



## JIM SNOW EXECUTIVE DIRECTOR

Adjunct Professor, University of Qld  
Energy Initiative

Bachelor of Engineering (Chemical)  
Honours, FICHEM

Graduate, Australian Administrative Staff  
College, Mt Eliza, Melbourne

Panel Member, Australian Renewable  
Energy Agency

Member of Australian Institute of  
Company Directors

## PRIOR PROFESSIONAL HISTORY

2016 -	Adjunct Professor, University of Qld, Energy Initiative
2008 -	Executive Director, Oakley Greenwood
2006 - 2008	Senior Advisor, Charles River Associates - International
2005 - 2006	Energy Developments Ltd, Executive GM Development
2001 - 2004	Charles River Associates, Asia Pacific/Vice President
1993 - 2001	Energetics, CEO Consulting/CFO/General Manager
1991 - 1992	Hunter Electricity (Newcastle), CEO
1990 - 1991	Energetics Pty Ltd (Newcastle), Marketing Director
1978 - 1990	AGL, Manager Sales and Marketing (1986-90) / Manager Regulation 1990/ Manager Commercial and Industrial Sales (1983-86) / Project Engineer (1980- 83) / Works Engineer (1978-80)

## OVERVIEW

- Extensive regulatory work and detailed economic analysis, and leadership of teams of regulatory economists and specialists - gas, water and electricity transmission and distribution networks;
- A range of key CEO, EGM and GM roles in various energy related businesses and practices, and several Board Directorships in Australia and in Asia;
- Preparation of numerous Board submissions and investment proposals;
- Project development activities and the management of major construction for electricity networks, gas pipelines, gas and solar power stations, CNG and LNG facilities;
- Development and implementation of numerous detailed business cases and plans, and business strategies for primarily energy companies;
- Design and review of electricity and gas markets in Australia and Internationally including Saudi Arabia and Malaysian Electricity Supply Industry restructures;
- Market entry and restructuring strategies and projects for leading Australian and International Retail business entities - including designing such entities;

- Consulting and development experience with demand side management, embedded generation (large and small scale), AMI and smart grid deployment;
- Energy efficiency and greenhouse gas mitigation for large energy users
- Operational experience in commercial, financial and regulatory modelling;
- Operational experience with contract negotiation, formation and management (extensively trained in this area);
- Jim develops and presents many professional papers each year on various regulatory and industry matters - current papers can be found on the Oakley Greenwood website [www.oakleygreenwood.com.au](http://www.oakleygreenwood.com.au)

## EDUCATION

- Adjunct Professor, University of Queensland Energy Initiative
- B.E. (Chemical) Honours, Fellow IChemE, past Fellow IEAust
- Graduate Australian Administrative Staff College, Mt Eliza, Melbourne

## RELEVANT EXPERIENCE

Jim has spent over 20 years consulting to water and energy companies in Australia, South East Asia, the Middle East and the US. He has extensive expertise in regulatory matters (particularly networks), modelling and pricing of embedded generation options and large-scale generation developments; energy efficiency, business restructuring and improvement; greenhouse emission matters and demand side management, water; government policy on energy and water matters; business development, market entry, business cases and plans and energy marketing; project development and implementation; gas, LNG and CNG; training.

Jim spent 12 years in the Natural Gas Industry (AGL) holding several senior executive positions involved with the technical end use of energy, regulations and tariffs, contract pricing, wholesale gas procurement, analysis of energy projects investment for Board submission, growth strategies - including developing and implementing mergers and acquisitions and extensive retail management.

Jim has also spent over 20 years consulting to large industrial energy consumers on their energy needs, energy efficiency and greenhouse gas mitigation issues, and to the leading energy and water companies in Australia, New Zealand, South East Asia and the Middle East. Jim was a leading executive in Energetics for 11 years and was CEO Consulting for more than 6 years, as well as an Executive Director.

Jim Snow has undertaken several major electricity industry restructuring and regulatory assignments as the lead consultant that have involved extensive analysis of power supply options - recently in Malaysia (MYPower, TNB and SESB) and the Kingdom of Saudi Arabia (SEC - 2.5 years restructuring the entire electricity supply industry).

Jim is regarded as a leading expert in the gas sector in terms of gas supply options, transmission, distribution, pricing, contracts and end use. Jim has over the last 7 years developed gas supply options for a number of power station developments (on and off grid) including piped gas, LNG and CNG supplies. He has also built gas transmission and distribution systems and small-scale LNG and CNG facilities.

Jim is also regarded as an expert on the economic regulation of energy and water businesses and has presented many papers on associated issues. He is also regarded as a modelling expert being used extensively to scope and develop complex, bespoke economic and commercial models.

Jim also has senior executive experience running a major Business Development and Construction business for listed entity Energy Developments Ltd (Executive General Manager reporting to the Managing Director). This encompassed (Coal Seam Gas, CNG and LNG) power station developments - remote and embedded, production and trading of greenhouse gas credits and certificates, and CNG and LNG facility developments in Australia. Jim developed detailed financial models for all the investment opportunities for EDL over a 2-year period and reported these to the Board at each Board meeting. He was responsible for these developments and if approved their construction and commissioning.

Jim has also been the CEO of a major electrical power systems contracting company specializing in the design and construction of sub-transmission (132 kV) and low voltage overhead power-lines and electrical contracting.

He also has extensive project development and implementation experience (including construction management), is engaged often to undertake bespoke modelling and pricing assignments; retail new entrant strategies and implementation, business restructuring and improvement; greenhouse emissions matters and demand side management.

Jim's expertise and standing in the energy sector was recognised in June 2016 being conferred the Honorary Title of Adjunct Professor by the University of Queensland, Energy initiative.

## REPRESENTATIVE ASSIGNMENTS AS LEAD CONSULTANT

### **Economic Regulation, Demand Side Participation and Pricing for the gas, electricity and water industries, and Embedded Network Development**

- Jim has recently advised Murrumbidgee Irrigation on the development and implementation of new pricing structured and tariffs. Initial advice was received by the Board and is being implemented.
- Jim has led a team in Malaysia over the last 5 years to assist in the development of their economic regulation - he has worked for the market reform team, Tenaga Nationale and Sabah Electricity.
- Jim is advising a large retirement park operator on the economics of embedded electricity networks with solar generation and battery storage, and in regard to the new Embedded Network Operator rules;
- He also recently advised the AEMC on embedded networks in a landmark report including specific case studies.
- Advised Ausgrid on various electricity pricing issues related to time of use, demand response and pricing strategy including assessing pricing options and peak demand reduction incentive scheme options for their management and Board, for submission to national and jurisdictional regulators (AER, IPART) and other stakeholders;

- Jim completed the development of a pricing and cost allocation model for CBD electricity network owner Energex (Brisbane, Queensland) that is more flexible, provides more analysis tools, and is more attuned to the new National Electricity Rules and Regulatory procedures - this was a major modelling project led by Snow and has been used extensively for network regulatory determination modelling;
- Jim led detailed work with both Ausgrid and Endeavour Energy on the development and verification of their underlying peak demand and energy forecasts and how these relate to pricing and regulatory issues, as well as supplied a number of submission documents for their Regulatory (AER) reviews;
- Jim provided the outlines for the electricity dynamic pricing trials work undertaken by Ausgrid and Endeavour Energy in NSW and has undertaken detailed reviews of these trials, and provided analysis and advice on progressing this work;
  - Jim has worked closely over many years with the authors and implementers of the landmark dynamic pricing trials work undertaken in California (particularly Dr Ahmed Faruqi) and has presented joint papers and peer reviewed work in this area;
  - Jim worked extensively with Southpower (now Orion Energy) in Christchurch on the development and implementation of their network dynamic pricing products. This was ground breaking work internationally (completed in 1993/95) and it has seen the total reversal in the network system load factor trends. This was diminishing quickly and over a 20-year peak demand has grown less than 10% whilst energy consumption has been very strong lifting load factors back to very high levels.
  - Jim also provided Southpower with the underlying marginal cost analysis and benchmarks that have been consistently used over that 20-year period to analyse network investments and demand reduction strategies (particularly embedded generation which has been taken up extensively), and set prices (still used today);
  - Jim developed a key paper for Integral (Endeavour) Energy on the impacts of air conditioning on their network and estimates of inherent subsidies and deadweight loss, as part of the IPART Determination of Revenues for DNSP's in NSW for 2004. The paper (Integral Energy - CRA Air Conditioning Impact Report - publicly available) has been recognised nationally and internationally as a benchmark on this rapidly developing issue;

## Renewable Generation, CNG, LNG and Remote Power Station developments in Australia.

- Jim advised a large solar PV power station developer on selling the offtake from their portfolio to large energy users (e.g. miners) using financial instruments and direct supply options;
- Jim has also advised several; new market entrants into the solar PV power station market in Australia (Chinese and German groups);
- Jim was instrumental in the development and construction of remote power stations fuelled off coal seam methane gas which receive major environmental (green) credits in Australia (e.g. German Creek plant);
- He also pioneered the long-distance trucking of CNG to fuel remote power stations (Yulara) and was heavily involved in the development of CNG and LNG supply, storage and dispensing facilities for transport and power use across Australia;

- Jim also led the development of LNG use for mine haul trucks (circa 200 tonne) with the options of using drainage gas at coal mines as the fuel (formed venture of CAT, Xstrata, EDL and Westport from Vancouver). This was while at EDL and was subsequently taken up by CAT and Westport after Jim left EDL;
- Jim has completed major power station prefeasibility assessments and implementation of new plant for Anglo Gold Ashanti (\$300m plus) and South32, and similar assignments for Rach and Rio Tinto;
- Led a major market review of renewable energy and gas fired electricity generation of the Asia Pacific region for a major US Utility with detailed work on the opportunities in China;
- Jim also completed a detailed business case for a Chinese supplier of Solar PV power stations for market entry into Australia. This work included the detailed financial modelling of the various market sector opportunities and advice on entry strategies;

## Power Generation Investments

- Jim over the last 7 years has had long term engagements with major gas power station developers (all have existing stations - in total projects were in excess of 2,000 MW) working as part of their project teams on modelling of the financial viability of the projects, providing detailed information to support funding, assisting with the strategic development of the project and working extensively on gas supply agreements and power off taker arrangements and market price forecasting;
- Jim assisted HRL technologies during the development of their Dual Gas Power Station plant that used natural gas and the output from HRL Technology brown coal gasification plant. This project went to full development but was halted due to a drop-off in the NEM wholesale market prices - Jim provided modelling support and the procurement of gas supplies for the project;
- The gas supply arrangements for power stations (circa contract size exceeding \$6 billion) have led Jim to develop a 20-year gas price forecast that has been used by these investors and is based on a high degree of price discovery across gas, coal and LNG markets in Australia and Asia. This is matched with Oakley Greenwoods electricity price and demand forecasts using our proprietary models;
- Prior to this Jim was a lead advisor to two small companies that we seeking to develop into the embedded gas fired power generation and renewable energy power generation sectors.
- Jim worked for two years with Energy Developments Ltd as their lead business development Executive General Manager (EGM) reporting to the MD and regularly reporting to the Board on development matters, opportunities and projects. This included major power station developments and potential merger and acquisitions.
  - While at EDL Jim developed a detailed financial modelling approach to project investment analysis and embedded a process of MD and Finance Director sign off prior to Board sign off based on this modelling approach. Jim also was responsible for the construction and commissioning of all major projects once they were signed off by the Board and their on-going economics on completion. He then handed them over to the Operations side of the business;
  - As part of his Executive role Jim also worked closely with the Auditors of the business to verify and have signed off the holding values of the various on-going assets and facilities (mostly power stations), and the work in process, for the annual accounts;

- Jim also pitched the development of an LNG peaking and fuelling plant at Newcastle, NSW to AGL while at EDL. AGL subsequently went on to develop this plant after Jim left EDL (A\$310m);
- Acted for a major Queensland industry on the potential purchase of 20 PJ of gas from either Timor Sea or PNG for self-generation;
- Examined the role of gas-fired generation in Australia and the subsequent opportunities that arise in the market for new developments and market entry;

## Water Sector

- Advised Murrumbidgee Irrigation on the development and implementation of new water pricing tariffs over a 12-month period;
- Advised South East Queensland Water (Seqwater) on new tariff options for bulk water;
- Advised IPART, the water regulator in NSW on the capex and opex costs of various water authority pricing and revenue submissions
- Advised Unitywater on its first regulatory submission to the Queensland Competition Authority. Unitywater has recently been formed from the water and waste water assets of Moreton Bay and Sunshine Coast Councils and is both a network operator and retailer;
- Also advised Unitywater on the development of its field control strategies and internal resourcing;
- Advised the Queensland Department of Energy and Water on policy related to Independent Water Utilities and new entrant providers;
- Advised a very large investment fund on the due diligence for a major water related acquisition;
- Water and wastewater - Jim has undertaken several key studies of the value chain in the water industry, operations, pricing and management of inputs (Hunter Water, GCCC, and Brisbane Water);

## Demand Side Energy Management, Energy Efficiency and Productivity, Procurement and Industrial Energy Use

- Jim worked closely with the large energy intensive industries to assist them to develop their strategies for increasing energy productivity and manage energy costs in a deregulated market (for electricity and gas). This included industries such as glass, bricks, aluminium, steel, plastics, pulp and paper, wall board, MDF board, chemicals (particularly fertiliser plants), food (particularly meat and chicken processing), beverage and beer, manufacturing, etc.
- This also included managing greenhouse emission matters in some detail, and
- He developed sophisticated strategic options for especially large users to become more of a participant in the industry using the strength of their portfolios (to the point some customers are also now energy traders with limited risk exposure);

- With his partners, they built a leading consulting business in Australia and as the CEO of Consulting (and Executive Director) he oversaw some 120 staff working on these matters across Australian and the South East Asian region. This included the development of a range of new and innovative technical options, process improvements, and other related products for large users including web based data aggregation systems (and management/reporting modules) and separate tendering services for energy procurement - but the focus was always on developing and delivering effective strategies;
- He also forged strong links with some of the key energy providers in Australia and developed for them a range of service businesses and products they could offer to their large users and new procurement related joint services to minimise margins and optimise the value of the client's portfolio (e.g. demand management options, technical support services, trading options, greenhouse credit development options, bespoke supply arrangements that avoided key market risks, etc.);
- Jim has also advised some of the large energy intensive industries on strategies to exploit the greenhouse gas reduction and carbon tax/trading scheme developments - how to turn compliance into a business opportunity and to make it a competitive advantage of the business (including using CHP type arrangements);
- Jim has also been a lead advisor to GridX Power which was a trigeneration developer (9.6 MW Trigeneration plant for Qantas at Sydney Airport);
- In more recent years Jim has worked extensively with major mining houses across Australia such as Anglo Gold Ashanti, RIO, South32 and Ratch.
- Policy and modelling work for AEMC and NSW OEH related to energy efficiency measures and peak demand reduction options and impacts - this integrated the NEM price modelling forecast dynamically to assess the impacts of various policy options and required new and innovative modelling developments to be undertaken to get reliable results;
- Advised on advanced metrology developments (AMI metering) issues in Victoria - key work examining cost benefits of these technologies in the supply chain;
- Facilitation of major industry issue workshops and working groups for AEMO (previously for NEMMCO and VENCORP) and for the Energy Networks Association including a recent workshop on consumer issues related to AMI and price increases with 10 network owners, 10 retailer groups, 10 national and jurisdictional regulatory and policy groups and 10 consumer representative groups;
- Has advised on the barriers and opportunities for Demand Side Response and embedded generation involvement in the Australian energy market including recommendations on related policy issues for several state government bodies, independent entities, market participants and Regulators (numerous projects spanning 20 years).
- Wrote numerous submissions over an 18-month period to the NSW IPART review of the AGL Gas Undertaking (Revenue Determination process) for major energy users (CUB, NSW Health, CSR - public reports) and for a major competitor/new entrant gas Retailer (EnergyAustralia) that was highly successful in establishing large user pricing economics and assisting new market entry;

## Energy Retail Sector

- Undertaken several business strategy projects for very large retailers advising on the most efficient way to organise and implement customer service in retail operations and to develop new services and offerings in the market;

- This has included detailed work over an 18-month period with the then EnergyAustralia Retail business (Sydney - 1.2m clients) to completely review and redesign their operational processes, business systems and sales strategy within the competitive energy market and developed a working financial model for the business based on a value creation process. The recommendations from this work were implemented and the business went from making large losses to full profitability, and became benchmarked as one of the lowest cost to serve retail businesses in Australia;
- Strategic advice to a leading regional retailer (Ergon Energy - Queensland) on business development and stakeholder management over a 5-year period;
- Jim also worked through (facilitated) with the Ergon Energy organisation the pricing strategy that was taken to the Regulator for both the network and retail components and for the treatment of Customer Service Obligations (cross subsidies) and capital contributions policies;
- Jim worked on several projects for Integral Energy (when they were a Retailer) on key retail matters associated with their overall retail strategy, product developments and tariff development;
- Jim worked extensively with Energex in the early days of the market opening in Queensland on strategy and product development,
- Jim advised on the setting of retail costs and margin benchmarks for the first Retail pricing regulatory review (in Victoria) and the options developed now form the basis for this type of regulation across the NEM;
- Development of several new gas businesses for electricity retailing groups in Australia and New Zealand - full business plans and follow on implementation work;
- Jim has extensive advisory experience with new entrants and start-ups in Australia (at Board and MD level) having been a key advisor to GridX Power and CBD Energy (ASX listed) in particular. He comprehensively assisted them to develop their on-going business strategies, modelled their financial forecasts and business scenarios and assisted with the implementation of their business plans (also assisted with regulatory matters, gas and power sourcing, marketing strategies and other key operational matters);
- Jim has recently advised a new solar PV start-up venture on the design and implementation of a new PPA based product including detailed modelling of consumer economics and forecasts of take up above business-as-usual - and has advised the Clean Energy Finance Corporation in this process regarding potential changes to consumer tariffs and their likely impact on PV take up.

### Gas and Electricity Markets in Australia, Asia and the Middle East.

- Jim has been recently working in Malaysia (peninsular and Sabah) on issues associated with the restructuring of their Electricity Supply Industry (TNB, SESB) and issues related to the development of the power generations sector.
- Jim was for example engaged as an expert advisor to the Malaysian Government working group (MYPower) on the potential governance and restructuring options for the Malaysian electricity supply industry - including the disaggregation options such as forming new Generation, Transmission, Distribution and Retailing entities;

- He was then engaged on a long-term contract to Tenaga National Berhad (TNB) the fully integrated power industry business for Malaysia working closely with their senior management on the restructuring issues, including the development of the power sector and its long-term viability including demerger options, the impacts of renewable energy programs, impacts of coal and gas/LNG pricing, etc.
- Jim led a detailed review of the TNB initial approach to IBR implementation and made some 45 recommendations for improvement for the second IBR review period, all of which were accepted and implemented,
  - Jim has also led the first IBR submission process by Sabah Electricity Berhad (SESB), particularly advising on regulatory strategy as this is a very heavily subsidised supply system.
- Advised on the NSW Solar Bonus Scheme including developing (and reporting) detailed supply and demand constraint modelling and forecasting and cost effectiveness analysis e.g. equivalent carbon abatement cost calculations;
- Jim was a key author of a top end review of the Victorian Gas Market (market carriage market design) for VENCORP and the local market Participants;
  - Jim has previously undertaken reviews for VENCORP of the gas market design, and modelling and valuation of LNG storage in Victoria including recommendations on the approach that should be taken for its economic use - model now in use in the gas market;
- Restructuring of the Saudi Arabia Electricity Company (SEC), which at the time had some 38,000 MW of generation plant servicing a country of some 20 million people, and had some 30,000 permanent staff. Jim was the strategic architect and lead industry adviser on the formation of the new generation, transmission, energy trading, distribution/retail and shared services businesses over a 3-year period (2002 - 2004):
  - The Transmission Business Unit (TBU) was designed to be the sole buyer in Saudi selling to the Distribution Company and to a small group of large users (55% of the sales). The structure of this entity featured the creation of two zones by Snow that covered the developing regions and a consolidated zone which pulled together interconnected sections of the transmission grid for greater efficiency. Snow created the initial specification of all roles (down to Level 4) in this Business Unit.
  - The Distribution and Customer Services/Retail Business Unit (Distco) which encompasses distribution and retail operations and sells power to the majority of small medium enterprises and residential users. Snow worked very closely with the then head of this Business Unit (now SEC MD) and designed the structure of the new business to manage multiple and competing requirements, and specified all jobs down to Level 4 in the organisation. Snow also developed the interaction with the newly created Regulator which involved detailed discussions on how this oversight should initially work in KSA;
  - Generation Business Unit development. Snow gave extensive advice on the structuring of this unit and how it should develop more efficient dispatch operations under a workable model before any transition to a competitive market environment, and developed transfer pricing systems for cost transfer. This work also involved structuring the Business Unit to be able to disaggregate in the future (into competing units) if this was deemed to be warranted or to continue along the path of more efficient dispatch methodologies. Snow was directly involved in the design of the hierarchy and development of the job roles (again down to Level 4 in the organisation);

- Overall this work involved extensive input and leadership of the CRA organisational structure design team working directly with the senior SEC team, development of detailed business strategy and business plans for the new Business Units, development of the regulatory affairs group and its strategy in both Transco and Distco and future access arrangements, and advice to the SEC senior staff on the formation of JV's and third party investment in the industry including the development of desalination plants that deliver water and electricity;
- It also involved a detailed review of the operational benchmarks related to distribution, transmission and support services such as materials management and transportation. This review led to the development of a financial management model (led by Snow) and the setting of key performance metrics for these separate business undertakings (set by Snow);
- The project also involved the detailed analysis of more economically efficient pricing options in Saudi and how these could be implemented within the middle eastern culture and legal systems;

### Technical Expertise

- Jim is a Fellow of the IChemE (past Fellow of IEAust) and was the Chairman of the IEAust College of Chemical Engineers for some 6 years after holding numerous positions on its Board, and sat on the Board of the IEAust for several years. He has represented Australian Chemical Engineering in the UK (Presented to Duke of Edinburgh), Hong Kong, Taiwan, New Zealand, Singapore and the US;
- Jim is one of the few Professional Engineers in Australia to have developed and constructed power stations, gas transmission and distribution systems, electricity transmission and distribution systems, and CNG and LNG facilities;