Chapter 15

ENERGY

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During 1984–85 the total energy consumption in Tasmania grew to nearly 85 petajoules. However, the rate of increase, at 1.5 per cent for the year, was minimal, reflecting the ongoing effects of national oil price increases in the 1970s and the recession of 1982–83.

15.1 TOTAL ENERGY CONSUMPTION, TASMANIA AND AUSTRALIA (petajoules)

Year	*Tasmania*	*Australia*
1960–61	39.1	1 336.6
1970–71	65.5	2 210.3
1980–81	83.7	3 146.1
1981–82	84.9	3 236.5
1982–83	82.5	3 120.5
1983–84	83.4	3 218.6
1984–85	84.7	3 367.1

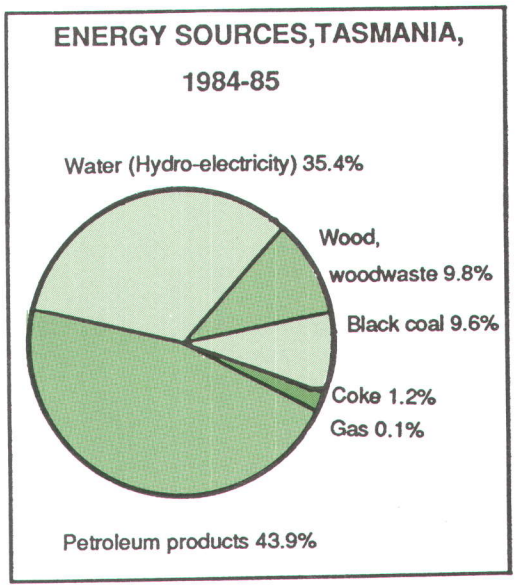
Source: Department of Primary Industry and Energy

The biggest user of energy continued to be the manufacturing sector, consuming 42 per cent of the total in 1984–85.

15.2 ENERGY CONSUMPTION, TASMANIA (petajoules)

Sector	*1983–84*	*1984–85*
Industry		
Agriculture	1.5	1.5
Mining	4.0	4.2
Manufacturing	33.7	35.2
Electricity, gas and water	5.1	4.0
Construction	1.2	1.2
Wholesale retail trade	1.9	1.9
Transport and storage	20.8	21.2
Communications, finance and business services	0.3	0.3
Public administration	0.3	0.3
Community services	1.0	1.0
Entertainment and personal services	0.5	0.5
Residential	12.0	12.1
Lubes, bitumen and solvents	1.3	1.4
Total	83.4	84.7

Source: Department of Primary Industry and Energy



The use of black coal and hydro-electricity as energy sources increased during 1984–85. However, the main source in most sectors still came from imported petroleum products.

15.1 PETROLEUM

Consumption of petroleum products in Tasmania decreased a further three per cent between 1985 and 1986 reflecting the continued national transition from oil to other fuels which commenced in the late 1970s. This trend is most apparent where petroleum products are used in stationary applications, for example industrial/ marine diesel oil and fuel oil.

15.3 CONSUMPTION OF MAJOR PETROLEUM PRODUCTS, TASMANIA (megalitres)

Product	*1984*	*1985*	*1986*
Petrol —			
Leaded super	392	419	421
Leaded standard	31	10	*
Unleaded	–	6	18
Total petrol	423	434	439
Liquefied petroleum gas	5	2	1
Aviation gasoline	3	3	3
Aviation turbine fuel	32	39	41
Kerosine	2	2	2
Heating oil	15	14	16
Automotive distillate	224	231	242
Industrial/Marine diesel fuel	21	25	10
Fuel oil	166	122	91
Total	891	872	845

* less than 0.1 megalitre.

Source: Department of Primary Industry and Energy.

Consumption of transport fuels continued to dominate overall consumption of petroleum products in Tasmania. In particular there has been a move away from the use of leaded super in favour of unleaded petrol as the number of new vehicles on the road increases.

Petrol Retailing

The Tasmanian petrol retail industry has been the subject of severe criticism over the past few years, particularly over the petrol roster system and petrol pricing.

The petrol roster system was established 25 years ago as a means of ensuring that the public had access to fuel for 15 hours a day, seven days a week, while providing service station proprietors with viable working hours and equity of business. The system continued successfully until recently when it came under attack from several organisations claiming that it was outmoded since the introduction of note acceptors and credit cards, and was partially responsible for Tasmania's high petrol prices in relation to other States.

As a result, the Legislative Council set up a select committee to inquire into the Tasmanian petrol retail industry. In 1986, the committee recommended that the roster system continue but that it should be modified to take into account changing social and trading patterns such as late-night shopping. The report also noted that the roster system had very little influence on petrol prices in the State, accounting for only 0.6 to 1 cent a litre of retail prices.

15.1.1 Petroleum Exploration

All Tasmania's petroleum is imported from interstate refineries to bulk depots at Hobart, Bell Bay and Devonport. During 1985–86 intensive exploration in Bass Strait led to speculation that Tasmania could provide enough oil and gas to meet its own requirements. Exploratory wells were drilled in the Bass Basin area off shore from Burnie with mixed results by two consortia, Amoco Australia and Bridge Oil Ltd.

15.4 WELLS DRILLED, TASMANIA 1985–86

Name	*Depth*	*Status*
Yolla 1	3 347 m	Plugged and abandoned
Tilana 1	3 900 m	Plugged and abandoned with shows
Koorkah 1	3 149 m	Plugged and abandoned
Chat 1	3 104 m	Plugged and abandoned
Seal 1	1 670 m	Plugged and abandoned
Pelican 5	4 627 m	Plugged and abandoned with shows

Source: Director of Mines, Report 30 June 1986

Yolla One showed good flows of oil and gas, and drillstem tests at Tilana One were inconclusive but hopeful. Pelican Five was the deepest well drilled in the basin. Gas shows were encountered but only one significant flow was discovered. The well was plugged and abandoned in April 1986.

During the year $75 million was spent on drilling, the highest amount ever spent in exploring the Tasmanian offshore area. In January 1986 the then Minister for Mines Mr Roger Groom announced that the Government would appoint a petroleum engineer to head a team designed to advise the Government on the exploration work. The Petroleum Division of the Department of Mines was then established, its major aims being to promote oil and gas exploration in Tasmania and its waters, and to inform the Director of Mines on all matters which could influence the petroleum industry.

Exploration during the year proved that hydrocarbons are present in the Bass Basin, and in reasonable quantities. However, the results did not live up to expectations. In addition there was a shock decrease in world oil prices during the year. As a result further development in the area was suspended until it became clear that drilling would be economically viable.

15.2 ELECTRICITY

Tasmania's electricity requirements are provided by the Hydro-Electric Commission from a system based almost entirely on hydro installations. The total installed generator capacity at June 1987 was 2.171 million kW of which 89 per cent (1.9 million kW) was supplied by an integrated hydro network. An oil-fired thermal station of 240 000 kW is located at Bell Bay.

During the 1986–87 financial year total energy generated was 8 319 million kWh, a decrease of 0.1 per cent on the previous year. Total sales amounted to 7 681 million kWh of which 64 per cent was sold to the major industrial sector.

15.5 ELECTRICITY SALES, TASMANIA (million kWh)

Purpose	*1986–87*
Residential	949.6
Industrial	484.6
Hot water	591.9
Off peak	279.7
Lighting	117.8
Commercial	219.7
Bulk commercial	82.4
Major industrial	4 944.1
HEC villages, unread meters	11.1
Total	7 681.0

Source: Hydro-Electric Commission Report

Consumption by the major industrial sector decreased by 1.7 per cent in 1986–87 due to furnace upgrading at Temco and industrial problems at Savage River Mines at Port Latta. However, sales to commercial consumers increased by 10 per cent following an increase of 2.7 per cent in the number of customers in that category.

15.6 ELECTRICITY CONSUMERS, TASMANIA

Consumers	*1986*	*1987*
Residential	165 435	168 796
Public utilities	4 620	4 749
Industrial	16 888	16 968
Commercial	14 898	15 300
Major industrial	17	17
Miscellaneous	1 631	1 668
Total	203 489	207 498

Source: Hydro-Electric Commission Report

Water storage levels improved during 1986–87 following a slightly wetter than average year. Energy storage at 30 June was 48.6 per cent of full capacity, 11.4 per cent better than the previous year. The improvement was also a consequence of increased generation from the Pieman Scheme which enabled replenishment of the Lake Gordon and Great Lake storage areas.

Hydro-Electric Commission trading operations resulted in a loss of $4.3 million for the year 1986–87, offset to some extent by the $10 million profit made in 1985–86. Income for the year at $292.4 million was 14.1 per cent higher than the previous year. Retail customers contributed $189.6 million while sales to the major industrial sector accounted for $91 million. Miscellaneous income amounted to $3.2 million. A total of $8.5 million was collected and paid into consolidated revenue by way of the government surcharge.

Changes to Hydro-Electric Commission

During 1987 the Hydro-Electric Commission became the subject of major structural and operational changes. In July legislation was passed to give the Commission a more flexible and up-to-date corporate structure, and to expand its activities to allow utilisation of its skills and expertise while continuing its primary objective of generating and supplying electricity.

The legislation provided for the creation of a separate trading entity called the Hydro-Electric Commission Enterprises Corporation. The corporation would enable the Commission to tender for work both in and out of the State not presently undertaken by Tasmanian firms, thus diversifying and making use of its technical expertise.

The legislation also altered the executive of the Commission, changing the structure from one commissioner and four associate commissioners to a total of six commissioners, with one being appointed as General Manager and one as Chairman. Following enactment in July 1987 Mr R.J. Harvey was appointed Acting General Manager and Sir Geoffrey Foot was appointed Chairman.

Mr Harvey had been Acting Commissioner following the retirement of Mr J.R. Ashton on 23 February 1987. Mr Ashton joined the Commission in 1947 as a junior engineer and spent ten years as the Commissioner.

On 16 December 1987 the Premier announced that Sydney business consultant, Mr Donald Williams, would become the new General Manager of the Commission from 8 February 1988.

Operating expenses increased by 3.5 per cent to total $80.9 million while financial charges rose

by 31.7 per cent to $178.8 million. This increase was mainly due to the interest charges on the Pieman River Power Development being transferred virtually in full to the trading account, rather than being in part capitalised as was the case prior to completion of the development.

During the year $152.6 million was spent on capital works bringing total capital expenditure to $1.9 million.

15.7 HYDRO-ELECTRIC COMMISSION CAPITAL EXPENDITURE, 1986-87

Project	*$ million*
Pieman River Power Development	15.047
Anthony Power Development	34.031
King River Power Development	54.538
Gordon Power Station, No. 3 Machine	10.200
Bass Strait Islands Power Stations and Reticulation	0.999
Power Station Extensions	1.986
Substations	6.758
Transmission Lines	3.338
Distribution System and Services	13.162
Sundry Buildings	3.044
Stores, General Plant, etc.	8.990
Construction Equipment	0.535
Total	152.628

Source: Hydro-Electric Commission Report

15.2.1 Major Construction Projects

1986–87 was another intense year for civil and electrical engineering construction activity on the West Coast by the Hydro-Electric Commission. Major projects included progress on the King and Anthony schemes, and the completion and official opening of the Pieman scheme. This power project added 16 per cent to the State's generating capacity and cost about $690 million. It took 13 years to build.

Good progress continued on all schemes under construction although 1 221 man days were lost due to industrial action. The Construction Division Workforce continued to decline in numbers, falling by 232 to 1 158.

Lower Pieman

The installed capacity of the State's power generating system was increased to 2 171 MW, with the commissioning in February 1987 of the second 115.6 MW machine at Reece Power Station. Commissioning was completed in a record nine days from water on to power on. Soil stripped from work sites and soil won from the bed of the area now occupied by Lake Pieman was spread over quarries, roads, campsites and storage areas no longer required. Re-vegetation work was commenced. The Governor, Sir James Plimsoll, formally opened the Pieman River Power Development on 1 May 1987.

King River

On the site of the King River Power Development, excavation was completed to the assembly bay level. The Station is situated on the left bank of the King River and will house a 144 MW hydro-electric generating set. It is due for completion in 1991.

On the other side of Mt Jukes, excavation continued on the seven km long headrace tunnel which will be used to carry the waters of the new Lake Burbury to the generating plant. The tunnel is being drilled by an 85 tonne jumbo rig which was fabricated in Tasmania at Somerset and assembled on site. During 1986–87 the tunnel length advanced by more than one km.

Jumbo drill, weighing 85 tonnes and costing $1.2 m, used on the King headrace tunnel. Photo: *Advocate*

At the Crotty damsite on the King River, a diversion tunnel to carry the river while the dam is built, reached an advanced stage of construction. The first 200 m of the tunnel was driven and work on concrete lining commenced.

Anthony

The Anthony Power Station is scheduled for completion in 1993. The development features an underground power station close to Lake Murchison which is part of the Pieman River Power Development. When completed this station will house one 82.8 MW hydro-electric generating set. During 1986–87 most investigation work for the 6 km long Anthony Tunnel and associated underground power station was completed.

The Anthony Road was also completed and largely sealed. This 38 km road links the Murchison Highway near Tullah with the Lyell Highway north of Queenstown and gives good access to all work sites on the scheme.

Construction began on White Spur Dam and most excavation of the dam and spillway was completed. The Henty River diversion was completed and construction of a concrete gravity dam about 25 per cent finished.

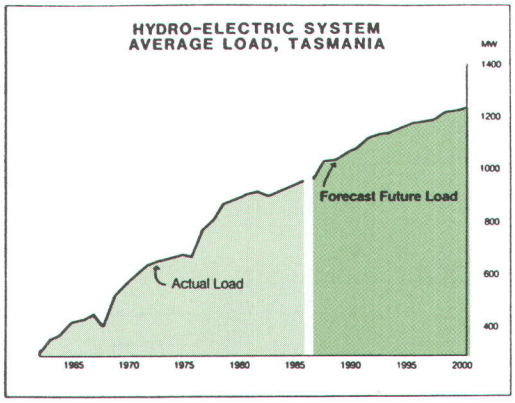
At Newton good progress was made on the damsite, pumping station and rising main. The pumping station is due for completion in 1989 and will incorporate three pumps, each capable of moving three cubic metres of water a second.

Gordon Power Station - 3rd Machine

At the existing Gordon underground power station, design work for installation of a third 144 MW hydro-electric generating set was virtually completed and construction work three quarters completed by June 1987.

15.2.2 Future Expansion

Overall assessment of long term growth in annual electricity loads has confirmed the somewhat lower average growth rate indicated by earlier studies. The average annual rate of growth forecast from 1987 to 2000 is 1.86 per cent.



Source: Hydro-Electric Commission Report

Consequently it is expected that the level of load in the immediate future will be economically met from existing and planned hydro developments without recourse to significant use of the Bell Bay oil-fired thermal station.

Forecasts of load levels and expansion needs aimed at assessing the best program for system expansion from the mid 1990s and beyond, are continually being reviewed by the Commission. During 1986–87 investigations continued on the remaining available hydro schemes including the Que South, Lower King, Lake Margaret and Lake Augusta schemes. In addition collection and analysis of wind and wave energy and environmental data in respect of thermal generation were continued at selected sites.

15.2.3 Energy Planning

The Hydro-Electric Commission continued investigation of the State's energy resources in 1986–87. This included estimation of the costs of extracting various energy materials and the examination of processes for converting them into useful fuels. Further studies were completed covering black coal and liquid fuels from oil shale and oilseeds. Progress was also made on studies covering the extraction of energy from wastes and liquid fuels from brown coal.

During the year progress was also made on preparation of a series of reports on various aspects of energy conversion and utilisation.

The first of these will cover the feasibility of using battery-powered electric vehicles in Tasmania.

The Commission continued to represent the State on national committees concerned with various aspects of fuel supply. These included the National Petroleum Advisory Committee, the National Fuels Emergency Consultative Committee, and the National Oil Supplies Advisory Committee. The Commission is also represented on the AMEC Working Group on Alternative Fuels, which was established during the year to report on possible sources of transport fuels for Australia in the future.

15.3 COAL

Approximately 10 per cent of Tasmania's energy is derived from coal. Although substantial deposits exist throughout Tasmania, particularly in the Fingal Valley in the north-east, the quality is not as high as NSW coal. Nevertheless, over recent years, coal has been increasingly used as a fuel source for industry.

The Cornwall Coal Company, the State's only producer, is currently producing and selling 350 000 tonnes per annum from the Duncan colliery near Fingal and the Blackwood colliery at Mt Nicholas, near St Marys. It supplies coal to Associated Pulp and Paper Mills Ltd, Australian Newsprint Mills Ltd, Goliath Portland Cement Company Ltd, Edgell-Birdseye (Division of Petersville), Wander (Australia) Pty Ltd, Tasmanian Breweries (Cascade), Cadbury Schweppes Pty Ltd, Royal Derwent Hospital, and Tioxide Australia Pty Ltd.

15.4 WOOD

The use of wood as an energy source for domestic heating has been growing steadily over recent years. In 1987, 53 per cent of all Tasmanian households used wood as the major source of space heating. This represents a 25 per cent increase since 1975.

15.8 HOUSEHOLD HEATING (per cent)

Energy source	*August 1975*	*October 1985*	*July 1987*
Electricity	12.2	31.8	32.3
Wood	42.7	51.5	53.3
Oil	36.5	11.9	9.8
Gas	2.8	4.1	3.7
Other (*a*)	5.9	*	0.8

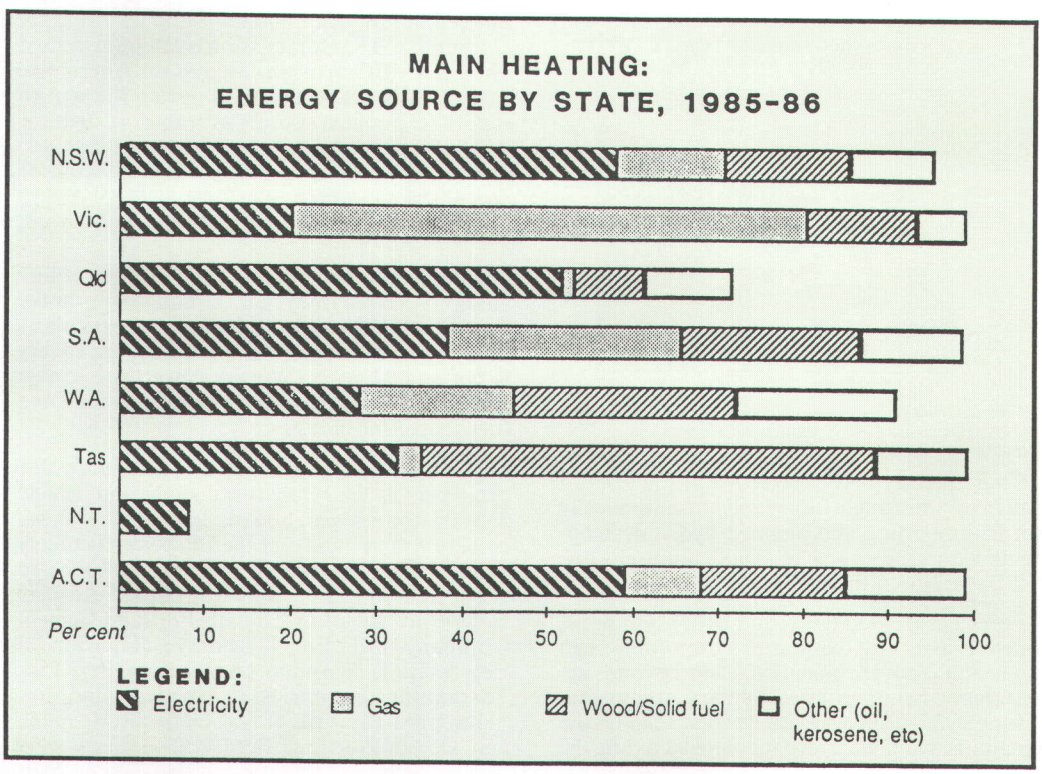
(*a*) includes households stating 'no heating'.

This trend has been linked to rising oil prices; it may also be at least partly due to recent improvements in the efficiency of wood burning heaters. Certainly, import figures show a demand for solid fuel space heaters with New Zealand being the main supplier. In 1987, 63 700 of the 85 500 Tasmanian households that used wood as the main form of heating had either a slow combustion heater, pot belly, or simple box stove.

Domestic consumption of firewood was an estimated 653 000 tonnes during the twelve months to July 1987. Of that just over half was purchased and the remainder collected.

To date, supply at source (if not always in the yards) is considered to be plentiful, although at some distance from the major population centres. It has been estimated that at least two million tonnes of logging residues per year are available, mainly in State forests some 50 to 100 km from Hobart and Launceston. The Forestry Commission provides licences permitting the collection of firewood from Crown land. In addition the Commission provides designated 'free firewood' areas for advertised periods during the summer as part of a campaign to educate consumers to collect or buy their firewood in the summer when it is easier and cheaper to collect.

In 1986 the Hydro-Electric Commission completed a study on wood as a source of energy. The report concluded that despite expected price rises



in future, use of firewood for residential heating would remain attractive. In commercial and industrial applications it noted that wood has a number of advantages over coal and fuel oil including availability and lower levels of ash for disposal. Combined with a relative stability in price it is therefore expected that in future, more enterprises will make the decision to change over to wood-fired equipment for industrial heating and steam raising.

15.5 ENERGY RESEARCH

15.5.1 Hydro-Electric Commission

Wind Energy

An investigation partly funded by National Energy Research Development and Demonstration Council (NERDDC) of the potential use of wind power energy was completed by June 1987. Later in the year negotiations were underway with a company planning to build and operate a wind turbine generator on Flinders Island. The Hydro-Electric Commission was considering connecting the generator to the island's electricity grid and purchasing the energy for use in conjunction with its own system.

Solar Electric Water Heating

The continuing program of field and laboratory testing at the Moonah Laboratories indicated that, in suitable locations, the solar contribution could be sufficient to replace up to 45 per cent of the energy needed for normal domestic hot water heating.

Heat Pump

A commercially available heat pump was installed in a private residence and its performance monitored during 1986–87. The aim is to evaluate savings which may be achieved with a heat pump compared with resistance or storage heating. Monitoring will continue for another year or two.

Energy Conservation

The Energy Management Centre has been awarded a NERDDC grant to demonstrate integrated control to minimise energy use at the East Devonport factory of United Milk Tasmania. This is a continuation of the computer-based monitoring system which was installed and commissioned by the Centre the previous year.

Wave Power

The Commission's Civil and Electrical Engineering Branches held discussions with organisations involved in the design and manufacture of wave power plant systems. Information was provided to enable the organisations to determine conditions under which a wave power plant could be economically installed and connected to the Commission's system.

Customer Load Pattern Survey

Research equipment developed by the Commission's Load Research Section has attracted keen interest from other electricity supply authorities. The Electricity Trust of South Australia has decided to buy 50 of the load research data logger units and samples, and specifications have been sent to Victoria, New South Wales, Queensland and Western Australia.

The loggers were designed and made for use in a survey of the way residential customers use their electricity supply. No comparable equipment was commercially available. During the year 81 units were installed throughout Tasmania. The householders were interviewed so that their load pattern could be related to their appliance use and other factors.

The survey aim was to assess electricity load characteristics, including the likely growth, to assist future design and planning of the whole electrical network.

15.6 ENERGY MANAGEMENT

The Hydro-Electric Commission operates an Energy Management Centre with the objective of providing advice on all energy uses to the industrial, commercial and public sectors. Advice is based entirely on the best economic interests of the client and frequently results in significant savings of electricity and other energy consumption.

The Centre completed 12 energy-use assessments for industrial customers during 1986–87 including an assessment of the energy efficiency in essential oil production for the Tasmanian Development Authority, and assisting three sawmills to improve combustion performance of their wood-fired boilers.

As a result of advice from the Centre a number of industrial undertakings have found it practical and economical to switch from oil to wood fuel for steam raising. During the year, six companies made the change and another four were considering a change.

The Government Energy Management Program, in its fifth year, made savings of more than $2 million from the total State Government fuel and electricity bill of $26 million. Particular attention was paid to the correct adjustment of time switches in school heaters. This has the potential to save about $150 000 a year.

15.7 REFERENCES

ABS Publications:

Domestic Energy and Firewood Usage, Tasmania 1987 (8204.6).

National Energy Survey: Household Appliances, Facilities and Insulation, Australia (8212.0).

National Energy Survey: Annual Consumption of Reticulated Energy by Households, Australia 1985–86 (8213.0).

Survey of Household Energy Sources, Tasmania, November *1975*. (Uncatalogued)

Survey of Household Energy Sources and Home Insulation, Tasmania, June 1978 and November 1979. (Uncatalogued)

Other Publications:

Department of Resources and Energy, *Energy Demand and Supply Australia 1960–61 to 1984–85*, Australian Government Publishing Service.

Forestry Commission Tasmania, *Firewood*, 1985.

The Hydro-Electric Commission, Tasmania, *Annual Report 1986–87*.