Ch 21

Weak regulation, rising margins, and asset revaluations: New Zealand's failing experiment in electricity reform

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Abstract

This chapter summarises the reforms in the New Zealand electricity industry since 1986, and presents an analysis of performance over the past three decades in terms of prices, operating costs, and investment. The chapter is especially focused on the escalation of costs and margins in the decade following the consolidation in 2001 of a vertically-integrated five-firm cartel in generation and retailing. The use of asset revaluations to put a ratchet under rising prices, the continuing lack of rigorous regulation, and the successful foreclosure of competing independent generation and retail operations, give substance to the notion of regulatory capture. Government plans to part-privatise the three state-owned members of the gentailer club were legislated in 2012 and are to be completed by 2014.

1. Introduction

Reform of the New Zealand electricity sector began in 1986, as part of a wave of neoliberal policy changes pushed through by the Fourth Labour Government (1984-2000). In that year two major pieces of legislation – the State Owned Enterprises Act 1986 (SOE Act) and the Commerce Act 1986 – transformed the institutional and policy environment within which electricity, along with other publicly-owned essential services, was produced and delivered.

The SOE Act changed the primary objective of these enterprises from social service to profit: state owned enterprises were to be "as profitable and efficient as comparable businesses that are not owned by the Crown". A secondary objective was that an SOE should be "an organisation that exhibits a sense of social responsibility by having regard to the interests of the community in which it operates and by endeavouring to accommodate or encourage these when able to do so", but only insofar as this did not interfere with the central goal of profit. SOEs were

transformed from government departments to corporations, with management systems modelled on the private sector.

There was debate at the time over whether the SOE Act was intended to achieve more efficient provision of goods and services supplied by the state, or as the first step on the road to privatisation. Public opinion and policymakers remain divided over whether the state should divest itself of commercial activities as a matter of basic principle, or utilise business methods to more efficiently deliver services for which the state remains responsible.

Meantime, the Commerce Act 1986 brought fundamental changes in regulatory philosophy. Its premise was that competition law ought to be generic, with a single body, the Commerce Commission, responsible for implementing legal tests in relation to anti-competitive behaviour, collusion, mergers and takeovers. The stated purpose of the Act was "to promote competition in markets for the long-term benefit of consumers within New Zealand", but this left open the issue of what was to be done in markets where competition was weak or absent (Stevens 2003 pp.93-98). There were no provisions to outlaw price gouging or profiteering at consumers' expense. The presumption was that promotion of competition would generally suffice to restrain the use of market power by large firms to transfer wealth from consumers to themselves. If abuse of market power was suspected, Part 4 of the Act empowered the Minister of Commerce to instruct the Commerce Commission to inquire into particular industries and, if appropriate, recommend price regulation. If the Commission judged regulation to be warranted, a ministerial decision was still required before the Commission could proceed. Price regulation was thus rendered an exception to the general rule that promotion of competition was sufficient to protect consumer interests, and decisions on whether and how to regulate prices and profits were removed from the judicial to the political sphere. The common-law right of consumers, faced with high prices for essential services, to seek redress through the courts was extinguished (Taggart 2008).

Electricity policymaking since 1986 has involved ongoing tension between those who saw privatisation under generic competition law as the logical destination for policy, and those who retained the idea of electricity as an essential public service for the price and quality of which the state remained responsible, implying ongoing state participation and/or regulation. Successive changes to the structure and regulation of the electricity sector over two and a half decades have not resolved these tensions. In the 2011 general election campaign, privatisation remained a core issue. The conservative National Party campaigned on a pledge to privatise 49% of four state-owned energy companies, three of which were engaged in large-scale electricity generation and retailing¹, while the opposition Labour Party campaigned against privatisation. Having won, the National administration passed legislation in May 2012 providing for the privatisation to proceed. The sales programme quickly encountered fierce political opposition and legal challenges in relation to the right of hydro generators to utilise water without payment – whether to the Crown, or to the indigenous Maori holders of proprietary rights under the 1840 Treaty of Waitangi (New Zealand's founding constitutional document).

The electricity industry has been a key test-bed both for the generic competition law approach of the Commerce Act, and for the neoliberal view that more markets and less regulation would deliver improved performance in terms of both economic efficiency and consumers' long-term interests. Several key features of the New Zealand experiment made it unusually neoliberal in its approach, compared with most other countries' approach to electricity restructuring:

- First, New Zealand shared with Germany the absence of a specialist regulator to oversee the early stages of reform. When eventually forced to establish an Electricity Commission in 2003, New Zealand policymakers gave it a minimal mandate, with its price-regulating power narrowly confined to transmission grid pricing, and a governance-focused agenda. As described later, the Commission was abolished after only six years, to be replaced by a more generator-friendly Electricity Authority.
- Second, an anti-regulatory mindset applied broadly to all facets of the electricity industry reform process. "Light-handed regulation" was interpreted as a reduction not only in regulatory intervention, but in regulatory capacity

¹ The fourth, Solid Energy, is a state-owned coal miner.

as well², so that the rare government interventions in the face of anticompetitive market outcomes have been poorly designed, and have come too late to prevent large wealth transfers from being banked by key private-sector players.

- Third, there was no official enthusiasm in New Zealand for the institutional innovations that many other countries adopted to widen the range of electricity market participation and foster an active demand side. No feed-in tariff has yet been tried, nor any serious restriction on the power of incumbent large vertically-integrated generator-retailers (gentailers) to foreclose wholesale market entry by independents, using tactics which in other jurisdictions would arguably be in breach of antitrust law. Smart metering is yet to arrive as of 2012; the industry's conception of a smart meter has been one that enables customers to be billed more efficiently (Concept Consulting Group 2009; Parliamentary Commissioner for the Environment 2009). The demand side of the market remains undeveloped, and the ripple-control peak-shaving technology that was universal in 1986 has been largely eliminated under commercial incentives, moving the market away from real-time pricing.
- Fourth, the balance of representation and policy influence in relation to
 electricity matters has been unusually heavily loaded against small
 consumers and in favour of large industry and the big electricity suppliers.
 Over time the official stance has hardened against any protection for small
 consumers exposed to the exercise of market power by the generatorretailers. Terms such as "fair" that at one stage were included in the
 government's objectives for the industry have recently disappeared from the
 policy lexicon, and small-consumer representation on governance bodies
 has been token or non-existent.

² A 2009 consultants' review of electricity regulation noted that "New Zealand has no consistent or coherent measure of electricity sector performance against which to measure the results of policy changes. None of the many regulatory agencies which routinely comment on the electricity sector has developed, or report[s] in a structured way, indicators of electricity sector performance." (Murray et al 2009 p.1.)

Overall, therefore, the most interesting lessons from the New Zealand experiment have to do not with the technical engineering detail of the pool, the wholesale market, the system operator, or the grid, but rather with the outcomes in terms of prices, profits, asset valuations, investment timing, industry coordination in meeting demand forecasts, and entry by independent entrepreneurs at any level of the supply chain or on the demand side. These areas are accordingly the focus of this chapter.

A brief overview of the industry provides the background in section 2. Section 3 summarises the history of structural and regulatory change since 1986. Section 4 traces industry performance in terms of pricing, profitability and investment outcomes. Section 5 concludes.

2. Background: system description and history

New Zealand is an island nation of 4 million people with no interconnection to any other national electricity system, and no prospect of such interconnection. Matching generation, transmission and distribution capacity to local requirements, both at the national aggregate level and locally, presents major engineering challenges in a long, thin country with rough topography, low population density, and population clustered in a few major cities the largest of which, Auckland, is at the opposite end of the country from the largest hydroelectric resources in the south. Those challenges were successfully overcome in the course of the twentieth century by construction of a publicly-owned integrated system with large generating stations located to take advantage of the country's natural resources - hydro, geothermal, coal and natural gas – and with the main load centres supplied over a nationwide transmission grid and local distribution networks³. Figure 1 shows the grid layout⁴.

³ The history of the building of the national system is set out in Martin (1998).

⁴ Detailed maps of the transmission system are available online at <u>http://www.transpower.co.nz/maps-diagrams#cs-91581</u>. An online map of distribution networks and their associated grid exit points is at <u>http://www.electricity.org.nz/Site/Map/default.aspx</u>. Both sites accessed July 2012.

Figure 1: New Zealand electricity system Auckland **Central North** Island constraint Otahuhu Huntly thermal **Cook Strait** constraint Bunnythorpe substation Haywards substation Wellington Manapouri Christchurch Major generation hydro and substations Main load centres Benmore 0 hvdro **HVDC** link Dunedin Main high-voltage AC transmission lines Rio Tinto smelter Key constraints

Electricity demand has grown steadily over the past century and is currently nearly 40,000 GWh per year, of which roughly two-thirds is used as an input by productive sectors (43% in industry, agriculture, forestry and fishing; 24% in commerce and transport) and one-third is residential final consumption⁵. Installed generating capacity at December 2011, seen in Table 1, was 9,751 MW, implying overall capacity utilisation of less than 50%, which is to be expected in a system heavily reliant on renewable resources such as wind and rain. Peak demand, also shown in Table 1, reached 6,654 MW in 2011, equal to 68% of installed capacity (but far closer than this to actually available capacity at the time of the peak). Softer demand growth since the global financial crisis has cut previous projections of peak load by about 1,000 MW for the next couple of decades (Transpower 2012 p.33), implying that the system is currently carrying excess capacity relative to that needed to meet normal and projected demand (cf Layton and Hansen 2012 p. 20).

⁵ Ministry of Economic Development, *Energy Data File* June 2012 pp.105-106, <u>http://www.med.govt.nz/sectors-industries/energy/energy-modelling/publications/energy-data-file/new-zealand-energy-data-file-2012</u> accessed July 2012.

							Real
							average
	Total				Total		price,
	installed				sales	Average	c/kWh at
	generating	Peak load	Generation	Consump-	revenue	price,	March
	capacity	MW	GWh	tion GWh	\$m	c/kWh	2011 prices
1975	4,784	3,391		17,306	215.2	1.2	11.5
1980	6,576	3,677	22,700	19,415	744.2	3.8	17.0
1985	8,038	4,642	27,689	24,205	1,393.8	5.8	14.3
1990	8,001	5,122	31,459	27,745	2,267.6	8.2	13.8
1995	8,061	5,240	35,250	30,370	2,748.7	9.1	13.8
2000	8,323	5,766	38,069	34,011	3,189.4	9.4	13.4
2005	8,851	6,084	41,514	37,626	4,981.1	13.2	16.7
2011	9,751	6,654	43,138	39,005	6,357.7	16.3	17.2

Table 1: Trends 1980-2011

Sources: Capacity, generation, consumption and average prices from Ministry of Economic Development *Energy Data File 2012* http://www.med.govt.nz/sectorsindustries/energy/energy-modelling/publications/energy-data-file/new-zealand-energydata-file-2012 (accessed July 2012) Tables G.3a, G.2a, I.1a respectively. Total sales revenue calculated from sectoral data in the same sources; real average price derived using CPI for residential sales and PPI Inputs for commercial and industrial sales. Peak load 1975-1995 from Bertram (2006) Table 7.1 and 2000-2011 from http://www.ea.govt.nz/industry/monitoring/cds/centralised-dataset-web-interface/peakelectricity-demand-nationally/ (accessed August 2012)..

Figure 2, charting growth of generation capacity since 1945, shows that the pioneering construction and expansion phase of the industry's history had been completed when the Government embarked on increasingly radical restructuring experiments from 1986 on. By then the system was engineered and operated to a very high standard, having overcome the recurrent supply shortfalls that had been the central challenge from the 1940s to the 1970s. By the late 1980s there was ample generation capacity in hand, an expansion of the inter-island HVDC link was underway, and sophisticated software programmes had been developed for the merit-order scheduling of generation and frequency control. Thus when, during the 1990s, economic policymakers disrupted the established ownership, governance and objectives of the industry, often displaying scant regard for engineering subtleties, they were fortunate to be operating on a patient in robust physical health, with a strong core of technically skilled employees who were able to maintain supply quality in the face of the often-perverse incentives thrown up by market institutions in a deregulated policy environment.



Figure 2: Installed generating capacity in the New Zealand electricity system, 1945-2011





Figure 3: Generation by fuel type, 1976-2011

Source: Ministry of Economic Development *Energy Data File 2012*, p.110 Table G.2c.

Figure 3 shows generation by fuel type, and total electricity demand, which is less than total generation due to line losses in transmission and distribution. The New Zealand electricity system has always been primarily renewables-based, but a large tranche of fossil-fuelled capacity was added in the 1970s.

The availability of low-priced gas from the Maui field raised non-renewables to over a third of generation by the late 1990s, part of a thirty-year trend seen in Figure 4. The trend then reversed, bringing the renewables share back up to 77% in 2011. Depletion of the Maui gasfield raised the operating cost of thermal plant after 2005 and this, combined with the beginning of carbon pricing policies and generators' pre-emptive occupation of the best windfarm sites, has contributed to a rapid decline in the share of non-renewables in the past five years. The system is now on track back towards the 90% renewables share last seen in the 1970s (Bertram and Clover 2009), even in the absence of Government policy support⁶.



Figure 4: Share of renewables in total electricity generation, 1976-2011

Source: Calculated from Ministry of Economic Development *Energy Data File 2012*, p.110 Table G.2c.

⁶ The Labour administration which was defeated in 2008 had adopted an explicit 90% target (<u>http://www.beehive.govt.nz/release/90-renewable-energy-target-achievable</u>). The new National administration initially backed away from the target, but later included it as a general aspiration in its 2011 Energy Strategy (<u>http://www.eeca.govt.nz/sites/all/files/nz-energy-strategy-2011.pdf</u> p.6). There are no explicit policies directed to achieving the aspiration, however.

Comparison of Figure 3 with Figure 2 shows a mismatch between trends in consumption and trends in capacity over the reform period. Consumption rose steadily throughout the 1980s and 1990s while capacity stagnated; then capacity grew rapidly from 2000 to 2011 while consumption levelled off in response to rising electricity prices, the global financial crisis, and some gains in energy efficiency. The failure of capacity to track consumption is significant because one major neoliberal argument advanced in the 1980s and 1990s in favour of corporatisation, deregulation, and privatisation was that commercial management guided by market signals would deliver investment in a more timely and orderly way than had been accomplished by the old government monopoly NZED. The reality has turned out to be, if anything, the reverse, an issue discussed in more detail later in this chapter.

Turning to the institutional setup prior to the onset of reform, at the time when New Zealand embarked on restructuring of its electricity sector in the mid-1980s the industry had a simple structure that had been built up pragmatically over the preceding 80 years to fit the geographical, physical and social realities of the country.⁷ Supply was entirely in public hands, and operated according to politically-determined rules for pricing and investment. Large generating stations and the national high-voltage transmission grid were owned and operated by a government department, the New Zealand Electricity Department (NZED). Local-area distribution networks, electricity retailing, and appliance sales and servicing, were controlled by a special class of local Electricity Supply Authorities (ESAs), called Electric Power Boards in rural and small-town areas, and Municipal Electricity Authorities in the main centres.

At both wholesale and retail levels of the industry, prices were set by administrative procedures designed to recover costs on a non-profit basis. The aim was to ensure that infrastructure was installed to meet rising demand, while prices were held down to the lowest level consistent with covering cash requirements for investment, maintenance and operation of the system. There was a general society-wide consensus that electricity was an essential service that could be most efficiently

⁷ The history of the industry is described in detail in Martin (1998)..

and cheaply supplied on a collective basis. There was consensus also around holding prices to residential consumers below those paid by industrial and commercial users. Electricity was, in short, an essential service made available at cost. At all levels the industry's operations were transparently accounted for by the annual publication of detailed statistics relating to its operations, revenues, costs, and sales volumes.⁸ Downward pressure on prices at wholesale level was provided by the accountability of the responsible Minister to Parliament, and at retail level by the requirement for Electric Power Board members and city councils to face the local electorate in local body elections.

These arrangements displayed the familiar advantages and disadvantages of public ownership. Prices were set in advance for long periods by administrative decision the Bulk Supply Tariff (BST) at wholesale level, and retail prices at local level as a mark-up on the BST to cover distribution costs. Investment decisions were taken on the basis of engineering considerations subject to political constraints, and hence were somewhat isolated from commercial market disciplines. The planning agency responsible for forecasting demand and advising on the commissioning of new capacity investments – the Committee to Review Power Requirements – was subject to a degree of capture by engineers and the heavy construction sector, and was risk-averse in the sense of trying to establish and maintain a substantial margin of excess generating capacity so as to minimise the prospect of power blackouts. Management of lake levels by NZED was similarly risk-averse, aimed to keep the system secure against the risk of dry years when meeting winter demand would stretch the system to its limits. ESAs similarly gave high priority to supply security, investing in excess capacity and employing enough staff to ensure in-house capability to handle emergencies.

The industry in that old form was exposed to three lines of criticism, which in the 1980s developed into a political platform for change.

• First, administrative decision-making was only as good as the people holding responsible posts, and could potentially be subject both to political influence

⁸ Statistics appeared annually under the cumbersome title *Statistics in relation to the electric power industry in New Zealand*. The minister's annual reports to Parliament can be found in the Appendices *to the Journal of the House of Representatives*

from above and to 'capture'. During the 1970s the ambitions of engineers in NZED and the Ministry of Works to sustain a rapid hydroelectric construction programme, combined with the wish of government energy planners to use the newly-discovered Maui natural gas reserves for electricity generation, made the growth of future electricity demand a political issue. Increasingly strong criticisms of the escalating cost of new hydro plants, and of the Government's promotion of electricity-intensive large industries to ensure a market for expanded generation, meant that NZED became politically exposed going into the 1980s as the legitimacy of its demand forecasts was eroded.

- Second, the allocation of supply costs across different categories of consumer at retail level had arbitrary elements that were subject to political challenge. ESAs purchased power in bulk at a uniform wholesale price, the BST, and then distributed it at different retail prices to commercial, smallindustrial, and residential consumers. Residential customers dominated the local-body electorate and probably had higher demand elasticity than commercial users; these two factors combined to produce a pricing structure under which residential pricing was significantly cheaper, leading commercial and small-industrial sector organisations to lobby for tariff rebalancing in their favour. Because such rebalancing was politically difficult so long as ESAs were elected bodies, a constituency developed in favour of abolishing electoral accountability in favour of a governance structure more susceptible to commercial pressures.
- Third, and crucial, was the rise of neoliberal ideology in New Zealand policy circles during the 1980s, inspired by overseas discussion of deregulation and the privatisation policies of the Thatcher government in the UK. Led by the New Zealand Treasury, neoliberal thinking supported corporatisation and if possible privatisation of state-owned operations, minimal regulation, and heavy reliance upon market forces to guide investment, pricing and industrial structure. The average-cost-pricing model of the BST was rejected in favour of supposedly more "efficient" pricing procedures focusing on the margin of supply in both short and long run, and competitive market forces were promoted as the alternative to central planning as the means to direct

investment in new capacity. The promise was that a market-driven alternative to the NZED/ESA organisational structure would deliver electricity as reliably, but at lower cost to the economy (and to consumers).

The next section covers the institutional detail of the industry restructuring programme.

3. Industry Restructuring since 1986

3.1 Supply-side structure

The history of the New Zealand electricity reforms is extremely complex and only a quick overview of major trends will be given here.⁹ The evolving structure of the industry is set out in Figure 5. Initially generation and transmission were combined in a state monopoly. NZED, while distribution lines and retail were combined in the hands of local electric supply authorities. NZED was corporatized in 1987, then split into separate generation and grid companies in 1994 after a period of uncertainty during which privatisation of ECNZ and club ownership of the grid operator Transpower were unsuccessfully pursued. ECNZ was split into two supposedly-competing generators in 1996 by the creation of Contact Energy. Contact was privatised in 1999 at the same time as the remaining ECNZ generation assets were broken up among three new state-owned enterprises (SOEs) and a small group of independent private companies. In 2012 legislation was passed allowing part-privatisation of the three generation SOEs by selling up to 49% stakes to private investors; this sell-down of the government stake is intended to be complete by 2014.

⁹ More detailed descriptions are provided in Bertram (2006), Evans and Meade (2005), Nillesen and Pollitt (2011), and on the Electricity Authority website at <u>http://www.ea.govt.nz/about-</u><u>us/structure/background-to-governance-and-regulation/</u>. A detailed and accessible description of the generation system and the operation of the New Zealand pool and wholesale market is in Wolak (2009) section 2 and Appendix 1.



Figure 5: Evolving industry structure

Meanwhile, the Electricity Supply Authorities and Municipal Electricity Departments that operated retail distribution were converted into commercial companies in 1993-94, lost their local-monopoly franchises, and were required to ring-fence their lines businesses which were made subject to "light-handed regulation" through information disclosure. The Electricity Industry Reform Act 1998 forced breakup of these companies, requiring ownership separation of distribution networks from energy (generation and retailing). An intensive period of takeovers and mergers followed as industry players jockeyed for position. Three of the 37 distributors -TransAlta, Trustpower, and the tiny King Country Power – divested their networks and moved into vertically-integrated generation and energy-retail activities. The other generation companies with tranches of the former ECNZ assets hastened to buy up retail businesses to match their generation portfolios. By 2000 there were six large vertically-integrated players in generation and energy retailing – three private, and three state-owned - plus a tiny fringe comprising Todd Energy (a private company long active in the natural gas sector, which picked up a small portfolio of generation plant divested by distributors and ECNZ) and King Country. The elimination of TransAlta in 2001, a victim of imbalance between its large retail

customer base and its tiny generation portfolio (Bertram 2006 pp.218-219), and a shuffling of retail portfolios among the remaining gentailers, produced a cartel of five large operators controlling around 95% of generation and a similar share of the retail market, with a very limited set of small independents occupying the fringe. The dominance of the five-gentailer group over the past decade has remained unchallenged.

3.2 Regulatory arrangements: generation and retail

The regulatory arrangements covering electricity in New Zealand are unusual in the extent to which policymakers have adhered to a deregulatory mindset, from which they have deviated only with great reluctance and in the face of overwhelming evidence of inability or refusal by industry players to self-regulate. The successive restructurings summarised above have been motivated by the desire to bring market forces to play at all levels to the greatest extent possible, starting with abandonment at the outset of the previous social contract under which electricity was publicly supplied at cost and treated as an essential service. Once profitmaximisation replaced social service as the industry objective, policymakers aimed to create competitive markets in generation and retail - the former by separating generation from involvement with lines networks and breaking-up ECNZ, the latter by abolishing the franchise areas which had given distributors a local monopoly. Through thick and thin since the commercialisation of generation in 1987, of retail in 1993-94, and ownership separation in 1999, these two "energy" levels of the industry have been left free of so-called "heavy-handed regulation" of their prices and profitability.

The only regulatory intervention the gentailers have faced over the past decade has related to industry governance. The engineering imperatives of coordinating dispatch and delivery of generated electricity have had to be matched by institutional arrangements for the operation of a pool which sets a spot price, the provision of ancillary services such as voltage support for frequency control, the maintenance of quality standards of supply, and some measures to reduce the uncertainty surrounding investment decision-making and to improve coordination among nominally competing parties in a market effectively foreclosed to large new independent entry. (Foreclosure is a consequence of vertical integration of

generation with retail, which forces any potential entrant to begin operations in two industries simultaneously if it is to escape the sort of fatal imbalance that destroyed TransAlta/OnEnergy in 2001. That company's failure to secure sufficient generation capacity out of the breakup of the old ECNZ portfolio left it overweight in retail and dependent on the spot market for wholesale supply during the 2001 dry winter; bankruptcy was the outcome.)

Until 1999 ECNZ's dominance, and state ownership of all major generation, enabled these issues to be handled within-firm by management, but thereafter some more formal arrangements were required. After a ministerial inquiry in 2000 an Electricity Governance Establishment Committee was set up, within which the industry was invited to develop its own set of rules and institutions for selfgovernance, with Government standing aside but available to become involved if agreement could not be reached. The outcome was a replay of an earlier unsuccessful effort in 1991-92 to divest the state-owned grid to a joint-venture club of generators and distributors – a project which had run aground on the divergence of interests amongst the players, leaving the grid (and the system operator within Transpower) in state ownership. The generation self-governance experiment of 2000-2003 similarly failed, for the same reason: voluntary coordination of conflicting interests could not be achieved. After several years of fruitless negotiations the Government was forced to establish, for the first time, a specialist electricity-sector regulator, the Electricity Commission, in 2003¹⁰.

The Electricity Commission was tasked with implementing and overseeing the rules, already largely developed by industry players themselves, covering the New Zealand Electricity Market (NZEM), the Metering and Reconciliation Information Agreement (MARIA), and the Multilateral Agreement on Common Quality Standards (MACQS). It was responsible for managing the supply into the market of reserve energy from a 155 MW generation plant at Whirinaki installed by the

¹⁰ A comprehensive overview of the Commission's activities, including a concise summary of the industry's officially-perceived failings as of 2009, is in Office the Auditor-General, *Electricity Commission: Review of the First Five Years*, June 2009, online at http://www.oag.govt.nz/2009/electricity-commission/docs/electricity-commission.pdf.

Government in the wake of the 2001 dry year crisis¹¹. The Commission had no brief to oversee pricing¹²; this area was covered - if at all - by New Zealand's generic competition law, the Commerce Act 1986, under which the Commerce Commission (a general-purpose regulator under the Act) would be responsible for undertaking any pricing inquiries and possible direct regulation that the Minister of Commerce might consider desirable. No such political decision to consider or introduce price regulation of generation or retail has been forthcoming to date¹³.

Most importantly, the Commission was mandated to facilitate efficient new investment. Investment in new generation was to be coordinated by indicative planning, comprising economic modelling and publication of demand projections and of a "statement of opportunities" to indicate when and where new capacity would be required, leaving it up to the gentailers to decide where and when to actually undertake the investments. Investment by the monopoly grid operator was, however, to be directly regulated, with all significant Transpower investment projects requiring approval by the Commission, subject to a rigorously-specified cost-benefit procedure, the "Grid Investment Test".

The Commission's first three years were dominated by an acrimonious dispute over Transpower's desire to build a new 400MW transmission line across the Waikato region from Whakamaru to Auckland. Transpower's plans were judged incompatible with the legally-specified Grid Investment Test. After repeated unsuccessful attempts to persuade the Commission, Transpower called on political support from its owner, the Government, which dismissed the Commission Chair, Roy Hemingway, when he refused to accept political direction¹⁴. A chastened

¹¹ The new plant was commissioned in 2004, on the same site as had previously been occupied by a similar dry-year reserve plant decommissioned by Contact Energy in 2001. After the Electricity Commission was abolished the plant was sold in 2011 to Contact Energy for \$33 million, less than one quarter of its original cost of \$150 million..

¹² Apart from approving the grid pricing methodology for Transpower.

¹³ "Threshold" price regulation of lines networks by the Commerce Commission came into effect in 2003 and is discussed further below.

¹⁴ A detailed insider account of these events was provided by Mr Hemingway in a sworn affidavit dated December 2007 for a High Court case in which local interests sought to overturn the Commission's eventual decision in favour of the Waikato line. The judgment in the case, which refused judicial review, is *New Era Energy Inc. v Electricity Commission* [2010] NZRMA 63 [HC].

Commission, headed by a political appointee installed to replace Mr Hemingway, proceeded to approve the project¹⁵.

After this defeat the Commission survived only another two years, facing growing opposition within the industry. The issue of the price at which Whirinaki reserve power was to be dispatched was a major bone of contention with the large gentailers, and a 2009 ministerial inquiry concluded that the existence of a reserve generator was deterring new investment and thereby reducing rather than improving system security (Electricity Technical Advisory Group 2009 Vol.1 pp.16-22; Office of the Minister of Energy and Resources 2009 paragraph 88). The Commission's analyses and modelling occasionally ruffled feathers as well, uncovering preliminary evidence of excessive retail margins being charged by the gentailers. Following an election win by the conservative National Party at the end of 2008 a new ministerial inquiry recommended abolition of the Commission and a return to more business-friendly approach (Office of the Minister of Energy and Resources 2009). New legislation, the Electricity Act 2010, provided for termination of the Whirinaki contract, some shuffling of generation assets between two SOEs (South Island-based Meridian Energy and North-Island-based Genesis Energy), and the replacement of the Electricity Commission by a new Electricity Authority with the general objective of "promot[ing] competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers"¹⁶.

Included in the functions of the new Authority alongside monitoring the market, maintaining registers, and implementing an industry code of conduct, was "to promote to consumers the benefits of comparing and switching retailers"¹⁷. Together with asset switching between two of the gentailers, this was intended to revive some appearance at least of competition in the retail market by raising the rate at which consumers were switching from one retailer to another. In association with a consumer watchdog organisation, the Consumer Institute, the Authority set

¹⁵ H. de Lacy, "The Waikato Pylon War", *Energy New Zealand* 4(5) September-October 2010, <u>http://www.contrafedpublishing.co.nz/Energy+NZ/Vol.4+No.5+September-October+2010/The+Waikato+pylon+war.html</u>.

¹⁶ Electricity Industry Act 2010 section 15.

¹⁷ Electricity Industry Act 2010 section 16(1)(i).

up a "Powerswitch" website¹⁸ on which consumers could compare retail prices in their locality. The gentailers contributed to the impression of competitive activity by diversifying the brand names under which they sold electricity at retail. These activities, plus an intensive advertising campaign entitled "What's my Number?" (Electricity Authority 2012), succeeded in raising the rate of customer churn amongst retailers, at the cost of a very large deadweight burden of information-gathering, calculation, and anxiety borne by individual consumers and voluntary budget advisory services; the Authority nevertheless judged its efforts a success¹⁹. It is not yet clear whether increased customer switching has had any clear effect on the rate of increase of retail prices over the long run, but it may have had at least a temporary effect similar to the initial impact of the Electricity Industry Reform Act in 1998-2000 (see Figure 7 below)²⁰.

Having thus ticked the requisite box for promoting retail competition, the Authority contented itself with defending the industry's continuing retail price rises as legitimate commercial behaviour, in the face of a steady rumble of public discontent.

3.3 Lines regulation

The ongoing non-regulation of generation and retail pricing and profitability (in the name of promoting, and relying on, market competition and efficiency) was from the outset separate from the regulatory treatment of transmission and distribution lines, whose natural-monopoly character made some sort of regulation inescapable. For the first decade of corporatisation, 1994-2003, policymakers relied on information disclosure alone as a means of disciplining market behaviour, and regulation since has remained as "light-handed" as possible.

The central idea behind light-handed regulation is that a natural-monopoly industry in which anti-competitive conduct is predictable can be induced to self-regulate and behave as if workably competitive, provided that there exists a credible threat of

¹⁸ <u>http://www.powerswitch.org.nz/powerswitch</u>.

¹⁹ Layton and Hansen (2012) pp.12-14.

²⁰ In both 1998-2000 and 2009-2012 there were downward pressures on price from surplus generation capacity in periods of economic recession, which makes it difficult to identify any separate effect from customer churn.

full-scale regulation being imposed. The theory has obvious attractions in terms of fiscal savings and greater entrepreneurial freedom to innovate. It has an equally obvious weakness: the threat of regulation can be credible only if it is backed up by capacity-building - and capacity maintenance - within government. The potential regulator must be extremely well informed, in detail, about key aspects of the deregulated sector's activities, must have the analytical capacity to make sense if the information, and must have in place the necessary legislative provisions and institutional machinery to implement re-regulation at any time without delay.

The New Zealand Government grasped with enthusiasm the apparent opportunity to cut regulatory costs and the anticipated benefits from commercialised management, but failed to develop and maintain the capacity to analyse or regulate the sector.

Lines businesses were required to disclose financial, and some physical, information for publication in the official *New Zealand Gazette*; but the government department responsible for overseeing the information disclosure process (the Ministry of Commerce) did not maintain a public registry of disclosed information, nor undertake analysis of financial disclosures. As lines companies became increasingly bold in their asset revaluations, price-cost markups, and creative accounting, government's ability and will to regulate declined steadily through the 1990s. The official electricity sector statistics shrank rapidly in coverage and accuracy after 1989 and were phased out entirely in 1994.

By 2000 the lines companies were carrying on their books some \$2 billion of asset revaluations that their auditors had signed off without challenge from government – effectively a wealth transfer from electricity consumers, underpinned by increased prices and margins – and had become the object of widespread public disquiet about their apparent profiteering at consumers' expense. A ministerial inquiry, however, largely exonerated the companies, even going so far as to deny that capital gains captured by natural monopolists should be treated as income for regulatory purposes (Caygill et al 2000). Nevertheless, some regulatory intervention was judged politically unavoidable, and amendments to the Commerce Act were passed requiring the Commerce Commission (a general-purpose

competition agency under the Act) to inquire into the need for regulation. In due course, after a three-year process of deliberation and ministerial approval, the Commission introduced a version of CPI-X price regulation, based on thresholds that accepted as a fait accompli the asset revaluations and high-priced takeovers of the preceding decade, and allowed the accumulated revaluations to be reclassified as historic cost (Bertram and Twaddle 2005 p.298).

Subsequently, two detailed empirical studies utilising disclosed information (Bertram and Twaddle 2005; Nillesen and Pollitt 2011) have traced the large increases in price-cost margins, and in asset values, in the late 1990s as the new company managements drove costs down and (to a lesser extent) prices up. Figure 6 charts the revaluation boom which doubled the book value of distribution lines assets 1994-1999 before the Government referred lines pricing to the Commerce Commission. After regulation began in 2003, steady annual revaluations were still allowed to reflect the increasing replacement cost of assets. Of the 2011 regulatory asset base of around \$8 billion, nearly half consisted of revaluations as distinct from net actual investment. \$2 billion of those revaluations represent the initial wealth transfer from consumers – the rate shock attributable to the reform process - as valuations rose from historic cost to Optimised Deprival Value (ODV) or more during the unregulated 1994-2003 period.



Figure 6: Distribution networks book value of fixed assets

The next section turns to the outcomes of industry restructuring and the evolving regulatory regime since 1986, asking whether there is clear evidence of improved performance emerging from two decades of neoliberal "reform".

4. Outcomes over the reform period

This section summarises the trends in prices, costs, margins, profits, asset values and investment performance over the 25-year period 1987-2012. At aggregate level, Figure 7 shows that the real price of delivered electricity was falling prior to reform, stabilised over the first decade of restructuring, fell briefly during a competitive interlude 1998-2001, and then climbed steadily from 2001 to 2009. In the last two years of the chart it is evident that the global financial crisis, emerging excess generation capacity, and some pro-competitive regulatory activism have curbed the industry's rate of price inflation to below the economy-wide inflation rate.

Sources: 1979-1993 from annual electricity statistics; 1994-2002 assembled from individual company disclosure statements; 2003-2011 from Commerce Commission disclosure data at http://www.comcom.govt.nz/information-disclosure/



Figure 7: Average real electricity price 1979-2011, 2011 cents per kWh



Figure 8 shows real price trends by end-use sector, with the overall average from Figure 7 overlaid. It is apparent that the flat trend of prices overall through the 1990s (Figure 6) did not hold for all end-users. Residential prices began to rise in 1990 and over the following two decades they increased 3% per year ahead of the inflation rate. The only time when competitive market pressures seriously checked the trend was 1998-2001, when a scramble for retail-market shares was underway following the ownership separation of lines and energy businesses. Once the defacto cartel of five vertically-integrated gentailers consolidated in 2001, price rises for residential consumers accelerated to a steady 5% per year above the general inflation rate until the global financial crisis struck.



Figure 8: Real electricity price by end-use sector, 1979-2011

Commercial prices fell steeply in real terms through the 1990s, offsetting the residential price hikes. However, after the gentailer cartel consolidated in 2001, they too turned up sharply until 2008. Industrial prices stayed much more constant in real terms throughout, but with a period of real price hikes 2001-2008. (The average industrial price is held down by the heavy weight of the Rio Tinto aluminium smelter at Bluff (see Figure 1) which uses around 17% of New Zealand's total electricity at a very low contract price.)

The key to the divergent trends pitting households against business has been the lobbying and bargaining power exercised by the industrial and commercial sectors to keep their costs down, and to the almost complete loss by residential consumers of any effective voice in policy or regulatory arrangements. In government, both main political parties have allowed the large electricity suppliers to set retail prices without regulatory intervention.

Sources: Prices and volumes from *Energy Data File 2012* Table I.1a and Table G.5a. Deflated by the author using CPI for residential and PPI (Inputs) for commercial and industrial, but using CPI for years before the PPI series begins.

How did the New Zealand price trends in Figure 8 compare with those elsewhere in the world? Using IEA data, Figure 9 shows the path of residential prices in New Zealand compared with a number of the other countries covered in this book. Figure 10 carries out the same exercise for industrial electricity. Both charts are constructed to show trends before and since the restructuring of the New Zealand industry began in 1986. New Zealand is clearly an extreme outlier in terms of the extent to which residential prices have been driven up ahead of the inflation rate in the reform era, whereas other countries in this book have held residential prices stable or reduced them over the same period. In contrast, industrial electricity prices in New Zealand have roughly tracked those in neighbouring Australia.



Figure 9: Real electricity price to residential consumers: New Zealand compared with some other countries covered in this book

Source: International Energy Agency, *Energy Prices and Taxes* online database, accessed July 2012.



Figure 10: Real electricity price to industrial consumers: New Zealand compared with some other countries covered in this book

Source: International Energy Agency, *Energy Prices and Taxes* online database accessed July 2012.

There are two possible explanations for the 40% increase in the real average residential price since 2001 seen in Figure 7. One would be that electricity supply costs were increasing and that the rising prices were simply a pass-through of those costs. The other would be that the generator-retailers, once securely vertically-integrated from 2001, were price gouging to increase their profits – a straight wealth transfer from consumers, reflecting the exercise of market power.

In fact, both stories appear to have some explanatory power. The profitability of the gentailers was certainly very substantial over the period 2002-2011. A profitability analysis of the three SOE gentailers (Meridian, Genesis and Mighty River) conducted for the Treasury by Ernst and Young in 2011 estimated that "economic profit" (the companies' return over and above their cost of capital) had totalled some \$3.8 billion over the ten years (Ernst and Young 2011; Treasury 2011 p.39 Table 8) on total revenues of \$42 billion. Their "invested capital" was stated to have risen from \$4 billion in 2002 to nearly \$12 billion in 2011 (Treasury 2011 p.38 Table 8); but the great bulk of this increase - \$6.2 billion, according to the companies' annual reports - was asset revaluations, with less than \$2 billion representing the historic cost of net actual investment. The revaluations were so-called "fair value" exercises which wrote-up the book value of assets to reflect the present value of expected cashflows, and in this sense they provide a gauge of the actual and anticipated profitability of the vertically-integrated state-owned businesses.





Sources: 1979-1993 from annual electricity statistics; 1994-2011 collated by the author from company annual reports.

Analysis of the annual financial reports of all five large gentailers, and of their predecessor ECNZ, enables construction of Figure 11, which compares the recorded book value of fixed assets with the cumulative revaluations taken to book over the years. It can be seen that by 2011 roughly half of the total book value was revaluations. The revaluation process got under way in 1999, when generation assets transferred from ECNZ to their new owners were marked up by \$1.5 billion; but the really big surge came after 2001 as the cartel consolidated and was able to

exercise its market power to generate increasing cashflows that could be capitalised into "fair value" entries on their balance sheets

In interpreting Figure 11, two peculiar features of the New Zealand regulatory environment need to be borne in mind. First, there is no capital gains tax in New Zealand, so that revaluations are in effect untaxed income, which under New Zealand's generally accepted accounting practice (GAAP) does not have to be entered in the profit and loss account. Second, as noted earlier, there is no law prohibiting the taking of excess profits. As a Commerce Commission report noted in 2009

The exercise of market power to earn market power rents is not by itself a contravention of the Commerce Act, but is a lawful, rational exploitation of the ability and incentives available to the generators. (Commerce Commission 2009 p.6 paragraph v.)

Under new financial reporting standards introduced about 2007, and used by all the gentailers from 2008 on, company accounts now show, in addition to the book value of fixed assets including revaluations, a figure for the value that would have appeared under historic-cost accounting conventions of the sort that apply in, for example, the USA. Table 2 assembles, from the five large gentailers' accounts, comparative data on the two measures for the years 2008-2012. If one imagines a hypothetical regulator controlling retail prices on the basis of a historic-cost regulatory asset base, it is immediately apparent that such a regulator would have disallowed a substantial proportion of the price increases charged by these companies over the past decade.

		2008	2009	2010	2011	2012	
"Fair value" at which generation fixed assets are carried							
	Contact	4.1	4.1	3.7*	4.1*	4.2	
	Genesis	1.5	1.5	1.4	2.5	2.5	
	Meridian	6.0	5.9	7.7	7.3	7.3	
	Mighty River	3.0	3.5	4.1	4.4	4.5	
	Trustpower	2.0	2.3	2.3	2.4	2.5	
	Total	16.5	17.2	19.2	20.8	21.0	
Book value if a historic cost basis were used							
	Contact	1.6	1.6	1.6*	1.6*	1.6*	
	Genesis	1.2	1.2	0.9	1.7	1.6	
	Meridian	2.3	2.2	2.9	2.9	2.7	
	Mighty River	1.2	1.5	1.7	1.7	1.7	
	Trustpower	1.1	1.2	1.2	1.2	1.2	
	Total	7.4	7.7	8.3	9.1	8.9	

Table 2: "Fair value" book value of generation fixed assets compared with historic cost

• Contact Energy in its 2010 *Annual Report* p.60 announced a voluntary switch to historic cost and an end to "fair value" adjustments. In constructing this table the 2009 revaluation reserve has been carried forward to make up for the removal of any corresponding item in Contact's financial statements.

Source: company annual reports, collated by the author.

To capture as cashflows the capital gains embodied in "fair value" revaluations, either the companies must make return-of-capital distributions to their owners, or the assets must be on-sold to a third party at book value, with the sales proceeds including both the historic-cost and the fair-value components. The New Zealand Treasury, hungry for revenue from state-owned enterprises, has encouraged and benefited from the sequence of ownership changes forced on the industry by restructuring policies. When in 1996 the first split of ECNZ took place with the creation of Contact Energy, the new company raised debt finance to pay out ECNZ in cash, enabling ECNZ to pay its owners cash dividends totalling \$3 billion over two years; see Figure 12. The divestment of the remaining ECNZ assets in 1999 produced another \$2.5 billion. The Treasury in 2012 hoped that the pending sale of 49% of the three generator SOEs could produce another \$5-6 billion in cash.



Figure 12: Distributions to owners by the large generator-retailers, 1988-2011

Source: Collated by the athor from annual reports.

The circular process of revaluing assets, declaring higher capital charges to service the resulting higher book values, then raising prices to recover those charges before proceeding to the next "fair value" exercise, slowed down after 2008 - more because of macroeconomic conditions affecting the market than due to any reguatory restraint. It may be that the profit-maximising level of the real electricity price has been reached, in which case the era of "fair-value" revaluations may be nearly at an end. (Certainly the largest privately-owned gentailer, Contact Energy, as mentioned in the note to Table 2, returned to historic-cost conventions for its balance sheet in 2010, opportunistically restating its accumulated revaluation reserve as "historic cost" in the process.)

On this interpretation, the timing of the privatisation decision in 2012 could be interpreted as Treasury's desire to realise the cash value of as much as possible of the accumulated revaluations, given that future policy changes, or market conditions, might force some write-downs. To look more closely at cost/price trends in the four levels of the industry (generation, transmission, distribution lines and retail), a first step is to decompose total electricity sales revenue between lines charges and energy charges. Figure 13 carries out this exercise by assembling scattered data published in official statistics, company annual financial statements, and information disclosure documents. The solid bars at the bottom of this chart represent lines charges for transmission (black) and distribution lines (grey), while the hatched bars at the top represent energy charges. For the first half of the 1990s, official statistics permit a further breakdown between wholesale and retail charges for both lines and energy, with the retail margin derived as a residual from total sales after subtracting transmission, distribution lines charges, and ECNZ's wholesale energy sales revenue.



Figure 13: Decomposition of total sales revenue, 1989-2010

Source: Compiled by the author from electricity statistics, company annual reports, information disclosures, and *Energy Data File* various issues

It is not possible to disaggregate the "energy" charges in Figure 13 for years since 1997 because the vertically-integrated gentailers combine their generation and

retail businesses into a single set of annual financial statements, and segmental reporting of revenues and costs has begun only very recently.

It is obvious, however, from inspection of Figure 13, that trends in total sales revenue have been driven more by energy charges than by lines charges. The 1998-2000 dip in total revenue, and its very rapid rise 2001-2009, were due primarily to developments in the pricing of energy. In 2009 - 2010 when average overall prices softened (Figure 7 above) it was distribution lines, rather than energy revenues, that took the hit. Transmission charges, apart from their sharp increase 1989-1991 (when ECNZ restructured to load costs onto its transmission subsidiary and thereby improve the privatisation prospects of the generation operation) have remained constant in nominal terms, and declined in real terms, over the two decades.





Source: As for Figure 13, deflated using the PPI (Inputs) published by Statistics New Zealand.

Using the Producer Price Index (Inputs) to deflate the figures, and dividing by annual final sales volume, Figure 14 shows the breakdown of the average real price using the same data as Figure 13. The relative constancy of distribution lines charges, and the decline in transmission charges, are clear, as is the sharp increase in energy charges after 2000.

Recently, data have become available for the segmental breakdown of the gentailers' aggregated sales revenues between the cost of wholesale electricity generated and purchased, and the retail margin (covering charges for various market services, metering, consultants, industry governance levies, advertising, plus the gross profit margin secured). This new data makes it possible to compare, in Figure 15, the breakdown of final price paid by all consumers on average in 1990 and 2010.



Figure 15: Proportional breakdown of final electricity price amongst the four components, 1990 and 2010



The striking feature in Figure 15 is the enormous increase in the proportion of the price paid by consumers that is absorbed by the retail segment of the industry. Under the old industry structure, with retailing undertaken by ESA distributors on a non-profit basis, retailing absorbed 7% or less of the consumer dollar. By 2010, after two decades of restructuring supposedly for the benefit of consumers, these charges had risen to 28% of the bill. In real 2011 dollar terms, retail and other minor charges cost the consumer 0.9 cents per kWh in 1990; by 2010 this had risen to 4.2 cents. For residential consumers the increase was far greater than this, taking retail charges from under a cent to around eight cents per kWh.

The establishment of a commercial deregulated retail sector thus raised the real price of retail delivery by over 400% in aggregate, and about 800% for residential customers. Part of this was increased costs associated with advertising, branding, construction of modern luxury offices, and payment of high salaries to chief executives (most or all of whom were on multi-million-dollar remuneration by 2010). A large part also, is likely to be pure profit. As no regulatory inquiry has yet been held into the costs and profits of the generation and retail segments, no authoritative figures are available, although analysis by the Electricity Commission (summarised in Electricity Technical Advisory Group 2009 Vol.2 Appendix 14 pp.101-112) produced clear evidence that retail margins were high as at 2008, and had risen relative to the cost of supply since 2000.

Some preliminary cost series drawn from the annual financial statements of the companies are in Figure 16 and are indicative of substantial cost escalation in the five gentailers' businesses, for which no obvious justification comes to mind. There is a clear contrast between lines businesses which have brought their operating costs down substantially since corporatisation, and the gentailers who report their costs as having exploded since 2000. Because financial reports for most of the period treat generation and retail costs as a single aggregate, it is not yet possible to disaggregate them between retail and generation. It may be that the internal transfer prices at which the gentailers sell their generated energy to themselves as retailers have been inflated, as the geographical match between generation assets

and customer locations as weakened with increased retail customer switching²¹ and as company balance sheets have become cluttered with a huge array of obscure financial derivatives ostensibly designed to "reduce risk". This seems to be an issue that could eventually attract regulatory attention.



Figure 16: Real operating expenses (not including depreciation) 1979-2011

Source: Assembled by author from annual financial statements. Deflated using the PPI (Inputs). Note the absence of data for the retail businesses of distributors 1994-2999.

An important component of the price of electrical energy is the wholesale price emerging from the operation of New Zealand's pool²². The wholesale market is an energy-only market which clears every half-hour at the price offered by the marginal tranche of generation. A typical diagrammatic cross-section of the cost and demand structure is Figure 17²³, which shows clearly the large component of

²¹ Layton and Hansen (2012) p.14 report the Herfindahl-Hischman Index for retail nationally falling from over 6000 in 2004 just over 3500 in 2011, and p.12 shows the regional pattern of change. The reduction in the previous tendency for local dominance by one retailer in many localities is attributed to the policy of strong promotion of customer switching.

²² It is unclear how the wholesale price enters into the operating costs reported by gentailers in their annual financial statements, and shown in Figure 15. The transfer of electricity from wholesale to retail divisions of each company is an internal transaction, while electricity acquired from other generators is subject to complex contracting and hedging arrangements.

²³ The basic shape of the short-run marginal supply curve has remained unchanged since the 1980s; see Bertram (1987) for a very similar diagram.

generation capacity available at very low short-run cost, and the steeply-rising segment at the right-hand end of the supply curve as successive tranches of thermal plant (and of hydro generation with high opportunity cost of water) are called upon.





Source: Macrae and Wolak 2009 p.36 Figure 3.4..

It is obvious from the diagram that a large part of the total revenue secured in any period is rent on low-operating-cost fixed assets. Since the market is energy-only, incumbent generators are expected to utilise this large producer surplus to fund new capacity, and the availability of such large rents has allowed the system to function without separate arrangements to incentivise investment, such as capacity rights. There is no reason, however, to believe that the total rents bear anything other than an arbitrary relation to the actual financing needs of generation. There is, on the contrary, much reason to see them as pure wealth transfers from consumers, positively related to the spot price. Consumer advocates have long argued, unsuccessfully, for the introduction of some form of increasing-block pricing to reverse part at least of these wealth transfers (Bertram et al 1992; Bertram 1996).

Acknowledgment that the spot price might be subject to the exercise of market power led the Commerce Commission, in 2005, to initiate an inquiry into the issue of whether market power was being exercised in the wholesale market and, if so, whether this involved anti-competitive behaviour as defined under New Zealand competition law. The resulting quantitative study of the wholesale market (Wolak 2009; Macrae and Wolak 2009) found strong evidence that at times of relative shortage of supply, the spot price had been driven well above a hypothetical competitive level (the "counterfactual price" in Figure 18).



Figure 18: Deviation of actual wholesale spot price from hypothetical competitive price, 2001-2007

Source: Wolak (2009) p.201 Figure 5.13.

Based on this modelling work, Wolak estimated market power rents, shown in dark shading in Figure 19, at \$4.3 billion over the period -18 percent of the total wholesale market revenues received by all generators over the entire period. (Commerce Commission 2009 p.6 paragraph ii). A later, independent, study using a different methodology (agent-based modelling) found monopolistic rents on the same scale as Wolak, but with a different distribution of rents across seasons and years (Browne et al 2012).

Figure 19: Wolak estimates of "market-power rents"



Source: Wolak 2009 p.200 Figure 5.11.

The Wolak report triggered an extremely hostile reaction from the generators, and was the subject of published critiques from local economists and consultants linked to them (for example Evans et al 2012, Hogan and Jackson 2012, Evans and Guthrie 2012). While basically accepting Wolak's methodology, which compared market clearing prices with simulated marginal costs, the critics argued that the \$4.3 billion figure was (a) too high, and (b) did not raise the generators' return on assets above reasonable levels.

Because it found no evidence that the market power identified by Wolak had been "exercised for any anticompetitive purpose", the Commission ended its investigations with no further action being taken, but it did comment that

there are serious systemic issues arising out of the current market structure, market design and market rules that provide the generators with the ability and incentive to exercise market power under certain periodic and recurring conditions. (Commerce Commission 2009 p.6 para v) The Commission pointed also to the inadequacy of information available, even a decade and a half after the New Zealand Government had adopted a light-handed regulatory stance built around the idea of information disclosure as the key restraint on monopolistic conduct:

[U]nlike the situation in many other jurisdictions, the regulatory bodies monitoring the electricity industry in New Zealand have not historically collected, and still do not collect, all of the information typically required by a competition authority to fully assess competition in the wholesale and retail markets. (Commerce Commission 209 p.8 paragraph xvii).

Turning to another aspect of industry performance, the available data on investment are indicative of a failure of commercial management to produce more stable and coordinated investment in new capacity than was achieved under the pre-reform system – an issue already noted earlier in the comparison of Figures 2 and 3. Figure 20 shows the trends in depreciation and gross fixed capital formation for the sector "electricity, gas and water" in the New Zealand national accounts. Within that sector, electricity accounts for 85% or more of total sales and value added²⁴, which means it is the dominant influence on the aggregate figures.

²⁴ This figure comes from the 1996 input-output matrices published by Statistics New Zealand.



Figure 20: Investment performance of "electricity, gas and water" sector, 1972-2007²⁵

Early casualties of the uncertainty and disruption caused by restructuring of the electricity sector were maintenance spending and investment in new capacity, both in the generation fleet and in the transmission grid. As was seen in Figure 2, over the first fifteen years of "reform" from 1986 to 2000 generation capacity remained flat with no net gain from investment, as commercial decisions eliminated over 600 MW of reserve high-operating-cost thermal plant which fully offset what new investment was undertaken in lower-cost thermal baseload units (Bertram 2006 p.225 Table 7.5). This profit-motivated scrapping of inherited reserve plant had the effect of narrowing the safety margins in a system that was heavily dependent upon hydro flows. In due course a dry winter in 2001 brought a supply crisis, high prices, and blackouts, spurring a resumption of new construction.

The 1990s swing to negative net investment in Figure 16 amounted to an "investment strike" not only by the newly corporatised generation sector - resulting in a 15 percentage-point increase in capacity utilisation as the margin of excess

25

Source: National accounts published by Statistics New Zealand. The published sectoral data ends at 2007.

Official national accounts data at sector level are currently not available for years after 2007.

generation capacity was stripped back - but also by the state-owned grid operator Transpower, as it struggled to meet stringent financial performance requirements – high capital charges on revalued grid assets - imposed by Government as its shareholder. The grid was allowed to run down for a decade and a half while large cash dividends were extracted by the New Zealand Treasury. The grid assets inevitably deteriorated and eventually key components began to fail, a process dramatically illustrated by a blackout of much of Auckland in June 2006, and by the 2007 reduction in the capacity of the inter-island high-voltage DC link which is a key part of the grid backbone²⁶.

The HVDC link had been installed in the 1960s, and upgraded in 1987-1992 by addition of a new thyristor converter alongside the original mercury valves, plus the laying of three new undersea cables. Pole 1 of the system continued to operate with the original 1960-vintage equipment until 2007, leaving the link increasingly vulnerable to failure as Pole 2 also began to age. The coldest day of the 2006 winter, June 19, brought a grid emergency and blackouts in the North Island due to a sudden outage on the HVDC; and in September 2007 Pole 1 finally had to be taken out of service. The next year it was reactivated for a while using old equipment salvaged from Denmark, but the link effectively was reduced to a single pole, meaning that normal industry standards of grid security were not met, and wear and tear on the operational pole increased sharply. In 2008 planning finally commenced on a new pole for the HVDC; work began in 2010, and the new pole is finally due for commissioning at the end of 2012, restoring an (n-1) level of security.

Figure 21 shows the grid's book value since Transpower was established in 1987. The steep increase from 1990 to 1993 reflects a combination of asset revaluation (to Optimised Deprival Value, ODV) and heavy expenditure on the inter-island link. Thereafter until 2006 the book value drifted steadily down as depreciation outran new investment spending. A major downward revaluation was taken to book in 1998. Only after 2006 did the value of assets begin to increase as investment in replacement and extension of grid assets was resumed. Short-term thinking and

A useful overview of the HVDC is at <u>http://en.wikipedia.org/wiki/HVDC_Inter-Island</u>, (accessed July 2012).

Treasury's hunger for revenue eventually had their consequences in the 2006 Auckland blackout and 2007 HVDC downgrade.



Figure 21: Transpower fixed assets book value 1987-2010

Source: Transpower NZ Ltd Annual Reports

The proposition that market mechanisms would coordinate investment more efficiently than central planning had done prior to 1987 receives no support from Figures 19 and 20. Insofar as the policy-driven introduction of commercial management pursuing profit objectives from 1987 on had any obvious effect on the generation sector's investment performance, that effect was disruptive.

5. Conclusion

At the beginning of the restructuring process, the 1989 Electricity Industry Task Force report recommended privatisation of ECNZ with some limited spin-off of its assets, removal of retail franchises, separation of lines and energy, corporatisation and privatisation of distribution, light-handed regulation of lines, and no regulation of retail prices (Bertram 2006 p.209 Box 7.1). As it gained momentum, the New Zealand restructuring programme evolved gradually from the task force's recommendations, under the influence of an emerging alliance amongst key local interests with large stakes in the policy project. The New Zealand Treasury wanted increased cashflows (whether from state-owned-enterprise profits or from privatisation proceeds) along with minimal, if any, regulation – a combination which implied strong pressure on SOE managers to use any market power they possessed to raise shareholder returns at consumers' expense. Key members of the New Zealand business elite, and senior electricity-sector staff, were attracted by highly-paid management and board opportunities, which could be multiplied as the industry were broken up into more corporate entities. Accountants and consultants discovered a hugely lucrative new market for the development and application of novel governance and accounting frameworks for the restructured industry, under the banner of the vaguely-articulated and poorly understood concept of "light-handed regulation" to which Government committed itself early in the process.

The upshot was that the New Zealand electricity reforms have been a process of trial-and-error in the absence of a specialist regulator and with an official policy framework that was often confused and variable. Consistent themes have been a long-term push towards privatisation, a reluctance to regulate even in the face of blatant abuses of market power, bipartisan political tolerance of a steady price squeeze on residential consumers which has left them nowhere to turn, and the combination of steadily-rising prices and erratic investment behaviour that were described in section 4 above.

The regulatory arrangements covering prices, costs and profitability in the electricity sector have undergone repeated adjustments without as yet settling into any sustainable long-term shape. Originally, the proponents of reform in the 1980s argued that the transition to corporate forms of governance and commercial profitoriented objectives would restrain costs and improve investment relative to what a continued state-owned monopoly could have achieved under social objectives. Two decades of experience do not suggest that the anticipated major improvement in industry performance, relative to what could have been achieved by adjusting rather than overturning the pre-reform institutional setup, has occurred. New categories of costs - financial derivatives, high-paid management, large consultancy expenditures, and substantial outlays on branding, advertising, and customer switching – have all ended up being passed through to higher prices, borne disproportionately by households which lack either political power or legal remedies against price-gouging.

Unresolved issues still lie in wait as the state-owned generators are put through part-privatisation over the coming years. The tax treatment of windfall profits on sunk-cost renewables as the carbon price rises is one of these. Another is the freedom of hydro generators from any charge on the water they use, under the 1987 deed establishing ECNZ²⁷. A third is the growing evidence of energy poverty among low-income households – the flip side of the large wealth transfers from consumers to gentailers. A fourth is the re-emergence of surplus generation capacity, on a scale potentially greater than that of the 1980s which was used to justify industry restructuring in the first place.

Thus although the New Zealand reforms have kept the lights on (apart from some dramatic crises due to dry years and deferred investment), it is far from clear that the "long term benefit of consumers", continually cited as the basic motivation, has been successfully served by the changes. The very large scale of the wealth transfers away from consumers once the industry shifted from an "essential service" philosophy to a profit-led market model spells potential political vulnerability. At the same time, New Zealand under the reformed structure has failed to keep up with international best-practice in terms of smart metering, demand-side participation in the market, freedom of entry for independent generation, and planning for major future market development such as the pending arrival of electric vehicles. Much remains to be done.

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²⁷ At the time of writing the New Zealand Maori Council was asserting indigenous rights over water under customary law.

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