

# Developments in Electricity

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*This article examines developments in Australia's electricity supply industry over the past decade. The article outlines the impetus for reforms, their impact on the industry and emerging trends.*

## INTRODUCTION

The electricity supply industry is a key sector of the economy, both in terms of the essential service it provides to consumers and its contribution to broader economic performance. With its abundance of coal and natural gas reserves, Australia has a comparative advantage in energy supply that has contributed to growth opportunities for the economy as a whole. The electricity sector also accounts for large amounts of capital expenditure and provides an essential input to almost all businesses in the economy.

The electricity industry has undergone major changes over the last decade — beginning with major structural changes in some States in the early 1990s, and continuing with the introduction of National Competition Policy reforms in 1995. Benefits from these reforms are already apparent although the reform process is in a transitional phase and its full effects are yet to eventuate.

## PATH TO REFORM

In 1991, the Industry Commission released a report on Australia's natural gas and electricity sectors. The report, *Energy Generation and Distribution*, noted that:

The electricity and gas sectors have not been performing to their full potential... Poor investment decisions leading to excess capacity and gross over staffing during the 1980s provide the most striking evidence that electricity and gas have not been supplied at least cost.<sup>1</sup>

The report identified a number of inefficiencies in the electricity industry, including the following.<sup>2</sup>

- Capital utilisation, as measured by reserve plant margins,<sup>3</sup> ranged between 40 and 70 per cent over the mid to late 1980s across Australia,

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1 Industry Commission (1991), *Energy Generation and Distribution Volume I*, Commonwealth Government Printer, Canberra, p. 1.

2 Industry Commission (1991), *Energy Generation and Distribution Volume II*, Commonwealth Government Printer, Canberra.

compared with an international benchmark of between 20 and 25 per cent. These high reserve plant margins indicated substantial excess capacity in the electricity industry.

- There were substantial disparities between the cost of electricity supply and prices charged, with commercial and industrial consumers paying significantly more than the cost of supply.

Prior to 1990, the electricity supply industry in each State or Territory was generally characterised by a vertically integrated government-owned body responsible for the generation, transmission, distribution and retailing of electricity. The Industry Commission report recommended corporatisation and structural separation of electricity utilities as well as a network access regime.

### **Box 1: Corporatisation, structural separation and access**

- Corporatisation involves the creation of a more commercial focus for public utilities, including increased accountability for performance. The rationale is that organisations with a commercial focus are provided with better incentives to improve efficiency and make the best use of their available resources.
- Structural separation involves the disaggregation of electricity infrastructure in order to clearly separate the generation and retail segments (which are contestable in nature) from the transmission and distribution segments (which have natural monopoly characteristics). In some instances, it may also involve the transfer of regulatory functions from a business to an independent regulator.
- An access regime aims to provide non-discriminatory access for third parties to key infrastructure services in order to promote competition in related markets, eg access to the electricity transmission grid to promote competition at the generation and retail levels.

While corporatisation provides the managers of electricity infrastructure with improved incentives for performance, structural separation and access are the keys to creating a competitive environment. Separating ownership and control of different parts of electricity infrastructure ensures that an entity cannot use its control over natural monopoly infrastructure in order to gain an unfair advantage over rivals in contestable markets. Access regulation ensures that contestable parts of the industry can gain access on reasonable terms and conditions to bottleneck facilities.

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3 The reserve plant margin is the total plant capacity available less the actual maximum demand for electricity in a particular year, expressed as a percentage of maximum demand.

Most States and Territories have structurally separated their electricity industries — only Western Australia and the Northern Territory still have vertically integrated electricity businesses. Victoria has gone a step further and privatised its electricity assets, while South Australia is in the process of privatising its electricity assets by means of a long-term lease.

Reforms in the electricity industry gained particular momentum from recommendations of the Hilmer Committee on National Competition Policy in 1993. As part of their commitment in 1995 to implement National Competition Policy and the related reforms, State and Territory Governments agreed that progress in reforming the energy sector would be a condition for National Competition Payments from the Commonwealth Government.

The Productivity Commission has estimated that implementation of electricity and gas reforms will increase real gross domestic product by 1.1 per cent. This means that, in the long-run, the Australian economy will be approximately \$6.2 billion per year larger than would be the case in the absence of the reforms.<sup>4</sup>

## The national electricity market

A key focus of electricity reform has been the establishment of the National Electricity Market (NEM). The NEM is a single wholesale market for electricity in the Australian Capital Territory (ACT), New South Wales (NSW), Queensland, South Australia and Victoria. The first stage of interstate trade commenced in May 1997, with trading between the ACT, NSW and Victoria. Full operation of the NEM, incorporating the other jurisdictions, commenced in December 1998.

Queensland is currently an isolated participant<sup>5</sup> in the NEM but two interconnections to the NSW grid are currently under construction. Both interconnectors are expected to be operational in the year 2000-01. Tasmania may also join the NEM if an interconnection with Victoria across the Bass Strait is established. Western Australia and the Northern Territory are considered unlikely to join due to the long transmission distances involved. However, these jurisdictions are also in the process of implementing electricity reforms.

The National Electricity Code, in conjunction with Part IIIA of the *Trade Practices Act 1974*, sets out a framework for access to electricity transmission and distribution networks. This has facilitated the introduction of competition at the generation and retail levels of the electricity industry.

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4 Productivity Commission (1999), *Impact of Competition Policy Reforms on Rural and Regional Australia*, Report no. 8, Ausinfo, Canberra. 1997-98 figures.

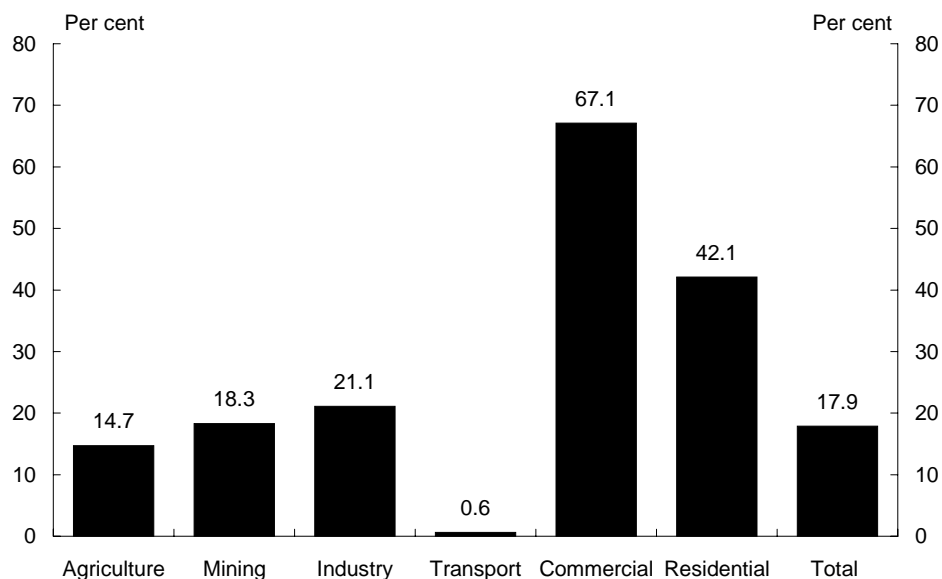
5 As an isolated participant, Queensland does not trade electricity with the other States but has operated a wholesale market for electricity under NEM rules since January 1998.

The NEM will eventually evolve to a stage where all customers within the NEM will have the opportunity to choose their electricity retailer, ie their electricity supply will be 'contestable'. At present, supply to over 29,000 customers in the NEM who consume more than 160 megawatt hours (MWh) per year (eg large commercial customers, supermarkets and fast food restaurants) is contestable. Based on expected timetables, over 6.5 million small business and residential customers in Victoria, NSW, Queensland and the ACT will be able to choose their electricity retailer by January 2001, with supply to an additional 700,000 customers in South Australia set to become contestable by January 2003.

## DEVELOPMENTS IN THE ELECTRICITY INDUSTRY

Electricity is a vital input to a wide range of Australian industries and provides an essential service to households. Electricity accounts for almost 18 per cent of Australia's total energy needs (Chart 1).

**Chart 1: Electricity consumption as a percentage of total energy consumed, 1995-96**



Source: Australian Gas Association, *Gas Statistics Australia 1998*.

The electricity supply industry generated \$13 billion in sales to final consumers in 1997-98<sup>6</sup> and accounts for around 1.6 per cent of GDP.<sup>7</sup> In addition, electricity

6 Electricity Supply Association of Australia (ESAA) (1999), *Electricity Australia 1999*, Gotham Press, Sydney.

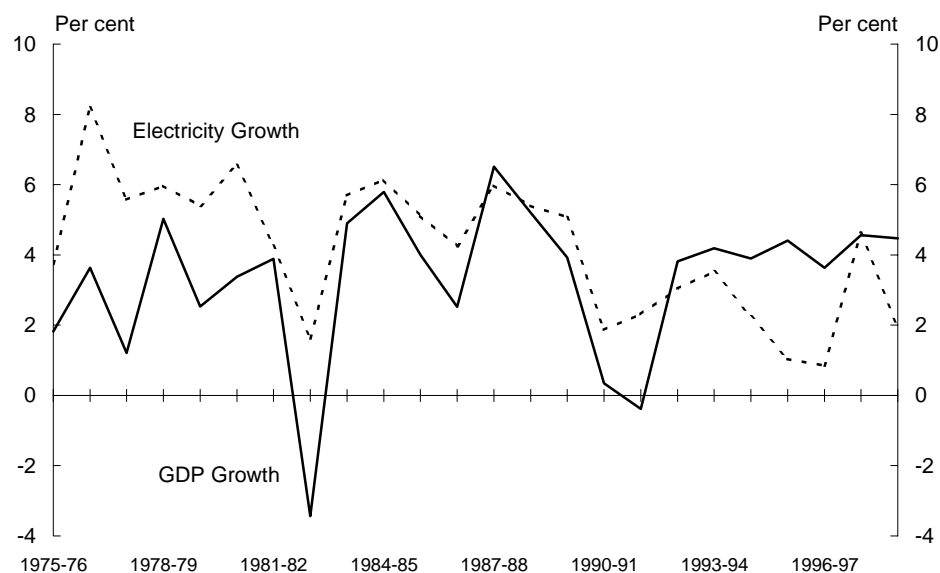
7 ABS Cat. No. 5206-48.

accounts for around 2 per cent of industry non-labour current costs.<sup>8</sup> For some energy intensive industries, such as aluminium smelting and non-ferrous metals, electricity is a much higher proportion of overall costs.

## Growth

Electricity generation has undergone strong growth in recent years due, in particular, to rapid growth in sectors where electricity is the prime fuel source, such as the commercial and non-ferrous metals sectors. Since 1975-76, growth in the electricity industry, in terms of value added production, has averaged around 4.3 per cent compared with an economy-wide average of around 3.3 per cent (Chart 2).

**Chart 2: Electricity growth and GDP growth**



Source: ABS Cat. No. 5206-48.

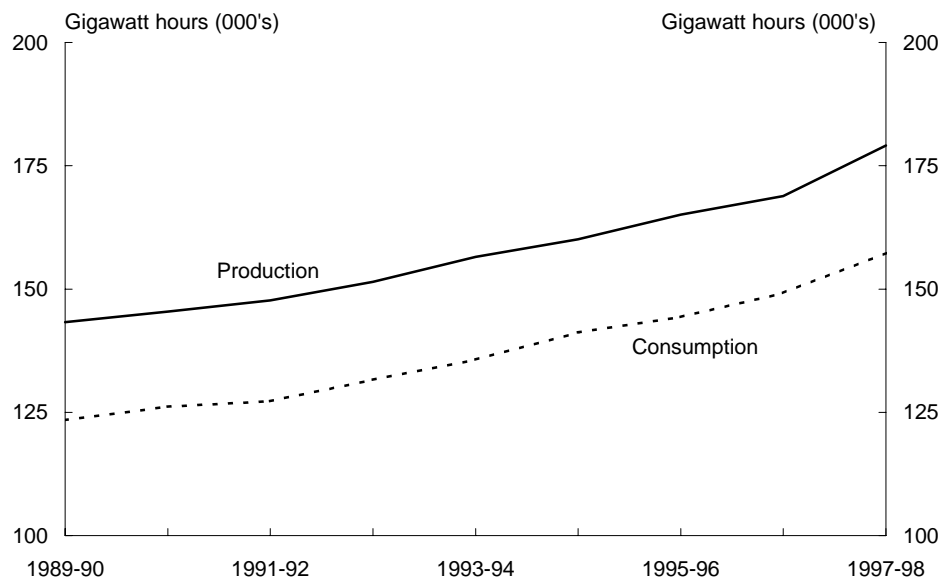
The sharp decline in the rate of electricity growth from 1993-94 to 1996-97 was largely attributable to a slow-down in manufacturing activity, predominantly in Victoria. The subsequent rise in the rate of growth largely stemmed from new mining and manufacturing activity, particularly in Queensland.

Production and consumption of electricity have also experienced strong growth over the past decade, rising by 17 and 20 per cent respectively from 1989-90 to

<sup>8</sup> ABS Cat. No. 5215.0.

1997-98 (Chart 3). The difference between consumption and production is due to transmission losses and ancillary services.<sup>9</sup>

**Chart 3: Electricity production and consumption**



Source: ESAA, *Electricity Australia (various issues)*.

## Productivity and employment

Since the late 1980s, the number of persons employed in the electricity industry has almost halved (Chart 4). These staff reductions have been partially offset by the contracting out of non-core services.

The electricity industry has made substantial improvements in productivity, with gigawatt hours produced per employee more than doubling since the late 1980s. While most of the gains are attributable to reduced staff numbers, productivity improvements are also related to other factors.

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<sup>9</sup> Transmission losses are the losses in electrical energy that occur as electricity is transported along transmission lines. Ancillary services relate to the management of power system supply (eg provision of generation capability to meet sudden changes in demand for electricity).

**Chart 4: Electricity industry employment and labour productivity**



Source: ESAA, *Electricity Australia* (various issues).

## Investment

Industry commentators have argued that there was significant over-investment or ‘gold-plating’ in the electricity industry in the mid-1980s, which led to substantial excess capacity. As noted above, this was a key criticism in the Industry Commission’s 1991 report on the electricity industry. The existence of excess capacity led to a decline in investment in NSW and Victoria following the commencement of interstate trade in electricity in 1997.

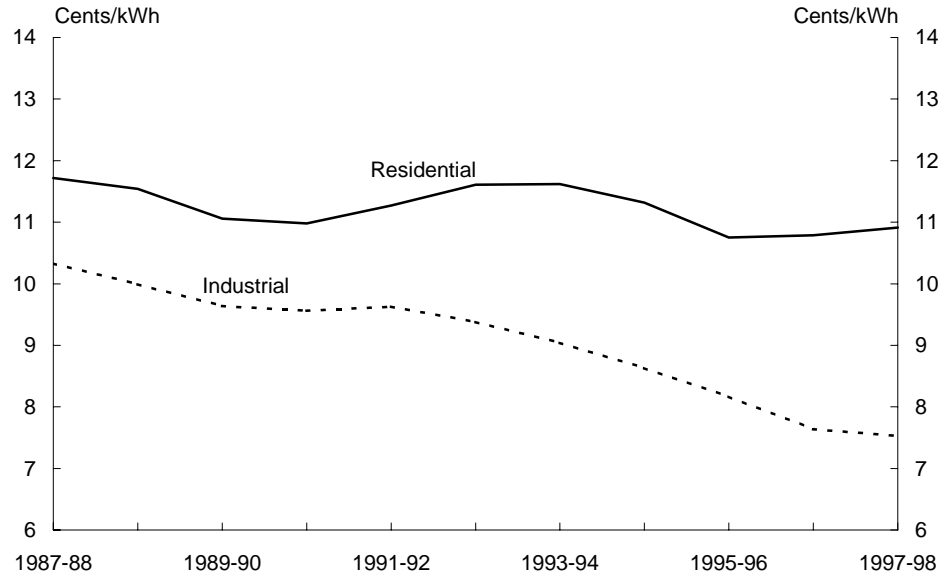
A number of longer term investment opportunities have been identified in the enhanced commercial environment created by the NEM. For example, two interconnectors are currently under construction, with at least one other proposed, and a number of new generators are also under construction or in the planning stages.

## Prices

Prior to the introduction of electricity reforms, the prices charged by electricity businesses were heavily regulated. Following the opening of the generation and retail markets to competition, the industry has had more freedom to set its charges. At the same time, competition has put downward pressure on prices.

Over the decade to 1997-98, electricity prices in Australia fell by around 15 per cent in real terms (Chart 5). These price reductions reflected, to some extent, the efficiency improvements that have occurred in the electricity supply industry over this timeframe.

**Chart 5: Australian electricity prices (real terms)**



Source: ESAA, *Electricity Australia (various issues)* and *Electricity Prices in Australia 1998-99*.

While industrial users have experienced the biggest price reductions, household customers have also benefited from the electricity reforms.

- For example, from 1993-94 to 1997-98, residential electricity prices fell by over 6 per cent in real terms. This equates to an average real saving of around \$45 on a residential consumer's annual electricity bill.<sup>10</sup>

More recent price movements have also been significant. Following the commencement of the interim NEM in May 1997, generators in Victoria and NSW were able to compete for the right to dispatch electricity to consumers in both States. This resulted in low wholesale electricity prices, which benefited consumers.

- A 1998 Australian Chamber of Manufactures survey found that contestable customers in Victoria and NSW had achieved savings averaging 26 per cent on their power bills.<sup>11</sup>
- A 1998 survey by Deloitte Touche Tohmatsu of 100 large companies within the NEM found that three quarters of the companies surveyed had achieved electricity cost savings of more than 20 per cent, with average savings of 30 to 35 per cent.<sup>12</sup>

10 Treasury estimates based on ESAA, *Electricity Australia (various issues)*, Gotham Press, Sydney.

11 ACM (1998), *Outcomes of the Contestable Electricity Market in NSW and Victoria*.

12 Deloitte Touche Tohmatsu (1998), *Deloitte Electricity Survey*.



Wholesale prices in NSW and Victoria averaged \$14.57 per MWh in 1997-98<sup>13</sup> which contrasted with industry estimates of long-run sustainable wholesale prices of between \$30 and \$40 per MWh. Many industry commentators argue that the low wholesale prices observed are unsustainable. Pool prices are now substantially higher than the 1997-98 levels and there has been a 29 per cent price rise for customers with contestable supply in NSW and Victoria over the twelve months to April 1999.<sup>14</sup>

Over time, excess capacity is expected to diminish as demand catches up to supply capability and prices settle around a long-run cost benchmark. There are also further changes still to occur in the electricity market, such as the completion of the Queensland-NSW interconnections, the phasing out of vesting contracts in parallel with full retail contestability,<sup>15</sup> and the removal of jurisdictional derogations from the National Electricity Code. These further changes will no doubt further influence the wholesale market.

### **International price comparisons**

Electricity prices in Australia compare favourably in international terms, with residential and industrial consumers paying among the lowest electricity prices in the world (Charts 6 and 7). Due to its natural resource endowments, Australia has always ranked favourably in international price comparisons. Reforms to the electricity sector will, however, help to reinforce Australia's comparative advantage in electricity supply.

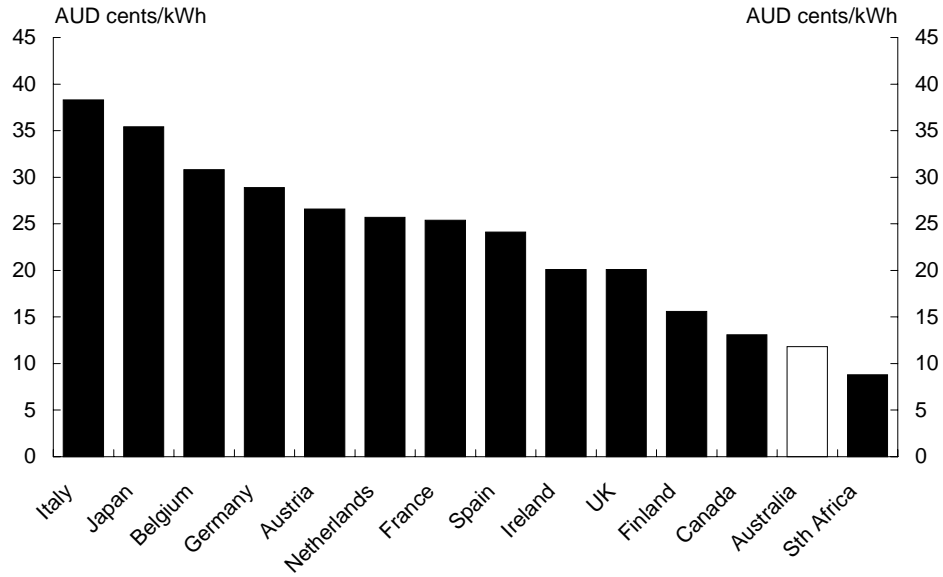
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13 ESAA (1999), *Electricity Supply Magazine*, February.

14 NUS International (1999).

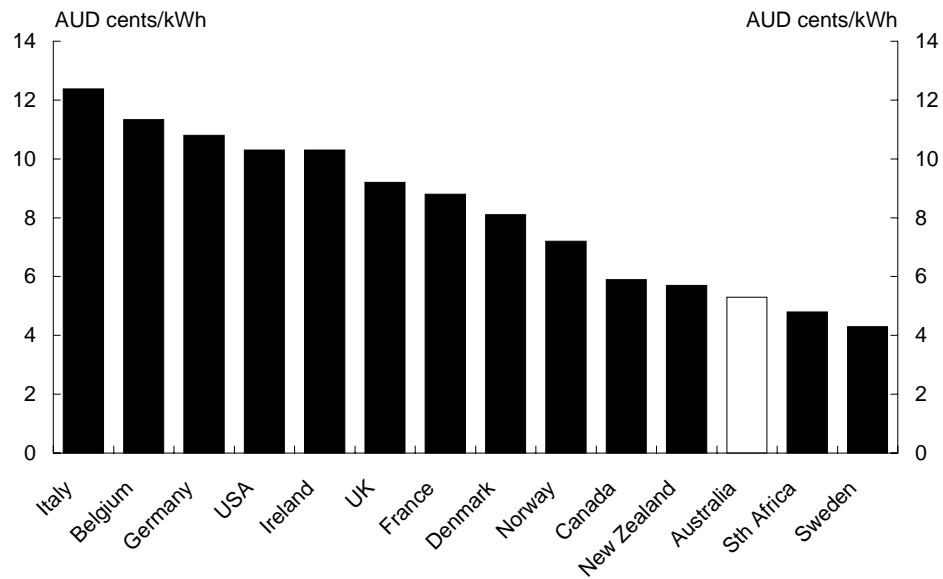
15 Vesting contracts are contracts set by governments between local generators and retailers to supply electricity at a set price to customers whose electricity supply is not yet contestable. They are designed to provide a progressive rate of exposure to competition and guard against volatility in wholesale prices. They will be phased out in Victoria and NSW by December 2000. The timetable for vesting contracts in South Australia is currently under consideration by the Australian Competition and Consumer Commission.

**Chart 6: International residential electricity prices (as at January 1999)**



Source: ESAA, *Electricity Australia 1999*.

**Chart 7: International industrial electricity prices (12 month average to March 1999)**



Source: NUS International (1999).

**Service levels & other benefits**

Despite concerns that service levels would decline as a result of corporatisation and industry restructuring, there is no strong evidence to suggest that this is the

case. A survey of companies within the NEM reported that while power disruptions remain a concern, reliability is no worse than it was before competition commenced.<sup>16</sup>

As more customers are able to choose their electricity supplier and wholesale prices stabilise, retailers will increasingly compete on service features in addition to price.

An anticipated trend is that electricity retailers will expand their traditional product line and offer household and business customers complete packages for electricity, gas and water and, possibly, other products like telecommunications, banking and insurance. This could lead to lower retail prices through economies of scale and scope. International experience suggests that it will also lead to improved service delivery and greater product innovation.

Electricity industry developments are also being shaped by environmental concerns and, in particular, by Australia's international obligations relating to climate change and greenhouse gas emissions. The electricity industry has placed increased emphasis on improving energy efficiency and on using more environmentally friendly fuel sources. Some retailers are now also offering customers the choice of purchasing their electricity from renewable generation sources such as wind, solar, biomass, wave and hydro power.

## CONCLUSION

The reforms to the electricity supply industry over the last decade have been a fundamental part of Australia's microeconomic reform program. These reforms are leading to more efficient pricing and investment decisions, with ensuing benefits to end users.

The path of reform to date has seen the structure of the electricity industry evolve into a more competitive framework. On the whole, the industry has responded well to these changes and continued to record strong growth. However, it is yet to complete the transition to the new competitive environment.

The industry is still moving towards full contestability for all consumers, and transitional arrangements such as vesting contracts and jurisdictional derogations from the National Electricity Code are yet to be phased out. There are clearly further challenges ahead for businesses, regulators and policy makers alike to maintain the momentum of the reform process and to ensure continued benefits are realised for businesses, consumers and the economy more generally.

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16 ACM (1998), *Outcomes of the Contestable Electricity Market in NSW and Victoria*.