



More power to your elbow

NEW ZEALAND'S electricity industry has gone through so many transformations in the past twenty years that consumers can barely understand just who owns the power or the transmission lines at any given time, or how the system works.

THIS bulletin may not be able to provide all the answers, but at least it offers an introductory guide to the Hocken Library's extensive coverage of the history, development, expansion and governance of the electricity industry. The computerised catalogue headings such as Electrical Industry, Hydroelectric, Electric Power, Wind Power, Geothermal etc run into hundreds. But easy starting points for general readers are *No 3. Power* (in the 'Making New Zealand' series, 1940); 'A Bright New World' article on pp.1485–90 of *New Zealand's Heritage*; and descriptive entries in official yearbooks and encyclopedias.

PIONEER DAYS

From such 18th century physicists as Coulomb and the publication of Benjamin Franklin's famous *Experiments and Observations on Electricity* in 1751, the mastery and exploitation of electricity developed only gradually. Volta first demonstrated current electricity in 1800, and Ampère enlarged on his work over the next 25 years. Faraday produced his first battery in 1812, a crude electric motor in 1821 and established the principles of a continuous-current generator in 1831. Dynamos were being manufactured from about 1850.

Britain was relatively slow to push ahead with electric lighting because of the efficiency and cheapness of its established gas industry, and this perhaps also affected the pioneer years in New Zealand until more go-ahead American influences made their mark. Occasional early gold-dredges, sawmills and flourmills introduced coal-powered electrical machinery by the 1880s.

The real revolution dates from that decade. Sir Julius Vogel, returning from London in 1882 as representative of the British Electric Light & Power Co., pushed the use of electricity. Moss Davis had his Auckland home lit by electricity in 1882; Lyttelton Harbour was lit in 1883; Wirth Brothers lit their circus in 1884; and in 1885 the Mosgiel woollen factory lit its carding and spinning room — at that time the largest electrical installation in the country. When Wellington lit its streets in 1888 it claimed

to be the first city in the Southern Hemisphere to adopt electricity for street lighting.

The gold-dredging industry began to play a prominent part, and *Let There Be Light...* (1986), the excellent history of Bullendale and the generation of power in Central Otago by Peter Chandler and Ron Hall, not only gives a first-class account of the Phoenix mining company's adoption of electric power in 1886, but places that event in the perspective of power development before and since.

WAIPORI

The Waipori Falls power scheme (originally instigated by private enterprise) has been so vital to Dunedin, and the achievements of its American engineer Edgar Stark were so dramatic that its literature — starting off with Stark's own *Description of Waipori Falls Power Project*, c.1904 — deserves a special listing:

Anon. *Prospectus: Waipori Falls Electric Power Co.*, 1902.

Anon. *Nature's Own Power, Waipori Falls*, 1904.

Anon. *Newspaper Clippings, Waipori Falls*, 1904.

Anon. *DCC Annual Reports, Waipori Falls*, 1908; and DCC annual reports generally.

Anderson, J.T.N. *The Lee Stream as a Source of Power for Dunedin*, 1902.

Crowley, Agnes J. *Waipori Whispers*, 1969.

Drew, E.H. *Report on Hydraulic Section of Waipori Falls*, 1907.

Goodman, W.G.T. *The Waipori Hydro Electric Power Transmission Scheme*, 1907.

Henderson, M.C. *Brief History of Waipori Hydro-electric Development*, c.1943.

Hutcheson, W.H. *To the Waipori Electric Power Syndicate*, 1901.

Johnson, J.T. *A Story of Waipori*, 1944. McGregor, W.C. *Waipori Falls Power Co.'s Bill*, 1904

Noyes Bros. *Report on Cost of Electric Power from Waipori Falls*, 1906.

Pairman, Ian R. *An Engineer Told Me*, 1998.

Pairman, Rodian. *A History of DCC Electricity Dept and*

Waipori Falls Hydro-electric Scheme, 1951

Parson, E.Marguerite. *Waipori Centennial, 1861–1969*, 1969.

Stark, E.E. *Waipori Hydro-electric Plant: Second Annual Report*, 1909.

Winfield, S.J. *Waipori Extensions*, 1953.

[Note also Daphne Y.Woolman's thesis, 'Waipori: an economic analysis for hydro-electricity', Master of Commerce, OU. 1955]

SMALL STATIONS TO LARGE

Before World War 2 most hydroelectric schemes in New Zealand, including such state-run facilities at Lakes Coleridge and Monowai, were notable for small dams and extensive pipelines, whereas the postwar period brought in the big-dam era on the Waitaki, Clutha and Waikato rivers, and such schemes as the harnessing of the southern lakes.

For Coleridge, see *Coleridge* (NZED, 1953), an illustrated pictorial booklet recording its construction and operation; also Rosemary Britten, *Lake Coleridge* (2000) for station and community. For the Waitaki, the construction of the first station on the river is told in considerable detail by G.G.Natusch in *Waitaki Dammed* (1984). Marion Sheridan's *Dam Dwellers* (1995) gives an unequalled account of life in the Upper Waitaki power-dam townships.



Earlier power schemes were noted for 'small stations and long pipelines'. Here, Ministry of Works men construct the pipeline to the Fraser River Scheme, near Clyde, in the 1950s. [Photo J.F.Shepherd & ODT]

Several general histories describe the participation of the state and its agencies in the industry including: John E.Martin ed. *People, Politics and Power Stations: Electric Power Generation in NZ, 1880–1990*, 1991; Susan Paris, *Two Per Mile, a History of the Rural Electrical Reticulation Council*, 1997; and Neil Rennie, *Power to the People, 100 years of Public Electricity Supply in NZ*, 1989. See also B.B.Pickering, 'State Policy and Hydro-electricity in NZ, 1884–1926', MA thesis, OU, 1949.

Other southern references which may be of interest are:

CLUTHA CATCHMENT — *Clutha Valley Development Project*, CVD Newsletter No.1, 1978; *Impact Reports*, Proposal F 1975, Central Otago 1976, Cromwell 1978–79–80; *Social Impact, Clutha Power Development, Luggate and Queensberry*, 1982; *Cawthron Technical Group*, 1980; Keith Johnston, *An Analysis of Clutha Rescue's Protest Action*, 1978; and Paul Powell's *Who Killed the Clutha?*, 1978.

CLYDE — *Power Project, Environmental Impact*, MWD 1977; *Water Rights for the Clyde Dam*, 1979; *What You Should Know and What You Can Do About the Clyde High Dam*, Clutha Action Committee, 1977; *Power Project, Clutha Valley Development*, 1978; *Applications for Water Rights*, Upper Clutha Development Cttee 1979–81, 1982; *Hands off Lake Wanaka*, 1972; J.R.S.Higham, *Upper Clutha Scheme, regional resource development, Clyde: a Guide to the Clyde Power Station; Lakeside Stabilisation, social and economic impact*.

MANAPOURI — Sir Douglas Mawson, papers relating to NZ Sounds Hydro Concessions Ltd, 1925–30 (ms 880); G.A.Howard, *Power from Fiordland*, School Bulletin, 1971; G.Roy Hanan, *A Dentist at Large*, 1977; A.Leigh Hunt, *An Empire Enterprise*, 1927, also *Confessions of a Leigh Hunt*; 1951; *Information*, NZ Nature Conservation Council, 1970; *Benefit & Cost Analysis*, NZ Institute of Economic Research, 1977; *Manapouri Power Project, some facts & figures of interest*, n.d.; Neville Peat, *Manapouri Saved!*, 1994; and D.H.Jones, *Power Development & Environmental Protection of Lakes Manapouri and Te Anau*, 1979/80. Aaron Fox's 335-page PhD thesis, 'The Power Game: the development of the Manapouri-Tiwai Pt electro-industrial complex, 1904–1969' offers outstanding coverage.

OTHER POWER SCHEMES — Check the Hocken Library's computerised catalogue for publications under such headings as — Arapuni, Aviemore, Bay of Plenty, Benmore, Buller, East Cape, Egmont, Hauraki, Hawkes Bay, Hinemaiaia, Horowhenua, Kaihu, Kaniere, Maniototo-Paerau Gorge, Northland, Ohaaki, Rangitaiki, Rotorua, Taranaki, Timaru, Waikaremoana,

Waikato, Wairakei, Wanganui and West Poverty Bay.

For coverage of Reefton's pioneer municipal scheme in 1888 see *Inangahua Centennial Times: celebrating 100 years of electricity in Reefton, 4 August 1988* (Reefton, 1988). And for the subsequent reticulation of other southern urban areas, refer to such histories as K.C.McDonald's *White Stone Country* (1965) for Oamaru, Jim McAloon's *Nelson* (1997), Hallam L.Smith's *A History of the Town of Gore Pt 2* (1997); J.O.P.Watt's *Centenary of Invercargill*

Municipality (1971) and K.C.McDonald's *City of Dunedin* (1965).

A search under 'electric power board' in the computerised catalogue produces much material. The index to *Otago Daily Times* headlines c.1950s to 1990, available both in bound volumes and online, is another invaluable research resource; and one should remember that the official openings of power stations were invariably marked by substantial coverage (often special supplements) in local newspapers. Consult also the various volumes of the *NZ National Bibliography*, particularly Vol.5, p.369 which indexes titles up to 1960 relating to electricity.

THE NEW ZEALAND INDUSTRY

From the enormous literature on our electricity industry, both technical and general, the following selection is intended primarily to guide inquirers to the types of material available.

BY TITLE (AUTHOR ANONYMOUS)

- Dams in New Zealand*, 1989.
- Design Power. Our mission to be NZ's leading provider of professional services to the energy sector.* Design Power, 1996.
- Developing Financial Contributions under the Resource Management Act.* Ministry for the Environment, 1994.
- Developing Market for Energy Efficiency in NZ*, Electricorp, 1992.
- Domestic Contracts Code of Practice*, Electricity Supply Assn, 1997.
- Early Warning Indicators, Pricing Mechanisms and Dry Weather Security Criteria*, Electricorp, 1993.
- Electric Power from a NZ River*, colour slides & commentary, National Publicity Studios.
- Electricity Distribution Industry Reform, Social & Rural Impacts*, Min. of Commerce, 1990.
- Electricity Supply & Demand*, Electricorp 1994; and other similar titles.
- Energy Conservation Source Book*, NZE, 4th ed., 1978.
- Energy Efficiency Initiatives, a survey of progress in the electricity sector to August 1993*, Min. of Commerce, 1993.
- Eleven Years of Drawn Conclusions*, cartoon collection, ECNZ, 1998.
- Government Policy towards the Electricity Industry, issues & options*, Treasury, 1989.
- Guide for the Detection & Measurement of Harmonics in Distribution Networks*, Electricity Supply Assn, 1989.
- Guide to NZ Power Stations*, Electricorp wall chart, n.d.
- Guideline for Renewal Accounting of Infrastructure Assets for Performance Measurement Derivation*, Min. of Commerce, 1994.
- Hydroelectric Power*, NZED, 1946.
- Hydro NZ: Providing for Progressive Pricing of Electricity*, Electricity Reform Coalition, 1992.

Inquiry into the Electricity Industry, Ministry of Energy, 2000.

- Metering & Profiling: competition for small electricity consumers*, Inst. for Economic Research, 1997.
- NZ Electricity Model at Work*, Wellington, AIC Conferences, 1993.
- Handbook for Optimised Deprivation Valuation of Electricity Line Businesses*, Min. of Commerce, 1998.
- Reliability of Electricity Supply, Project Overview*, Centre for Advanced Engineering, Chch, 1993.
- Te Ika Whenua, Energy Assets Report*, Waitangi Tribunal, 1993.
- Transmission Pricing*, Trans Power, 1993.
- Water Put to Work*, Min. of Works, 1945.
- Wholesale Electricity Market Reform: analysis of options*, Wholesale Electricity Market Study (WEMS), 1992.
- Wholesale Electricity, glossary of terms, 1993-94*, ECNZ, 1993.
- Wholesale Electricity Market Development Group, final report*, Auckland, 1994.

BY AUTHOR

- Bach, Kaye, *ESOL language resource material: Electricity, schools*, 1994.
- Bertram, I.G. *Economy-wide Effects of a Major Increase in the Wholesale Price of Electricity; new results from Joanna model*, 1993.
- Biggar, Kevin. *The Cost of Wind Farm Electricity*, 1995.
- Birks, Lawrence. *Development of Hydroelectric Power in Canterbury*, 1920.
- Carryer, Basil. *Before We Had Electricity, schools*, 1998.
- Cowan, Thomas K. *Light, Power and Some Heat*, 3v, 1992-96.
- Crookes, Samuel I. *The Development of Hydro-electric Power in NZ*, 1917.
- Culy, John & others. *The Evolution of NZ's Electricity Supply Structure*, 1995.
- Farrell, Bryan H. *Power in NZ: a geography of energy resources*, 1962.
- Gale, Stephen. *The Effect of Electricity Tariff Reforms on Cogeneration*, 1991.
- Gray, Alan T. *The Earth Garden Book of Alternative Energy*, 1996.
- Gunn, Calum. *Optimal Energy Company Behaviour in NZ's Deregulated Electricity Market: issues & comments*, 1996
- Hardcastle, H. *Power from the River*, schools, 1950s.
- Hawcroft, Norman. *Systems modelling as an aid to decision-making by retail electricity suppliers in NZ*, 1996.
- Hill, H.T. *National Hydro-electric Scheme for NZ*, Napier, 1919.
- Hook, George & Ingram, Brent. *Mini Investigation. Making Sense of Electricity*, schools, 1996.
- Hooks, Jillian & others. *Information Disclosure in the Annual Reports of NZ Electricity Retail & Distribution Companies: preliminary findings*, 2001.

- Jackson, Kenneth E. *Electricity Provision and the Concept of Service in NZ: an historical example of pricing policies*, 1990.
- Jones, Desmond H. *Hydro-electric Power Development & Environmental Conservation, Southland, Otago, Southland & Mackenzie Country*, 1981.
- Kellow, Aynsley J. *Transforming Power: politics of electricity planning*, Cambridge UP, 1996.
- Lowe, James. *Hydro-electric Schemes compared with Gas*, Auckland Gas. Co., 1918.
- McGlinchy, Brian. *Reliability of Electricity Distribution Networks, 1998/99*, 2000.
- Owens, Raymond A. *The Hydro-electric Power Station Operator*, schools, 1967.
- Parker, Graeme. *An Analysis of Contracts, Metering and Disputes Procedures for Domestic Electricity Customers*, 1977.
- Quinn, Pat & Gaynor, Bill. *Wind Power*, schools, 1995.
- Ranatunga, R.A.S.K. & Annakkage, U.D. *Optimum Power Dispatch for a Multi-node Electricity Market*, 1997.
- Searle, J.N.L. *The NZ Electricity Industry: its organisation and financial structure*, 1975.
- Speer, N.M. *The Electrical Supply Industry in NZ: its progress and achievement*, 1962.
- Spicer, Barry. *The Power to Manage: restructuring the NZ Electricity Dept as a State-owned Enterprise*, 1991.
- Steele, David. *Recommendations on Wholesale Electricity Pricing Policy*, 1992.
- Toynbee, Peter A. *Energy Planning, Electricity 'Reforms', Market Forces: Thoughts on 'Electricity Reforms'*, 1998.
- Troughton, Peter, *WEMS Critique*, report to Minister of Energy, 1993.

HOME & WORKPLACE

A few titles may be mentioned:

- Anon. *Electricity versus Gas, an independent study of the relative performance of hot-water storage heating*, 1990.
- Atkinson, Mary. *Switched-on*, schools, 1994.
- Dept of Statistics. *Survey of Household Electricity Consumption 1971–72: a report on the temperature/insulation study*, 1976.
- Dunedin City Council. *Electricity & the Home*, with recipes by Sheila Porteous, 193?.
- Dunedin City Cl. *A Handbook for the Better Use of Electricity for domestic, business and farm use . . .*, c.1930.
- Mill, Alex. *History of the Electrical Wiring Regulations in NZ*, 1979.
- Otago Electric Power Bd. *Domestic Electricity, handbook for consumers*, 193?.
- Trent, Mildred A. *Up-to-date Cook's Book, together with complete instructions for the economical handling of electricity in the preparation of household foods*, 1931.

ARCHIVES

- Some significant collections of material are held in Hocken Archives:
- Clutha Action Committee. Virtually complete files on its operations.
- Cowan, T.K. Papers relating to Clutha water rights, tariffs for North & South Islands, electricity pricing and the Dunedin City electricity supply.
- Macdougall, W.P. Personal textbooks on electricity, 1927–52,
- Mark, Allan. Records relating to the Guardians of Lakes Manapouri, Monowai & Te Anau, 1969–2001.
- Monowai Dam. Cuttings, papers and photographs relating to the dam & the Southland Electric Power Board.
- NZ Electrical Institute. Records of the Otago, South & Central Otago branches, c.1950–80.
- Otago & Southland Employers' Assn. Papers relating to the Manapouri Power Project & Tiwai Point, c.1960, restricted.
- Parsonson, Gordon. Scrapbooks relating to the electricity industry.
- Roxburgh Hydro Dam. Vol.12 scrapbook, newspaper cuttings on construction, 1946–63.
- Russell, A.Eden. Papers relating to Otago Electric Power Bd, 1929–31, 1949, 1962–64.
- Save Manapouri Campaign. Records, c.1970–77.
- Waitaki Catchment Commission & Regional Water Board. Papers, 1973–82.

PERIODICALS

The Hocken's holdings include runs of such periodicals as *Power* (the official journal of the Electrical Trades Industrial Union of Workers), *NZ Electrical Journal*, 1928–1974, *Live Lines*, *Current*, and the annual reports of many administering bodies. For periodical articles check the *Index to NZ Periodicals*, 1941–1986, and *Index New Zealand*, 1987–on.

PHOTOGRAPHS

The reception desk for Hocken Photographs is on the first floor. Consult the main index for envelopes mainly under the headings of individual power-stations. A limited index is available to the bound copies of the *Otago Witness* pictorial sections from 1899 to 1927. For copies of the *Witness* outside of those years inquire at the information desk on the ground floor.

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