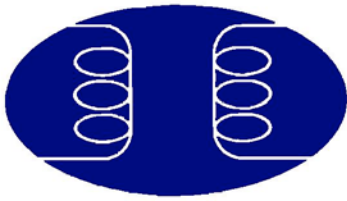


# Electric Power Consulting Pty Ltd

ABN 44 050 057 568



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Director: **Dr Robert Barr**  
BE(Hons), ME,PhD,FIE(Aust), AFAIM



## CURRICULUM VITAE

1 May 2003

### 1. PERSONAL DETAILS

**Dr Robert Arthur Barr**  
**BE(Hons),ME,PhD,FIE(Aust),CPEng,AFAIM**

Company: Electric Power Consulting Pty Ltd

### 2. PROFESSIONAL CONSULTING SERVICES PROVIDED

Electric Power Consulting Pty. Ltd. provides specialised electrical engineering consulting services to industries utilising electric energy.

E.P.C. clients include electricity supply authorities, high voltage electricity customers, water & sewerage authorities and other large energy users.

The key services provide are:

- ◆ Electric power system analysis.
- ◆ Cost/benefit analysis and financial modelling.
- ◆ Power System asset valuation.
- ◆ Computer software development.
- ◆ Energy audits and energy management programs.
- ◆ Network Planning and System loss reduction studies for electricity distributors.

203 Penguin Head Road, Culburra Beach, N.S.W., 2540, AUSTRALIA.

- ◆ Design and specification of overhead lines, underground mains, substations and protection systems.
- ◆ Improved performance and safety through staff training.

### **3. PROFESSIONAL EXPERIENCE**

#### **1990 - Present**

In 1990 Robert formed his company "Electric Power Consulting Pty Ltd" to provide professional energy and electrical engineering consulting services throughout Australia.

Major projects have included:

- ◆ Development of Ring Fencing Procedures for TransGrid
- ◆ Loadflow and Power System stability studies for the Pindari hydro power station for Power Facilities Pty Ltd.
- ◆ Electrical Safety review for Integral Energy.
- ◆ National Power Quality Survey with the Illawarra Technology Corporation Limited and ESAA in co-operation with Aurora Energy, CitiPower, EnergyAustralia, Integral Energy, Advance Energy, Great Southern Energy, Energex and Ergon.
- ◆ Retail Electricity Billing system established for the Rail Infrastructure Corporation.
- ◆ Audit of Asset Valuations for Great Southern Energy, South East Queensland Electricity Corporation and North Queensland Electricity Corporation.
- ◆ Review of electricity distribution ownership options for the Jervis Bay Territory.
- ◆ PhD completed in Series Capacitor Compensation.
- ◆ Water supply and waste water system energy audits for Goulburn City Council, Wingecarribee Shire Council, Walcha Shire Council and Shoalhaven City Council.
- ◆ 11kV co-generation preliminary design, protection setting, protection testing and protection commissioning for Associated Pulp and Paper Mill, Shoalhaven (now Australian Paper).

- ◆ High voltage fault level and protection study for Australian Paper (Shoalhaven Mill), H.M.A.S. Albatross, Shoalhaven Starches (Bomaderry Plant) and Christmas Island.
- ◆ System loss studies for Ulan Electric and Murrumbidgee Electricity.
- ◆ Training programs for the electricity distribution industry.
- ◆ Cost reflective electricity pricing study for Ulan Electric.
- ◆ Software development - energy management system for Shoalhaven City Council and Electricity Billing System for the Commonwealth Department of Environment Sport and Territories, Jervis Bay Administration.
- ◆ Energy Audit and Reactive Power Study for the Ulan Coal Mines.

During this period Robert taught electrical engineering (Associate Diploma) subjects "Electronic Power Converters", "Electrical Principles" and "Programmable Logic Controllers" at Nowra T.A.F.E..

### 1985 - 1990

In 1985 Robert was appointed Area Manager Nowra with Illawarra Electricity with overall responsibility for electricity supply to 28000 customers in the Nowra/Shoalhaven area of N.S.W..

The management of the Nowra area involved a wide range of responsibilities including system operation, metering, protection, zone/distribution substation construction and maintenance, overhead line design/construction, U.R.D. design/construction, accounts, meter reading, appliance sales, installation inspection, stores, drafting, plant, vehicles and system planning.

### 1982 - 1985

In 1982 Robert joined Illawarra Electricity as System Control Engineer. This position involved responsibility for the 24 hour operation of a 240 MW system up to 132kV with over 100000 customers.

### 1976 - 1982

Late in 1976 Robert was appointed as a professional engineer with Prospect Electricity and gained wide experience in all engineering aspects of electricity distribution including load forecasting and system planning.

**1973 - 1976**

Robert commenced his career in the electricity supply industry in 1973 as a cadet engineer with Prospect Electricity. During this time he studied electrical engineering full time at Sydney University.

**4. ACADEMIC QUALIFICATIONS****Wollongong University**

Doctor of Philosophy (PhD) completed in the Department of Electrical and Computer Engineering in 1997. This work involved the analysis of non linear power circuit components and ferroresonance effects. The research has included harmonic studies using fourier transform techniques and transient power circuit behaviour involving series capacitors, saturable chokes and power transformers.

**University of N.S.W**

Undertook research work by thesis in association with work being carried out at Prospect Electricity during the years 1978-1981. Graduated with a Master of Engineering degree in electrical engineering and computer science.

**Sydney University**

Studied full time during the years 1973-1976 as a Cadet Engineer with Prospect Electricity. Graduated with Honours in Electrical Engineering in 1977.

**Mitchell College of Advanced Education**

Power and duties of a Local Government Electrical Engineer course completed in 1987.

**Sydney T.A.F.E.**

Energy Management course completed in 1988.

**5. PUBLISHED TECHNICAL PAPERS AND MAJOR PROJECTS**

During his career Robert has published papers both within Australia and overseas and has completed major projects as detailed below:

- ◆ Voltage Sags - Customer Needs Verus what Distributors can Deliver - Presented to the Annual Conference of the Electric Energy Society, Canberra, 2002.

- ◆ Power Quality incident Investigation Cadbury Claremont Tasmania & Aurora Energy - Aurora and ITC 2002
- ◆ A Methodology for a National Power Quality Survey of Distribution Network - co-author with Professor Gosbell, Dr Smith & Dr Perera, Presented at the 6<sup>th</sup> International Transmission & Distribution Conference - D2001, Brisbane 2001 and published in the Journal of Electrical & Electronics Engineering, Australia Vol 21, No. 3 2002
- ◆ Strategic Review of Jervis Bay Territory Electricity Distribution Assets - Commonwealth Department of Territories , Jervis Bay Administration 2001
- ◆ Damage to Liddell Generator Core - Tachnical Assesing & Zurick Financial Services 2001
- ◆ Damage to Power Transformers - Tachnical Assesing & Zurick Financial Services 2001
- ◆ Form of Economic Regulation for NSW Electrcity Network Charges - Submission to IPART 2001
- ◆ Tahmoor Power Station - Energy Performance and Power Output Test - Clarke Energy 2002test
- ◆ Review of TransGrid Burdening and Costing Procedures - TransGrid 2001
- ◆ Ring Fencing Procedures for the Treatment of Regulated and Unregulated Activities - TransGrid 2001
- ◆ National Power Quality Survey - Illawarra Technology Corporation Limited and ESAA in co-operation with Aurora Energy, CitiPower, EnergyAustralia, Integral Energy, Advance Energy, Great Southern Energy, Energex and Ergon 2001.
- ◆ Loadflow and Power System stability studies for the Pindari hydro power station - Power Facilities Pty Ltd 2000.
- ◆ Electrical Safety Review report - Integral Energy 2000.
- ◆ Retail Electricity Billing system established - Rail Infrastructure Corporation 2000.
- ◆ Electrical Assets Report - NT Power Group 1999.
- ◆ Identification of TransGrid Unregulated Assets - Sinclair Knight Merz/ Australian Competition and Consumer Commission (ACCC)
- ◆ Electrical Turbine Report - Australian Paper 1999.

- ◆ Management of Electrical Assets - Rail Access Corporation 1998.
- ◆ Electricity Generation from Natural Gas - pre-feasibility Study - Queensland. Mosaic Oil 1998.
- ◆ Organisational Review of Electrical Technology Services - Shoalhaven City Council 1998.
- ◆ Energy Management System Feasibility Study HMAS Creswell and Energy Management System Review HMAS Albatross. Commonwealth Depart of Defence (Navy) 1998.
- ◆ Tariff analysis incorporating Network Charges, Loss Factors and Energy Rates for inclusion into the Determination of Electricity Service Ordinance of the Jervis Bay Territory - Jervis Bay Territory 1998.
- ◆ "HSC Simulator" software developed to assist High School Students plan Higher School Certificate Subject Choices and examine University Course Options.
- ◆ Future Management Options for the Jervis Bay Territory Electricity Distribution Undertaking. Commonwealth Department of the Environment Sport and Territories 1997.
- ◆ High Voltage Network Planning for Ulan Coal Mines Second Longwall 1997.
- ◆ Series Compensation of Distribution and Transmission Lines. Wollongong University PhD thesis 1997.
- ◆ Queensland Electricity Distributors Valuation Project. Audit work on the South East Queensland Electricity Corporation (SEQEB) valuation and North Queensland Electricity Corporation (NORQEB) valuation. Sinclair Knight Merz/ Queensland Transmission and Supply Corporation (QTSC) 1997.
- ◆ High Voltage Protection Analysis of the Winmalee Water Treatment Plant. Stowe Electric/Sydney Water 1996.
- ◆ Options for improving the Performance of the Coonabarabran Subtransmission System - Advance Energy 1996.
- ◆ Reducing Electricity Costs by Improved Reactive Power Control - Shoalhaven Mill, Australian Paper 1996.
- ◆ Electrical upgrade specification Greenpatch reserve - Australian Nature Conservation Agency - Jervis Bay 1996.
- ◆ Augmentation design of State Rail Authority 33kV overhead feeder 707 Canterbury to North Bexley - Incoll Constructions Pty Ltd 1996.

- ◆ NSW Electricity Distributors Valuation Project. Audit work on the Energy South Valuation. Energy South Asset Valuation. Sinclair Knight Merz/ Price Waterhouse/ NSW Treasury 1996.
- ◆ “High Voltage Network analysis and High Voltage Protection Settings for Christmas Island (Indian Ocean)”. TSF Engineering/ Christmas Island Power Authority/ Works Australia 1995.
- ◆ “Maximising Energy Efficiency in Water Supply and Waste Water using a Computer Energy Analysing System”. Local Government Energy Efficiency Award entry for Shoalhaven City Council October 1995. Certificate of Commendation winner.
- ◆ “Saving Energy, Saving Money and Saving the Environment with a P.C. Based Energy Management System for Water Supply Authorities”. Institute of Municipal Management /Sydney Morning Herald Management Excellence Award Entry for Shoalhaven City Council June 1995. Silver Medal Winner in the Category of Management Excellence.
- ◆ Design and Specification of High Voltage Underground Electricity Conversion Projects for the Jervis Bay Administration, Department of the Environment Sports and Territories September 1995.
- ◆ Design of 6.6km of 33kV overhead subtransmission line for the electricity supply to the Woronora Water Filtration Plant for Poles and Electrical Underground Transmission/ Concrete Constructions May 1995.
- ◆ Book review on the “Big Switch” published in Electrical Engineer Magazine March 1995.
- ◆ Modelling and Mapping Ferroresonant States in Series Compensated Distribution and Subtransmission Lines - Paper prepared for presentation at the 1995 Summer meeting of the Institution of Electrical and Electronic Engineers, Power Engineering Society held in Portland Or. USA July 1995. Published IEEE Transactions on Power Delivery April 1996, Vol. 11, No. 2 pages 931-939.
- ◆ Energy Audit Report - Ulan Coal Mines -for Ulan Coal Mines Ltd 1995.
- ◆ Report on Electric Reactive Power Consumption at the Ulan Coal Mines -for Ulan Coal Mines Ltd 1994.
- ◆ Software Development for P.C. Based Electricity Administration and Billing System for the Commonwealth Department of the Environment Sport and Territories, Jervis Bay Administration 1994.
- ◆ Report on High Voltage Protection Settings - Shoalhaven Milling Company (Bomaderry Mill) 1994.

- ◆ Jervis Bay Territory Electricity Distribution Report for the Commonwealth Department of the Environment Sport and Territories, Jervis Bay Administration 1994.
- ◆ Electrical Operator Training Course - A Training Course on Operating Procedures and Safe Working Practices for Murrumbidgee Electricity 1994.
- ◆ Software Development for P.C. Based Energy Management System for Shoalhaven City Council 1994.
- ◆ Report on 3.3kV Motor Failure for Wingecarribee Shire Council 1994.
- ◆ Network Impacts of Proposed Generation at Appin and Tower Collieries - Preliminary Analysis for Prospect Electricity 1994.
- ◆ National Grid Powers-up for Change - Published in Electrical Engineer Magazine February 1994.
- ◆ Shoalhaven Waste Water System Energy Audit - for Shoalhaven City Council 1993.
- ◆ Energy Audit Report - Murrumbidgee Electricity Distribution System - for Murrumbidgee Electricity 1993.
- ◆ Report on Energy Cost Considerations for the Wine Growers' Co-operative Irrigation Scheme - for Ulan Electric 1993.
- ◆ Report on High Voltage Protection Settings - H.M.A.S. Albatross Central Emergency Power House - for O'Donnell Griffin 1993.
- ◆ Energy Audit Report - 20 Home Unit development at North Wollongong for Conserve Pty Ltd 1993.
- ◆ Forecasting Transformer Life - Published in Electrical Engineer Magazine November 1993.
- ◆ Report on the Condition of Electricity Supply Assets at H.M.A.S. Creswell for Depart of Defence (Navy) 1993.
- ◆ Overhead Line Design Training Course - for Central West Electricity, 1993.
- ◆ A Temperature Controlled Non-linear Choke - Published and presented at the Australasian Universities Power Engineering Conference held at Wollongong University 1993.
- ◆ Energy Audit Shoalhaven Water Supply System - for Shoalhaven City Council 1993.

- ◆ Energy Audit Wingecarribee Dam and Medway Dam Water Supply System - for Wingecarribee Shire Council 1993.
- ◆ Analysis and Development of a Cost Reflective Electricity Pricing Model -Ulan Electric 1993.
- ◆ Energy Audit Water Supply and Waste Water System - Walcha Shire Council 1993.
- ◆ Preliminary Gas Turbine Stability Analysis - A.P.P.M. Shoalhaven Recycled Papers Project 1993.
- ◆ Cogeneration Synchronisation Operations Manual - A.P.P.M. Shoalhaven 1993.
- ◆ Cogeneration Protection Relay Settings and Relay Test Instructions - A.P.P.M. Shoalhaven 1993.
- ◆ Energy Audit Bundanoon Creek Dam Water Supply System - for Wingecarribee Shire Council 1993.
- ◆ High Voltage System Fault Level and Protection Study - A.P.P.M. Shoalhaven 1992.
- ◆ Oil Deterioration in Power Transformers - Presented and Published at the 1992 Annual Conference of the Electricity Supply Engineers Association of N.S.W..
- ◆ High Voltage Operating Procedures for High Voltage Electricity Customers. Training course for Shoalhaven Milling Company, 1992.
- ◆ Capital Project Evaluation for Electricity Supply Authorities. Training Course conducted for Ophir Electricity & Local Government Electricity Association, 1992.
- ◆ Energy Audit - Goulburn City Council Civic Centre, 1992.
- ◆ Ulan Electric - Distribution System Loss Reduction Analysis, 1992.
- ◆ Institution of Engineers Australia - Submission on the N.S.W. Government Discussion Paper on Energy Issues in N.S.W.. - Co-author and Co-ordinator, 1992.
- ◆ Specification of electrical works to upgrade H.M.A.S. Albatross aircraft hangars to hazardous zone requirements, 1992.
- ◆ Energy Audit - Goulburn City Council Water Supply and Sewerage System, 1992.
- ◆ Institution of Engineers Australia - Position paper on the Industry Commission report on Energy Generation and Distribution - Co-author and Co-ordinator, 1992.
- ◆ Cost Benefit Analysis for the Proposed Purchase of Oil Treatment Equipment. SouthWest Electricity, 1991.

- ◆ Options for Augmentation of Electricity Services - Thomas Holt Memorial Village, 1991.
- ◆ Energy Audit - Chep Head Office Crows Nest Sydney, 1991.
- ◆ Submission to the Industry Commission on Energy Generation and Distribution for the Urban Development Institute of Australia, 1991.
- ◆ Proposals for Reducing the Cost of Underground Electricity Supply to New Urban Subdivisions - Prepared for Telman Holdings Pty Ltd, 1991.
- ◆ Voltage Regulation in Power Transformers by the Control of Leakage Flux - Presented and published I.E.E.E. conference on Electromagnetic Field Computation held at Washington D.C. U.S.A. December 1988.
- ◆ The Challenge of Productivity Improvement in the Electricity Distribution Industry - Presented and Published at the 1988 Annual Conference of the Electricity Supply Engineers Association of N.S.W..
- ◆ System Operations arrangements of the Southern Electricity Board (U.K.), Seattle City Light (U.S.A.) and British Columbia Hydro (Canada), Report for Illawarra Electricity 1985.
- ◆ A Tapping Range and Voltage Level Analysis Chart for Tap Changing Transformers - Presented and Published I.E.E.E./P.E.S. 1985 Summer Meeting Vancouver B.C., Canada.
- ◆ The Design, Installation and Operation of the Illawarra County Council's Supervisory Control and Data acquisition System- Presented to the Regional Conference of the Electricity Supply Engineers' Association of N.S.W. held at Wollongong on 21 March 1985.
- ◆ A Nomogram for the Selection of Matching Design Parameters for the Underground Residential Distribution of Electricity - Published June, 1983 Journal of Electrical and Electronics Engineering, Australia.
- ◆ Techniques for the Computer Mapping of Electricity Distribution Systems and the Network Applications of Mapping Data. Master of Engineering Thesis U.N.S.W. 1980.
- ◆ A Storage and Interpolation Algorithm for the Implementation of Optimal Control using Mini Computers. Honours Thesis in Electrical Engineering University of Sydney 1976.

## **6. MEMBERSHIP OF PROFESSIONAL AND INDUSTRY**

## **ORGANISATIONS**

- ◆ Member of the Association of Consulting Engineers Australia.
- ◆ Fellow of the Institution of Engineers Australia, member of the College of Electrical Engineers and registered on the National Professional Engineers Register (NPER).
- ◆ Committee member of the Shoalhaven Country Group of the Institution of Engineers Australia, Sydney Division.
- ◆ Member and NSW committee member of the Electric Energy Society of Australia.
- ◆ Associate Fellow of the Australian Institute of Management.
- ◆ Member of the Institution of Electrical and Electronics Engineers (U.S.A.).
- ◆ Registered Professional Engineer in Queensland.
- ◆ Member of Standards Australia.

## **7. ENERGY AUDITOR**

Electric Power Consulting is an experienced Energy Auditor with specialisation in water supply.