000, on the recommendation of consultants who had investigated the economics of the project. However, the innovation aroused hostility among some circles in Townsville. Tom Aikens' questions to the minister indicate the tenor of local criticism of the new technology:

> Has he been advised that the manufacturers of the computer had insisted that operators of the computer were, under no circumstances, to wear any garment made of wool or coarse fibre or footwear made of plastic or rubber and that for at least four hours prior to entering the computer room they were not to partake of any food containing onions, garlic, mustard pickles and certain other specified condiments? ... what price did the T.R.E.B. pay at the outset for this capricious, mechanical monstrosity....[54]

In 1968 a new garage, vehicle pool, line depot and carpenters' workshops were occupied in a central location at Garbutt; workshop space at the Townsville power station was vacated. A new workshops building was constructed at Garbutt in 1974-75.

New office buildings and showrooms were built at Julia Creek (opened in February 1970), Nathan Shopping Plaza, Aitkenvale (October 1970), Collinsville (1971), and Richmond (November 1971), where the old wooden building had been destroyed by fire.

In April 1971 the Neil Smith Building, a two-storey substation in Sturt Street, was opened by the Commissioner for Electricity Supply, H. Neil Smith, who retired shortly afterwards. The substation housed two 66/11kV 25 MVA transformers and associated switchgear to cater for increasing demand in the Townsville city area. On the first floor was the system control centre, where an operator could monitor the Board's entire coastal distribution system. A v.h.f. radio alarm system allowed an interruption of supply from any substation to be identified and promptly attended to by local staff; with the help of this warning system, TREB achieved a reliability rating of 99.95% in its coastal system in 1970-71.[55]

During its first ten years, TREB was often hampered by lack of transport. This problem was exacerbated by the large area which the Board covered, and by the condition of northern roads after every wet season. In 1946 TREB took over 16 vehicles; this fleet was immediately augmented by 12 second-hand vehicles purchased from the Army. Yet the Manager estimated that this met only about 50% of the

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54. *QPD*, Vol.256, 1970-71, p.2706.
55. *TREB AR, 1970-71*, p.11.

Board's transport requirements.[56] Moreover, post-war shortages of spare parts affected vehicles old and new, and slowed the movement of vehicles through the repair shop. Another transportation problem during TREB's first decade was the scarcity of railway coal trucks, which sometimes delayed coal deliveries. Special arrangements were made for early morning coal deliveries at the Townsville power station, and quick turnaround made the trucks available to the railway during the day.

In 1958-59 a major reorganisation of the transport workshops and transport maintenance procedures took place. Implemented on the recommendation of management consultants, these changes reduced costs by £10,000 for the year, with comparable savings in subsequent years. By 1976-77 TREB's fleet had increased to 252 vehicles, comprising 35 passenger and 217 work vehicles; in June 1977 it was valued at $1,664,000.

Supplying electricity in the tropics is fraught with unusual problems because of the high incidence of outages and destruction due to cyclones, floods, thunderstorms and lightning, and bush and cane fires.

In 1957-58, for instance, TREB was troubled by all of these calamities in succession. Grass and cane fires were a recurrent problem in the Lower Burdekin; thunderstorms damaged the distribution system in the Burdekin and Townsville areas; the Bowen power station lost its roof in a cyclone in April 1958 and it took four days to put it back into operation; flooding, another result of the cyclone, damaged the distribution system in the Burdekin. That year staff at the Home Hill substation maintained it in operation through two serious floods.

In another cyclone in February of the following year, the Bowen power station again lost its roof, together with an end wall; two of the generating sets were damaged by falling timber. Again it took four days to bring it back into operation. The 66 kV transmission system was also damaged by cyclone "Connie" in 1959. It took only one day to restore supply to Home Hill and Ayr, but nearly three weeks to repair the 66 kV link with Bowen. Once again the distribution system in the Lower Burdekin was severely impaired; supply was restored to all consumers in the Ayr district in about a week, but in Home Hill it took up to a month.

Cyclone "Althea", which hit Townsville on Christmas Eve, December 1971, caused massive damage to the city's reticulation system. The endurance shown by TREB employees in trying to restore power as quickly as possible, in difficult and sometimes dangerous conditions, will long be remembered in Townsville. TREB was assisted by the Army, electrical contractors, and staff from NEA and from Toowoomba, Ipswich, Brisbane, Maryborough, Rockhampton, Mackay, Innisfail and Cairns. It took eight days to repair the distribution system in Townsville, and five days in other districts. The cost of restoration in Townsville was $577,695, with damage to the extent of $84,775 in the rest of the TREB region.[57] After "Althea", a conference of Queensland supply authorities was held in Townsville to formulate a Disaster Relief Plan. In their turn,

56. *TREB AR, 1946-47*, p.14.
57. *TREB AR, 1971-72*, p.21.

TREB employees assisted when other supply authorities were struck by natural disaster; they were the first to arrive, for instance, after Darwin was hit by cyclone "Tracy" in December 1974.

The electricity department of the Townsville City Council had begun marketing electrical appliances in 1939, despite strong opposition from local electrical retailers, and with considerable success. TREB commenced its merchandising operation in March 1947, with a new showroom in the administration building in Townsville and showrooms in each District Office. Under the Act of 1945, Regional Boards had a statutory obligation to sell and service electrical appliances. The functions of the commercial department were to promote the use of electricity (or "load development"); and to market appliances. The position of Trading Officer was created in 1950, with responsibility for managing this section. W. Rooney, the first appointment, continued in this position until 1982.

Immediately after the war, trading was hampered by inadequate supplies, the only appliances available in any quantity being wash boilers and hot water systems. Queueing was used as a rationing device; orders placed with TREB were filled in strict succession as appliances became available. When appliances arrived, TREB expected intending purchasers to buy them within a limited period of time; this aroused popular dissatisfaction because the unpredictable financial outlay put strains on household budgets; in response TREB modified its policy. Some orders for major appliances remained unfilled until 1952, when the supply of appliances became plentiful. Despite shortages of stock until this time, TREB's merchandising section was consistently successful - in marked contrast to that of the Mackay Regional Electricity Board, for example.[58] TREB placed exhibits of appliances in all the local Shows, and allowed attractive hire purchase terms to customers.

There was still opposition from local retailers, especially when it appeared that TREB was undercutting prevailing retail prices; whenever the price was reduced on damaged goods, for instance, TREB was taken to task by individual retailers and merchants' associations. Like its municipal forerunner, TREB was also under pressure from appliance manufacturers for retail price maintenance, on pain of curtailment of supplies - a practice widely accepted in Australia before it was outlawed in 1971 by the Trade Practices Act. These pressures were met with avowals of TREB's policy of charging the full retail price.[59] This policy was challenged only in 1965 when, in response to a slowing up of appliance sales and increasing competition from gas, the Manager suggested that the trading department sell under the manufacturer's retail list price.[60] However, when the Board joined the National Associated Retail Traders of Australia (NARTA) in 1971, it was careful to advise that any selling advantage gained would not be used to undercut other electrical retailers.[61] Clearly the Board did not

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58. Williams, *An Electric Beginning*, p.93.
59. TREB Mins, July 1948-December 1949, p.328. Local business groups also protested at the inclusion of advertisements with electricity accounts, and at advertising on envelopes.
60. TREB Mins, January 1965-June 1966, p.3116, p.3193.
61. TREB Mins, January 1971-October 1972, p.4049.

regard it as part of its function to keep other retailers in line by strenuous competition in the market place.

From the 1960s promotional campaigns were intensified and every possible source of demand was investigated. Pressure was put on the Housing Commission and Department of Health to use electricity rather than gas in their houses, hospitals and nursing homes. A Consumers' Advisory Service was introduced in 1963 to carry out consulting work on all uses of electricity, including design, technical planning and economic appraisals; designs were prepared for applications such as commercial kitchens, airconditioning schemes and floodlighting of sports arenas. From the 1960s a Home Management Section gave demonstrations to women's organisations; its very popular weekly television programme, "Living Better Electrically", advertised the use of electricity not only for cooking, but for lighting, airconditioning, and other domestic uses. By the end of TREB's period, demand had outstripped supply and shortages of some major appliances again hindered trading activity.

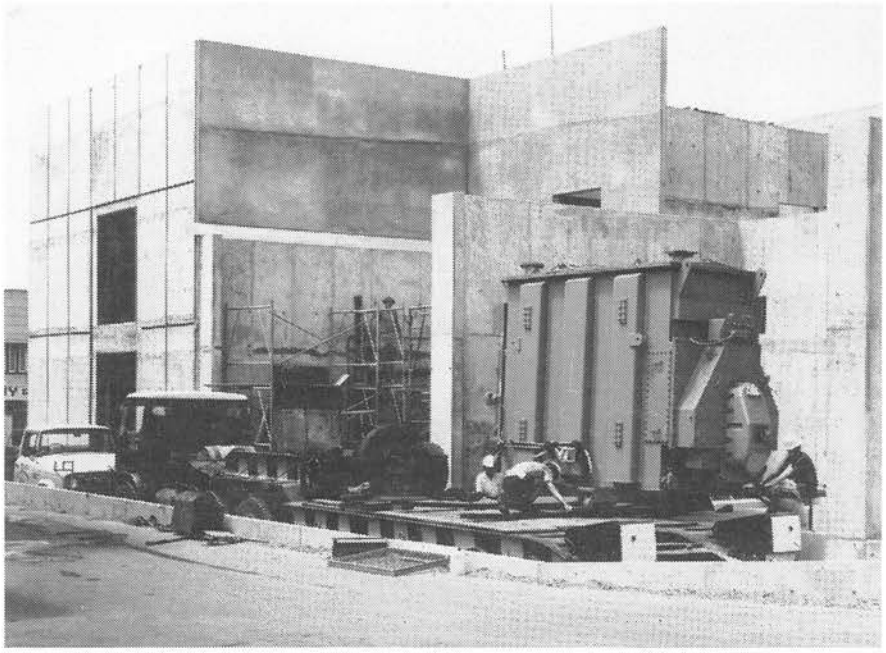
After the war the appliances in greatest demand were refrigerators, stoves and hot water systems. By the mid-1950s washing machines were becoming popular. Competition from gas stoves around 1960 prompted TREB to offer subsidies on electric stoves and other incentives; the installation subsidy on stoves was withdrawn in 1971. The advent of television in Townsville in the early 1960s led to high sales of TV sets, and by the mid-1960s sales of domestic freezers were growing. In TREB's final year, the appliances in greatest demand were freezers, dishwashers and colour television sets, following the introduction of colour TV in the previous year. By then TREB had 12 showrooms throughout the region. As a result of the widespread adoption of labour-saving electrical appliances during the TREB era, the character of domestic life was changed beyond recognition:

> the housewife has been able to lay aside her mop and scrubbing brush, the old fashioned wash copper and stand has been cast aside, the ice chest has vanished, the old smoking wood stove no longer discolours the kitchen wall and curtains; the electric polisher has put an end to that old complaint, 'Housemaid's Knee' and the modern husband doesn't know what an axe is.[62]

An outstanding feature of TREB's history was the progressive expansion of the area under its control. In 1946 the Board's initial jurisdiction covered an area of about 10,000 square kilometres, with 840 kilometres of transmission and distribution lines and 12,000 customers. After lengthy negotiation with the Inkerman Irrigation Board, TREB in January 1947 took over its supply area including the town of Home Hill and its surrounds. The extent of TREB's control, comprising coastal areas north and south of Townsville, then remained unchanged for nearly ten years; during this period TREB was fully occupied with the problems of supplying these districts under trying post-war conditions. After the opening of the Central Generating Station, a period of expansion began in 1956 with the controversial acquisition of the Charters Towers Electricity Supply Company. Bowen and the surrounding rural district were added in the following

62. TREB Souvenir Supplement, Ayr, 27 October 1965.

25. Opening the Julia Creek office, February 1970



26a. Transformer installation, Townsville, 1970

26b. Interior of substation, Townsville, 1971

year. In 1959-60 Hughenden and the Flinders Shire were taken over, followed by Collinsville. TREB took in the Shires of McKinlay and Richmond in 1964, and finally in 1968 Winton became the last addition, making up the total area which continued under TREB until it was superseded by NORQEB. In June 1977 that area was 264,442 square kilometres (larger than the State of Victoria and more than 20 times the original extent), with 10,100 kilometres of lines supplying 51,000 customers.[63] TREB's territorial expansiveness was consistent with the whole character of the electricity industry during this period: growth was its dominant feature.

TREB's first expansionary move was the incorporation of the Inkerman Irrigation Board in 1947. The Irrigation Board did not reticulate water, but supplied electricity to the Burdekin farmers and to townspeople in Home Hill, as well as selling or hiring pumping equipment for irrigation of the cane farms. After 1947 the Irrigation Board continued to sell and hire pumping plant, but production and distribution of electricity was handled by TREB. The take-over was delayed by the need to amend legislation to ensure its legality; the Regional Electric Authorities Act had provided only for acquisition of electrical undertakings run by private companies or local authorities and the Irrigation Board came into neither category.[64]

Every subsequent addition to TREB's territory brought new challenges and problems. When the Board purchased the Charters Towers Electricity Supply Company in 1956, the local power station, a diesel plant of approximately 1,500 kW capacity, was already operating at a load above its effective capacity; indeed the possibility of TREB's supplying the company with bulk electricity had been discussed for several years before the idea of outright purchase was raised. Moreover, local demand was increasing all the time. Only by stringent maintenance and close supervision was it possible to keep the plant operating.

After the commissioning of the Central Generating Station in Townsville in 1953, TREB had surplus capacity to dispose of; there were sound economic reasons for incorporating outlying districts within the distribution network. The Board's first priority was therefore to connect Charters Towers with the 66 kV coastal system, which was achieved in August 1957 by means of a 66 kV steel tower transmission line from Woodstock substation. After a major overhaul, the plant in Charters Towers was put on standby for use in emergencies and during maintenance on the transmission system. However, the Charters Towers plant was increasingly troublesome as a result of age and over-work, and by 1968 was unable to meet peak local demand during maintenance. To provide an alternative supply, a second transmission line from Clare was commissioned in July 1971. The Charters Towers plant was finally dismantled and sold.

Incorporation of the supply area of the Bowen Town Council in July 1957 aroused no dissension within the Board, in contrast to the Charters Towers acquisition a year earlier. The local Council was eager to effect the transfer: their finances were strained and they wished to avoid the expense of expanding the system, particularly to

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63. *TREB AR, 1976-77*, p.18.
64. *QPD*, Vol.189, 1946, p.1635.

supply developing areas within the adjoining Wangaratta Shire. There was, however, some local opposition, especially since the Bowen station had been well-run and had provided a secure supply.

After the acquisition, plans were immediately drawn up to connect the district to the TREB system by means of a 66 kV line from Home Hill, which was commenced in January 1958. Meanwhile efforts were made to improve the efficiency and reliability of the Bowen station: there had been no qualified engineer at the station, whereas TREB could provide technical expertise; where necessary outdated equipment was replaced. The 66 kV link was commissioned in February 1959, but three days later it was damaged by cyclone "Connie" and was not restored until March. During the following year tariffs in Bowen were brought into line with those in the rest of TREB's region; after completion of the transmission link the average price of electricity fell by about 50%.[65] The link with Townsville also made possible some important additions to loading, notably the Merinda meatworks north of Bowen. The Bowen station continued to operate in parallel with the main transmission system and efforts to reduce costs continued, but although generating costs were cut by nearly 20%, Bowen could not match the efficiency of larger stations. For this reason it was decided, despite local opposition, to close the station for regular operation in October 1960 and retain it as a standby for the local area; the plant was finally disposed of in 1963.

After TREB took over the Hughenden power station in October 1959 a major overhaul and upgrading began. Poor management, a heavy burden of debt and limited local financial resources had retarded the development of the station. Because of the electric authority's insolvency, the SEC appealed to Treasury to write off the outstanding balance of the loan used to establish the undertaking in 1927; this helped to lighten the burden transferred to TREB, but even so the Board took on liabilities amounting to more than £80,000.[66]

At this time interconnection of Hughenden with TREB's coastal network was not economic. Therefore measures were taken to increase reliability and efficiency of the local plant, with considerable success; within a year fuel consumption was reduced by about 25%. A new power station was built on the same site and a decision was made to retire the gas plant and use only diesel engines. Eventually the plant comprised six Mirrlees diesel engines with Brush alternators brought in from various parts of the State; these were designed to run on furnace fuel oil. Staffing was also reorganised: Sam Needham, whose management was considered unsatisfactory, was transferred to Townsville and William Purdy was appointed District Superintendent. Accommodation for an office and stores was found in a concrete building in the centre of the business area, which was purchased from J. & R.D. Arida; the property, which included suitable storage sheds with rear access, was also used as a line depot and service workshop. Up to 1959 domestic consumption of electricity had been very low, over one-third of the units sold being purchased by the local Shire Council. Under TREB a vigorous trading policy was initiated, service facilities were improved and attractive tariffs were set to increase sales of electricity.

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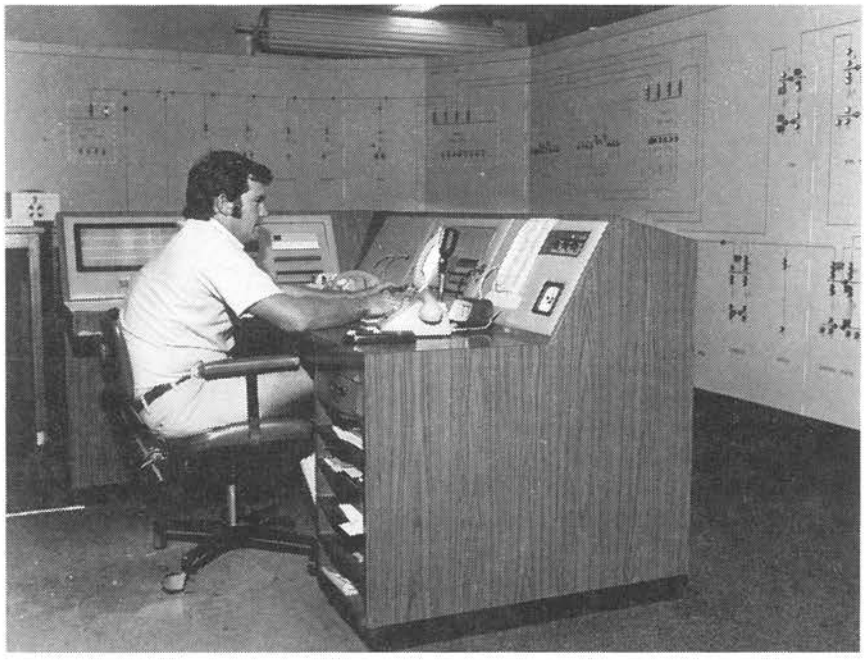
65. *TREB AR, 1958-59*, p.2.
66. Neil Smith to Secretary, TREB, 17 June 1959.

27a. Opening the Neil Smith Building, Townsville, 1971



27b. Control Room, Townsville

28. Charters Towers power station, 1970

When TREB took over the station, Hughenden's tariffs were the highest in Queensland. Within three years prices had been reduced by 17%; however, as the Chairman of the Board, J.A. Sherriff, admitted, tariffs were then about 15% less than the cost of local production - evidence of subsidisation by government or by other consumers in TREB's region.[67] Tariffs were reduced further in the following year. When TREB originally agreed to take over the station, it was on condition that local tariffs would be set so as to cover local costs, but in July 1961 the Board decided that capital and management costs of the western districts would be spread over the whole region.[68]

After the incorporation of the Richmond, McKinlay and Winton Shires, smaller diesel-powered stations at Richmond, Julia Creek and Winton were connected by 33 kV line with Hughenden and placed on standby for emergencies; at the same time tariffs in these areas were equalised. The SEC considered linking Julia Creek with Cloncurry, but connection to TREB's western network was found to be more economic. The 33 kV lines connecting these main western centres later became the backbone for an extensive 19 kV single wire earth return (s.w.e.r.) rural distribution system.

The closing down of the smaller stations following connection with Hughenden allowed Hughenden station to operate at higher loading and with greater efficiency. As a result, in 1965 and in five subsequent years Hughenden was rated the most efficient diesel station in Australia by the Electricity Supply Association of Australia.[69] Despite rising costs of fuel oil, improved thermal efficiency allowed tariffs in the western districts to be progressively lowered; the average cost of a unit of electricity in 1964-65 was 4.1 cents, which fell to 3.1 cents in 1965-66 and 2.1 cents in 1966-67.[70] The Hughenden station maintained its record of efficiency into the 1970s; in 1974 it was ranked third in the world for generating efficiency by the Diesel-engine Users' Association.[71]

A major new scheme for western supply was inaugurated in 1975, when TREB decided to construct a 66 kV interconnector with Hughenden at an estimated cost of $1.8 million. By that time overloading of the Hughenden station had become critical, the plant was considered to be near the end of its mechanical life, and rising fuel and operating costs made transmitted supply more economic. There was no further expenditure on additional diesel plant for Hughenden.[72] The western interconnector was opened at a ceremony in April 1978, when the aging Hughenden power station was relegated to standby duty.

Apart from the western network, TREB also maintained an isolated generating station at McKinlay, 110 kilometres south-west of Julia Creek and 750 kilometres by

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67. TREB Mins, January 1962-June 1963, p.2563.
68. H.T. Priestley's report, 25 February 1964, TREB File 6-17-0.
69. *TREB AR, 1965-66*, p.8.
70. *Ibid. TREB AR, 1966-67*, p.6.
71. TREB Mins, November 1972-October 1974, p.4603.
72. TREB Mins, November 1974-March 1976, p.4792. See Report on Augmentation of Supply to the Western Division of TREB, 26 May 1975, TREB File 2-38-9.

road from Townsville; the history of this small station illustrates many of the special problems of western supply. The town, the river and the nearby mountain range take their name from a Scots explorer, John McKinlay, who was sent by the South Australian government to search for Burke and Wills in 1861. Pastoral settlement of the area began in the late 1870s and the township itself was established a decade later. In 1965, in response to a request from the Queensland Bush Nursing Association to provide a small lighting plant for their nursing home at McKinlay, TREB decided to install generating equipment and to reticulate the town. Although local soil conditions posed some initial problems in planning foundations, construction of the power station began in mid-November and was completed a month later. This was a co-operative effort: the McKinlay Shire Council supplied the land, a shed to house the engines and building materials; the Board provided the engines and tradesmen; townspeople assisted with the actual construction work. The plant consisted of two 16 kW sets from Richmond: single-cylinder National horizontal diesel engines of about 1926 vintage and Mawdsley alternators; these were the original sets installed at Richmond under the SEC's "small townships scheme". The total cost of the system was $8,800; the venture always ran at a loss but was maintained as a service to the community.

Local supervision of the station raised problems. In 1965 a motor mechanic offered to tend the machinery, ensuring adequate supplies of fuel and lubricating oil; in 1967 he was given an honorarium of $200 per annum. However when he later took over the Federal Hotel, there was popular resentment against his holding two jobs, a difficulty he resolved by subcontracting supervision of the power station to the policeman's wife for $100 per annum. This unofficial arrangement worked well until the policeman was forced to close the hotel late one night, which resulted in his wife being summarily dismissed from her employ. Interruptions of supply ensued until she was finally reinstated.[73]

In 1971 there were many lengthy outages because of engine failure partly attributable to unusually high rainfall; local flooding made it difficult to organise repair work. Subsequently the original engines were replaced by two McLaren units from Julia Creek. In December 1974 these in turn were replaced by four-cylinder Ford diesels direct coupled to 28 kW Dunlite alternators. By the time TREB was superseded by NORQEB, there were about 20 domestic consumers in the town, as well as the police station, the local Council building, post office, church, school, C.W.A. hall, masonic hall, sports club, the hotel, a shop and caravan park. Aptly summing up the problems encountered in supplying electricity to McKinlay, Owen Rooney, who contributed much to the establishment and maintenance of this and other small western stations, listed "soil, dust, rain, flood, temperature extremes, insects, alcohol, petulance, boredom, neglect and industrial unrest".[74]

After 1960 rural supply was given high priority in TREB's development programme. By this time the post-war surge of demand for electricity had been met in all but the most isolated areas. In the process a large and complex organisation had been created, and now efforts were directed to demand creation so as not to allow that

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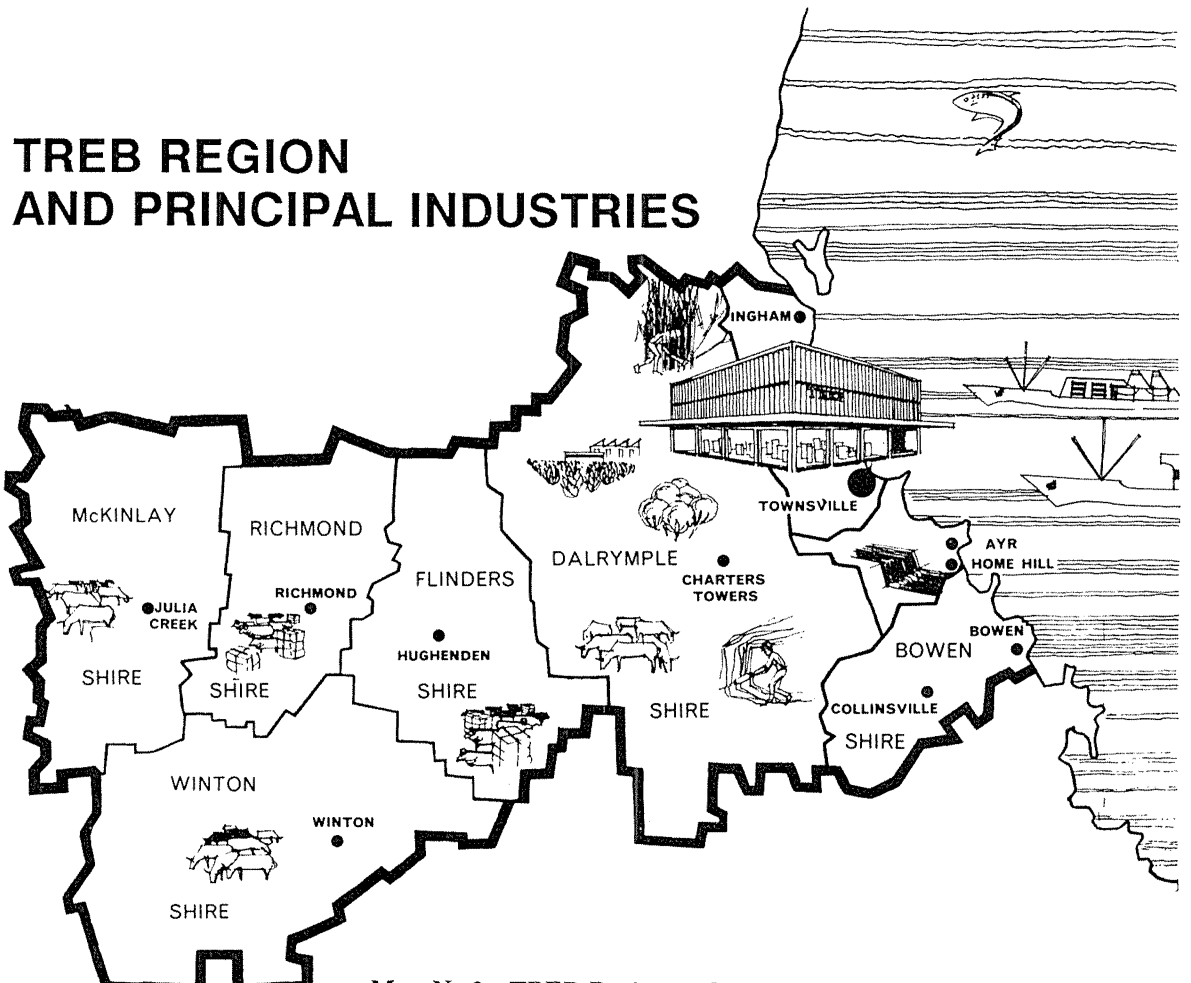
73. Owen Rooney's report to TREB, 7 April 1977.
74. *Ibid.*



Map No.2: TREB Region and Principal Industries

organisation to run down. The promotion of government-subsidised or cross-subsidised rural works was an obvious expedient. Thus at the end of 1963 the Board called for a five-year plan for rural development, advising "that the work be programmed as early as practicable to maintain the staff at its present level."[75]

From the late 1950s there were many extensions to farms in the Lower Burdekin. Important rural schemes in 1960 included Bambaroo, Stone River, Bootooloo and Gumlu, which involved a total of 86 kilometres of line, 81 substations and 129 customers.[76] In the following year these were followed by other projects such as Woodstock, Blue Water Creek - Saunders Beach and the Lower Don. In 1962 the Board decided to begin western rural extensions in the Flinders Shire. By 1966 95% of the population in TREB's region was being supplied with electricity, compared to the State average of 93%.[77] In TREB's final year, 1976, a five-year plan was drawn up for rural works, which estimated the cost of complete electrification of TREB's area of supply at $6,170,000.[78]

At local Shows and rural exhibitions of all kinds TREB promoted "electro-farming". A long-term marketing programme, assisted by the rising cost of diesel fuel, encouraged the use of electric pumping for irrigation, especially in the sugar and rice growing areas of the Lower Burdekin. As a consequence, seasonal conditions came to have a significant effect on TREB's annual revenue, since in dry years sales were boosted by the need for more irrigation; this introduced an unpredictable element which made budgeting more difficult. As well as electric irrigation pumps, other applications of "electro-farming" in the region included stock-watering, sheep-jetting, grain drying, grain pelletising and ensilage, lot feeding, shearing, heated plant-cutting propagating beds, broiler farms and yard lighting.

During the 1960s and 1970s the single wire earth return network was developed in western districts, supply gradually being made available to isolated grazing properties. The s.w.e.r. system was first tested, with satisfactory results, by the Cairns Regional Electricity Board in 1953. Their two trial installations on the Atherton Tableland were probably the first in Australia. The system was then adopted by the SEC as a method of rural electrification in circumstances where three phase or the standard single phase system would be too costly. The system delivered single-phase 240 volt a.c. supply. Within the TREB region, the first 19 kV s.w.e.r. extensions were constructed in the Flinders Shire in 1964, when 45 kilometres of line were erected between Hughenden and Prairie and another 45 kilometres between Prairie and Torrens Creek. Some recurrent problems with rural reticulation were lightning damage and difficulty of access to lines after storms. System losses in this network were high - 15%, compared to 7% in the coastal system; however, placement of reactors at intervals along the lines helped to minimise the problem.

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75. TREB Mins, July 1963-December 1964, p.2818.
76. *TREB AR, 1959-60*, p.5.
77. TREB Mins, January 1965-June 1966, p.3210.
78. TREB Mins, April 1976-June 1977, p.4972.

Obtaining funds for rural electrification engaged the Board's attention particularly during the 1960s. In 1964 the government withdrew its subsidy of one-third of the cost of capital expenditure in rural areas. TREB was active in bringing pressure to bear for its reinstatement; a subsidy was finally restored in 1973, though it was not as generous as before. In the meantime other sources of finance were tapped.

In the early 1960s the guarantee system was important in financing rural work. Although low tension distribution lines to rural properties were at the consumers' expense, the Board carried the cost of high tension mains and of one transformer station for each property; guarantees were set to help cover the large capital outlay. In the Flinders Shire in 1962, for instance, guarantees were requested for a minimum consumption averaging over £200 per annum for ten years. In each district committees of consumers organised the guarantee scheme. In the Flinders Shire, the amount of guarantee demanded of individual consumers was fixed by the Rural Committee after taking into account the size and profitability of each property. These committees took up the role of representing rural consumers in negotiations with TREB; a special night rate for water pumping was later introduced on the initiative of the Flinders Rural Committee. Generally tariffs for outback properties were similar to those in Hughenden.

The introduction of the Rural Extension Deposit Scheme in 1966, to operate alongside the minimum guarantee system, also helped finance rural extensions. Based on a scheme which had operated for many years in Victoria, it was introduced in Queensland at a time when the Regional Boards faced a shortage of loan funds; the Loan Council had approved less than the full amount of the Queensland government's application for funds for electrical development. Implementation of the scheme was temporarily delayed when R.V. Coglan pointed out a legal obstacle - the fact that the deposits could be regarded as a loan to the Regional Board - which necessitated amendment of the Electric Light and Power Act.[79]

Under the Rural Extension Deposit Scheme a prospective rural consumer or group of consumers advanced money to the Board as a deposit against the payment of future electricity accounts; the deposit was used to help finance extension of supply to those consumers. The deposit attracted interest at the current maximum rate of SEC public loans, and was refunded to the consumers over a period of 15 years. The Board could pay half the cost of rural extensions outside established reticulation networks up to a maximum of $1,000 per consumer (increased to $1,500 in 1970); the balance was provided by consumers in the form of the extension deposit. In the event, however, TREB's contributions exceeded the ceiling; in the scheme's first two years, for instance, TREB contributed, on average, $2,186 of a total cost of $5,684 per consumer.[80] The Manager attributed this to inexperience with rural work: costs were often underestimated and inadequate deposits requested. Moreover, compared to the Central Western Board, TREB's costs for rural extensions were inflated by inefficient transport of men and materials.[81] Though designed to accelerate rural electrification under

79. TREB Mins, January 1968-June 1969, p.3483. See *QPD*, Vol.247, 1967-68, p.2187.
80. TREB Mins, January 1968-June 1969, p.3593.
81. *Ibid.*, p.3625.

terms favourable to rural dwellers and generally well received by potential consumers, the scheme was not universally welcomed by its intended beneficiaries, some of whom resented having to contribute anything to the cost of their extensions; the long term of the loan was a particular source of dissatisfaction.[82] Consumers' committees in the various districts allocated deposits among potential consumers and organised payments to TREB.

TREB's initial tariff schedule included a 60% surcharge for the Ayr and Home Hill districts, and 65% for Ingham. Because the surcharges aroused ill-feeling in these areas, TREB in 1949 decided to reduce their visibility by incorporating them into district tariff schedules.[83] In the following years rural surcharges were gradually reduced. Whenever tariffs were to be increased, the practice was adopted of calculating a percentage increase on the Townsville prices, and raising prices in other districts by the same monetary amount; this had an equalising effect. In January 1954 the Board decided to reduce all surcharges to 10%.[84] The rural surcharge was eliminated within TREB's region in July 1959. However, the uniform tariff did not apply to the Hughenden district when it was incorporated in late 1959, nor to other western areas added later. Although uniformity of tariffs was a long-term objective, in the short term the policy was that only areas receiving transmitted supply from central generating stations should enjoy lower tariffs. But as each new area was incorporated, there was pressure from local consumers for TREB to reduce tariffs. In April 1965 the Board decided that tariffs in its western section would be brought into line with coastal prices over a five-year period.[85] Finally in August 1969 regional uniformity was achieved.[86] By mid-1975, when a 21% overall increase in TREB's charges was approved in order to meet rising costs and requirements for higher internal financing of capital works, the retail tariffs of the three northern Boards had been brought into alignment.[87]

In the 30 years from 1946-47 to 1976-77 TREB's sales of electricity increased by a factor of 26, from 22,835,000 kWh[88] to 596,139,000 kWh.[89] In the latter year sales were distributed between districts as set out in Table 8.

The rise in sales was due in part to increasing numbers of consumers but even more to higher levels of consumption: whereas consumer numbers quadrupled - from 12,657 in 1946-47 to over 51,000 in 1976-77 - consumption levels increased more than six fold - from 1,800 kWh per consumer to 11,400 kWh. The monotonic expansion of the electricity industry during this period is evident from the graphs in Figure 2.

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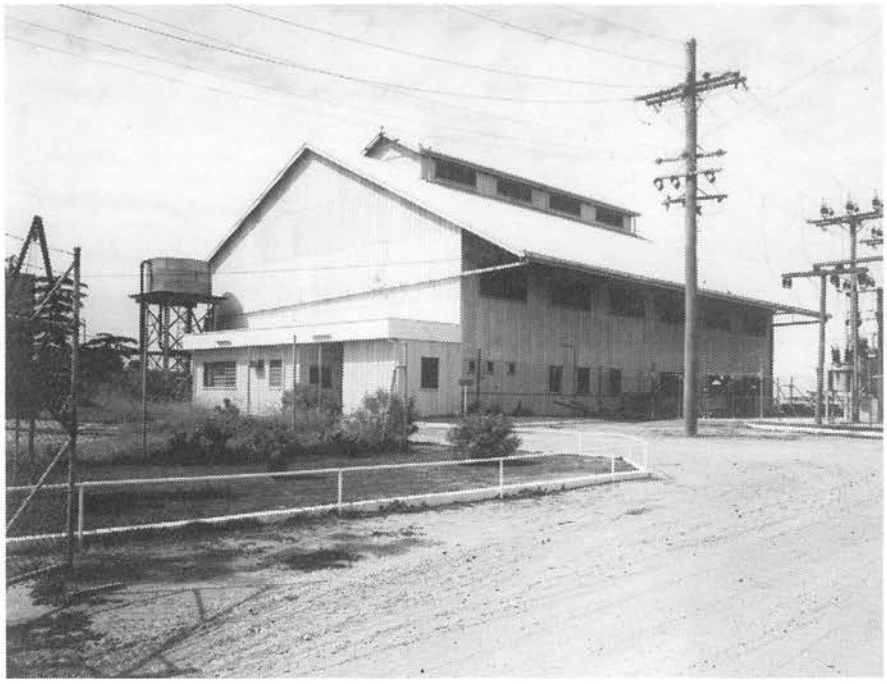
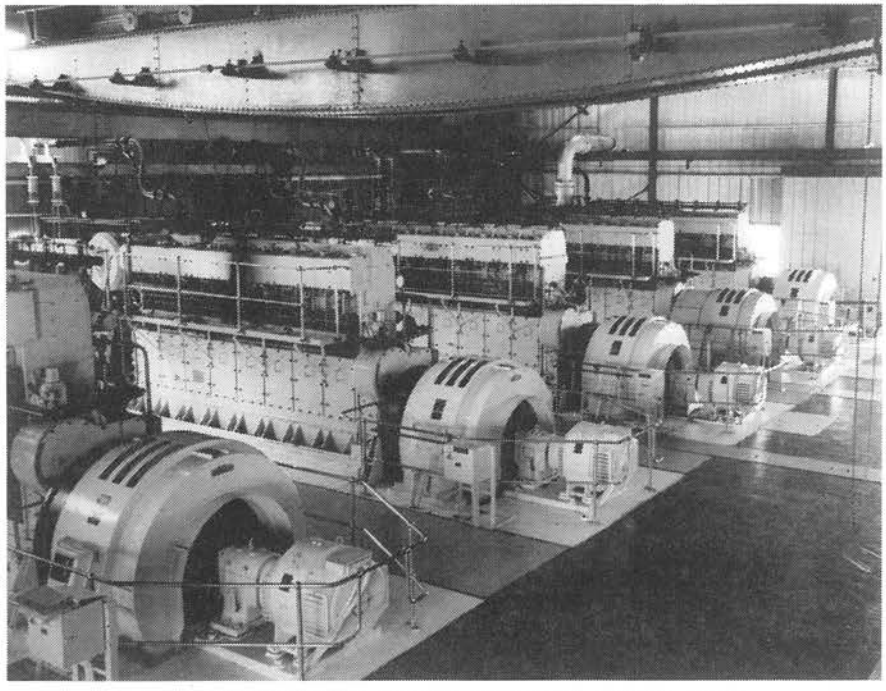
82. *QPD*, Vol.247, 1967-68, p.2189. C.W. Back to Priestley, 7 January 1967, Delamothe Collection, James Cook University, Mona Vale Station (Casey Family) Papers, 62L, MV/26.
83. TREB Mins, July 1948-December 1949, p.292, p.296, p.304.
84. TREB Mins, July 1953-June 1954, p.1109.
85. TREB Mins, January 1965-June 1966, p.3045.
86. TREB Mins, July 1969-December 1970, p.3752.
87. TREB Mins, November 1974-March 1976, p.4737.
88. *TREB AR, 1946-47*, p.5.
89. *TREB Financial Statements and Operating Statistics (FS&OS), 1976-77*, pp.2-3.



29a. Hughenden power station, 1970



29b. Engine room, Hughenden power station, 1970

30. McKinlay power station, 1974

Table 8:
DISTRIBUTION OF TREB SALES BY DIVISION; 1976-77
(,000 kWh)

Townsville	378,900
Ingham	25,800
Ayr - Home Hill	14,800
Bowen	87,900
Collinsville	51,200
Charters Towers	22,100
Total Coastal Division	580,700
Hughenden	7,000
Richmond	3,000
Julia Creek	2,600
Winton	2,800
Total Western Division	15,400
Total Sales	596,100

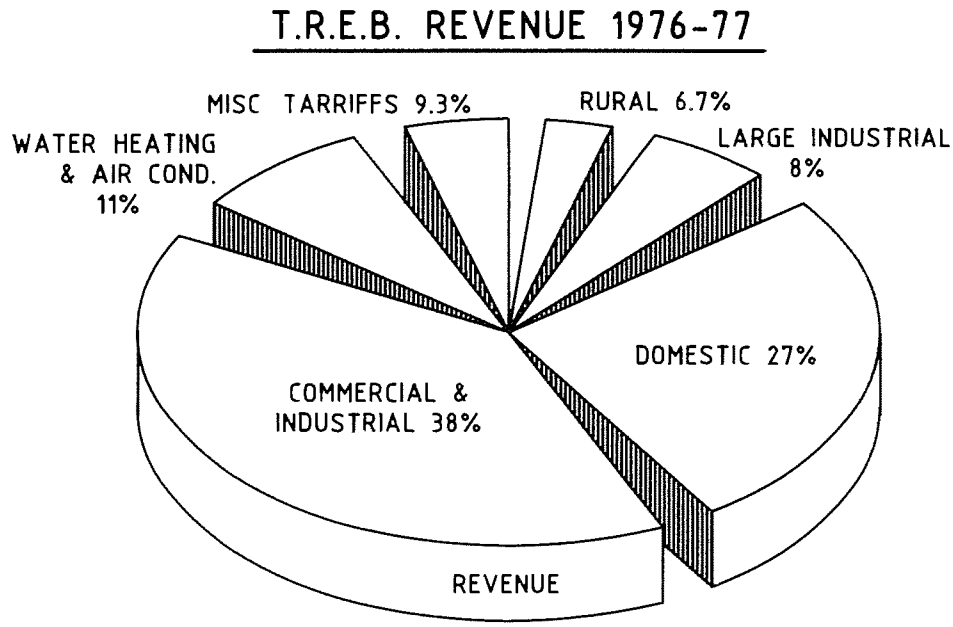


Fig. II

In 1946-47 sales of electricity were divided between different types of customers as follows: domestic 36%; commercial and industrial 46%; rural 8%; street lighting 3%; water heating 0.1%.[90] By 1976-77, domestic consumption as a percentage of total sales had fallen to 27%; commercial and industrial remained constant at 46% (of this 8% went to large industrial concerns); rural had fallen to 6.7%; street lighting accounted for only 1.5%; and water heating and airconditioning for 11%, a large increase.[91] The distribution of sales in 1976-77 is shown in Figure 3.

The average cost per kWh sold in 1946-47 was 1.926d.[92]; in 1976-77 the average cost was 3.938c.[93] Since the general level of prices increased by over six times in this period,[94] the dramatic fall in the real cost of electricity is apparent.

The falling real cost of electricity was partly attributable to progressive improvement in system load factors. The Table below (Table 9) shows the outputs and load factors of the four power stations taken over by TREB in its first year of operation.[95] By 1957-58 the overall system load factor had increased to 51.1%.[96] By 1976-77 the load factor in the coastal division had risen to 60%.[97]

Table 9: TREB OUTPUT, 1946-47

Station	kWh Generated	Load Factor (%)
Townsville	22,615,000	48.3
Ingham	2,389,000	29.2
Ayr	489,293	24.6
Home Hill (6 months only)	1,921,915	13.8
	26,416,222	

In 1946-47 TREB's total revenue was £198,000; sales of electricity accounted for over £180,000, cash sales of appliances for £1,300, with £327 in hire purchase receipts.[98] In 1976-77 total receipts amounted to over $30 million - about $26,750,000 from sales of electricity, more than $1.5 million from cash sales of appliances and

90. *TREB AR, 1946-47*, p.20.
91. *FS&OS, 1976-77*, p.14.
92. *TREB AR, 1946-47*, p.5.
93. *FS&OS, 1976-77*, p.4, p.2. In the coastal division the average cost of electricity was only 2.16c.
94. Australian Bureau of Statistics, *Year Book: Australia 1977-1978* Canberra, 1978, p.131.
95. *TREB AR, 1946-47*, p.17.
96. *TREB AR, 1957-58*, p.6.
97. *FS&OS, 1976-77*, pp.1-2. However in the western districts incorporated after 1959 load factors were considerably lower - 47.6% for Hughenden and 34.2% for McKinlay.
98. *TREB AR, 1946-47 (Financial Statements)*, p.1.

Coastal System Maximum Demand (MW)	118.9
Western System Maximum Demand (MW)	4.2
Western Total kWh Sales (x 10^6)	15.4
Regional Total kWh Sales (x 10^6)	596.1
Regional Total Consumers	51154

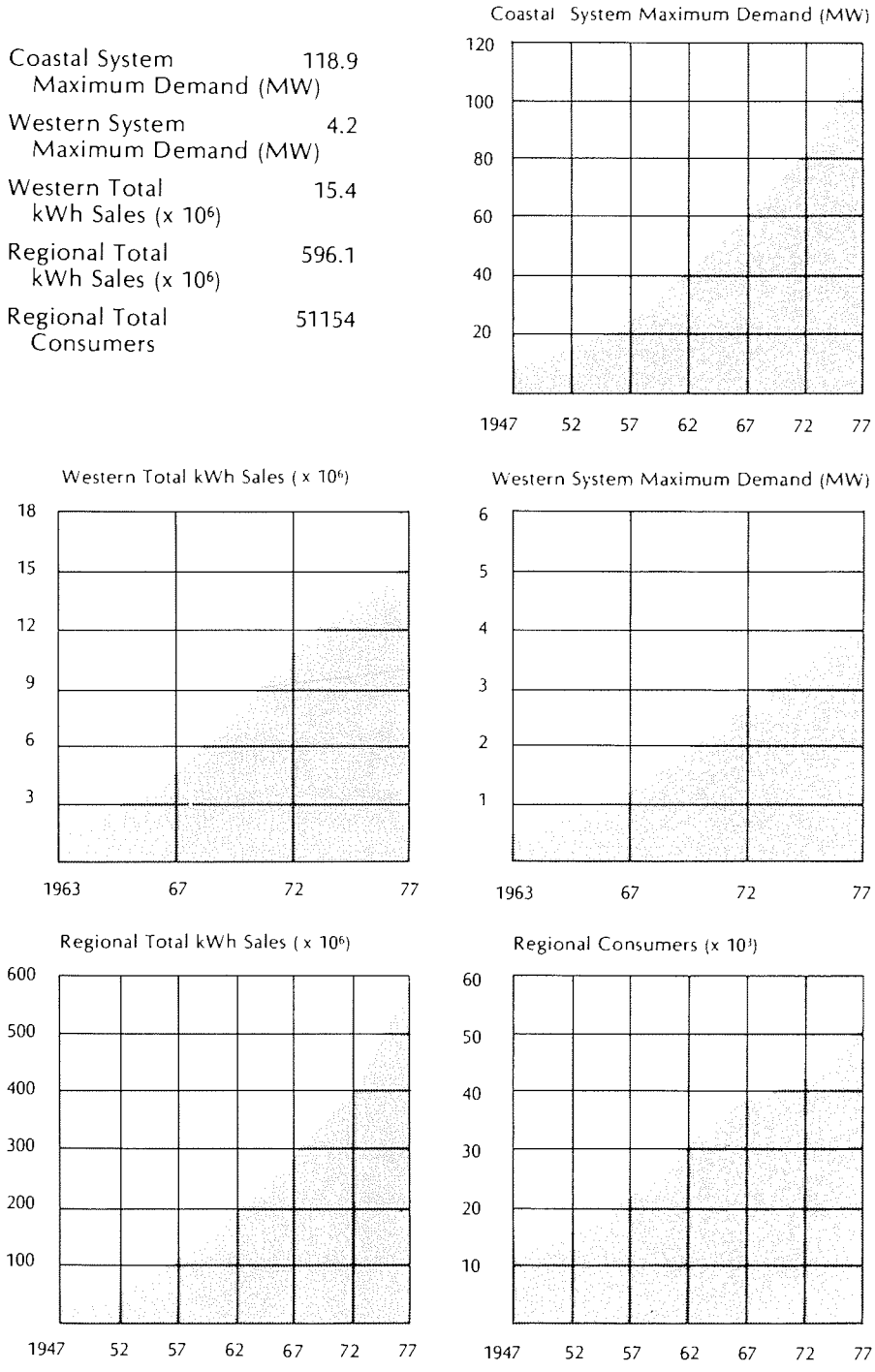


Fig. III: TREB's Expansion

nearly $3.5 million from hire purchase sales.[99] After taking account of inflation, revenue increased over 12 times over the period. When TREB began operating it had 189 staff members, with 22 apprentices.[100] In 1976-77 over $7 million was paid out in wages and salaries[101] to some 665 employees, with 49 apprentices.[102] Thus staff numbers had increased over three times since TREB's inception. The disproportion between the increase in output and revenue and the increase in numbers of employees underlines the capital intensity of the industry.

There were two outstanding features of TREB's activities during its 30-year tenure. One was the constant effort, sometimes despite difficult obstacles such as lack of materials, labour and funds, to keep pace with the ever-rising demand for electricity. The other was the constant effort to increase that demand - through publicly subsidised new, and increasingly remote, extensions, and by efforts to promote and popularise an ever-widening gamut of electrical appliances. This might be likened to a dog chasing its own tail, except that in the process a huge industry was created, a range of new jobs - technical and administrative - was made available, many of them requiring significant amounts of education or training, and large amounts of public money were consumed. Most apt were the words of a Chief Engineer of the SEC who described the industry during this period as having "a positive drive to expand".[103]

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99. *FS&OS, 1976-77*, p.16, p.21.
100. *TREB AR, 1946-47*, pp.3-4.
101. *FS&OS, 1976-77*, p.19.
102. *TREB AR, 1976-77*, p.28.
103. H.F. Egeberg, "The Development of Electricity Supply in Queensland", *Royal Historical Society of Queensland Journal*, Vol.6, No.1, 1959, p.61.

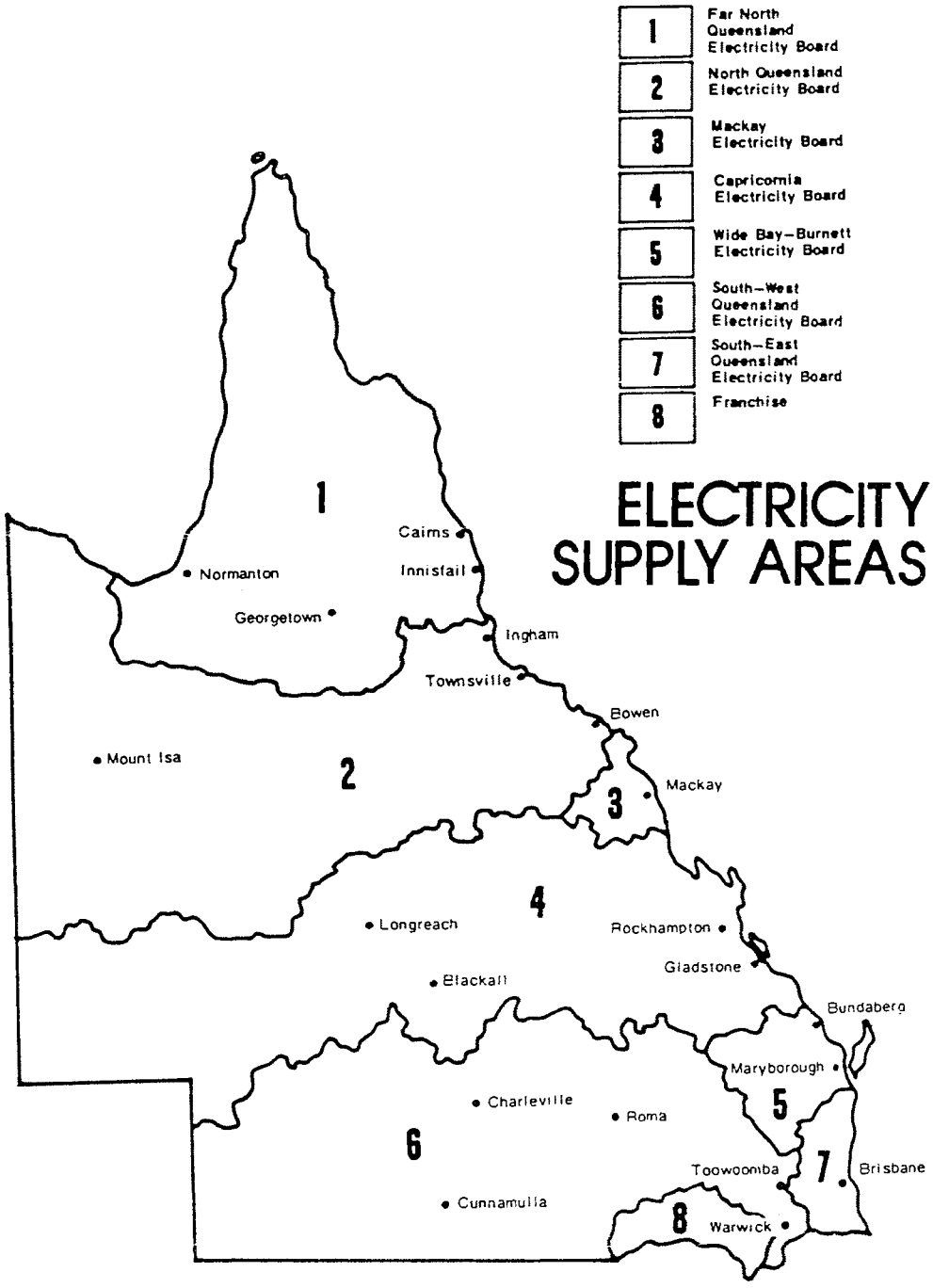
CHAPTER SEVEN

NORQEB

At present the regional authority responsible for distributing electricity is the North Queensland Electricity Board, or NORQEB, a name used daily in households throughout north Queensland. Commencing in 1977, NORQEB has operated during what has proved to be a difficult, transitional period for the electricity industry in Queensland, as in Australia as a whole. This chapter considers in turn the establishment of NORQEB and its place within Queensland's electricity supply industry; the main activities and policies of NORQEB since its inception; and the challenges it has encountered within the 1980s environment of arrested economic development, slower growth of electricity consumption and rising costs.

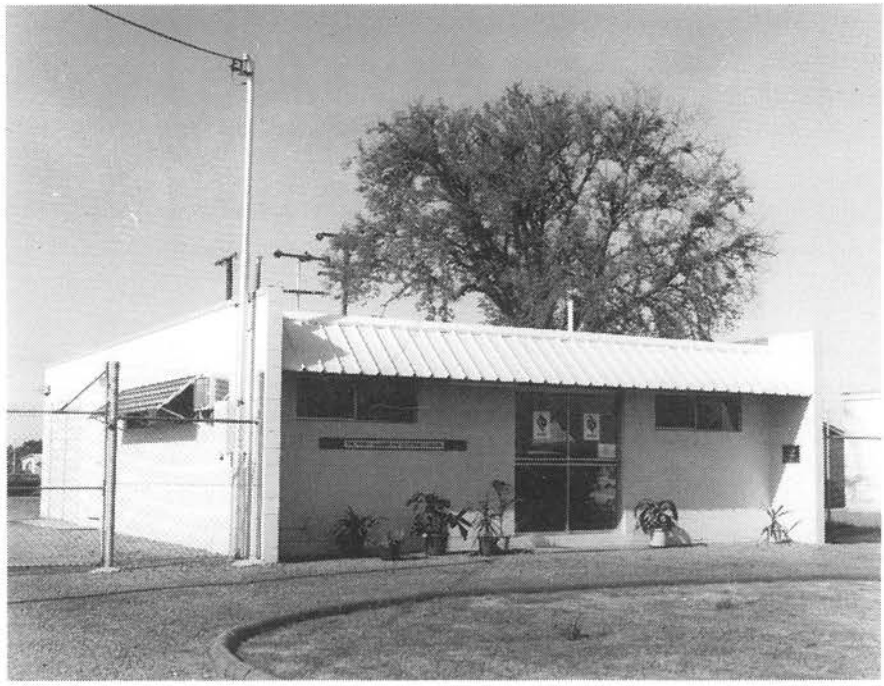
In July 1977 NORQEB superseded TREB as part of a State-wide reorganisation of the electricity supply industry. The Electricity Act of 1976 restructured the industry on the basis of a central, co-ordinating SEC; the Queensland Electricity Generating Board (QEGB), which became responsible for generation and main transmission within the whole coastal network from Cooktown to Murwillumbah; and seven regional Electricity Boards responsible for distribution to consumers. The organisation of the SEC remained essentially the same, but its authority for loan-raising was extended to cover the whole industry; the Commissioner remained directly accountable to the Minister for Mines and Energy. The newly-formed QEGB consisted of a general manager appointed by the government, who acted as chairman, the Electricity Commissioner, the Under Treasurer, one representative each from north Queensland, central Queensland and southern Queensland, and two members chosen as consumers' representatives by the Electricity Boards. NORQEB was to purchase bulk electricity from QEGB at seven supply points located at Ingham, Townsville (3), Clare, Collinsville and Proserpine, this bulk supply including some power generated by sugar mills during the crushing season. NORQEB's peak load on the interconnected grid would represent about five per cent of the Queensland total. In 1985, under the Electricity Act Amendment Act, the functions of the QEGB and SEC were absorbed by a new body, the Queensland Electricity Commission (QEC).

The Electricity Boards, which replaced 22 existing electric authorities, each comprised five members nominated by local authorities in the region, one of whom would be chairman, as well as the Commissioner and two members appointed by the government for their qualifications and experience. The seven regional boards were Far North, North Queensland, Mackay, Capricornia, Wide Bay-Burnett, South-east Queensland and South-west Queensland. An earlier proposal to reduce the number of Electricity Boards to four had aroused such a storm of angry protest that the government had been forced to drop it; protests from Cairns and Mackay against inclusion in a regional Board centred in Townsville had been especially noisy, as age-old local rivalries resurfaced. Of the seven Boards created in 1977, the North Queensland Electricity Board covered the largest area, over 26% of the State.



Map No. 3: Electricity Supply Areas, 1977

31a. Opening the Winton office, 1980



31b. Cloncurry office, 1980

32a. Underground cable pulling

32b. Underground works

The 1976 Act was comprehensive, consolidating the many Acts which previously covered the industry.[1] One of the main sources of opposition to the Act was the provision to divest the Brisbane City Council of its electric authority; the Labor Council saw political motives in the determination of the Bjelke-Petersen government to take over what the Council considered an efficient and profitable enterprise.[2] Nevertheless, the Act passed without difficulty and was assented to in November 1976.

For the North Queensland Electricity Board, the Act meant amalgamation of the huge supply area of TREB with the far-flung areas of the North Western Electric Authority, centred in Mount Isa, and the smaller undertakings operated by the Boulia and Burke Shire Councils; new centres brought under control from head office in Townsville included Mount Isa, Cloncurry, Duchess, Dajarra, Boulia, Burketown near the Gulf of Carpentaria, and Camooweal close to the Northern Territory border. NORQEB's area of supply would thus cover over 458,000 square kilometres, compared to TREB's 260,000 square kilometres. At its inception NORQEB supplied 59,000 consumers with approximately 640 million kilowatt hours of electricity for an annual revenue of about $26 million. The maximum demand for electricity was around 137 megawatts; the staff numbered 740.[3]

In the first half of 1977 there was considerable activity to set up the new organisation. Official notification of the appointment of members of the Board appeared in the *Queensland Government Gazette* in February 1977.[4] The Board met for the first time in March, but did not begin operating until July. At the inaugural meeting, Alderman B.H. Bloom was appointed chairman; the Act stipulated that only members nominated by local authorities were eligible for that position. Alderman Frank Born from Mount Isa was elected deputy chairman. The government had determined that the chairman would receive a fee of $3,500 per annum and other members $2,500. B.M. Hammond, then Manager of TREB, was chosen as General Manager of the new organisation.

The first business included adoption of a corporate symbol and official seal, selection of bankers (the Commonwealth Trading Bank), insurance brokers (Stenhouse Queensland Limited), and solicitors (Dean, Gillman and Thompson), and the forms of agenda and minutes. Later the acronym "NORQEB", which had become popular as an abbreviated title, was formally adopted, together with the slogan "A partner in progress" and Board colours of green and blue. An organisational structure was devised, with a Chief Engineer supporting the General Manager and controlling engineering and marketing; a Secretary responsible for administration and finance; and Personnel and Trading Officers supervising their respective departments. Liaison was established with the North Western Electric Authority and the authorities in Boulia and Burketown through G.B. Stephens, who was later appointed Senior Engineer in Charge at Mount Isa; he replaced J. Kastrissios, who had previously managed the North Western Electric

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1. *QPD*, Vol.271, 1976-77, pp.420-1.
2. *Ibid.*, p.425.
3. NORQEB Minute Books (NORQEB Min), 2 March 1977, p.2.
4. *QGG*, 12 February 1977. See Appendix 2 for lists of members of NORQEB.

Authority and who had recently gained appointment as General Manager of the new South-west Queensland Electricity Board.

Preliminary arrangements were therefore progressing well when disaster suddenly struck. On 26 May 1977 meetings of both TREB and NORQEB took place at Julia Creek, in accordance with a deliberate policy of holding meetings in various centres throughout the region. That afternoon four men returning to Townsville were killed when their aircraft crashed at Thornton Gap as a result of poor weather conditions.[5] The victims were Alderman B.H. Bloom, chairman of NORQEB and deputy chairman of TREB, Councillor W.O. Garbutt, chairman of TREB, Dr L.F. Power, member of NORQEB, and B.M. Hammond, the Manager of TREB and General Manager designate of NORQEB. The loss of such an experienced and capable group at a crucial juncture in the industry's history was a tragedy felt throughout the organisation.

A special meeting of the Board was called for 31 May, when it was decided that Col Harris would act as manager from 27 May to 23 June, and then David Pearse, who was overseas at the time of the accident, would fill the position until a permanent appointment was made. At the same meeting Jack Bordujenko, who had previously been secretary of NEA and was currently secretary of QEGB, was appointed Secretary of NORQEB. Alderman Mike Reynolds of the Townsville City Council, and Professor P.L. Arlett of the Department of Electrical and Electronic Engineering at James Cook University were appointed to fill vacancies in the Board. In June the reconstituted Board chose Frank Born as its chairman and Mike Reynolds as deputy chairman.

David Pearse was later appointed as General Manager of NORQEB for a seven year term. Pearse had received his engineering training in Adelaide and had subsequently worked on a variety of projects in Greece, England and New Zealand before joining TREB in 1960; within TREB he gained promotion from Distribution Design Engineer to Planning and Design Engineer to Distribution Engineer and finally to General Manager of NORQEB.[6] He held the position of General Manager for ten years, from 1977 to 1987. Like Tom Priestley before him, David Pearse was appointed to the James Cook University Council, became Deputy Chancellor and continued in that office after retiring from the industry: one of many indicators of continuing close relations between the industry and the university. After Pearse's retirement, Keith Hilless was appointed as in his successor in July 1987.

In 1979 and 1982 Aldermen Born and Reynolds were re-appointed as chairman and deputy chairman respectively. After emigrating from Germany in the 1950s, Franz Born had worked for Mount Isa Mines and had gone on to develop extensive and varied business interests in Mount Isa, including butcher shops, health food shops, delicatessens, hardware stores and a steel fabrication works; he was elected Mayor of the city in 1974, served on the North Western Electric Authority, and was a foundation member of NORQEB. As a leader, Born commanded the respect of all who worked with him. When he failed to be returned in the local government elections in 1985, the Queensland government used its power under the Electricity Act Amendment Act of

5. Mem. 1300, Book No. 9.
6. Interview with David Pearse, 20 March 1987.

1984 to appoint him to the Board as chairman. This use of a new and controversial power might have been justified as maintaining continuity of leadership, but when Born left the region early the following year, the government exercised its power to appoint as chairman Dan Gleeson, Mayor of the newly-created City of Thuringowa, who had not previously served on NORQEB or on TREB.[7] Many observers became concerned that the new power was being used for political ends rather than to tap expertise and ability valuable to the industry.

One of the first priorities of the new NORQEB management was to secure adequate accommodation. In early 1978 the Board decided to construct a new head office in Townsville, on the same site as TREB headquarters on the corner of Stanley and Stokes Streets. The existing three-storey office was renovated and a new five-storey section added. One of the objectives was to bring most employees into one building. The project was completed by Krogh Constructions in November 1981 at a cost of over $5 million. New district offices were also opened in Winton and Cloncurry in 1980, in Charters Towers in 1981 and in Bowen in 1984. In September 1984 a new stores building was completed at the Garbutt complex in Townsville, which improved efficiency by centralising stores on one convenient site.

In 1983 the Board established a training centre at Garbutt, providing facilities for training linesmen, apprentices and supervisory staff. The second school of its kind in Queensland, it was set up with the co-operation of SEQEB's Rocklea training centre. As well as catering for NORQEB's training needs, the centre ran training programmes for the QEC, other Electricity Boards, Queensland Railways, Telecom and mining companies.

In the coastal section of NORQEB's distribution network there was gradual expansion. One notable feature in Townsville was the development of new suburbs with underground mains and gradual progress with undergrounding existing lines, especially in the central business district. This process had begun in 1970 with the first high voltage underground lines to the Neil Smith substation, but in the first three years of the 1980s NORQEB spent as much on underground conversion as in the whole of the previous decade.[8] Underground cables possessed many advantages: practical, technical, economic, aesthetic, security and safety. After reaching an all-time high in 1983-84, with suburban expansion extending to the Upper Ross area, demand for electricity supply to new rural/residential subdivisions in Townsville began to decline as suburban real estate entered the doldrums.

Emphasis then transferred to catering for new tourist and commercial developments in the city area, most notably the Breakwater Casino and the Great Barrier Reef Wonderland, and on the South Townsville side of Ross Creek, an area supposedly emerging as Townsville's fashionable Rive Gauche (though actually on the right bank of the Creek). In early 1987 a new substation, the largest ever constructed by NORQEB, was completed in South Townsville to meet increasing loads in the inner city and the suburbs of South Townsville, North Ward and Magnetic Island. In 1983,

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7. NORQEB Min, 30 January 1986, p.1325.
8. Mem. 3651, Book No. 26.

a larger submarine cable had been laid to Magnetic Island to provide for increasing suburban construction and ambitious tourist development plans; advice was sought from local conservation groups and James Cook University to ensure that disturbance to marine life and coral reefs was minimised; the two old cables were then relegated to standby,[9] but were later re-activated.

In 1986 a new information and control system was introduced in seven zone substations in Townsville. The SCADA (Supervisory Control and Data Acquisition) system provided information on substations and the distribution system; in emergencies, its ability to analyse faults and allow remote control of equipment reduced the duration of interruptions to supply. Another NORQEB initiative during this period, undertaken in collaboration with local government, was an extensive programme to improve street lighting by installing extra lanterns in the older suburbs and erecting mercury and sodium vapour lanterns on Townsville's major thoroughfares and intersections; this became a model for similar projects in other northern towns.

In the Burdekin district, NORQEB continued to encourage conversion of pumping equipment from diesel to electric motors, a major project initiated under TREB and prompted by the oil crises of the 1970s and special tax concessions for installation of electric irrigation equipment.[10] Many hundreds of extensions were constructed to take supply to sugar and rice farms for irrigation purposes. As a result consumption of electricity in the Burdekin fluctuated from year to year depending on rainfall, which introduced an element of unpredictability into NORQEB planning. Periodic flooding and cane fires continued to be special problems in the Burdekin, as in the Hinchinbrook area. In 1985 NORQEB responded to representations from Burdekin cane farmers by arranging a special time-of-day tariff with low weekend charges. In the urban centres there was constant upgrading of the distribution system, addition of new substations, and undergrounding of lines in Queen Street, Ayr. In 1979 a depot for field staff was completed at Home Hill, which later became Burdekin district headquarters. Depression in the sugar industry in the 1980s had a dampening effect on electricity sales in the Burdekin and in the Hinchinbrook district, where repairing damage caused by Cyclone Winifred in 1986 placed extra burdens on NORQEB finances.

In the 1980s the fastest growing district within NORQEB's supply area was the Bowen - Collinsville region. This was largely attributable to new mining developments in the area, particularly the Newlands-Collinsville-Abbot Point coal project involving an open-cut mine at Newlands, a dragline and coal washing plant at Collinsville and coal-loading facilities at Abbot Point. Partly on the basis of this industrial investment, there was also significant development of infrastructure and facilities in Bowen itself, including a new hotel/motel, supermarket, entertainment facilities and government departments. NORQEB supplied power to the mining operations and undertook an extensive reinforcement programme in the Bowen area, where a new substation was completed in 1984; a second 66 kV line was constructed from Bowen to the QEC bulk supply point at Proserpine in order to augment and safeguard supply. Supply was also

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9. Mem. 4297, Book No. 31.
10. Interview with Owen McCane and John Slatcher, 18 June 1987.

taken from Collinsville to the construction site of the Burdekin Falls Dam, the 33 kV line traversing unusually intractable terrain.

Notwithstanding dramatic changes in and around Bowen, developments in the coastal section were eclipsed by rapid expansion in western supply. Excluding power used by the mines, electricity consumption in Mount Isa, Burketown and Boulia increased by about 35% in the decade after NORQEB's formation. In the far west Mount Isa was developed as the administrative centre for a huge area encompassing Burketown, Camooweal, Boulia, Cloncurry, Julia Creek, Richmond, Hughenden, and Winton. The entire staff of the North Western Electric Authority, about 40 employees, transferred directly to NORQEB in 1977.

Power required by NORQEB consumers in the far western region including Mount Isa, Cloncurry and Dajarra is still purchased in bulk from Mount Isa Mines Limited. An important issue for NORQEB, which requires continual reassessment, is whether it is more economic to continue re-negotiating agreements with MIM for bulk supply or whether the Board should opt for transmitted supply from the coast. Decisions on the development of electricity supply in the north-western region are taken by NORQEB in consultation with the QEC.

In 1982 a detailed investigation estimated the cost of capital works to allow transmission from the coast at $100 million. At that time MIM itself used 85% of electricity output from its Mica Creek station, while NORQEB purchased the remaining 15%. The study showed that transmitted supply of only about 15% of the region's total requirements would clearly be uneconomic; far better utilisation of the transmission network could be achieved if MIM itself took transmitted supply. However, this would mean a significant reduction in the use of coal at Mount Isa, which would adversely affect mining operations at Collinsville. Since coal is back-loaded from Townsville in otherwise empty ore trains, any change in the existing arrangements would also alter the economics of MIM's use of the railway. Clearly the decision about the source of Mount Isa's electricity impinges upon much wider interests than merely those of the electricity supply industry. Another drawback to transmitted supply to Mount Isa is the potential difficulty of maintaining security of supply by means of a single transmission link hundreds of kilometres in length. In view of these points, the 1982 report recommended continuation of bulk purchasing and the installation by MIM of additional generating equipment with financial assistance from NORQEB.[11]

However, the negotiation of a new agreement with MIM in 1982 proved a difficult and lengthy process, as had previous negotiations between MIM and the North Western Electric Authority. Finally in August 1983 agreement was reached between the Minister for Mines and Energy and MIM for "the reservation of a block of 27 MW of electric power to provide a bulk supply of electricity for public use in the Mount Isa area".[12] NORQEB would make a capital contribution of over $5 million towards the

11. Mem. 4174, Book No. 30.
12. Mem. 3209, Book No. 22.

cost of existing generating plant at Mount Isa,[13] and further contributions totalling more than $10 million towards the cost of installing a fifth set of 30 MW capacity in 1985 and of subsequent additions to plant. In return NORQEB obtained no rights, equity or control over MIM's power station assets, but received a bulk supply tariff calculated on operating costs alone.[14] Power purchased from MIM remains expensive, however, because the generating units are relatively small and because of the use of expensive underground coal transported from Collinsville.

Cloncurry had been supplied with power from MIM since 1962 by means of a 66 kV transmission link. In 1977 there were no s.w.e.r. extensions from Cloncurry; under NORQEB, an extensive network of 19 kV lines was constructed, which made supply available to virtually every potential consumer in the Shire. As well as rural development, there was also significant growth in the urban area as a result of expansion of official, commercial and tourist facilities; this necessitated extension and improvement of the distribution system. NORQEB maintained one diesel set at the Cloncurry power station as a standby, though because of growth in consumption it could no longer carry the load of the business district, let alone the whole town. In 1987 NORQEB decided that since outages were no longer frequent on the Mount Isa - Cloncurry line, the standby plant at Cloncurry should be abandoned, although this provoked an outcry from local business people and the Shire Council. At the same time the National Trust expressed interest in restoring the old power house near the Cloncurry River as a museum, in particular the old suction gas producers and engines which were still intact. Mid-way between Mount Isa and Cloncurry, the Mary Kathleen uranium mine was supplied by NORQEB until the closure of the mine and abandonment of the township at the end of 1982; for several years this area was notorious for the high frequency with which insulators were shot off by vandals.

For a number of years NORQEB also operated an isolated station in the tiny township of Dajarra, south of Mount Isa. The local publican/storekeeper ran the station, which began under the North Western Electric Authority with two 42 kW sets supplying about 50 consumers.[15] In 1984 the township was connected by s.w.e.r. line to Mount Isa, an extension made economic by the connection of several intervening pastoral properties under the rural subsidy scheme. One generating set remains at Dajarra as a standby, run by the postmaster in case of interruption of supply.[16] The township of Duchess was also provided with reticulated supply from Mount Isa, allowing residents to use a wider range of electrical appliances.

When NORQEB took it over in mid-1977, the Camooweal power station was operating near its limit; upgrading was considered urgent. The existing plant comprised four 16 kW National sets, all unserviceable, and two 75 kW Caterpillar sets which could not be operated in parallel. Maximum demand on the station was 96 kW from 60 consumers. NORQEB decided to refurbish the existing machinery, add a new 120 kW

13. MIM costed the plant at $37 million, and based NORQEB's contribution on its maximum demand as a proportion of installed capacity.
14. Mem. 2952, Book No. 20 and Mem. 3209, Book No. 22.
15. Interview with Owen Rooney, 10 April 1987.
16. Interview with Jim Lonergan, 6 January 1988.

33. Opening the Camooweal station, 1979

34. Burketown power station, 1978

unit and erect a new building to house the enlarged plant. The reconstruction was completed in October 1978.[17] An additional 120 kW unit was installed in 1980. The township of Camooweal continued to grow, partly as a result of tourist interest in the area. In the mid-1980s the isolated generating plant was expanded. A NORQEB employee was stationed permanently at Camooweal to ensure that the plant ran smoothly and to look after reticulation in the township.[18]

From its inception, NORQEB took in the small, newly-established electrical undertaking of the Burke Shire Council. The Council had supplied electricity to the people of Burketown for the first time in November 1975, by means of a generating plant consisting of two 62.5 kW diesel alternators, one set on base load and the other on standby. Initially 26 consumers were supplied; by the end of June 1977, when NORQEB took formal control, the number had risen to 47. NORQEB decided to replace the existing sets with two 120 kW units arranged for parallel operation.[19]

Burketown was to be administered from NORQEB's Mount Isa office, but its inaccessibility - about eight hours by unsealed roads, or more than an hour by air from Mount Isa - made direct administration somewhat impractical. By agreement with the Board, the Burke Shire Council continued operating the power station. In return for a fee, the Council was also to receive fuel, read meters, and act as agents for receipt of payments, enquiries and applications for supply. Almost immediately, however, conflict arose, which was to continue until the Council's involvement with electricity supply ceased.

NORQEB soon realised that the Council was not fulfilling its obligations satisfactorily. NORQEB staff from Mount Isa, who inspected the Burketown undertaking regularly, were critical of virtually all aspects of Council management, pointing in particular to deficiencies in maintenance and operation of the power station. The Council, for its part, found maintaining the station more expensive than it had anticipated, partly because of frequent break-downs, and therefore wished to terminate the agreement.[20] NORQEB acceded to the Council's wishes in 1979.

A receiving agency was established at the Salt Pan Store and in late 1979 an electrical fitter/mechanic was stationed at Burketown as Power Station Supervisor to operate and maintain the generating plant and distribution system. In addition he would provide some electrical services to the Council: in particular, maintenance and repair of electrical equipment associated with their water supply and sewerage systems. In return the Council agreed to contribute for a period of five years to the cost of maintaining the tradesman at Burketown. Since there was no electrical contractor in Burketown, it had previously been necessary to fly in a tradesperson whenever the Council required urgent electrical work; under the arrangement with NORQEB the Council would avoid those expenses.

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17. Mem. 194, Book No. 2.
18. Interview with Jim Lonergan, 6 January 1988.
19. Mem. 734, Book No. 5.
20. Mem. 861, Book No. 6.

Once again, however, the Council and the Board were soon at loggerheads. The Council began to doubt whether they could utilise the tradesman's services to the extent they had expected; conflict erupted when he was directed to do non-electrical work such as supervising fencing, which led to direct confrontation between NORQEB's employee and the Shire Clerk, Allan Choveaux.[21] In response to representations from the Council, NORQEB agreed in October 1980 to reduce the services provided to 10 hours a week and the Council's contribution to $100 a week.[22]

Nevertheless, tension continued over issues such as the Power Station Supervisor's being called upon to do more work for the Council than stipulated in the modified agreement, apportioning blame for recurrent problems with water pumping equipment, and Council pressure on NORQEB to terminate the agreement early. Despite continual friction, the Board resolved to hold the Burke Shire Council to the agreement until 1984 in order to help defray the costs of keeping an employee permanently at Burketown.[23]

By the late 1980s capacity had reached 480 kW, as a result of gradual expansion along with the growth of the township. Supply remained restricted to the urban area.[24]

Boulia in the Channel Country was first supplied with electricity in 1957 under the SEC's "small townships scheme". At its inauguration in 1977, NORQEB took over the small, isolated station previously run by the Boulia Shire Council. The Council had requested the government to relieve it of the financial burden of running the undertaking.

When NORQEB assumed control, a new 110 kW Caterpillar/Dunlite diesel alternator set and auxiliary gear had just been installed.[25] This brought total capacity to 200 kW, while maximum demand was about 140 kW.[26] Expansion soon proved necessary, so a new Detroit set was added in 1981, doubling the capacity of the station. By then maximum demand had reached 245 kW, recorded on the day of the rodeo in April, the annual peak.[27] Further expansion was necessary later in order to provide adequately for water pumping, which was managed in conjunction with the power station in order to synchronise operations efficiently.

One of the main issues at Boulia, as at several other small western centres, was restrictions on appliance use. In 1977 power restrictions were still in force at Boulia, Burketown, Camooweal and Dajarra, and to a lesser extent at McKinlay. In order to limit the demand on these small stations, where costs of generation were high, stoves, stovettes, grillers, automatic toasters, other cooking appliances, washing machines with heating elements, wash boilers, radiators and welders were not permitted in domestic

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21. Mem. 1814, Book No. 12.
22. Mem. 1856, Book No. 13.
23. Mem. 3170, Book No. 22.
24. Interview with Jim Lonergan, 6 January 1988.
25. Mem. 124, Book No. 1.
26. Mem. 232, Book No. 2.
27. Mem. 2791, Book No. 19.

or commercial premises; motors larger than 2.2 kW were not allowed in commercial use.[28] In 1979 the annual Queensland Electricity Authorities' Conference resolved that this policy should be reconsidered. NORQEB calculated in 1980 that the increase in maximum demand if all restrictions were lifted was already within the capacity of all stations except Boulia, and that Boulia would have sufficient capacity by 1981. Restrictions were therefore lifted, except in Boulia where prohibitions remained temporarily on motors, hot water systems and welders; these were later rescinded.[29]

For some years the security of supply at Boulia was considered unsatisfactory. Routine maintenance was supposed to be carried out by the Power Station Supervisor; all machinery was inspected four times a year by Mount Isa mechanical staff. Nevertheless, the standard of operation and maintenance was not comparable with that of other western stations.[30]

The station remains very small, with a capacity of 600 kW and about 120 consumers. There is some rural supply in the district, by means of s.w.e.r. lines installed earlier by the Boulia Shire Council; NORQEB's programme does not include constructing s.w.e.r. lines from isolated generating stations. A NORQEB employee resides permanently at Boulia to service the three engines and the reticulation system, and read meters; accounts are paid at the local Post Office. As a result of recession in the rural industry, growth of electricity consumption in the district has slowed.[31]

In the mid-western section of NORQEB there were also significant changes. In April 1978 NORQEB celebrated the opening of the 66 kV interconnector between Cape River and Hughenden, which linked NORQEB's mid-western 33 kV network to the State-wide power grid. Ageing of the diesel equipment at Hughenden and the sharp rise in the cost of fuel oil as a consequence of the first oil shock in the early 1970s had enabled TREB engineers to convince the SEC of the need for interconnection. The connecting link was about 140 kilometres in length and was completed at a cost of nearly $3 million; Persal and Company was the major contractor on the project. A substation constructed at Hughenden in 1978 stepped down voltage from 66 kV to the 33 kV of the mid-western network linking Hughenden, Winton, Richmond and Julia Creek.

After interconnection the Hughenden power station was retained on standby in case of interruption of supply from the coast. The staff at Hughenden was halved, but the hazards of outback power supply were undiminished. During most storm seasons, reported a NORQEB supervisor, "our staff are required to swim flooded creeks, fly in helicopters and drive over boggy roads to restore supply to the rural areas". Increasing use was made of helicopters and other aircraft in emergencies and also for routine maintenance and line patrols.

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28. Mem. 232, Book No.2.
29. Mem. 1513, Book No. 10.
30. Mem. 2981, Book No. 20.
31. Interview with Jim Lonergan, 6 January 1988.

The 66 kV line was extended to Richmond and part of the distance to Winton in 1985. Further extensions to Julia Creek and to Winton are planned for the early 1990s. There was also considerable expansion of the s.w.e.r. network to rural properties, adding over 250 consumers. Hughenden remains a standby station of 3.5 MW capacity, and the six Mirrlees diesel engines are run regularly. The main transmission line was duplicated from Charters Charters to Cape River; when the section from Cape River to Hughenden is also duplicated, as is planned for the early 1990s, the Hughenden power station will be de-commissioned.[32]

In late 1978 there was a change in NORQEB organisation, when it was decided that the Julia Creek and Richmond areas should in future be administered from Mount Isa rather than from Hughenden.[33] Around the same time it was decided to close the Richmond station and to develop Julia Creek as the main standby for the Richmond-Julia Creek district.[34] Thereafter the capacity of the Julia Creek station was expanded to about 1 MW; in December 1982 a 880 kW diesel generating set was purchased from Mary Kathleen and transferred to Julia Creek when the uranium mine closed.

Nevertheless, supplying Julia Creek proved to be a source of continual problems. The long stretches of transmission line and the frequency of lightning storms were the main causes, although, as a report to the Board stressed in 1981, there were other culprits:

> [The difficulties] particularly at that time of year (February - April) are generally caused by lightning. The storms mostly seem to occur between mid-afternoon and midnight. There is another phenomenon which occurs and is known as the "dawn flash-over", and is ascribed to ornithological micturition [sic]...Another cause is ascribed to the pre-dawn and post-dusk flight of large birds; these can sometimes collide with conductors near mid-span and cause flashovers from phase to phase.[35]

One way of reducing these problems was to install more sectionalisers along the line in order to limit the number of consumers affected by outages.[36] The possibility of supplying Julia Creek from Mount Isa is kept under review, but to date has not been considered desirable.

The tiny 42 kW station which TREB had established at McKinlay, mainly for the convenience of the Bush Nursing Association, continued to operate until the end of 1980, when the township was connected to the s.w.e.r. network based on Julia Creek. Since the s.w.e.r. system could supply only single-phase motors, NORQEB exchanged the two three-phase motors in town - the Council's bore pump and the refrigerator at the hotel - for equivalent single-phase motors, without charge to the consumers. The local generating plant was retired when the change-over was completed.[37] The small township of Kynuna also received supply by means of s.w.e.r. line from Julia Creek;

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32. Interview with Jim Ashcroft, 6 January 1988.
33. NORQEB Min, 19 December 1978, p.236.
34. *Ibid.*, 25 January 1979, p.243.
35. Mem. 2203, Book No. 15.
36. NORQEB Min, 28 February 1980, p.420.
37. Mem. 1670, Book No. 12.

previously its inhabitants had used private generators, usually 32 volts, as well as kerosene refrigerators and gas stoves.

Under NORQEB, the extension of electricity supply into rural areas went on apace. Financing rural extensions was naturally one of NORQEB's foremost concerns. The State government continued to offer substantial financial assistance to rural consumers.

In October 1978 State cabinet approved a new rural electricity subsidy scheme to operate from July 1978 to June 1985, replacing the previous scheme which expired in June 1978. Under the new regime, subsidies would amount to 50% of the cost of approved rural extensions in excess of $4000 per consumer. The maximum subsidy payable by the State government would be $4000 per consumer, the balance of subsidy to be paid by the Electricity Board from its operating fund. The contribution asked of consumers was a non-refundable capital payment. Local authorities wishing to promote electrification of their districts were free to provide all or part of this non-refundable contribution. Before supply could be made available to a group of prospective consumers, 75% of the group had to accept the Board's offer. Small townships which had not previously enjoyed a reticulated supply would also receive a subsidy equal to 50% of the capital cost. A total of $6 million was allocated to the scheme.[38]

In May 1981 the scheme was amended to increase funding by $1 million, to introduce subsidies of up to 60% for higher cost connections and to allow consumers' capital contributions to be paid in instalments.[39] However, the amended scheme involved extra subsidy payments by Electricity Boards; NORQEB therefore protested to the government "because of the additional costs that would have to be borne by the consumers generally",[40] but without effect. By January 1983 the limit on government financial assistance under the scheme had been reached; the subsidy scheme was extended indefinitely, but from 1983 all subsidies were payable by the Board.[41] Nevertheless, the subsidy scheme helped to finance a significant proportion of NORQEB's expansion in western areas; in 1982-83, for instance, extensions under the rural electricity subsidy scheme accounted for approximately 50% of new reticulation in the NORQEB region.

The old rural extension deposit scheme was withdrawn in November 1978 and in its place a rural guarantee scheme was introduced for those consumers not covered by the subsidy scheme. The Board's contribution and the consumer's non-refundable capital contribution were to be calculated according to a formula based on the capital cost of the extension and potential annual revenue. Consumers were also required to pay a minimum annual charge, also calculated by formula, for a period of 15 years. If the annual potential revenue was expected to be more than 22.5% of the Board's outlay, no guarantee was required.[42]

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38. Mem. 728, Book No. 5.
39. Mem. 2169, Book No. 15.
40. NORQEB Min, 28 May 1981, p.626.
41. NORQEB Min, 27 January 1983, p.872.
42. Mem. 727, Book No. 5.

In 1978-79, under the new rural financing arrangements, NORQEB drew up a rural electrification plan, including a timetable for making offers of supply to the various rural groups and small townships and for constructing these works if the offers were accepted. The five-year programme included 506 grazing properties and 83 other potential rural consumers.[43] The Board resolved in February 1979 to exclude rural groups who could only be supplied from isolated generating stations because of the high capital cost of extensions, the high cost of operations, particularly generation, and the probable need for extra staff at these centres, which were usually run by one employee. The original plan was expanded in March 1983 to include some more costly extensions.[44]

Several problems arose with the implementation of the rural scheme. Some of the contractors hired were inexperienced, which resulted in long delays in completing projects. Some graziers then objected to having to pay large capital contributions perhaps many months before they received supply;[45] NORQEB policy was opposed to paying interest on these amounts. Another problem was the increasing difficulty experienced by local authorities in raising loan funds to finance consumers' capital contributions; the SEC was requested to throw its weight behind applications for finance.[46] Nevertheless, the whole programme, which brought electricity to 538 rural consumers, was completed in 1986; it involved the construction of nearly 10,000 kilometres of line at a cost of over $15 million.

Other developments in rural supply included providing power for a number of gold mining projects in the coastal and mid-western areas of north Queensland; often located on old abandoned gold fields, these ventures adopted new capital-intensive technology, notably heat leaching, to extract gold from deposits previously considered uneconomic. Completion of the Burdekin Dam also necessitated extensions of supply for water pumping and opened the way for considerable rural development in the Burdekin and Bowen Shires.

As a result of increasing financial stringency and completion of the more feasible, lower cost extensions, the scope for further rural development has progressively decreased. There are still some pockets of outback Queensland and a few isolated pastoral stations without electricity supply; it may never be economic to connect all potential consumers.

When the electricity industry was reorganised in 1977, the State government explicitly acknowledged tariff equalisation as an objective. At that time consumers in some parts of the State were paying 50% to 170% more for electricity than those in the Brisbane metropolitan area. A policy was adopted of equalising tariffs throughout the State over a 15-year period.

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43. *NORQEB Annual Report 1979-80*, p.21.
44. Mem. 3016, Book No. 21.
45. Mem. 1941, Book No. 13.
46. Mem. 1835, Book No. 13.

Equalisation was a complicated process. Each Electricity Board had its own complex structure of tariffs, and movements towards equality had to take local conditions into account. To facilitate the process, a Tariffs Equalisation Committee was formed comprising one representative from each Board and a chairman from the SEC. No Board could introduce or modify a tariff without prior consideration by the Committee.

Considerable progress was achieved during the first five years after reorganisation. In July 1977 there were about 180 different tariff levels throughout Queensland; by July 1981 these had been reduced to 72 and by July 1982 to 49.[47] In July 1977 domestic consumers in Townsville were paying 45% more than people in Brisbane; by July 1983 the margin had been reduced to 6.3%.[48] Moreover, in 1977 domestic consumers were charged at four different tariffs within the NORQEB area; lower tariffs applied in NORQEB's coastal system than in most western centres.[49] In mid-1982 the government decided to aim for uniform tariffs by mid-1986, an objective since realised.

The decade or so since the inception of NORQEB has been one of the most difficult in the history of the electricity supply industry, not only in Queensland but throughout Australia. Pressures have come simultaneously from many different directions: the general economic downturn, slower growth of electricity consumption, excess capacity in the industry, rising costs and prices and, as the next chapter shows, industrial discord and increasing political intervention.

During this period the growth of electricity consumption slowed markedly. Whereas in the previous decade annual increases of about 7.5% had been the rule, in the period from 1977 to 1987 growth rates averaged 6% and actually fell under 1% in 1977-78 and 1978-79. (See Table 10). In the early 80s growth in consumer numbers was maintained but average consumption fell; after 1985 these trends were reversed. At the same time other areas of Board activity, such as appliance retailing, also showed a noticeable downturn. Attitudes and expectations appropriate to a period of high growth were forced to undergo a radical modification.

During the long economic boom which Australia enjoyed after the Second World War, sales of electricity rose steadily, growing faster than Australia's national product. In the late 1970s, in the context of slower economic growth following the second round of OPEC-induced oil price rises, expansion of electricity sales began to slow. As a result most electricity supply authorities throughout Australia faced the problem of excess capacity by the mid-1980s.[50] In Queensland this problem was exacerbated by the abandonment of several large industrial projects, notably in aluminium processing.

At the same time the long term decline in the real price of electricity came to a halt, partly because of the increasing problem of excess capacity; higher fuel, labour

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47. Mem. 3130, Book No. 22.
48. NORQEB File 3.5.OB.
49. Mem. 232, Book No. 2.
50. G.D. McColl, "Economic Issues Facing Electricity Supply Authorities", p.28.

Table 10: NORQEB ELECTRICITY SALES

	Sales (,000 kWh)	% Increase
1977-89	741 000	9.7
1978-79	743 893	0.4
1979-80	786 055	5.7
1980-81	831 830	5.8
1981-82	912 221	9.7
1982-83	949 556	4.1
1983-84	987 666	5.8
1984-85	1 043 378	5.6
1985-86	1 113 210	6.7
1986-87	1 186 284	6.6

and capital costs also contributed to hikes in power prices. From 1980 to 1985, when the Consumer Price Index (CPI) rose by 48%, NORQEB's wages increased by 64%, the cost of conductor rose by 86%, while the index for all electrical materials gained 55%.[51] In the 1960s and 1970s electricity prices in Queensland had increased more slowly than the general price level - thus the *real* price of electricity actually fell. But each year from 1981 to 1985 electricity prices rose faster than the general level of prices, as measured by the CPI. These price increases drew critical attention from the Queensland government and pressure was put on the industry to contain price rises to less than half increases in the CPI - a formidable task in the circumstances.[52] The government wished by means of lower power prices both to attract big industrialists to Queensland and to placate disgruntled electricity consumers.

The QEC was given the task of streamlining the industry, promoting greater efficiency, evaluating which parts of the workload were really essential, and introducing greater flexibility into work and management practices.[53] The Minister for Mines and Energy, Ivan Gibbs, directed that "the industry must become leaner and behave more like private enterprise".[54]

In 1985 NORQEB committed itself to reducing costs by $14.6 million over five years, an exercise in stringent cost containment necessitating fundamental changes in the Board's cost structure. Measures implemented included de-commissioning less efficient generating plant, reducing the use of standby plant, deferring or abandoning planned capital works, financing more capital works internally, imposing staff ceilings, cutting overtime, and limiting the growth of operating expenses. Preferring to reduce staff numbers by voluntary retrenchment or natural attrition, NORQEB produced a redundancy package to tempt staff into retirement with attractive superannuation

51. *NORQEB Annual Report, 1984-85*, p.19.
52. Mem. 4236, Book No. 31.
53. *Ibid.*
54. NORQEB Min, 30 January 1986, p.1331.

payouts.[55] The practical implications of these changes were that NORQEB was forced to give priority to essential maintenance work, taking supply to new consumers and restoring supply in emergencies; augmentation of the distribution system, pole inspections, earth testing, regular inspection of installations and so on had to be accommodated as resources permitted.[56]

In early 1986 a Project Team was set up to investigate options for reducing costs. The team looked at the whole spectrum of Board activities and made numerous recommendations on matters ranging from vehicle replacement, to repairing rather than replacing poles, to lengthening the period between meter readings.[57] Other strategies given consideration included "meterless billing", basing domestic tariffs on maximum demand rather than on actual consumption, and charging in advance rather than in arrears.[58]

The Board met the challenge of reducing costs, despite some unexpected emergency outlays such as repairing damage wreaked by Cyclone Winifred in the Ingham district in 1986. Through a combination of resignations, retirements, voluntary retrenchment and a small number of forced redundancies, the number of staff was reduced. At the end of 1986 the number of employees actually fell below staffing at the Board's inception, despite increases over the period of 26% in consumers, 76% in length of lines serviced and 55% in power sold. (See Table 11). Reductions were also achieved in the NORQEB vehicle fleet. Maintenance costs were reduced by means of infra-red cameras and monitors to detect incipient faults on overhead mains. By these and many similar methods the Board succeeded in meeting its cost reduction targets. This in turn allowed tariff increases to be contained; in the first ten years of NORQEB's operation the real price of domestic electricity fell by 6%,[59] an achievement attributable to cost control and the government's tariff equalisation policy.

One section of NORQEB which suffered a significant decline in the early 1980s was appliance retailing. The economic forces mentioned earlier, as well as other more specific influences, accounted for the falling off in appliance sales. A number of measures were taken to cut costs and promote efficiency in order to maintain the viability of the trading department; by the late 1980s appliance trading was booming again.

When NORQEB took over from TREB, the trading department was expanding, confident and flushed with success: during the 1976-77 financial year retailing had maintained its previous upward trend, reaching a record sales level of $4.87 million, which represented an increase of $0.81 million or 20% for the year.[60] This achievement was partly attributed to a contract entered into with NARTA, the national buying group, who were able to supply a range of products more cheaply.

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55. NORQEB Min, 30 January 1986, pp.1332-6; 24 April 1986, p.1373.
56. NORQEB Min, 31 October 1985, p.1292.
57. Mem. 4346, Book No. 32.
58. Mem. 4379, Book No. 32.
59. *NORQEB Annual Report, 1986-87*, p.9.
60. Mem. 60, Book No. 1.

Table 11: NORQEB CONSUMERS AND STAFF

	Consumers	Staff
1977-78	61 209	734
1978-79	62 649	731
1979-80	63 972	737
1980-81	65 698	734
1981-82	67 810	748
1982-83	69 657	773
1983-84	71 921	758
1984-85	73 905	748
1985-86	75 324	705
1986-87	76 302	652

Even as early as 1977, however, there were numerous portents of decline. TREB had always maintained a fine record in retailing, but elsewhere trading departments were increasingly in financial trouble. As early as mid-1976 there were rumours and publicity suggesting that Regional Boards would be divested of their retailing functions, suggestions to which TREB strongly objected.[61] All the same, when the Mount Isa region was incorporated within NORQEB in 1977, the Board decided against venturing into retailing there because of the downturn in sales elsewhere.[62] One by one the other Electricity Boards abandoned appliance retailing as their trading departments became unprofitable.

The market for electrical appliances had become much more competitive. Economic recession had reduced consumer demand for appliances. As the rate of increase of electricity consumers slowed, so too did sales of appliances. At the same time the rate of technological innovation in the appliance field had declined, so that fewer new appliances appeared on the market each year: "the appliance industry is currently faced with high saturation in colour TV, videos and micro-wave ovens and there is no 'magic' product emerging to keep the impetus going". Competing for shares of a shrinking market, retailers resorted to price discounting, paring away profit margins, with several large southern firms setting the pace by relying on high turnover to obtain adequate returns.

Stiffer competition forced NORQEB to re-evaluate trading policies and streamline its retailing department. Advertising was stepped up in order to hold a share of the market. In 1982 NORQEB broke with tradition and abandoned appliance displays at local Shows; instead more effective forms of advertising through television, press, radio and catalogues were intensified, with major promotions scheduled quarterly.

A market survey commissioned in 1980 from Associate-Professor W. Grichting of James Cook University indicated that over 95% of respondents were in favour of

61. Mem. Nos. 467 and 540, Book No. 4.
62. NORQEB Min, 24 November 1977, p.71.

NORQEB's continuing to sell appliances, but also revealed particular areas of weakness such as in marketing stereos and small appliances.[63] In 1986 NORQEB saw advantage in switching from NARTA to the Retravision buying group, whose Queensland warehouse would allow quicker and easier access to appliances. Although NORQEB is still committed to after-sales service, it is now performed mainly by sub-contracted service agents, except in the mid-west where NORQEB is often the only electrical retailer providing after-sales service; in the coastal districts, however, the number of servicing outlets was reduced and facilities were centralised in Townsville. By these means the trading department managed to survive in an increasingly tight market. In 1985-86, for instance, when there was a 25% fall in appliance turnover nation-wide, NORQEB's decrease was only 13%.[64] NORQEB is currently the only Electricity Board in Queensland still in retailing.

From 1946 TREB and then NORQEB have maintained an excellent record in appliance sales compared to other Boards; this is largely attributable to quality and enthusiasm of management. Bill Rooney set the department upon a firm footing and gave it continuity of management from 1950 to 1982. Barry Thomson took it over in a stressful period, maintaining it in spite of growing pressure. Part of the profits earned from retailing was transferred to the Boards' operating funds, subsidising general operations. In 1986 a survey of customer perceptions by the Dangar research group confirmed Grichting's finding that the community generally supported NORQEB's involvement in retailing, partly in the belief that competing in the market place helps keep the Board in touch with economic realities.[65]

A survey of appliance use in the NORQEB area in 1985 showed the high degree of market penetration by some of the most modern domestic appliances. Almost all consumers had a refrigerator, 37% had a second fridge, and 65% also owned a separate freezer. Washing machines had a market penetration of 99%; 46% of respondents also owned a clothes dryer. There was a dramatic increase in installation of domestic airconditioning in the early 1980s, which tapered off by mid-decade; by then 37% of consumers had one or more airconditioners in their home. Water heating was an area of weakness, the market shares of both electric water heaters and gas heaters declining slightly from the late 1970s as a result of the growing popularity of solar hot water systems.[66] NORQEB adopted promotional schemes to encourage domestic airconditioning and to reduce the cost of electric water heating by means of lower night-rate heating tariffs.[67] About 80% of consumers used an electric range, the market shares of electric and gas stoves remaining steady; however in the early 1980s there was great demand for microwave ovens, which by 1985 were being used by 25% of consumers. These market statistics testify to what is obvious yet seldom recognised consciously: the enormous effect the advent of electricity has had on the daily lives of north Queenslanders.

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63. Mem. 1669, Book No. 12.
64. *NORQEB Annual Report, 1985-86*, pp.10-1.
65. Interview with David Pearse, 21 April 1987.
66. Mem. 3739, Book No. 27.
67. NORQEB Min, 26 March 1986, p.1367; 24 April 1986, p.1378.

CHAPTER EIGHT

INDUSTRIAL RELATIONS

Apart from a notorious period in the 1970s and early 1980s, industrial relations in the electricity supply industry have been remarkably harmonious, especially considering the essential nature of the service, which can be used to bargaining advantage by both unions and management. Several reasons can be advanced to explain the industrial peace which prevailed before 1970: the small-scale, isolated pattern of development of the industry, which precluded large concentrations of workers; undeveloped union organisation; strong rivalry for membership among the many unions in the industry, which made co-operation on industrial action more difficult; and the conservative ideology often associated with craft unions of skilled workers, exacerbated during the 1950s and early 1960s by the influence of extreme right-wing elements. The 1970s and early 80s brought a marked change in industrial relations: electricity unions, especially the Electrical Trades Union (ETU), gained reputations for militancy and extracted concessions from management which set trends for many other industries. In clear contrast is the "harmony" which descended on the industry in the mid-1980s, though it is probably more apparent than real, imposed as it is through legislation restricting the activities of unions in essential industries; legislation in 1985 inaugurated a new regime by effectively undermining the industry's once-powerful trade unions.

Trends in industrial relations reflected developments in the Australian economy, as well as changes within the industry itself. The harmony apparent after the Second World War was associated with a period of near full employment in Australia, and with constant expansion of electricity supply; during this period management was well-placed to meet union demands for improved conditions. Conversely, the unusual turbulence of the 1970s and 1980s was linked to problems in the Australian economy, together with changes in the industry and in the ETU. Growing unemployment, a sluggish economy and excess capacity in the industry were reflected in increasing industrial discord, leading finally to the Queensland government's victory in imposing industrial legislation of exceptional severity.

A large number of unions have been involved in the electricity industry, though none concerned exclusively with electricity supply workers. These unions' relative influence varied over time depending on a range of factors, including the strength of their organisation and technological change within the industry. Among the first unions to enrol electricity supply workers was the Amalgamated Engineering Union, which developed an organisation in north Queensland mainly to cater for railway workers and meat workers; as other unions grew and established organisations in the north, members were attracted from the AEU. The Federated Engine Drivers' and Firemen's Association was also an important union in the early period of small, coal-fired power stations, and it grew more militant in the late 1930s and 1940s; but its significance declined within the modern industry and its relevance for TREB and NORQEB was diminished when TREB was divested of most of its responsibilities for power generation in 1964. Other unions which have played important roles in electricity supply include the Municipal Officers' Association, the Federated Clerks' Union, the Amalgamated Society of Engineers, the Amalgamated Metal Workers' Union, the Australian Workers' Union, the Plumbers' and Gasfitters' Employees' Union, the

Building Workers' Industrial Union, the Association of Professional Engineers Australia, the Association of Architects, Engineers, Surveyors and Draftsmen of Australia, and of course the ETU.

Because of the large number of unions involved, the time span of over 60 years and the large geographical extent of NORQEB, this chapter will discuss only selected aspects of union organisation and activity. First, the development of union organisation in north Queensland by the AEU and ETU is outlined briefly. The policies pursued by the Queensland branch of the ETU are then discussed. Labour relations are best approached by concentrating on the ETU, the dominant union in the industry since 1920. For several reasons, the history of the ETU in Townsville from the 1950s is the main focus of attention. Before this period the union was very small, its organisation faltering. Townsville was the centre of organisation, as regional capital and the location of TREB and NORQEB headquarters. Unions in outside centres were smaller and usually dependent upon organisers who travelled from Townsville. Moreover, western employees were almost invariably more conservative with regard to industrial action; even during State-wide strikes, they went out later and returned earlier than those in the larger coastal towns. The Townsville sub-branch was therefore the source of most union initiatives in the north.

In the early years of electricity supply in north Queensland, many workers were organised by the pioneering Amalgamated Society of Engineers (ASE), and its successor, the Amalgamated Engineering Union (AEU), whose awards covered electrical fitters and mechanics. The ASE established a branch in Townsville as early as the 1890s and, following the fusion of the ASE and nine other metal trades unions to form the AEU in 1920, the new union appointed a resident organiser based in Townsville from 1921.[1]

Electrical workers enrolled by the AEU gradually transferred to the ETU as its organisation in the north grew in scope and sophistication. The AEU was then left with coverage of a range of occupations within electric authorities, including shift engineers in power stations, control room operators, and engineering maintenance staff such as fitters and turners, boilermakers and blacksmiths, and motor mechanics. Despite some friction over loss of members, and periodic demarcation disputes, the AEU and ETU generally co-operated as kindred unions.[2]

More militant than most craft unions, the AEU became responsible for the establishment through arbitration of margins for skill; the fitter's margin was used by arbitration tribunals as the reference point for all skill margins. Through the highly-structured Australian wage system, gains achieved by AEU militancy flowed on to members of other unions. In 1972 the AEU amalgamated with the Boilermakers' and Blacksmiths' Society and the Sheet Metal Workers' Union to form the

1. For the history of the ASE, see K.D. Buckley, *The Amalgamated Engineers in Australia, 1852-1920*, Canberra, 1970.
2. Interview with Fred Thompson, 24 September 1987.

Amalgamated Metal Workers' Union, which by the 1980s had become Australia's largest trade union with a formidable reputation for industrial strength and militancy.[3]

Although several other unions were in the field before the ETU, which had no branch in Queensland until June 1915, by the 1920s it had established a dominant position within the electricity industry, enrolling a large majority of employees. The ETU covered a range of occupations within the industry including electrical fitters, armature winders, electrical mechanics, railway electricians, telephone fitters, cable jointers, linesmen, arc lamp trimmers, electricians and switchboard attendants. The membership thus comprised skilled tradesmen, semi-skilled and unskilled workers, apprentices and juniors. As well as employees of electricity supply authorities, the union recruited from manufacturing, mining, sugar milling, transport and electrical contracting.[4]

To conduct its affairs in north Queensland, the ETU appointed agents in early 1919: A.F. Wallace for the Townsville area and R. St Clair at Home Hill. In north Queensland the first recorded clash between the union and an employer occurred at Home Hill on the Queensland government's Inkerman Irrigation Scheme. In June 1919 R. St Clair pointed out that the government had engaged a worker who was not a member of the union. The anomaly was quickly rectified: the man joined the union and paid fees outstanding from the date of employment. But soon after St Clair was dismissed in what the union executive viewed as a clear case of victimisation. St Clair was eventually reinstated following discussions between the minister and the union.[5]

In succeeding years the northern agents were replaced, and membership gradually increased. By 1940 there were about 50 union members employed by the Council's electric authority in Townsville, as well as members working for the railway and for contractors, and a small number in electrical retail outlets. Organisation was poorly developed and rather spasmodic, however, only a handful of members attending meetings; one of the greatest obstacles to improving organisation was fragmentation of membership between industries and work sites. Through delegates appointed to the local Trades and Labor Council the ETU developed co-operative relationships with other unions, but at this time the ETU was by no means militant; industrial disputes were rare and usually brief. After the establishment of TREB in 1946, industrial conflict increased somewhat with the advent of the professional engineer, who sometimes encroached upon what had previously been regarded as tradesmen's work; this provoked a series of short stoppages until demarcation lines were drawn.[6]

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3. For the history of the AEU, see T. Sheridan, *Mindful Militants: The Amalgamated Engineering Union in Australia 1920-1972*, Cambridge, 1975. P. Huntley, *Inside Australia's Largest Trade Union*, Canberra, 1980.
4. A history of the Queensland branch was compiled by Archie Dawson, who for nearly 20 years (1944-63) was Secretary of the union. See A. Dawson, *Points and Politics: A History of the Electrical Trades Union of Queensland*, Brisbane, 1978.
5. *Ibid.*, pp.46-7.
6. Interview with Alan Hunter, 5 October 1987. Interview with Les Davies, 13 October 1987.

By the 1950s sub-branches of the union had been established in Townsville and Mount Isa, with agencies in Bowen and Charters Towers.[7] Under the leadership of Archie Dawson the Queensland branch was unwilling to incur the expense of a full-time northern organiser, so it was not until 1962 that an ETU organiser, Terry Madden, was transferred from Brisbane to Townsville.[8] This venture fell through after a couple of years as a result of mounting dissatisfaction in the north with Madden's performance. Influential left-wing members campaigned for the appointment of another northern organiser, preferably of their own political persuasion, but not until 1969 was Col Emery, a State organiser from Brisbane, appointed as a full-time paid official in Townsville. Both Madden and Emery worked from home until an ETU office was finally opened in Townsville in mid-1976.[9]

Immediately after its formation in 1915, the ETU, in common with most unions of the period, was concerned with the broad industrial and political issues of the eight-hour day, conscription for overseas service, and the importation of cheap foreign labour. Particular ETU objectives were the introduction of an apprenticeship system and, more generally, classification and regulation of employment in the electrical industry: the original constitution referred specifically to the union's aims "to advance the trade interests of members; to secure a proper classification of the workers in the industry; to obtain adequate pay for our members, and institution and maintenance of the apprenticeship system".[10] Classification and licensing were to be among the union's foremost aims over the next 50 years.

The dangers associated with incompetent electrical work gave the ETU a persuasive rationale for demanding regulation and licensing. But other motives may have been at work, motives which seem to have applied in similar instances of union activity both in Australia and overseas, including enhancement of occupational status through the enforcement of educational standards, and increasing market power and wage rates by restricting entry into particular occupational categories.[11] At their worst, the effects of such schemes of regulation and licensing can be

> to create a system, not markedly different from the medieval guilds, whereby occupations are rigidly segmented, individuals are denied the right to work in their chosen field, existing practitioners are sheltered from the threat of external competition, numbers within the various callings are kept artificially low and prices as a result increase.[12]

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7. Dawson, *Points and Politics*, pp.150-1.
8. *Ibid.*, p.173.
9. Interview with Col Emery, 6 October 1987.
10. Dawson, *Points and Politics*, p.45.
11. A.J. Duggan, "Occupational Licensing and the Consumer Interest", in A.J. Duggan & L.W. Darvall (eds.), *Consumer Protection : Law and Theory* Sydney, 1980, pp.163-81. R. Albon & G. Lindsay (eds.), *Occupational Regulation and the Public Interest: Competition or Monopoly?* CIS Readings, Sydney, 1984. A. Maurizi, "Occupational Licensing and the Public Interest", *Journal of Political Economy*, Vol.82, No.2, Part 1, Mar-Apr 1974, pp.399-413.
12. Duggan, "Occupational Licensing", p.173.

The question of the union's motives for supporting classification and licensing is one difficult to resolve in the absence of appropriate and conclusive evidence; suffice it to say that a great many unions in a variety of countries have strenuously promoted occupational regulation, ostensibly for altruistic reasons of consumer protection, and it seems salutary to ask, *cui bono*?

Formation of the Queensland branch of the ETU coincided with the advent of Queensland's first fully-fledged Labor government under T.J. Ryan; this began a period of Labor hegemony which lasted until 1929, when the pressures of economic depression and growing dissension within the ruling party combined to defeat the McCormack ministry. Under Labor governments, the ETU's demands for occupational regulation were gradually acceded to, though the foundations of a regulatory system had been laid under a conservative government as early as 1914.

In 1914 a Board of Examiners was constituted under the Electric Light and Power Act (1896) to examine and issue certificates of competency to electrical wiremen, mechanics and jointers.[13] The first Board appointed in September 1914 comprised five members: one representative each from the Department of Public Instruction, the Fire Underwriters' Association of Queensland, the electric authorities, the employers in the industry and employees.[14] It was empowered to make By-laws concerning procedure, examinations, certificates, fees, circumstances in which certificates would be granted without examination, and cancellation and suspension of certificates.

The first set of By-laws which took effect in January 1916 conceded a certificate without examination to employees who had at least five years experience in the trade.[15] Work experience was also required as a prerequisite to sitting an examination. For example, an applicant for certification as an electrical wireman had to have worked for at least three years as an apprentice or four years as an improver, as well as attending training courses; for electrical mechanics five years as an apprentice or six as an improver were necessary.[16] The examinations covered calculation, sketching, knowledge of the Fire Underwriters' Rules, and practical work. The Board of Examiners was involved in the design and establishment of technical training courses leading to the examinations. Throughout Queensland apprentices undertook such courses by correspondence, until the 1950s in their own time and at their own expense.

In 1920 there were two important changes in this system of certification. A significant concession was made to the ETU as the industry's dominant union when, in February 1920, a representative nominated by the union was added to the Board of Examiners.[17] In June 1920 certification was extended to linesmen;[18] previously labourers had simply been employed as linesmen as and when required.

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13. *QGG*, 4 July 1914, p.47.
14. *Ibid.*, 26 September 1914.
15. *Ibid.*, 16 October 1915.
16. Dawson, *Points and Politics*, pp.50-1.
17. *QGG*, 19 February 1920, p.715.
18. *Ibid.*, 12 June 1920, p.2335.

Despite increasing sophistication in the system of certification, there was as yet no legal obstacle to employing workers without certificates of competency. At this time local electric authorities usually granted their own certificates allowing tradesmen to work on their reticulation systems, but certification by the Board of Examiners was not a necessary qualification. The ETU applied increasing pressure on the government to implement a more stringent licensing system.[19] In early 1923 the ETU gained Labor Party support for an even more ambitious regulatory objective: the establishment of "a board of electricity commissioners ... to organise electrical undertakings".[20]

Although more than a decade would elapse before the Labor Party took the first steps towards public control and ownership, at the end of 1923 the Theodore government did pass the Electrical Workers Act, a goal towards which the ETU had striven for many years. In September, W. Forgan Smith as Secretary for Public Works introduced the Bill "to make better provision for the execution of electrical works by competent persons and for the examination of electrical workers and the granting of certificates to them".[21] The minister's main justification for the legislation was the need to protect both persons and property from faulty electrical installations.

Forgan Smith pointed to inadequacies in the existing system of certification. Certificates issued by electric authorities applied only within the local area so that itinerant tradesmen had to re-apply for certification whenever they moved to a new district; issue of certificates was at the whim of the local electric authority and therefore subject to abuse; and, above all, electrical workers were not legally required to hold certificates of competency in order to be employed in the industry.[22] To overcome these deficiencies he proposed a system of compulsory certificates, issued by a Board and valid throughout the State.

The previous Board of Examiners would be expanded to include eight members: a representative of the government who would act as chairman; a representative nominated by the Fire Underwriters' Association of Queensland; one representative elected by the electric authorities; one member chosen by employers in the industry; two representatives elected by certificated employees and two nominated by the Queensland branch of the ETU. The government's proposal therefore involved an increase in membership of the Board from six to eight and a significant shift in its internal balance towards greater weight for employees' representatives. The new Electrical Workers' Board would issue certificates in four different trades: electrical fitting, electrical mechanics, electrical jointing and linework. Like most legislation of its kind,[23] the Bill included safeguards for those currently employed in the industry:

> Those who now hold certificates of competency under the Act [of 1896]...will be entitled to a certificate under this Bill. The men who have been engaged in the electrical calling for some time past will be entitled to certificates of service without examination, but others will have to sit for

19. Dawson, *Points and Politics*, p.53.
20. Official Record of 11th Queensland Labor-in-Politics Convention, March 1923, pp.52-3.
21. *QPD*, Vol.142, 1923, p.1203.
22. *Ibid.*, p.1242, p.1442.
23. Albon & Lindsay (eds.), *Occupational Regulation*, p.4.

> the necessary examination and show their proficiency before certificates will be granted.[24]

For existing employees, three years' experience as a journeyman was deemed sufficient to obtain a certificate and workers were given one year to apply.[25]

The minister himself acknowledged a potential danger of the legislation, though unlike most Opposition speakers he maintained that the Bill included adequate safeguards:

> We know that there is a tendency in a trade, calling or profession that is given protection by statute for those engaged in that trade, calling, or profession, after they get into it, to create a close corporation with a view to eliminating competition as far as possible and securing any advantage that may accrue to them thereby.[26]

Forgan Smith contended that the requirement for government approval of the standard of examination set by the Board was sufficient protection against this "tendency in human nature". However several members of the Opposition, most notably the leader of the Country Party, Arthur Moore, feared that the legislation and in particular the composition of the Board would encourage restriction of entry and monopoly;[27] the possibility of the union's using the Board as a political instrument to impose union policy or discriminate against political opponents was also raised.[28] The minister justified heavy employee representation, arguing that the Board's decisions would primarily and directly affect the interests and livelihoods of workers in the industry. Many such regulatory bodies have a predominance of industry interests, usually justified on similar grounds, though policy analysts generally recommend that if occupational regulation is deemed necessary in the public interest, its dangers are best avoided by a widely representative administrative body.[29]

Despite some opposition centring on the composition of the Board, the Electrical Workers Bill was quickly passed without significant amendment and received assent in October. In January 1924 the first Electrical Workers' Board was appointed and twice-yearly examinations consisting of both written and practical tests were introduced. By 1927 there were 1,100 certificated electrical workers in Queensland.[30]

The Opposition repeated many of the arguments raised in 1923, though with more vehemence and persistence, when in 1927 the McCormack government decided to repeal the 1923 legislation and enact a revised Electrical Workers Bill. The government's intentions were to expand the Electrical Workers' Board by adding a second government representative with qualifications as an electrician; to define the trade categories of electrical fitter, mechanic, jointer, and linesman in accordance with industrial award classifications and to appoint an industrial inspectorate to check that

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24. *QPD*, Vol.142, 1923, p.1242.
25. *Ibid.*, p.1446, p.1455.
26. *Ibid.*, p.1442.
27. Moore, *ibid.*, p.1443. Cf., Swayne, *ibid.*, p.1444; Vowles, *ibid.*, p.1447.
28. *Ibid.*, p.1444.
29. Duggan, "Occupational Licensing", p.181.
30. *QPD*, Vol.150, 1927, p.1345.

employees were actually doing work for which they held certificates; and to formalise the appointment of technical inspectors by electric authorities and provide for those inspectors to report defective work to the Electrical Workers' Board.[31]

Opposition focused on the first two proposals and especially, as in 1923, on the composition of the Board. Conservative members wanted the Board reduced rather than enlarged, preferably to five instead of the proposed nine; they also wanted employee representation on the "lopsided Board" decreased, two members representing employees, two elected by employers and one government appointee as Chairman being the desired balance.[32] Opposition speakers agreed that the system inaugurated in 1924 had produced disastrous results:

> The unfortunate position to-day is that this board is dominated by union representatives, and, as a result, very many capable men are kept out of employment, because the union is able to make a close corporation of the calling by refusing to grant certificates of competency to certain men in the industry.[33]

Fears were expressed that the new legislation would only exacerbate these effects.[34]

The Opposition were also concerned about the government's attempt to impose a more rigid structure of occupational categories. The original Bill would have made it extremely difficult for any worker who qualified in one branch of the electrical trade, say as a mechanic or linesman, to apply later to sit for a certificate in another category; however the minister, David Gledson, agreed to amend the Bill to ease movement between trade categories.[35] The problems of small rural electric authorities, whose staff were often required to perform work in all categories, also received attention; the minister added provision for a "general certificate of competency" to be issued for periods up to six months if the Board considered circumstances warranted it.[36] Despite these concessions by the government on particular points, the overall effect of the new Act was to tighten still further occupational regulation within the industry.

In 1931 the conservative government took advantage of their temporary parliamentary majority to amend the Electrical Workers Act in line with their long-held views. The Board was reduced to five members representing the government, the Fire Underwriters, electric authorities, employers and employees. The Labor Party protested bitterly at the cut in employee representation from four to one, complaining of "a vicious attack on unionism"; the minister replied disingenuously that the Board was a technical not a political body.[37] Other policies of the Moore government were clearly intended to undermine the union movement: the 44 hour week was repealed, over-time payments and workers' compensation reduced, and some statutory holidays were eliminated; the Apprenticeship Act was altered to the advantage of employers, wages

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31. *Ibid.*, pp.1193-4.
32. Russell, *ibid.*, p.1195. Moore, *ibid.*, p.1198.
33. Kerr, *QPD*, Vol.149, 1927, p.437.
34. Russell, *QPD*, Vol.150, 1927, p.1196. Moore, *ibid.*, p.1338.
35. *Ibid.*, p.1375.
36. *Ibid.*, p.1376.
37. *QPD*, Vol.160, 1931, p.2526.

were cut, public works curtailed, and "preference" in employment for unionists, which the Industrial Court had granted to the ETU and ASE in 1920, was withdrawn.[38] Most of these benefits were regained gradually following Labor's return to government in 1932, but the composition of the Electrical Workers' Board was not altered.

In fact little change occurred in the regulatory structure until 1962, when the Electrical Workers and Contractors Act modified the system of licensing tradesmen as well as introducing State-wide licensing for the 1,500 electrical contractors in Queensland. Previously contractors had to obtain permits from electricity supply authorities before undertaking installation work for connection to their systems; the new licensing system was introduced at the suggestion of the Contractors' Association, whose aims included eliminating competition from "week-end contractors" who held other jobs during the week.[39] At the same time a representative of the SEC was added to the Board, renamed the Electrical Workers and Contractors Board. The new Act also introduced "restricted certificates" for those required to perform electrical work within a specific field, such as refrigeration or television, as part of their trade or calling;[40] this provision aroused a good deal of opposition from the Labor Party and ETU on the ground that the servicing of electrical equipment should be reserved to fully-qualified electrical tradesmen.

By the 1960s electrical unions had turned attention to other issues, especially safety, partly because of dangers associated with new technology. Problem areas included the use of vacuum pressure impregnated poles, treated with copper chrome arsenate to curb white ants and recognisable by their green colouring; introduced in the early 1960s, they were soon found to be semi-conductors.[41]

Another cause of serious concern was live-line work, a potentially hazardous technique which was perhaps encouraged by the statutory requirement to provide a 24-hour supply; work on low voltage reticulation had frequently been carried out on live lines and a new technique extended this to the high voltage system. In an effort to curb the sudden increase of fatal accidents in line work in the early 1960s, the ETU put pressure on the government to set up an Electrical Industry Safety Advisory Committee under the aegis of the SEC. The Committee, which included representatives of the union, drew up a new scheme for training linesmen: a year-long correspondence course and an intensive eight-week course at the Rocklea linesmen's training school, which had been opened in Brisbane in 1967, followed by an examination set by the Board. Previously applicants for a linesman's certificate had merely required two years' experience as a labourer or tradesman's assistant and three months' training on dead-line work before sitting for the Board's examination. In parliament D.J. Sherrington, who had worked in the electricity industry in the 1950s, vividly described the dangers:

> I can remember criticising the set-up that existed under the old scheme before the setting up of the Safety Council. Under that scheme, completely

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38. Dawson, *Points and Politics*, pp.110-1.
39. *QPD*, Vol.232, 1961-62, p.2119.
40. *Ibid.*, p.2118.
41. Interview with Bob Graham, 14 February 1986. Interview with John Hill, 16 September 1987.

> untrained persons were permitted to act as tradesmen's assistants to the linesmen. I have seen men who were employed in a hole-sinking team graduate to the role of linesmen's assistant without any training in resuscitation work. That could lead to a potential tragedy if a linesman were caught on a live line, because his assistant would not have the faintest idea how to rescue him. A maximum period of three minutes can elapse from the time of contact until resuscitation commences if there is to be any chance of saving the patient's life. When working for authorities I have seen untrained personnel - untrained even in methods of resuscitation - permitted to act as assistants to linesmen who were working daily within inches of a 415-volt supply. I applaud the fact that, because of the safety conferences many of these practices have been eliminated.[42]

By amendment of the Electrical Workers and Contractors Act the new training scheme was made compulsory for certification as a linesman.[43]

For most of its history the ETU took a notably moderate approach to industrial relations, perhaps a reflection of the large membership of skilled tradesmen, the aristocracy of labour, who tend to be more conservative than the unskilled constituency of industrial unions. Indeed, part of the significance of the quest for classification and regulation outlined above was that it was supposed to endow particular trades with status and prestige distinguishing them from other workers, especially unskilled labourers; by encouraging a sense of hierarchy within the labour force, by giving tradesmen a stake in the status quo and by cutting them off from fellow workers, industrial classification promoted a conservatism which prevailed until the 1970s.

In its early years industrial action by the ETU arose mainly out of demarcation disputes with other unions. From the beginning there was intense competition for enrolments between the ETU and a range of other unions such as the ASE, the Federated Engine Drivers' and Firemen's Association, the Australian Workers' Union and the Australian Railways Union. After the Second World War, for instance, there were several demarcation disputes between the ETU and AEU at Mount Isa, where sophisticated engineering equipment created problems in distinguishing between electrical and mechanical engineering work. Thus the electrically-driven "mules", the small locomotives used to haul trucks of ore at Mount Isa mines, were a source of demarcation conflict; finally it was agreed that an AEU tradesman would remove the bolts and outside plate from "mules" requiring servicing, the ETU would do the electrical maintenance or repair work, and the AEU would then refasten the plate.[44]

Some ETU members were involved in the lengthy Mount Morgan dispute of 1921-22, the 1946 meatworkers' strike and the 1948 railway dispute, but the first significant strike conducted by the ETU itself occurred in 1956 over the State Electrical Engineering Award. Incensed over long delays by the Industrial Court in considering their case for an industry-wide pay rise and other improvements in award conditions, the union first resorted to over-time bans; finally a belated decision granting far less

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42. *QPD*, Vol.248, 1967-68, pp.2630-1.
43. *Ibid.*, pp.2628-9.
44. Dawson, *Points and Politics*, p.182. Interview with Fred Thompson, 24 September 1987.

than the increase they had asked provoked a State-wide strike lasting three weeks in January-February 1956. A surprising departure for a union long dominated by conservatives, the strike was virtually forced upon a reluctant leadership by a groundswell of opinion among the rank and file and by rising support for strike action among conservative elements who provided the leaders' power base.[45]

In Townsville, as in Queensland as a whole, conservative members who opposed the use of strikes were entrenched in executive positions, while among ordinary members there was growing dissatisfaction with the existing leadership and its passivity. During the prelude to the 1956 strike, a radical group emerged from the rank and file and succeeded in carrying locally proposals for a series of rolling strikes (brief stoppages by sections of the work force in turn); it was argued that, as an alternative to a complete cessation of work, rolling strikes would avoid arousing public resentment against extended "blackouts" and the union who was usually blamed for them, and would keep members in their jobs and earning income. The proposals were considered by ETU members at stop work meetings throughout the State, but rejected in favour of the State-wide strike, which was implemented in Townsville as elsewhere.[46]

In managing the strike, Townsville organisers faced many difficulties. Local organisation was rudimentary, with no office or full-time official; the local Trades and Labor Council finally provided a room for the strike committee. When the strike was announced the conservative local president simply vanished. Leadership from Brisbane was also lacking; it proved nearly impossible to contact the Brisbane executive, several of the more conservative of whom had also disappeared suddenly. As one prominent organiser recalled, the Townsville branch felt "out on a limb". The strike was a sudden departure for which the union was ill-prepared. There was only limited provision for a strike fund to tide members over until they returned to work; some members, among the least well-off, found themselves without entitlement because their union contributions were not paid up. At the same time J. Saint-Smith as manager of TREB was difficult to deal with, giving no quarter to the union. Nevertheless, under stress several local members revealed organising ability. After the strike a more radical executive was installed, with Bert Jackson as president and Joe Brunskill as secretary.[47]

In response to the State-wide strike the Labor Premier, V.C. Gair, invoked power restrictions and declared a state of emergency, but finally the government relented and expressed a willingness to countenance a substantial increase in pay. In the Industrial Court the ETU justified the pay claim in terms of the industry's rising prosperity and the need to bring conditions of employees in Queensland electric authorities into line with those prevailing in southern States. Eventually the Court granted an acceptable increase, larger than that previously offered though less than what the union had demanded; it was among the largest granted during this period. However the wage rise was not industry-wide as the union had sought, so as to improve the relative position of the growing body of unskilled workers in the ETU, but varied according to

45. Interview with Col Emery, 6 October 1987.
46. Interview with Bert Jackson, 1 October 1987. Dawson, *Points and Politics*, pp.203-5.
47. Interview with Bert Jackson, 1 October 1987. Interview with Les Davies, 13 October 1987.

occupational category through the "margins for skill" component of the wage structure; moreover it applied initially only to employees within electric authorities, though it was later extended to other employees under the award, including those working for electrical contractors and government departments.[48]

This first major industrial upheaval in the electricity industry cast interesting side-lights on political rifts within the ETU itself. During the 1950s the union executive had become dominated by adherents of the "Movement", a Catholic organisation formed after the Second World War to counter communist infiltration and gain control of Australian trade unions; they attempted unsuccessfully to capitalise on the 1956 dispute to enhance their power.[49] Internal dissension was to come to a head in the following year, after Premier Vince Gair's expulsion from the ALP and formation of the break-away Queensland Labor Party, when the right wing tried, again unsuccessfully, to obtain control of the ETU and end its long affiliation with the Australian Labor Party.[50] These events contributed to the gradual decline of conservative influence in a union which was once said to be run by "priests, politicians and publicans".

After the 1956 strike the ETU was involved, with other unions, in a number of industrial disputes, among the most bitter a series of strikes and lock-outs at Mount Isa mines. During the 1950s several trade unions attempted to improve the conditions of employees at Mount Isa, especially the safety of underground workers, but found Mount Isa Mines Limited firmly resistant, unwilling even to negotiate. In 1959 trouble erupted over the attempted dismissal of a union official, which was prevented by combined union action. In 1961 problems arose again when the company rejected union claims for an increase in bonus payments. Over-time bans and a four-hour stoppage had already disrupted production when the company decided, in September 1961, to close the mine, putting 3,900 employees out of work for eight weeks. In November when the Industrial Conciliation and Arbitration Commission ordered a return to work, unionists refused to comply, prompting the Nicklin government to declare a state of emergency; all the unions involved then agreed to resume work,[51] but a residue of bitterness remained and before long further industrial trouble broke out. In 1964-65 MIM Limited, their policy directed from the United States, seemed bent on undermining the unions, whose organisational strength and community support had grown through the experiences of 1959 and 1961. A lock-out was implemented for five months from December 1964 to April 1965, and even when a return to work was finally negotiated the company was able to refuse reinstatement to over 40 employees. Power station workers were not involved in the dispute, so electricity supply at Mount Isa had been unaffected. The outcome of the 1964-65 dispute was certainly not considered a success for the union movement, but later in 1965 MIM Limited displayed a

48. Dawson, *Points and Politics*, Chapter 21.
49. *Ibid.*, p.213-4.
50. *Ibid.*, p.164.
51. *Ibid.*, pp.225-9.

remarkable reversal of attitude: structures were established to facilitate negotiation, which proved very effective in preventing further industrial outbreaks.[52]

Collinsville, a community of about 2,000 with a strong tradition of militancy, was the scene of the next serious industrial confrontation in north Queensland's electricity industry. From the days of T.J. Ryan's Labor government, with their policy of state mining, Collinsville had been the location of Queensland's largest state-owned coal mine - until 1961 when, following a bout of industrial strife, the Nicklin government decided to sell the mine to a private company. Because of its proximity to ample coal reserves, Collinsville was chosen in the early 1960s as the site for a major thermal power station to feed NEA's northern grid.

During construction of the Collinsville power house, industrial conflict culminated in a 13-week lock-out of 200 workers in June-September 1967. The dispute arose when NEA's contractor, the construction firm of John Holland Pty Ltd, with support from the Queensland government and State Industrial Commission, rejected union claims for over-award allowances comparable to those paid at Gladstone. The issue of a standard State-wide agreement on conditions had arisen even before work commenced on the project: the Brisbane Trades and Labor Council had actively discouraged workers from taking jobs at Collinsville before the site allowance question was settled, until ordered to cease by the Industrial Commission. Later, members of several unions[53] resolved to institute rolling strikes in support of their claims. This resulted in mass dismissals, the lock-out, and recruitment of "scab" or "free" labour; feelings ran high during continuous union picketing of the site and several violent clashes occurred between sacked unionists and scabs. Finally agreement was reached between the parties involved and work resumed in early September.[54] Nevertheless, industrial conflict between unions and NEA was almost continuous at Collinsville throughout the 1970s; safety issues were paramount but there were also stoppages over transport, staffing scales and housing.

Within TREB itself industrial relations were relatively placid. During the period from the 1956 strike to 1969, Tom Priestley was manager of TREB; the achievement of industrial harmony was just one facet of his remarkable administrative record. Although there were a number of brief stoppages by TREB employees over matters such as safety and travelling allowances, through constant and thoughtful negotiation with the electrical unions, Priestley managed to nip industrial problems in the bud before they caused serious disruption.[55] Another moderating influence on industrial relations in north Queensland was the strength of an active right wing within the local

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52. Interview with Fred Thompson, 24 September 1987. See M.B. Cribb, "The Mount Isa Strikes, 1961, 1964", in D.J. Murphy (ed.), *The Big Strikes: Queensland 1889-1965,* Brisbane, 1983, pp.270-97.
53. The unions involved included the AEU, AWU, Boilermakers' and Blacksmiths' Society, Federated Ironworkers Association, Federated Engine Drivers and Firemen's Association, ETU, Building Workers' Industrial Union, Painters' Union, Plumbers' Union and Plasterers' Union.
54. Trades and Labor Council, *How Collinsville Was Won: The Story Behind a Magnificent Struggle*, Brisbane, 1968. QEC NA/14.
55. Interview with Fred Thompson, 24 September 1987.

ETU; associated with the Queensland Labor Party, this group countered any militant tendencies in a news sheet called, significantly, *Blackout*.

Nevertheless, during the 1960s the Queensland branch of the ETU was gradually undergoing a change of character: there was a discernible increase in grass-roots activism, as rank and file members questioned whether the union was really promoting their interests effectively, challenged the entrenched, conservative union hierarchy, and became more actively involved in organisation. To some extent this was associated with the growing numbers and influence of line workers as distinct from tradesmen; the linesmen, who were looked down upon by many of the older tradesmen, tended to be more active in union affairs and more militant in industrial outlook.[56] Reflecting these developments, the leadership of the Queensland branch passed from Archie Dawson to Neal Kane, who was closer to the left wing of the union; the influence of the "Movement", the Industrial Groups and the National Civic Council, which remained strong during the 1950s and early 1960s, gradually began to wane. At the same time a strong left-wing group emerged in the Townsville sub-branch to replace the old conservative leadership. After these changes had been accomplished, and with increasing bureaucratisation of union affairs during the 1970s, this spirit of grass-roots activity seemed to fade.[57] But because of improved organisation, the removal of conservative influences and the advent of new officials wishing to consolidate and enhance their positions, among other reasons, the 1970s and early 80s were for the ETU a period of unprecedented militancy.

During this period there were major strikes at power stations in Collinsville, Gladstone and at Swanbank, near Ipswich, which necessitated strict power rationing throughout the State. In the north, as elsewhere, stoppages increased in frequency. The main strikes of local origin occurred in August 1973 over allowances payable to workers constructing a power line from Helen's Hill just south of Ingham to the nickel mine at Greenvale; in 1974 as a result of a disagreement between the ETU and MOA over union membership; and in March 1979 over a blue collar employee's entitlement to time off work in order to take a university course of his choice.[58] The ETU was the main union involved in these local disputes, each of which lasted over three weeks. In the early 1980s industrial issues prominent in the north included travelling allowances and the standard of accommodation away from home; these accounted for seven disputes in 1981-83. There were also numerous short stoppages of local origin, as well as strikes over broader issues involving employees throughout Queensland. David Pearse won union leaders' respect by his reasonable, conciliatory approach in negotiations and his commitment to keeping lines of communication open, but his term as General Manager of NORQEB coincided with the industry's most tumultuous period in industrial relations.

Among the important State-wide issues of the 1970s and early 80s were wages and allowances, demarcation, flexitime and the introduction of a 35 hour week. By the 1970s the electricity industry had become one of the trade union movement's frontrunners in

56. Interview with Joe Brunskill, 16 November 1987.
57. Interview with John Hill, 16 September 1987. Interview with Bert Jackson, 1 October 1987.
58. Interview with Peter Pearson, 23 October 1987.

the ongoing struggle to improve wages and conditions; benefits won by militant electricity unions gradually trickled down to other industries through the arbitration system. By 1977 wages of TREB employees far surpassed the average of Queensland males, as Table 12 illustrates; employment in the industry was eagerly sought after.

Table 12: AVERAGE WEEKLY WAGES, 1946-77

	TREB Employees[59] $	Index 1946=100	Queensland Males $	Index 1946=100
1946	13	100	13[60]	100
1967	52	400	43[61]	331
1977	208	1600	148[62]	1138

In 1980, after a series of State-wide strikes in support of the 35 hour week, a 37 1/2 hour week was granted to employees who had previously worked 40 hours. By the end of the following year all outside staff had gained a 36 1/4 hour week, which brought them into line with conditions long enjoyed by office staff.[63] NORQEB consistently opposed the introduction of "flexitime" (flexible working hours during the day) because of anticipated disruptive effects, but in 1980 the Board ratified the nine day fortnight.[64]

In the late 1970s industrial relations deteriorated markedly, causing frequent and widespread strikes and blackouts. Because they impinged directly on the everyday activities of the public, these strikes were unpopular; this made the ETU vulnerable and gave the conservative government an excellent pretext for intervention to curb the union. In October 1979, at the height of industrial conflict over the 35 hour week, the government passed the Essential Services Act, which limited the electricity unions' resort to strike action.[65] Though it had little immediate impact, the legislation played a major part in escalating conflict between the Bjelke-Petersen government and the ETU in particular, which reached crisis point in early 1985 with the dismissal of over 900 SEQEB employees striking over proposals to extend the use of contract labour; the dismissed workers refused to return to work under conditions of increased hours, a ten day fortnight and a no-strike provision. Supported by ETU members throughout the State, the strike resulted in the loss of 14 working days by NORQEB staff in Townsville

59. *TDB*, 27 May 1968; J.A. Sheriff, notes for public address, based on TREB records, in author's possession.
60. *Queensland Year Book*, 1955, p.336.
61. *Ibid.*, 1968, p.407.
62. *Ibid.*, 1979, p.217.
63. NORQEB Min, July 1979-December 1981, p.695.
64. *Ibid.*, p.513.
65. *QPD*, Vol.279, 1979-80, p.1381.

and Mount Isa (and shorter periods in other centres), and caused severe load shedding in north Queensland through a 40% rationing order.[66]

The failure of the SEQEB strike, and the legislation enacted in its wake, effectively brought an end to ETU militancy. Under the Electricity Authorities Industrial Causes Act of 1985, strikes are illegal for employees of the electricity supply industry, on pain of immediate dismissal; virtually any departure from the employers' instructions can be defined as a strike.[67] Understandably industrial disputation has fallen off dramatically. Under the legislation unions cannot enforce compulsory membership, and clauses giving preference to unionists have been deleted from the awards. As a result of this and the unions' perceived impotence, membership has fallen and union funds have declined commensurately. The unions have tried to circumvent the hostile Queensland government by seeking awards under federal jurisdiction, but industry management, including NORQEB, staunchly opposes the move, and so far the Conciliation and Arbitration Commission and High Court have rejected the unions' applications.

Among many changes in work practices made possible by the new industrial regime is the relaxation of occupational demarcation, much of which had been imposed by union pressure. For instance, an electrician intending to work in a high voltage substation previously had assistance from a system operator to isolate supply, whereas nowadays he would have to isolate supply himself; for safety reasons the ETU is concerned about the absence of double checking,[68] while the industry argues that a competent tradesperson requires no assistance. Curtailing staff numbers has also been a prime objective of management: in 1984 NORQEB implemented a "manpower freeze" and by the end of 1986 a voluntary retrenchment scheme with attractive termination pay-outs was in force.

Prominent among industry cut-backs, the announcement in November 1986 of the government's decision to close the Collinsville power station aroused muted protest from electricity unions, for whom the loss of local employment is the primary concern. In 1985 NORQEB itself expressed concern about the social impact both locally and regionally of the proposed closure.[69] Some northern consumers, including vocal members of the North Queensland Self-Government League, maintain that north Queensland needs its own generating station and should not be forced to rely on transmission links with the southern power grid, but the closure is an integral part of the government's plans for rationalising the industry and centralising generation.

Within the prevailing industrial context of economic recession, financial stringency and government repression, demoralised and fearful unionists have been forced to comply with severe retrenchment and rationalisation. The boom conditions which in previous decades supported a prosperous, expansive industry no longer exist; excess capacity, declining growth rates and budgetary constraints have compelled both

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66. Mem. 3947, Book No. 29. NORQEB Min, July 1984-May 1986, p.1174.
67. *QPD*, Vol.298, 1984-85, p.4213.
68. Interview with Terry Gillman, 13 November 1987.
69. NORQEB Min, July 1984-May 1986, p.1249.

unionists and management to face the need for staff reduction, rationalisation of work practices and a general streamlining of operations. Threats of redundancy and increasing use of contract labour have combined with government intervention to produce a more compliant labour force and, correspondingly, a more dominant management.

CONCLUSION

This history of electricity supply in north Queensland has illustrated many features of the industry's development world-wide since the turn of the century: the trend from low to high volume production; from consumption by an elite to mass consumption; from small-scale, isolated supply to centralised generation feeding vast transmission networks; from private to public control or ownership; from simple to sophisticated technology; from operation by the self-taught and the jack-of-all-trades to professionalisation and trade regulation. As elsewhere, these outcomes have been conditioned by a combination of social, political, economic and technological forces.

Production and distribution of cheap electricity has helped change the face of north Queensland and the lives of its people. Electricity has become an integral part of production techniques in mining, pastoralism and farming - the three great primary industries underpinning the northern economy. Secondary production also depends on the availability of large blocks of power at low tariffs. In all industries work has become physically less burdensome through the use of power tools and other labour-saving devices. Airconditioning, first in work environments and later in the home, has made the tropical climate more tolerable and labour more congenial. For women, until recently almost exclusively responsible for housework, electricity together with the proliferation of appliances has taken the drudgery and perhaps some of the monotony out of domestic chores; time and energy have been freed for other activities (though of course this ignores the potential for housework to fill whatever time is available). Electricity has played a part in opening up opportunities for women to work outside the home, both by lightening the burdens of housework and by reducing the physical strength needed to perform many paid jobs. As a result of electricity, people's daily lives have undergone farreaching change.

The contrast is most apparent if one compares the period before the Second World War with the present. In the 1930s electricity supply was available only to residents of the larger northern towns. Even there, some could not afford to adopt electricity; many still used it only for lighting their homes. Electrical appliances were rare: a few irons and jugs, and a very limited number of electric stoves. Today over 99% of north Queenslanders are connected to a power supply, the number who cannot afford it is minimal, and most people take for granted a large range of appliances useful in cooking, cleaning, heating, cooling and entertaining.

Partly because of the social impact of electricity, governments have been unable to resist involvement in the industry. This became clear very early; as the 20th century progressed, so did government intervention. The forms that intervention took varied over time according to prevailing political notions. At first the industry was regulated under an Act administered by a government department; operation by local government was favoured under the sway of the municipal trading movement. By the 1930s government regulations were increasingly stringent and wide-ranging. State acquisition followed. The favoured administrative vehicle was the QUANGO, believed at the time to avoid the problems of both private exploitation and "political" interference by keeping government at "arm's length", and to be most suitable for economic enterprises where specific expertise and a degree of latitude in decision-making were considered desirable. By the 1970s, however, the independence and lack of accountability of the QUANGO began to rankle. Seeing itself in a position of responsibility without power,

the government sought more direct control over policy and its implementation; it is ironic that the government concerned was usually so strident in its denunciation of socialist tendencies in its opponents. Each step in the process of increasing government control was justified as necessary to overcome perceived deficiencies of the preceding regime, faith in the ability of government to conduct the industry apparently unshaken by experience. Perhaps the fact that socialism as practised by Australian governments was *sans doctrines* made it invulnerable to refutation.[1]

Not surprisingly, the development of electricity supply in north Queensland has tended to mirror trends in the Australian economy as a whole: expansive in the 1920s; retarded by the depression; chaotic but productive during the Second World War; growing consistently in the 1950s and 60s and even showing signs of "growth for growth's sake"; troubled in the 1970s and 80s. Qualifications needed would be that in the 1950s and 60s electricity supply expanded even more rapidly than the economy, and that there was a lag before the economic downturn around 1970 became evident in the industry. Like the Australian economy as a whole, the industry is meeting the challenge of restructuring and streamlining, and now appears in a healthier condition to face the future.

That future is difficult to foretell, in part because of the industry's reliance on complex and changing technology. The future may involve products and processes undreamt of today. One possibility lies with the use of superconductors - substances which conduct electricity without resistance. At present the very low temperatures needed for superconduction can be achieved only in the laboratory, but if the technology could be developed, it would drastically cut the losses and hence the costs associated with transmission and distribution, thus revolutionising electricity supply. As regards generation, nuclear fusion could provide huge quantities of power while avoiding the problem of radioactive wastes. These are only two among many possibilities.

The rapid expansion of electricity supply in Australia up to recent years has led several previous writers to portray it as an unequivocal success, a victory over technological obstacles and organisational challenges, an instance of the working of a ghostly historical law called progress. Whatever the topic of study, local and regional historians have very often been inclined to play on such themes. Electricity especially lent itself to evocations of developmentalism. Represented most spectacularly by the Snowy Mountains Scheme, electricity supply was an integral part of the post-war mythology of growth; as Donald Horne observed, power stations became "cathedrals of the secular religions of capitalism and development".[2] (Strangely enough, power stations could in many minds be a symbol of capitalism rampant although they were almost invariably owned and operated by the state.)

Nowadays the temptation to succumb to these myths is far weaker. The broad trends outlined at the beginning of this chapter have certainly not brought unmixed blessings; some of their drawbacks have been indicated in previous chapters. Even if

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1. See A. Metin, *Le Socialisme sans Doctrines*, Paris, 1901, tr. Russel Ward, London, 1976.
2. D. Horne, *Time of Hope: Australia 1966-72*, Sydney, 1980, p.5.

these trends had been wholly desirable, the setbacks the industry has encountered in the last two decades would warn against any simple paean to progress. And even if expansion had been monotonic, recent challenges to the doctrine of growth at any cost, and concerns about depletion of non-renewable resources and environmental pollution, should give us pause. Circumstances seem favourable for a more realistic assessment of the industry's achievements.

APPENDIX I

TOWNSVILLE REGIONAL ELECTRICITY BOARDS

(C) = Chairman

1946-48

J.P. Corcoran	Townsville City Council
A.V. Hamilton	Townsville City Council
J.L. Kelly (C)	Hinchinbrook Shire Council
C.G. McCathie	Ayr Shire Council
C.W. Wordsworth	Thuringowa Shire Council
S.J. Bryan	SEC representative 1946-47
S.F. Cochran	SEC representative 1947-48

1948-52

J.A. Sherriff	Townsville City Council
H.H. Hopkins	Townsville City Council
J.L. Kelly (C)	Hinchinbrook Shire Council
C.G. McCathie	Ayr Shire Council 1948-51
E.A. Quartmaine	Ayr Shire Council 1951-52
J. Kelso	Thuringowa Shire Council
S.F. Cochran	SEC representative 1948-51
H. Neil Smith	SEC representative 1951-52

1952-55

J.A. Sherriff (C)	Townsville City Council
H.H. Hopkins	Townsville City Council
J.A. Row	Hinchinbrook Shire Council
E.W. Ford	Ayr Shire Council
W.D. McCloskey	Thuringowa Shire Council
H. Neil Smith	SEC representative

1955-57

J.A. Sherriff (C)	Townsville City Council
H.H. Hopkins	Townsville City Council
J.A. Row	Hinchinbrook Shire Council
E.W. Ford	Ayr Shire Council
W.H.F. Wordsworth	Thuringowa Shire Council
P.J. Wherry	Charters Towers City Council and Dalrymple Shire Council
R.J. Lister	Bowen Shire Council
H. Neil Smith	SEC representative

1957-60

J.A. Sherriff (C)	Townsville City Council
H.H. Hopkins	Townsville City Council
J.A. Row	Hinchinbrook Shire Council
E.W. Ford	Ayr Shire Council
W.H.F. Wordsworth	Thuringowa Shire Council
A. Downey	Charters Towers City Council and Dalrymple Shire Council
R.J. Lister	Bowen Shire Council
H. Neil Smith	SEC representative

1960-63

J.A. Sherriff (C)	Townsville City Council
H.H. Hopkins	Townsville City Council
J.A. Row	Hinchinbrook Shire Council
E.W. Ford	Ayr Shire Council
A.J. Innes	Thuringowa Shire Council 1960-61
J.R. Brabon	Thuringowa Shire Council 1961-63
A. Downey	Charters Towers City Council, Dalrymple and Flinders Shire Councils
D.H. Land	Bowen Shire Council
H. Neil Smith	SEC representative

1963-66

J.A. Sherriff (C)	Townsville City Council
H.H. Hopkins	Townsville City Council
W.O. Garbutt	Hinchinbrook Shire Council
E.W. Ford	Ayr Shire Council
J.R. Brabon	Thuringowa Shire Council, Charters Towers City Council and Dalrymple Shire Council 1965-66
A. Downey	Charters Towers City Council, Dalrymple and Flinders Shire Councils 1963-64
R.W. Tindale	Bowen Shire Council
F.J. Tritton	Flinders, Richmond and Mckinlay Shire Councils
H. Neil Smith	SEC represenative

1966-69

L.F. Power	Townsville City Council
W.O. Garbutt (C)	Hinchinbrook Shire Council
E.W. Ford	Ayr Shire Council
T.H.A. Titley	Charters Towers City Council, Dalrymple and Thuringowa Shire Councils
S.C. Yardley	Bowen Shire Council
R.S. Lord	Flinders, Richmond and McKinlay Shire Councils
H. Neil Smith	SEC representative

1969-72

L.F. Power	Townsville City Council
W.O. Garbutt (C)	Hinchinbrook Shire Council
R. Rossiter	Ayr Shire Council
P.A. Black	Charters Towers City Council, Dalrymple and Thuringowa Shire Councils
S.C. Yardley	Bowen Shire Council
J. Barr	Flinders, Richmond and McKinlay Shire Councils
H. Neil Smith	SEC representative

1972-77

L.F. Power	Townsville City Council 1972-74
O.K. Griffiths	Townsville City Council
G.J.B. Keys	Townsville City Council 1975-76
W.O. Garbutt (C)	Hinchinbrook Shire Council
R. Rossiter	Ayr Shire Council
P.A. Black	Charters Towers City Council, Dalrymple and Thuringowa Shire Councils
S.C. Yardley	Bowen Shire Council
W.J. Holmes	Flinders, Richmond and McKinlay Shire Councils
E.D. Murray	SEC representative

APPENDIX II

NORQEB BOARD MEMBERS

(C) = Chairman (D-C) = Deputy Chairman

Feb 1977 - May 1979	**Representing**
F Born (C)	Mount Isa, Burke, Cloncurry, Boulia
M F Reynolds (D-C from 11.6.77)	Townsville
P L Arlett (from 11.6.77)	Nominated by government
L L Brosnan	Nominated by government
F L Page	Thuringowa, Charters Towers, Hinchinbrook, Dalrymple
F J Tritton	Richmond, McKinlay, Flinders, Winton
C R Gordon	Ayr
B H Bloom (to 26.5.77)	Townsville
L F Power (to 26.5.77)	Nominated by government
E D Murray	Electricity Commissioner
May 1979 - May 1982	
F Born (C)	Mount Isa, Burke, Cloncurry, Boulia
M F Reynolds (D-C)	Townsville
P L Arlett	Nominated by government
L L Brosnan	Nominated by government
R S Lord	McKinlay, Richmond, Flinders, Winton
D H Land	Bowen, Ayr
P A Black	Dalrymple, Charters Towers, Hinchinbrook, Thuringowa
E D Murray (to 4.7.80)	Electricity Commissioner
N A Galwey (from 5.7.80)	Electricity Commissioner
May 1982 - May 1985	
F Born (C)	Mount Isa, Boulia, Burke, Cloncurry
M F Reynolds (D-C)	Townsville
A J Andrews	Charters Towers, Dalrymple, Hinchinbrook, Thuringowa
P L Arlett	Nominated by government
E N Honeycombe	Ayr, Bowen
D H Land	Nominated by government
R G Westcott	Flinders, McKinlay, Richmond, Winton
N A Galwey	Electricity Commissioner

May 1985 - June 1988

F Born (C) (to 31.1.86)	Nominated by government
D T Gleeson (C) (from 31.1.86)	Nominated by government
P L Arlett (D-C)	Nominated by government
E B Bryce (to 17.9.87)	Flinders, McKinlay, Richmond, Winton
P J Evert (from 29.10.87)	Winton, McKinlay, Richmond, Flinders
G G Engler	Charters Towers, Dalrymple, Hinchinbrook, Thuringowa
R Moore	Mount Isa, Boulia, Burke, Cloncurry
P Wyche	Bowen, Burdekin
M F Reynolds	Townsville
N A Galwey	Electricity Commissioner

July 1988 - June 1991

D T Gleeson (C)	Appointed by government from a panel nominated by local authorities
P L Arlett (D-C)	Nominated by government
L J Searle	Nominated by government
F J Tritton	Appointed by government from a panel nominated by local authorities
N A Galwey	Electricity Commissioner

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Paul Wherry, Charters Towers, 1 September 1986.
Alan Withnall, Bowen, 26 June 1987.
Mr and Mrs Allan Wilkie, Home Hill, 18 June 1987.

Correspondence

E.J. Kendrick - March 1987.
E.D. Murray - 9 May 1987.
Syd Royes - 15 September 1987.
F.C. Warden-Hutton - 12 April 1987.

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