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Vertical integration, credit ratings and retail price settings in energy-only markets: Navigating the Resource Adequacy problem

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ABSTRACT

Energy-only markets are prone to the Resource Adequacy problem, i.e. the timely entry of new plant. The reason for this is that competitive energy-only markets struggle to be remunerative given reliability constraints and market price caps. Historically, Australia's 45,000 MW National Electricity Market has managed to navigate this well understood problem, albeit with government entities directly or indirectly responsible for a surprisingly large 73% of all new plant investments to 2007. But government involvement in direct investment has now ceased. So what will enable the industry to navigate the Resource Adequacy problem into the future? Quite simply, industrial organisation, the presence of merchant utilities with investment-grade credit ratings and setting any regulated retail prices or 'price to beat' with an LRMC floor.

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1. Introduction

Australia's 45,000 MW National Electricity Market (NEM), which comprises the eastern and southern states of Australia, has long been acknowledged as one of the most successful microeconomic reforms of a power industry globally.² But there are characteristics associated with the NEM's current institutional settings which represent risks to physical security of supply. These characteristics include a deregulated energy-only gross pool wholesale market, overlaid with regulated retail prices as the 'price to beat' in all but one region of the NEM. In academic literature, individually, these characteristics are well understood to present risks to future security of supply, but when combined they would seem to represent a particularly dangerous cocktail.

Despite the energy-only design of the market, Resource Adequacy, that is, the timely arrival of new plant to ensure ongoing reliability of supply, has historically been successfully navigated over the NEM's 11-year history, but hardly by good management. It has thus far been a story of an overcapitalised starting point, initial enthusiasm for deregulated investments quickly followed by the harsh financial reality of lumpy plant

entry, and then the fortunate presence of government-owned businesses pre-emptively investing and finally, material changes to the reserve requirement calculation. But all of these otherwise relieving conditions now seem to have been exhausted. Growth in demand has resulted in a system that is now largely in balance, governments with increasingly constrained funds have withdrawn their state-owned enterprises from the development market, and the banking of merchant investments faces higher hurdles than ever before, having been intensified by the financial and economic crisis of FY09.

The broader industry has evolved in a manner in which these conditions can be navigated, if not imperfectly. With the introduction of capacity payments or other additional reliability mechanisms having been ruled out on numerous occasions by policy makers, industry participants reorganised themselves into vertically integrated (VI) merchant utilities spanning generation and retail supply.³ Most importantly, all VI merchant utilities with a franchise retail base have investment-grade credit ratings and as this paper later reveals, such ratings are quite fundamental to navigating Resource Adequacy. And historically at least, the trajectory of regulated default retail prices have provided these firms with stable and directionally appropriate revenue streams in which to retain their credit ratings, which is the key enabler to underwriting or directly investing in any requisite new plant.

Wholesale market prices have, however, been marked by rising volatility since 2007 and as this article later explains, importing the full-force of this volatility into regulated retail

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² See for example IEA (2005) at p. 14.

³ The transmission and distribution network monopolies are structurally separated and regulated.

prices has the clear potential to disrupt the conditions required for future investment. At least two states in Australia, New South Wales (NSW) and Western Australia (WA), have managed to short-circuit this risk by moving to a regulated retail price comprising a market-based wholesale energy cost allowance with a long run marginal cost (LRMC) 'floor'. And at the time of writing a third state, South Australia (SA), was also pursuing this strategy in their pre-determination working papers. While it is true that regulated prices are merely a 'price to beat', they nonetheless set the tone for industry profitability given the asymmetric nature of regulated retail prices on the one hand, and the imperfect nature of customer switching on the other. The combination of industrial organisation by firms whilst maintaining investment grade credit ratings, and regulatory strategy, would appear capable of reducing the most adverse risks of Resource Adequacy that otherwise exist in energy-only markets. Thus, the purpose of this paper is to review the history and outlook of Resource Adequacy in the NEM.

This paper is organised as follows; Section 2 reviews the power plant investment task facing the NEM. Section 3 introduces the Resource Adequacy problem that exists in energy-only markets and Section 4 examines the important concept of "bankability" as it relates to new plant investments. Sections 5 and 6 then explore how industrial organisation and the regulated price setting process have been the more recent mechanisms that help the market navigate the Resource Adequacy problem. Concluding remarks follow.

2. The power plant investment task in the NEM: 2009–2020

Demand for electricity in the NEM has been characterised by comparatively strong growth by OECD standards, increasing at 2.8% pa over the 10 years to 2009 (ESAA, 2009). Forecasts to 2020 by AEMO (2009) indicate that peak load will increase from the current 36,000 to about 43,000 MW. Historically, any analysis of industry stability could focus exclusively on conventional energy sources, because the market shares in Australia could be summarised simply as 82% coal, 12% gas, 6% conventional utility-scale hydro with other renewable technologies representing little more than a rounding error. This is no longer the case. In 2009, legislation was passed by the Federal Government which enforces an expanded 20% Renewable Energy Target (RET). This legislation builds on the earlier 2% Mandated Renewable Energy Target (MRET). The most practical way in which to examine the regulated demand for renewable energy is in Fig. 1, which sets out Australia's baseline renewable generation (i.e. pre-1997 renewable generation output), to which the 2% MRET was added in 2002, followed by the 20% RET in 2009.

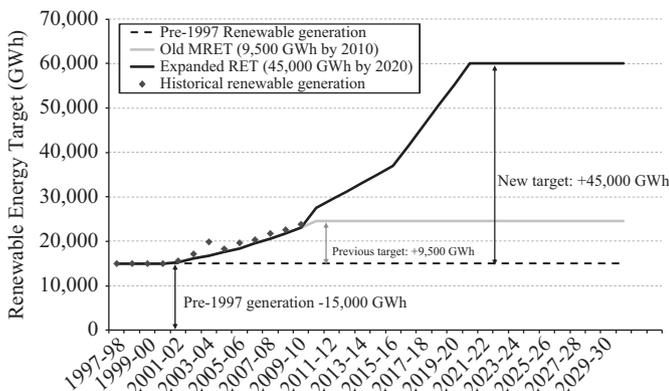


Fig. 1. Renewable energy production and targets in Australia. Source: Roam, AGL Energy Ltd.

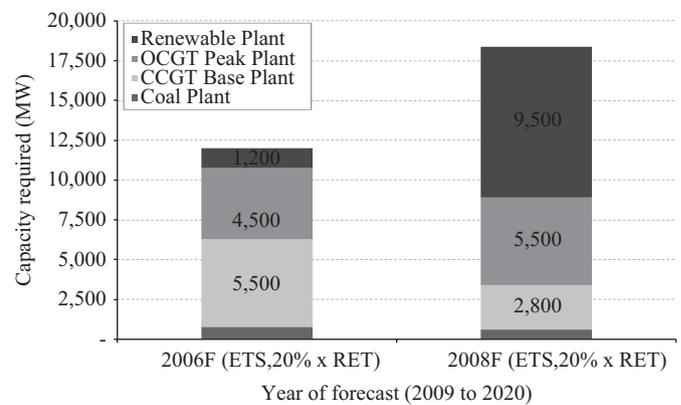


Fig. 2. Forecast of new generation plant from 2009 to 2020 in the NEM. Source: AGL Energy Ltd., Simshauser (2010).

The pre-1997 renewable energy 'baseline' production level primarily represents output from conventional utility-scale hydro schemes such as the Snowy Mountains, Victorian Alps, North Queensland and Tasmanian hydroelectric schemes. The MRET required an additional 9500 GWh of production from new (post-1997) renewable sources, or 'above-baseline' improvements from the existing (i.e. pre-1997) fleet. Actual renewable generation between FY98 and FY09 is also marked in Fig. 1 (i.e. diamond-shaped labels) and illustrates that in all years, the regulated incremental demand target was met.

The RET requires an additional 45,000 GWh. The tenor of this target was originally planned to decline from 2025, but was extended out to 2030 just prior to being introduced into parliament. The aim of this was to ensure that regulated market demand would have sufficient tenor to assist the 'banking' of projects. This final-minute adjustment to the RET legislation was a subtle but critical indication that scheme designers were sensitive to the fundamental requirements of investors, the importance of which will become clearer later in this article. The implications for future investment patterns in the NEM between 2009 and 2020 are illustrated in Fig. 2. Two investment scenarios are presented; the first examining the plant stock with the original 2% MRET target and the second incorporating the 20% RET. As noted in Simshauser (2010), the investment task has increased from \$17 billion to \$32 billion, with renewable generation increasing from about 1200 to about 9500 MW of additional capacity.

3. On Resource Adequacy in energy-only markets

The concept of Resource Adequacy, that is, the potential for insufficient generating plant capacity relative to aggregate power system demand, is well understood in energy economics (de Vries, 2002; Besser et al. 2002; Oren, 2003; Peluchon, 2003; Bidwell and Henney, 2004; Neuhoff et al. 2004; de Vries et al. 2004; Wen et al. 2004; Bushnell, 2005; Roques et al. 2005; Cramton and Stoft, 2006; Joskow, 2006; Simshauser, 2008; Finon, 2008 amongst others). The primary issue here is not that plant will not eventually be built, but whether or not it will arrive on a timely basis to maintain reliability of supply, and the common thematic in the academic literature is that prices in energy-only markets are inherently unstable at the wholesale level because generators are only paid for what they produce (i.e. there are no capacity payments to cover the heavy fixed costs of the power station fleet). Prima facie, this may appear to be no different to other commodity markets such as aluminium, where no fixed payments exist. But electricity markets differ from other capital-intensive commodity markets such as aluminium in that

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