



ALEX CRUICKSHANK PRINCIPAL CONSULTANT

Master of Business Administration
Bachelor of Science
Diploma in Education
Adelaide University

Fellow of the Australian Institute of Energy

PRIOR PROFESSIONAL HISTORY

2016 –	Oakley Greenwood Pty Ltd - Principal Consultant
2015 – 2016	Alex Cruickshank Consulting - Principal
2001 – 2015	AGL - various roles, including Manager NEM development, Manager Wholesale Markets Regulation, Head of Energy Regulation
2001 – 2001	SA Treasury (Micro-economic reform unit)
1998 – 2000	National Electricity Code Administrator - Principal Consultant Code Development
1997 – 1998	Optima Energy - Senior Analyst Market Liaison
1989 – 1997	ETSA - various roles, including Manager Organisational Development, Manager Strategic Planning, Executive Officer National Electricity Market Project.
1984 – 1989	University of South Australia (then SAIT) Coordinator of the Centre for Health Administration and lectured and tutored for various business courses.
1976 – 1984	SA Health Commission – various roles including Senior Staff Development Officer and Project Manager.

OVERVIEW

Prior to joining Oakley Greenwood in 2016, Alex had over 25 years' experience in energy markets within a range of organisations, including a vertically integrated utility, a generator/retailer, a rule making body and government.

Alex has deep experience in market design and rules development. He was involved in the initial design of the National Electricity Market; examining capacity markets versus energy only markets, network development approaches and access rules. He continued in the developmental role with the rules body (the National Electricity Code Administrator) as Principal Consultant Code Development and oversaw all rules change applications and changes.

After NECA, Alex worked with the Treasury Department in South Australia, providing technical advice as part of the Microeconomic Reform Unit and, in particular, managing a review into the operation of the National Electricity Market in South Australia during a period of system stress.

Alex then joined AGL, then a retailer, and was involved in the market development from a private sector perspective and assisted in the expansion of AGL initially into generation but later into new technologies. While always holding market development roles, Alex held senior roles in the Corporate Affairs division in AGL, including Head of Energy Regulation. In these roles, Alex was involved in responding to developments in wholesale and retail markets for gas and electricity and was often involved in working groups and task team examining specific rule changes. As Head of Energy Regulation, Alex managed the regulatory teams in AGL for wholesale gas & electricity, retail gas & electricity operations and retail compliance.

Before he joined the energy industry, Alex lectured and taught management and related processes at the SA Institute of Technology and the SA Health Commission as well as consulting on organisational design and IT (payroll and management systems).

Alex has also been active in working to identify new technology, including the market and organisational changes required to exploit it. Alex was Vice President of Smart Grid Australia and is a member of Smart Communities Australia. Alex designed an approach for a Distributed Services Operator for a network business and is active in looking at approaches, such as transactive energy, to better incorporate demand side options with markets.

The DER work has included working with ARENA and AEMO on methods to baseline customer demand for DER, assessment of DR projects and market or pricing mechanism for integrating DER into the Australian National Electricity Market. Most recently, Alex was involved in modelling the value of demand side orchestration (using a VPP) of loads and storage in WA.

During his time at Oakley Greenwood, Alex has participated in projects on market design, future technologies in Australia and reviews of change proposals. He is involved in the design of the NT and WA markets and worked with companies seeking to develop solar and wind farms that interact with the NEM and normal commercial markets as well as companies seeking to harness and coordinate embedded resources.

Alex is Chairman of the international study committee on markets and regulation for the International Council for Large Electrical Systems (CIGRE). Alex is also a member of the International Technical Council of CIGRE, which oversees the knowledge programme of CIGRE. Alex chairs the market aspects of the biennial Large Disturbance Workshop with Greg Thorpe, which examines market and system disturbances in electricity grids around the world and what can be learned from them.

Alex is also a member of the Advisory Committee for Transmission and Distribution (ACTAD) of the International Electrotechnical Commission (IEC), focusing on global electricity interconnection and integration of renewables.

During his career, Alex has developed experience in:

- Energy market design and operation – including pricing and integration of demand side operations and resources
- Wholesale and Retail energy processes, rules and regulation – including embedded networks and microgrids
- Demand side response and demand side orchestration – including smart grids and advanced metering
- The integration of emerging technologies into markets.
- Organisational design and business management processes
- Due diligence during acquisitions and mergers

RELEVANT EXPERIENCE

Economic Analysis and modelling

- Alex was a key part of the team that analysed how DER could be economically integrated into the NEM based on the economic value of its services to participants and the market operator. This project was partially funded by ARENA
- Oakley Greenwood was engaged to model the economic value of a VPP in the Western Australian Market. Alex was the market expert on the project and developed many of the modelling inputs.
- Alex developed scenarios as part of a modelling and planning project for Infrastructure NSW. The project was a 10 year look ahead and required development of scenarios for the development of various technologies and consumer adoption prior to economic modelling of the expected outcomes.

Market design and rules development

- Since becoming a consultant, Alex has been involved in a number of projects to do with market design, notably:
 - an approach to DSO operation and microgrids for United Energy and related work on Microgrids for AEMO;
 - the development of rules for the Northern Territory Energy Market;
 - a project to develop approaches and rules for the integration of DER into the NEM; and
 - designing the approach for Western Australia's market (the WEM) to operate their Reserve Capacity Mechanism with a constrained network.
 - Implementation of embedded networks – including the impact on market competition and their use in developments.
- Alex developed and honed his market design knowledge at ETSA, where he was part of the team that worked on the development of the, then, National Electricity Code. This work continued at Optima Energy (the generation arm of ETSA when it was separated) and then at NECA, where he was Principal Consultant Code development, managing changes to the Code.
- While at NECA, Alex established the first exemption guidelines for embedded networks and was involved in changes to market price caps and minimum pricing. Alex was involved in all aspects of Code changes during his time at NECA.
- Alex continued to be involved in market design issues at Treasury, where he was a key part of the review by South Australia into the operation of the National Electricity Market and then at AGL, where he held various roles reviewing and being involved in the development of the NEM and related retail markets.
- During his time at AGL, Alex regularly participated or led working groups and task teams to assess market and rules changes. This was often as either a participant representative on panels and working groups managed by AEMO or the AEMC. This included:
 - incorporating demand side response into the NEM
 - prudential management in the NEM
 - management of settlement residues
 - managing multiple trading relationships at a site
 - embedded networks (microgrids).

- While he was with AGL, Alex chaired the wholesale markets groups of both the National Generator Forum and the Energy Retailers Association of Australia where he led significant aspects of market design on behalf of those organisations. This included a major reworking of the implementation of generator technical standards.

Wholesale and Retail Regulation

- Alex was Head of Regulation for AGL, managing the regulatory teams for retail operations, retail compliance, wholesale gas operation and wholesale electricity. He also managed the metering regulatory group during the rollout of advanced meters in Victoria.

He personally worked on a number of aspects of industry regulation involving federal & state governments, regulators and market bodies. He was active in generation operations and connection, retail operations and new technology implementation.

- As part of the National Generator Forum, Alex led the effort to redesign the process for registering generators for the new technical standards, including arranging changes to the Law, Rules and business processes.
- During this period, Alex was a member of many working groups and industry bodies, including:
 - National Generator Forum, as chairman of the Wholesale Market Working Group
 - Energy Retailers Association of Australia, as a board member and chairman of the Wholesale Markets Working Group
 - The AEMO working group examining case studies and regulatory environments for embedded networks/microgrids
 - the Regulatory and Policy Steering Committee of the Smart Grid Smart City trial, a A\$100 million trial of smart grids in Australia
 - the Retail Market Executive Committee and the Information Exchange Committee, which oversaw changes to the retail operations of the market operator
 - standing and working groups on embedded networks & multiple trading relationships, management of settlement residues, market contract development and prudential matters.

Due Diligence

- Alex was a member of the Board and the final Chairman of GASCOR, the industry owned body that managed the transition of government established gas contracts after the gas privatisation in Victoria. GASCOR managed the contracts and allocated the gas to retailers. During this time Alex was involved in the oversight of GASCOR operations and its eventual voluntary liquidation when its role was complete.
- He was involved in the regulatory due diligence of the demerger of AGL into AGL Energy and Alinta. This was a complex merger/demerger, requiring significant due diligence for the decision process and reports to the shareholders.
- Alex also was involved in the due diligence activities for various generator and retail purchases by AGL, requiring assessment of regulatory environments, contracts and personnel of target companies.
- In addition, Alex was part of OGW teams that performed:
 - due diligence on the demand response proposals submitted as part of the ARENA 2017 competitive funding round
 - an audit of the RERT purchasing process.

Organisational design

- Alex was involved in organisation design work, using the Socio-Technical System approach prior to entering the energy industry and continued this work at ETSA initially in the strategic planning group and then as the Manager of Organisational Design. During this work, ETSA was radically redesigned and staffing substantially reduced to allow it to be competitive in the NEM.
- Alex used and trained other staff at ETSA in:
 - project management, decision making and issues analysis using Kepner-Tregoe methods
 - management and change facilitation, including quality assurance, using Total Quality Institute methods, amongst other approaches.

Emerging technology

- Alex has been involved in the application of demand side response, renewable and emerging technologies since his time at ETSA. More recently he has been the Vice President of Smart Grid Australia and prepared papers on Smart Grid future developments, including energy market disruption and future technology. He is currently a member of the Australian Smart Cities Association.
- Alex was a member of the Victorian Advance Metering Infrastructure Ministerial Advisory Council, the National Smart Meter Steering committee and the Advanced Metering Infrastructure Steering Committee. He was also a member of the Implementation Steering Committee for the Victorian Advanced Metering Infrastructure programme.
- Since becoming a consultant, Alex has worked on projects related to the adoption and integration of new technologies, including:
 - a report and proposal in relation distribution level markets, including designs, operations and an analysis of overseas experience
 - a paper on the use of microgrids in Australia, particularly their relationship to the National Electricity Rules and Embedded Network
 - a forecast of the future development of the energy market in Australia, particularly the likely adoption of new technologies Rules development
 - a due diligence report for ARENA in relation to demand side proposals to support the Reliability and Reserve Trader. Oakley Greenwood also provides support in disseminating the knowledge gained from this project
 - a review into approaches for the economic integration of distributed energy resources (DER) into markets, particularly the NEM.
- Alex is currently a member of ACTAD task team 6 – which is a group monitoring new developments in markets and technology, including global energy interconnection, PV and wind generation, hydrogen developments and other storage developments.

International Council for Large Electrical Systems (CIGRE)

- Alex has been active in the study of international market and regulatory systems since 1994 when he joined the relevant Australian panel of CIGRE. The International Council for Large Electrical Systems (CIGRE) is a worldwide body, established just after the first world war, which is active in fifty-eight countries and has 14,000 members.

- Alex is currently:

- the Chairman of the international study committee on markets and regulation (SC C5), which coordinates the CIGRE work in markets
- a member of the editorial board of *Electra*, the CIGRE journal, which develops and reviews content for the journal, which is published every second month. The board also collates and reviews contributions for the CIGRE newsletters
- a member of the International Technical Council, which oversees the knowledge programme of CIGRE.

The Study Committee and the Technical Council do their work via specific, task-focused working groups that examine key issues and provide published reports or presentations.

- Alex has participated in eight working groups (the published reports are shown as TB xxx):

- C5.9 Retail Market Competition - Customer Switching, Metering and Load Profiles
- C5.12/TB 580 Generator Market Power Mitigation Measures in Electricity Markets
- C5.13 Interaction of Markets and Regulatory Actions with Emerging Technology. The results of the WG were published in *Electra*, the CIGRE journal
- C5.15/TB 667 Risk Management in Evolving Regulatory Frameworks
- C5.15/TB 658 Default Management in Electricity Markets
- C5.16/TB 747 Costs of electric service, allocation methods, and residential rate trends
- C5.17/TB647 Capacity Mechanisms; needs, solutions and state of affairs
- C5.19/TB651 Regulatory Aspects of the Demand Response within Electricity Markets
- C5.23/TB753 Wholesale market price caps
- C5.24/TB803 Exploring the market value of Smart Grid developments.

- Alex chairs a biennial workshop, managed by Greg Thorpe from Oakley Greenwood, that examines market disturbances from the various member countries of CIGRE, including: the causes of the disturbances, how they were managed and what can be learned from them for other countries. This is part of the Large Disturbance Workshop held every two years at the CIGRE Paris Session.

- Alex recently presented a “World overview of Demand Response” to the Annual Seminar of the CIGRE Thailand National Committee.

- Alex has co-authored chapters in two books:

- He was lead author for the markets and regulation chapter in the Springer text: “Electricity Supply Systems of the Future” and
- A co-author (including with Greg Thorpe) of a markets chapter of the “Springer Handbook of Power Systems.

OTHER PUBLICATIONS

- Smart Grid Australia
 - “Towards Australia’s Energy Future, 2014 Update”, Smart Grid Australia 2014. Also a presentation and Webinar.
 - “The Five Disrupters - Report on the 2015 Seminar”, Smart Grid Australia, 2015. Also a presentation/webinar.
- CIGRE
 - International Perspectives on the Alignment of Electric Service Costs and Retail Rate Structures, Dublin 2017. Co-author with A Chuang (Lead) and others.
 - “Evolution of embedded networks in Australia”, CIGRE 2018. Co-author with Greg Thorpe and Ian Rose.
 - Exploring the Market Value of Smart Grids and Interactions with Wholesale (TSO) and Distribution (DSO) Markets, CIGRE 2018. Co-author with E LaRose (Lead) and WG C5.24.
 - Global Overview of Demand Response Markets and Regulation (Tutorial), CIGRE 2018. Joint presentation with Anant Venkateswaran (with Archie Battegay).
- Reference books
 - Electricity Supply Systems of the Future (Springer 2020). Lead author for chapter 14 Markets and Regulation,. The book examines system and market changes for the evolving market, particularly renewable, distributed energy and storage. The market and regulation chapter focused on two potential approaches – centralised and decentralised (microgrids) – as the ends of a range of potential approaches.
 - Springer Handbook of Power Systems (Springer 2020). Co-author for Chapter 18 Electricity Markets. The book covers all aspects of power systems with chapter 18 focusing on the various forms of markets used.