Electricity Supply—Industry In Transition

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Over several decades the electricity supply industry (ESI) in Australia has faced, and met, the challenge of providing the infrastructure needed for safe and reliable power during a period of very rapid load growth.

In Australia, as in many other countries in the developed world, it was necessary to build power stations at a rapid rate between the 1950s and 1970s. From the mid 1970s to 1987 dramatic changes in world oil prices impacted on energy pricing and international economic growth. The pattern of ever-increasing demand for electricity was broken. In Australia the much vaunted resources boom failed to eventuate. Power station construction has long lead times and utilities across the country found themselves from the mid 1980s with commitments which resulted in over-capacity.

In short, the Australian ESI is now a mature industry which requires (and is achieving) substantial restructuring, cost reductions and efficiency improvements in an environment of reduced system load growth. The size and scope of the industry is set out in Table 1.

The reform of the industry began internally in the late 1980s, driven by the need to cope with the changed economic circumstances described above. In addition, this drive towards change coincided with external pressure for reform as the business community generally found itself struggling to cope with the economic downturn.

The pressure on the industry to change its ways is not unique to Australia. Across the developed world in the 1980s the view developed that electricity must be seen as a commercial commodity that must be provided to customers by efficient businesses at competitive prices.

In Australia, while the ESI has not been an adequate communicator at the national level in past years in countering criticism of its efficiency, the industry has achieved, in fact, substantial improvements in performance since 1986—which are only now beginning to be appreciated by business and government. The ESI has cut employee numbers 20 per cent from 78,000 down to 62,000. These reductions plus a 17 per cent rise in output have resulted in a 46 per cent improvement in labour productivity. Reserve plant margins have been reduced from 51 per cent to 35 per cent. Average electricity prices in real terms have fallen 14 per cent since 1986. Australian average industrial electricity prices are now the third lowest in the OECD (source: Bureau of Industry Economics)

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and, according to the Asian Development Bank, the third lowest in south-east Asia (behind New Zealand and Indonesia). Inside Australia the cost of electricity has risen more slowly than the costs of other major inputs to industry such as steel, copper and labour (see Figure 1, p. 115).

TABLE 1

Size of Electricity Industry in Australia (1990-1991)

State	Installed Generating Plant (MW)	Generation (GWh)	Peak Load	Sales (GWh)	Income from Sales ($ Million)	Customers	Employees
New South Wales	10844	48885	9374	47393	4157	2479681	21681
Victoria	6653	36488	5886	30777	2752	1896211	15870
Queensland	5052	26226	4090	22082	1755	1201016	8476
South Australia	2350	7138	1935	8186	810	670021	4595
Western Australia	2544	10413	1905	9199	1142	640836	4843
Tasmania	2320	9038	1445	8351	390	224283	3669
Northern Territory	364	1144		1027	141	47985	688
Australian Capital Territory	N/A	N/A	N/A	2162	198	107278	1406
Snowy Mountains Scheme	3740	5797					803
Total Australia	33867	145130		129177	11345	7267311	62031

Note: The installed generation plant capacities for N.S.W. and Victoria do not include their entitlements to the capacity of the Snowy Mountains Hydro Scheme. This amounts to approximately 71% (N.S.W.) and 29% (Vic.). The figures for Victoria do not include an entitlement of half (25MW) of the Hume Hydro power station which is included in the N.S.W. figures. N.S.W. generation plant is also inclusive of 53 MW of private generation capacity. Sales do not include use by supply authorities or consumption on unread meters as at 30 June. N/A: not applicable.

However the business community is not satisfied with this progress and, under pressure from peak representative bodies, the federal government in May 1990 called on the Industry Commission to hold an inquiry into the ESI (and the Gas supply industry) over a wide range of issues directed towards efficiency improvements and advising on methods to reduce or improve inefficient resource use. The key areas of focus of the inquiry were work practices, management, structure, ownership, pricing, capital financing, load management and energy conservation.

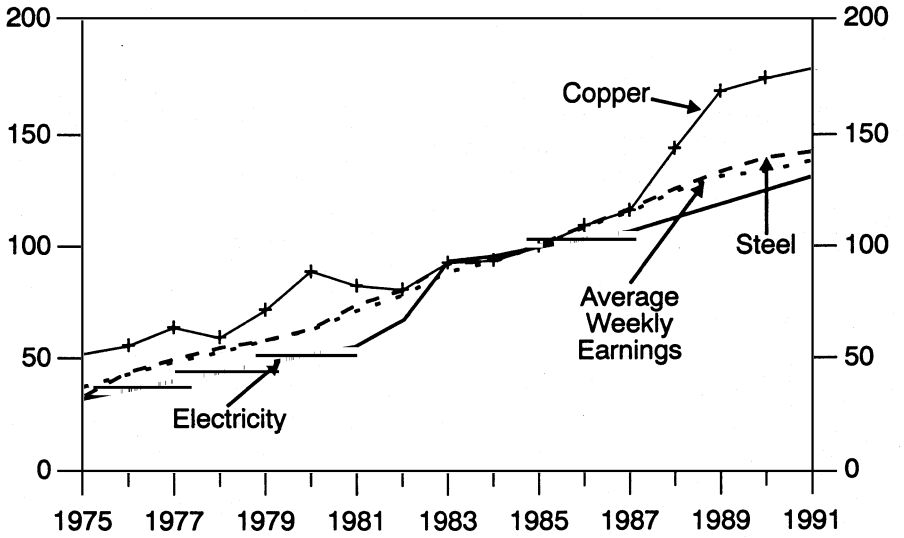
The final report of the Industry Commission was handed down in May 1991. It recommended major structural change to the electricity industry—a stance that has received both support and sharp criticism from the ESI and from the community at large.

The key recommendations of the Industry Commission are:

- separate ownership of generation, transmission and distribution
- breaking up of existing public generation into a number of independent authorities

FIGURE 1

Electricity Prices Have Risen More Slowly than Other Costs to Business



Index: 1984-1985 = 100

- formation of a single public-owned authority to own and operate transmission assets in New South Wales, Victoria, Queensland, South Australia and Tasmania
- creation of multiple distribution franchises in States where they do not exist
- right of common carriage access
- corporatisation of any remaining public generation and distribution authorities.

In a nutshell, the Industry Commission major recommendations relate to introducing competition into as many areas of the ESI as is practicable.

Responding to this pressure for change, the Special Premiers Conference decided in mid 1991 to establish a National Grid Management Council with government membership from all States except Western Australia (separated by the Nullabor Plain from any effective participation in a grid) plus the federal government and the Australian Capital Territory. The objectives of the Grid Council (NGMC) were set as:

- encouraging the most efficient, economical and environmentally sound development of the interstate ESI consistent with national and State policies and objectives
- providing long-term least-cost solutions to meet future power supply demands, including appropriate use of demand management

- ensuring the proper identification and accounting for the benefits and costs of transmission interconnection extensions
- maintaining and developing the technical, economic and environmental performance and use of the power system
- enabling participation by private generation on a fair and open access basis
- developing a national (that is, south-eastern Australian) market.

The principal activity of the NGMC over the past year has been to develop a Grid Protocol to encourage industry competition. Publication of the first draft of the Protocol led to controversy over whether the NGMC had erred on the side of protecting the rights of the existing power generation utilities to the detriment of distribution authorities, potential generation competitors and customers. Some 40 submissions were made to the NGMC over the draft Protocol and a revised version was expected to be published in late 1992.

Meanwhile the federal government moved unilaterally in the new Prime Minister's "One Nation" statement on 26 February to propose the establishment this year of a National Grid Corporation in line with the Industry Commission recommendation that one authority own and operate transmission assets in south-eastern Australia. Despite strong pressure from Canberra, the Special Premiers Conference in May 1992 declined to take an immediate decision on the Grid Corporation and agreed instead to establish a detailed study of the proposal during the rest of 1992.

The State governments and the industry itself have been pressing on with their reform agendas meanwhile. In Western Australia the government has sought private construction of a 600MW coal-fired power station at Collie. In Victoria the Kirner government has opted to sell 40 per cent of the ownership of the partially completed Loy Yang B power station to private interests.

The Victorian and Tasmanian governments and utilities are well along the path of consideration of interconnection of their transmission systems via a link under Bass Strait. The New South Wales and Queensland governments are considering establishing a substantial interconnection between their transmission systems. Victoria and South Australia completed such a link last year—and South Australia bought some 25 per cent of its electricity from Victoria in the first year of interconnection. It is public knowledge that the Queensland government is considering an approach from private industry for the sale of the Gladstone power station.

The Victorian, New South Wales and federal governments (hopefully) are progressing towards resolution of their considerations of the future of the Snowy Mountains hydro-electric system. There has been some considerable discussion in Tasmania about the merits of a north coast power station fuelled by natural gas from Bass Strait either as an addition to or in competition with the State's existing hydro-electric system.

Major changes in State markets in Victoria and New South Wales are beginning to be implemented. The structure of the county council

distribution system in New South Wales is under scrutiny by the government, albeit in apparent piecemeal fashion.

Most States are now moving utilities towards corporatised structures with, in most cases, provision for separate business units for the main functions of generation, transmission and distribution.

The ESI collectively, through the Electricity Supply Association of Australia (ESAA) has commissioned international consultants to produce the first uniform performance measures report on Australian utility efficiency and also to produce an international benchmarking study to provide appropriate indicators of "world's best practice". These studies will be published by ESAA in November.

It is clear from all this activity that it is most likely that rapid change will take place in the ESI in the remainder of the 1990s.

There seems little room for doubt that in the short- to medium-term there will be greater competition developing in the electricity marketplace and in the longer term major changes in market structures. The drive towards greater competition will place emphasis on new or strengthened transmission interconnections (but the practical considerations of transmission capital costs and the cost of energy losses need to be borne in mind in anticipating potential gains). The advent of private industry suppliers (at Collie in Western Australia, Loy Yang B in Victoria and perhaps elsewhere through smaller power stations powered by natural gas or—in Queensland—methane from coal seams) will sharpen the focus on utility performance.

A handful of new base load coal-fired power stations will come into operation in the remainder of the decade—Mount Piper in New South Wales, Stanwell in Queensland, Loy Yang B and Collie—and their input will add to the competitive pressures, particularly for the south-eastern States. Opportunities for cogeneration (production of combined heat and power, usually in substantial industrial or commercial premises) are being given close scrutiny in several States.

While all these practical issues are in play, it must also be remembered that the outcomes of State elections in Western Australia, South Australia and Queensland (and perhaps New South Wales, given the fragile political situation in that State) as well as the result of the next federal election during 1992-1993 will all impact on the process of change.

Through all this the question remains as to what is the most appropriate structure for the ESI in the 1990s and beyond. Views abound, from the very radical to the conservative. The concept that there has to be one national electricity market structure is itself open to question. After all, the electric utilities of Europe have strong individual national characters and differ radically from each other in structure. The systems in France, Greece, Ireland, Italy, Portugal and Turkey are fully integrated, with production, transmission and distribution carried out by a single company. In Austria, Holland, Spain, Sweden and (since 1990) Britain the systems are mixed, both in the degree of public and private ownership and in the degree of vertical integration.

It is said with truth that the western European economy could not function if its electricty interconnections were severed, but traded power does not dominate the electricity consumption patterns in that region's countries—France, for example, exports only 11.4 per cent of its production and Italy, a major importer, imports just 11.8 per cent of its needs.

It is also worth emphasising that the structure of the industry internationally is in constant evolution. For example, what began in the United States as part of a government energy efficiency policy in the 1970s is changing the electricity utility business there from one loosely based on regional monopolies to one that is much more competitive. In South America prolonged drought is driving countries long dependent on hydro-electric capacity towards privatisation in order to develop rapidly urgently needed new electricity capacity based on other resources.

Implementation of privatisation can vary widely. A state-owned enterprise may simply be sold and/or split into component parts and forced to compete with other producers for business. On the other hand only certain assets may be sold to raise money (for the state-owned utility or the government itself). Sometimes privatisation means allowing private (in a country such as Australia that will often mean "foreign") capital to finance what will still be state-owned/operated organisations. In build/own/operate/transfer (BOOT) arrangements a facility will be privately owned until capital and profit are recovered and, at a specified date, the facility is handed over to government.

As far as Australia is concerned, the bottom line is that the forces in play require the utilities to look more and more to their customers' needs. Customer-driven supply is replacing, and will do so more strongly in the future, the generalised standards of service that typically arise from the public service obligations. Different strategies and commercial practices will be needed, tailor-made for residential customers, commercial businesses and industrial customers.

Policies need also to be structured to suit Australian conditions. For example, while the interconnected electricity systems of Western Europe and Britain do approximate to true grids, load densitites are vastly different from Australia, where enormous sums need to be spent on infrastructure to provide even basic transmission of energy from supply sources to demand centres. The transmission system in south-eastern Australia does not really form a grid pattern as understood in Europe. Where interstate interconnection exists, it provides tie lines between individual State systems which themselves are formed by "backbone" interconnections rather than grids. The existing and potential interconnections in Australia should be considered more along the lines of the tie lines between North American regional pools. The Australian ESI engineers will explain, whenever they get a hearing, that a true grid permitting generalised generation and load developments unimpeded by transmission limitations is simply not practicable in Australia at this time for reasons of cost. In the case of Queensland/New South Wales

interconnection, for example, it can be shown easily that it has been the tyranny of distance giving rise to very costly transmission capital costs which has prevented the links being built to date. Planning studies have been conducted a number of times and interconnection proposals defeated by high installation and energy loss costs rather than by any political barrier erected by either State.

The ESAA appreciates that it has an important communications role in ensuring that both the facts of the Australian electricity supply situation and the views of its members, the generators and distributors of electricity, are fully understood by policy makers, those who influence decisions and the community at large. In pursuit of this role the Association produced a "vision" of the future of the electricity supply industry in April 1992 which focuses on:

- an industry oriented to its end-use customers
- free and open access for interstate trade in bulk electricity
- competitive markets in generation and distribution
- financial unbundling of generation, transmission and distribution, and
- evolution of a market conducive to cost-effective demand management.

The heart of the Association's approach is a belief that the industry's operational structure needs to evolve if there is to be orderly progress towards the objective of a competitive market. This evolutionary process must be accompanied by appropriate consultation between government, the ESI and its major customers. The process must also incorporate a timetable for reform related to the financial unbundling of generation, transmission and distribution. ESAA has made the point that the evolutionary process may well be uneven with respect to both timing and extent due to the different structures of the interconnected (and potentially interconnected) electricity enterprises.

A great deal of policy makers' (and media) attention is being focused on the national grid. The Association sees this being formed by co-ordinating the *use* of some of the transmission assets of the State utilities, the Snowy Mountains system and distribution authorities, with the elements that form the basis of the grid being determined by the function they perform in the major free flow of electricity through the system.

Should a National Grid Corporation be established, acquiring the main grid assets is one of a number of alternatives which, properly implemented, could achieve open access and efficient ownership. Ownership of grid assets is not a necessary prerequisite to the attainment of competition and argument over equity problems and other issues could easily slow the reform process.

The rules for access, market structure and pricing arrangements are the key competitive market framework issues. In ESAA's view, initially the national grid should be made up of regional systems with operation and maintenance of the pool being regionally based. The NGMC, or some

similar body, should have a role in providing independent guidance and direction in determining the rules under which the grid is operated. Ownership of grid assets is best left in a regional structure, provided that it is sufficiently separate from generation and distribution to ensure transparency of price and operational decision making.

A fundamental part of the reform process must be the provision of non-discriminatory access to the grid, with an established timetable, for private or public generators and customers. All participants should be free to trade in electricity with a fair and transparent charge for grid service. The NGMC should be responsible for reviewing and co-ordinating the competitive sourcing process, reporting to governments on the benefits of proceeding with supply and demand options which best serve the national interest. ESAA believes that the competitive sourcing process may well evolve into market-based sourcing of generation and demand management and in the meantime it will provide a consistent and effective, nationally focused approach to supply-side and demand-side planning.

In order to maximise the degree of competition in the electricity market, particularly allowing trading across State and distribution boundaries/franchises, considerable pricing reform will need to be undertaken. This will relate to addressing community service obligations, including cross-subsidies, both between classes of customers and regionally. The process may not be able to be developed politically at the same rate as other reforms and therefore mechanisms to identify, separate and transfer subsidies will need to be developed.

In conclusion, the electricity supply industry is as much influenced as any other part of the Australian economy by the imperatives of micro-economic reform, international competitiveness and debt reduction. How Australia meets these challenges is going to shape its 21st century future—and this applies equally to the ESI's future.

In the case of both the national economy as a whole and of the electricity supply industry, change will not and cannot take place in isolation. Events in the Pacific Rim region, involving 22 countries, in particular will influence our national and industry progress. In the ESI's case, other Pacific Rim countries and utilities will be competitors both for large industrial customers and for finance needed to fund power industry investment. International management consultants have calculated that U.S. $255 billion will be needed over the next ten years to fund expanded electricity generation in the Pacific Rim with another U.S. $170 billion needed for transmission lines, distribution systems and other related infrastructure (see Table 2, p. 121).

The challenge for Australia, as for all countries, in the Pacific Rim will be to develop a legal and economic framework within which the ESI, both publicly and privately owned, can operate to its maximum efficiency.

TABLE 2

Current Installed Capacity and Capacity Additions for 1990-1999

Country	1989-1990 Population (Millions)	1989 Installed Capacity (Millions of kW)	Net Capacity Additions (Millions of kW)
China	1,119.4	116.1	88.3
Indonesia	189.4	12.7	9.7
Malaysia	17.9	5.7	3.5
Philippines	66.1	6.5	5.1
Thailand	55.7	8.3	7.4
Hong Kong	5.8	7.4	10.5
Republic of Korea	42.1	23.8	13.0
Singapore	2.7	3.6	1.5
Taiwan	20.2	19.0	11.4
Australia	17.1	34.8	6.5
Canada (Pacific)	3.2	10.5	1.5
Japan	123.6	181.7	49.3
New Zealand	3.3	7.4	1.5
United States (Pacific)	39.1	101.5	10.1
Pacific Rim Total	1,706.0	539.0	219.3