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## **International Experience of Vertical Integration in the Electricity Sector**

A Report for AGL Energy Ltd

22 November 2017

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## Executive Summary

In this report, I discuss the reasons for firms to become vertically integrated and the implications for related markets, both in general and in the electricity industry.

Vertical integration means that the co-ordination of activities “vertically” within a supply chain is combined *within* a single firm, rather than being arranged *between* multiple firms through markets and contracts. In deregulated electricity markets, for instance, it is common to find that generators are vertically integrated with energy retailers, despite the existence of markets that allow generators to sell their output to retailers.

Because vertical integration replaces market transactions, at least to some degree, energy regulators in Australia and other countries have expressed concern about its impact on competition. Some have assumed that vertical integration stunts the growth of contract markets and thereby hampers competition. In response, they have tried to increase the liquidity of contract markets by imposing obligations to trade on energy companies, as a means of promoting competition. In this report, I explain why this type of analysis is faulty and also why measures to promote liquidity have proven to be ineffective and perhaps even counter-productive.

### Summary

- Vertical integration of electricity generators and retailers has occurred in deregulated electricity markets as a competitive response to underlying market conditions.
- Regulators have expressed concern about the possible impact of vertical integration on competition. Their two main concerns around vertical integration are;
  - Low liquidity of decentralised markets in electricity contracts; and
  - Limited access to “hedging” contracts for managing risks.
- However, vertical integration is not in itself a cause of these problems or a threat to competition. Indeed, vertically integrated energy companies can be as competitive as stand-alone companies, or even more competitive, due to their cost advantage. There is no evidence that vertical integration leads to higher bid prices.

Furthermore, regulations intended to promote liquidity, such as trading obligations, can be ineffective or even counterproductive. Vertical integration does not completely solve the misalignment between a company’s production and sales. Even integrated generation and retail businesses face separate and independent risks. Vertically integrated firms therefore continue to trade in short-term markets. International experience shows that some obligations to trade or to promote liquidity have not increased trade volumes, but merely shifted them into regulated products. The additional regulation may then depress liquidity.

### Causes of Vertical Integration

Since vertical integration is an alternative to using contracts, it occurs where underlying market conditions make it difficult or expensive to arrange and enforce a contract. Vertical integration then offers a lower cost, or more efficient and more competitive way of

organising production. Vertical integration is a competitive response to adverse market conditions.

Various factors can drive firms towards vertical integration. In underdeveloped markets, generators acquire retailing businesses because they are afraid that otherwise they will be unable to dispose of their output. That fear may have accelerated the tendency towards vertical integration when the British electricity market was reformed in 2001. However, that fear seems to have receded somewhat since contract markets have emerged. It need not arise at all in electricity markets that offer open access to a short-term market or “power pool”, as in Australia.

Risk management provides a more common reason for generators and retailers to become vertically integrated. Managing risks through standard contracts can be difficult or expensive because of electricity market design features like “dual cash-out prices” or unpredictable outputs from hydro or renewable sources.<sup>1</sup>

### **Vertical Integration and Competition**

Vertical integration *per se* does not reduce electricity market competition. It is a competitive response to market conditions and allows generators to share the opposing risks around spot price fluctuation. It does not affect the overall balance of supply and demand between generators and retailers so there is no reason why it would affect the competitive price.

Indeed, vertical integration may strengthen competition. Competing firms adopt vertical integration to gain an advantage over their rivals; standalone firms stay in business by finding some other source of efficiency, such as a lower cost way of providing customer service. Overall, therefore, vertical integration tends to drive down costs and prices to consumers.

International evidence shows that vertically integrated energy companies can be just as competitive as stand-alone companies. There is no evidence that vertically integrated companies trade less than standalone companies, or that vertical integration leads to generators offering higher prices. In a recent analysis of the Australian National Electricity Market (NEM) by Frontier Economics,<sup>2</sup> the authors found no statistical evidence that the trend towards vertical integration was leading generators to bid higher prices and concluded that “vertically integrated generators in fact behave more competitively on average than when they were operating as stand-alone generators.” These conclusions are consistent with the economic theory of vertical integration in electricity markets, and also with my own experience of vertical integration in the electricity markets of other countries.

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<sup>1</sup> Traders cannot “share” price risks if they face different prices. Standard “firm” contracts for fixed volumes can mitigate price risk, but not quantity risk.

<sup>2</sup> Frontier Economics (2017), *Effects of Vertical Integration on Capacity Bidding Behaviour: A Report Prepared For Herbert Smith Freehills*, August 2017.

## Vertical Integration and Liquidity

Vertical integration does not necessarily reduce electricity market liquidity.

Liquidity is a complex matter and markets only become liquid if a number of underlying conditions are met. To create a need for frequent trading, new information about changes in supply and demand must repeatedly enter the market. To encourage the participation of financial traders (i.e. those with no physical position in production or consumption), the market must possess a competitive market structure and be free of actual or threatened regulation. Some commodities (e.g. oil, metals and agricultural products) support liquid markets, but few (if any) wholesale electricity markets could ever meet these conditions.

Most electricity markets do not provide the impetus for liquid trading, because the relevant changes in information about supply and demand happen too infrequently or too late (for markets trading a quarter, a month, or even a day ahead of delivery) to promote much trade. The threat of regulation hangs over most electricity markets, even when they are operating competitively. Attempts to foster simple measures of liquidity in electricity markets, such as the volume traded on particular markets, have therefore been ineffective, because they have no impact on these underlying conditions (or aggravate the situation). Nevertheless, electricity industries that do not support a liquid trade in contracts can still operate competitively in the markets for generation and retail supply to customers. Even a market that is not very liquid can still give generators and retailers access to the contracts they require to hedge their output or retail load.

Liquidity depends on a number of underlying conditions, but varies independently of the level of vertical integration. The lack of a clear relationship between vertical integration and liquidity is due to the way vertically integrated firms manage their risks. They may allocate some of their forecast generation output to their in-house retailing business, but this initial allocation does not materially affect the total volume of trading. Trading is driven by circumstances changing in the market, at which point firms have to re-optimize their contract portfolios. The need for such changes applies to vertically integrated firms, as well as to standalone businesses.

For the most part, the circumstances facing any generation business change independently of the circumstances facing a retail business.<sup>3</sup> Even in vertically integrated firms, therefore, generator business will submit orders to trade at different times from their affiliated retail businesses, and for different amounts. Vertically integrated firms therefore continue trading to address the separate commercial needs of their generation and retailing businesses (even if they pass all such orders through a single wholesale trading unit, for the sake of efficiency and to take advantage of profitable opportunities outside the firm). As a result, the market impacts from the trading activities of generation and retailing businesses within vertically integrated firms are very much like those of standalone businesses.

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<sup>3</sup> Changes in the weather forecast may change expected generation and expected demand in the same direction, but individual firms will not usually see their expected generation change by the same amount as their expected demand.

Forcing vertically integrated firms to trade like standalone businesses therefore has little or no impact on liquidity. In practice, the same market conditions that prevent liquidity from emerging also cause vertical integration in electricity markets. Obliging electricity firms to trade a particular type of contract does not overcome these obstacles to liquidity. Implementing such measures in Britain and New Zealand has not increased either liquidity or competition.

### **Vertical Integration and Access to Hedging Contracts**

In a liquid electricity contract market, the volume of energy traded is a multiple of the physical volume generated and consumed. As explained above, not all electricity markets can ever reach this standard, but standalone generators and retailers need access to a volume of hedging contracts roughly equal to their physical output or sales. Once they possess such contracts, they may or may not engage in further trading. If they cannot gain access such contracts, they will be unable to hedge commercial risks or to compete effectively.

Vertically integrated firms do not deny standalone generators and retailers access to hedging contracts, if they still need to trade. However, in certain special circumstances, energy regulators have decided that vertically integrated firms are selling or buying too few contracts to give their competitors access to hedging, and that such behaviour is anti-competitive. The regulators have then forced these firms to sell particular types of contract at regulated prices. Such measures are not justified by the existence of vertical integration alone, but by a combination of circumstances. The combination of circumstances that led to such policies in Ireland, for instance, do not apply in Australia. It would therefore take more than vertical integration to justify the adoption of similar policies in the National Electricity Market.

# 1. Introduction and Summary of Conclusions

## 1.1. Terms of Reference

My name is Graham Shuttleworth. I studied economics in the United Kingdom, gaining a bachelor's degree from Cambridge University and a master's degree from Oxford University. I have worked on electricity markets around the world for nearly thirty years, starting in 1988 with the design of the Electricity Pool for England and Wales. My projects have included advice on electricity market design, regulatory rules for electricity markets, mergers and acquisitions and competition policy as applied to company structure and behaviour in electricity markets. This type of work, and its equivalent in the gas sector, has taken me to many countries within Europe, but also to the United States, Latin America, Asia, Australia and New Zealand.

Acting for AGL Energy Limited, Herbert Smith Freehills (HSF) has asked me to compile a report outlining my general views on the efficiency (or otherwise) of vertical integration and applying them to the Australian market for electricity. HSF also asked me to review the results of some analysis set out in a report by Frontier Economics and to opine as to whether the conclusions in the Frontier report are consistent with my views on the economics of vertical integration.

## 1.2. Outline of Report

In this report, I begin (chapter 2) by explaining the economics behind vertical integration<sup>4</sup> – why producers choose to coordinate different parts of a supply chain by bringing them into one firm, particularly in order to manage risks more effectively or at lower cost. I show therefore how vertical integration is a competitive response to external conditions and how it reduces costs and lowers prices to consumers.

I discuss the implications of vertical integration for contract markets. First, I consider its impact on the ability of other firms to gain access to hedging contracts, so that they can also manage price and volume risks. Second, I discuss the liquidity of electricity contract markets in general, and the impact of vertically integrated companies.

Analysis of the conditions facing electricity producers and retailers suggests one cannot expect liquid markets to thrive under any company structure, a conclusion borne out by my experience. Whenever I have worked with vertically integrated energy companies, I have found that they do not necessarily trade any less than non-integrated (“standalone”) companies, because of the way different risks affect each part of the business.

I also discuss the implications of various regulatory responses to vertical integration (chapter 3), particularly regulatory interventions intended to promote contract trading. I note the tenuous relationship between vertical integration and liquidity, and show how attempts to promote liquidity are often ineffective, or even counter-productive. I identify a second policy, obliging some companies to make a one-off sale of contracts, in order to give other

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<sup>4</sup> The term “vertical integration” in economics refers to a firm’s ownership of its supply chain, so that the task of co-ordinating activities vertically within a supply chain, is combined *within* a single firm.

companies access to hedging products. I note the special circumstances that gave rise to such policies, and that such obligations have been considered and rejected when they would harm competition.

These observations are borne out by my experience of vertical integration (summarised in chapter 4). In that chapter, I discuss responses to vertical integration in the electricity sector that were proposed or actually implemented by regulatory agencies, using examples from Great Britain, the Netherlands, New Zealand and Ireland. Each of these examples supports the view that vertical integration is a competitive response to market conditions, and that regulatory interventions to “overcome” the effect of vertical integration on competition, e.g. by trying to promote liquid contract markets, can be counter-productive.

### **1.3. Related Statistical Analysis**

In the course of writing this report, I reviewed an analysis of the Australian National Electricity Market (NEM) prepared by Frontier Economics for Herbert Smith Freehills.<sup>5</sup> The report shows the results of some regressions, i.e. equations based on statistical analysis, which link each generator’s pricing behaviour in the NEM to the state of the market, as defined by: the level of spare generation capacity; ownership structures and the degree of vertical integration; and the generator’s fuel type (a broad proxy for variable costs). On request, Frontier Economics sent me the results of a great many more regressions, in which one or more variables had been omitted, to investigate the specific impact of the remaining variables. These additional regressions confirmed the conclusions about vertical integration and competition that are stated in the report.

In particular, the authors found that “vertically integrated generators in fact behave more competitively on average than when they were operating as stand-alone generators.”<sup>6</sup> They also found no statistical evidence that the trend towards vertical integration was leading generators to bid higher prices. Prices in the NEM have risen recently, but the authors concluded that “the most important contributor to a change in bidding behaviour that causes prices to rise was the declining quantity of reserve generation capacity in the NEM.”

The conclusions of Frontier Economics are therefore consistent with the economic theory of vertical integration in electricity markets, as set out below, and with my own experience of vertical integration in the electricity markets of other countries.

### **1.4. Summary of Conclusions**

My conclusions, as summarised below, are derived from the analysis in chapters 2 to 4 and explained in more detail in chapter 5.

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<sup>5</sup> Frontier Economics (2017), *Effects of Vertical Integration on Capacity Bidding Behaviour: A Report Prepared For Herbert Smith Freehills*, August 2017.

<sup>6</sup> In many of the regressions, a higher degree of vertical integration at a specific electricity firm was associated with a negative (and statistically significant) effect on that generator’s bid prices, taking all the other factors into account. A higher degree of vertical integration in the market as a whole was sometimes associated with a positive impact on prices, but these effects were by and large statistically insignificant, meaning that no weight can be placed on this observation.

#### **1.4.1. Economics of vertical integration**

- Vertical integration is an alternative to coordinating the supply chain through markets and contracts.
- In electricity markets that lack the conditions required to foster liquid contract markets, vertical integration is an efficient competitive response to risk, which reduces the cost of risk management.
- Vertical integration therefore reduces costs throughout the market and puts downward pressure on prices to consumers.

#### **1.4.2. Competition**

- Vertical integration *per se* does not diminish competition or increase market prices.
- The conclusions of the report by Frontier Economics on vertical integration within the NEM are consistent with the economic theory of vertical integration in electricity markets, and also with my own experience of vertical integration in the electricity markets of other countries.

#### **1.4.3. Liquidity**

- Increased vertical integration does not necessarily reduce liquidity in contract markets.

#### **1.4.4. Access to Hedging**

- In some markets, a specific combination of circumstances prevents some generators and retailers from gaining access to hedging contracts, causing regulatory concern.
- In practice, such a combination of circumstances is rare; it does not apply in Australia.
- Vertical integration by itself does not provide grounds for concern in this respect, because competing firms have an incentive to trade contracts even if they are vertically integrated.

## 2. Economics of Vertical Integration

Vertical integration is not limited to the electricity industry. Firms<sup>7</sup> integrate vertically in many competitive markets, because competitive pressure drives them in that direction. In these markets, vertical integration is a competitive and efficient response to some underlying problem that can only be solved less efficiently (if at all) by other means, such as contracts.

The potential efficiency gain from vertical integration derives from the ability to reduce transactions costs. Among other benefits, vertical integration may lower the cost, or improve a firm's ability: (1) to dispose of output or to secure supplies of some item; or (2) to control the quality of inputs or of downstream services (like customer service); or (3) to manage price or quantity risk. Contracts can play a role in achieving these aims, but offer a less efficient solution if the transactions costs of using contracts are high.

### 2.1. Disposing of Output and Securing Supplies

In the electricity sector, the existence of a centralised “spot market”<sup>8</sup> that matches least-cost generation with total demand (1) removes any obstacle to the disposal of (economically priced or “in-merit”) generation and (2) enables retailers to secure a supply of electricity for their customers at any time. The situation differs in electricity systems that rely on individual market participants to schedule generation that matches contract obligations, such as the British Electricity Trading and Transmission Arrangements (BETTA). Before the introduction of BETTA in 2001 (as the “New Electricity Trading Arrangements” or “NETA”), Britain operated a centralised day-ahead market with many stand-alone generators and retailers. Electricity companies responded to BETTA by increasing the degree of integration between generation and retailing, in part because of the fear that generators might need a “captive” retailer to take their output. The existence of reasonably efficient markets for electricity contracts helps to mitigate that fear.<sup>9</sup>

### 2.2. Quality of Service and Security of Supply

Some electricity companies bring specific services in-house (e.g. maintenance or customer service), to reduce the transaction cost of managing the service and/or to improve their control over its quality. In these cases, managing a service within the firm is cheaper or more efficient than arranging that service through a contract with another firm. However, quality control does not explain the vertical integration of generators and retailers, as the trade between them concerns a standard commodity (i.e. wholesale electricity).

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<sup>7</sup> A “firm” is any corporate entity that operates under a single, coordinated management structure. It may consist of many separate companies, such as holding companies and subsidiaries, incorporated in different legal formats.

<sup>8</sup> Here, a spot market means the last market before final delivery in which all generators can sell their output to other traders (either directly or through an exchange or pool). It may run in real time, or anything from an hour to a day in advance of delivery. After this spot market closes, trading may continue, with generators and retailers buying or selling output to balance the system. Such trades take place at the discretion of the system operator, which acts as the sole counterparty for all such trades.

<sup>9</sup> Electricity firms' fear – that they might fail to dispose of, or to secure, supplies – has receded since 2001, following the emergence of contract markets. However, these contract markets are still not fully liquid, giving some residual benefit to vertical integration.

The quality of electricity service to consumers is measured by security of supply (i.e. the frequency and duration of interruptions to supply) and the quality of the current delivered at the point of connection. These outcomes are primarily a matter of network design and operation, in which vertical integration between generation and retailing again plays no role.

Security of supply ultimately depends on the construction of adequate generation capacity, which can be arranged either within vertically integrated firms, or through contracts between generators and retailers. In practice, compared with standalone retail businesses, vertically integrated firms may be better able to invest in generation (because they are already familiar with the generation business). They may also have a stronger incentive to invest in generation (to avoid the regulatory and political criticism they would face during a shortage). However, these effects are a consequence of vertical integration, but do not cause it. In the short-term, vertical integration between generators and retailers on its own offers no advantage for security of supply, as long as central dispatch or short-term trading efficiently directs the available generation output towards the demand of all consumers.

Thus, quality control and related concepts may encourage integration of some parts of the electricity industry, but not necessarily of generation and retailing.

### 2.3. Risk Management

Managing price and quantity risk is a general problem for firms in the electricity industry. Electricity spot prices fluctuate widely and unpredictably, because of variation in demand, fuel costs, capacity margins, and because of regulatory interventions. Trading all electricity at spot prices would leave generators exposed to huge variation in their revenues (and to the risk of not covering their fixed costs). It would also leave retailers exposed to huge variation in their costs (and to the risk of procurement costs rising above the prices at which they sell electricity).

When *price* risk affects generators and retailers to an equal extent, but in opposite directions, they can manage the risk by signing contracts with fixed prices. However, designing such contracts is difficult, or even impossible, if both parties face markedly different prices. Such price differences have arisen from time to time, for surpluses and deficits (e.g. in BETTA) or between different locations (e.g. within New Zealand and, to an extent, within Australia).

Moreover, contracts with fixed prices and quantities will not manage the *quantity* risk faced by both vertically integrated and standalone firms, due to unpredictable variation in the level and pattern of generator output and/or customer demand. Indeed, signing contracts with fixed prices and quantities might then increase each party's exposure to risk. Option contracts can help manage quantity risk, but it may be costly to find a form of option contract that suits more than one market participant, relative to the cost of managing uncertain outputs within a vertically integrated firm.

Thus, certain aspects of market design (multiple prices) or underlying risks (especially unpredictable quantity risks) can make risk management by contract expensive or impossible. In such conditions, generators and retailers may turn to vertical integration as a lower cost or more efficient method of risk management.

## 2.4. Transactions Costs

In principle, firms that perform different roles in an industry, like generators and retailers, can coordinate their activities vertically within a supply chain by writing contracts between firms, instead of combining their activities within one firm. However, as the examples above show, arranging a contract incurs costs – the so-called “transaction costs” of searching for a seller or buyer, of agreeing the terms of the contract, of monitoring performance of contract obligations and of enforcing the contract (including the cost of managing and financing credit control). Contracting is therefore a potentially expensive way to coordinate different activities within a supply chain.

An alternative is to achieve the same degree of vertical integration by managing the two activities within one firm. That approach also has costs and benefits, as shown in Table 2.1. In a competitive market, firms will choose whichever approach offers the best combination of costs and benefits, so that they can compete most effectively to supply customers.

**Table 2.1**  
**Costs and Benefits of Vertical Integration by Management and by Contract**  
**(Illustrative Examples)**

Management Within a Firm		Contracting Between Two Firms	
Benefits	Costs	Benefits	Costs
1: Direct and low-cost communication of requirements	1: Inefficient production, not guided by market prices or competition among multiple providers	1: Ability to select the least-cost source of supply from competing providers	1: Search costs of locating a potential contract party
2: Direct and low-cost observation of performance	2: Management superstructure, including higher levels	2: Clear, written definition of output specifications	2: Costs of defining and agreeing detailed output characteristics and other terms
3: Removal/avoidance of “double marginalisation” <sup>10</sup>	3: Inefficient long-distance coordination of activities via large bureaucracies, leading ultimately to loss of control	3: Separate, specialised and local management of production processes	3: Financing cost of risk management (“credit control”)
4: Swift resolution of disputes (“misunderstandings”)			4: Expensive (“adversarial”) dispute resolution procedures

<sup>10</sup> If two businesses in a supply chain both use their market power to charge a mark-up, merging them into one vertically integrated business has the benefit of replacing a double mark-up with one mark-up. However, if either or both of the businesses have no market power to begin with, there are no double mark-ups to eliminate, and no such benefit to vertical integration.

Table 2.1 illustrates that the choice between vertical integration and contracting is a complex one, and depends on many factors. However, it also indicates how vertical integration can be the efficient response to market conditions if the costs of contracting, on the right-hand side of the table, are particularly high.

## **2.5. Implications for Electricity Markets**

When vertical integration is the efficient response to underlying conditions in the electricity industry, it creates companies that are able to offer generation and retailing services at a lower cost than two standalone businesses integrated by contract. Competition among vertically integrated firms can then drive prices down to a level that would be impossible without vertical integration. Standalone generators and retailers may be able to set prices above that level for a while, if they have higher costs. However, such market outcomes are not sustainable if vertically integrated firms are able to operate at lower cost.

Thus, if standalone firms want to compete with firms that are benefiting from vertical integration, they have to find equivalent efficiencies from other sources. In this way, vertical integration drives efficiency throughout the market and drives down prices for consumers.

### 3. Regulatory Concerns over Vertical Integration in Electricity Markets

In many electricity markets, vertical integration between generation and retailing is a long-standing condition which raises no new issues for either competition policy or regulation. Indeed, in 1996, my NERA colleague Sally Hunt and I predicted that vertical integration would be a natural outcome of opening up electricity markets to full retail competition.<sup>11</sup>

However, the tendency for separate generation and retailing businesses to move towards vertical integration has led some regulators – particularly in energy markets that have recently been restructured – to express concern about related matters. A particular focus is the impact of vertical integration on contract markets. In my experience, these concerns are often overstated and remedial measures have been ineffective or even counter-productive. However, increasing vertical integration, and its associated efficiencies, is part of a competitive process that favours some companies over others. As such, it is bound to meet resistance from companies that are not – or that cannot become – vertically integrated. Some criticism of the trend towards vertical integration is therefore to be expected (whether it is justified or not).

Since vertical integration replaces contracts *between* firms with management *within* a firm, it prompts concern over two topics which, although often confused, are in fact distinct:

- (1) *access* to contracts for managing risks (“hedging”); and
- (2) the *liquidity* of decentralised markets in electricity contracts.

Indeed, the ACCC’s recent retail electricity inquiry interim report<sup>12</sup> refers both to access and to liquidity, but without necessarily noting that they are two separate issues.<sup>13</sup>

I define and discuss these two topics separately below.

#### 3.1. Access to Hedging

Vertical integration replaces a market transaction with internal coordination, but it does not change the balance of supply or demand for the physical product or service in question (here, wholesale electricity). In a competitive market, therefore, vertical integration by itself should affect the market price for that product or service. Similarly, it does not diminish the ability of standalone generators and retailers to acquire the contracts they need to hedge price risk.

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<sup>11</sup> S. Hunt, G. Shuttleworth (1996), *Competition and Choice in Electricity*, John Wiley & Co, England, 1996. See page 68: “In Model 3 [i.e. monopoly retailers], there was a conflict between being a generator and being a [retailer(\*)], because of the potential self-dealing... However, in Model 4 [i.e. full retail competition] there is no longer a self-dealing issue... In fact, there is reason to suppose that there is a natural integration of generation and sales to final customers.”. (\*) Note: This section of our book distinguishes between generators and “Distcos”, but the context makes it clear that the term “Distco” means a retailer, whether or not it owns a distribution network.

<sup>12</sup> ACCC (2017), *Retail Electricity Pricing Inquiry: Preliminary report*, 22 September 2017.

<sup>13</sup> The report refers to them occasionally as if the terms were interchangeable, e.g. at page 103. There, the ACCC notes [emphasis added] “Limited **access** to hedging products appears to be a significant concern in South Australia. The ACCC is also aware of at least one retailer which has chosen not to enter SA due to contract **liquidity issues**. A number of retailers have indicated to the AEMC that there is **limited access** to competitively priced risk management products, and that this is a barrier to entry, particularly in South Australia.” ACCC (2017), page 103.

- If total forecast generation and total forecast demand are both  $X$  units, then in a risky, competitive market with no vertical integration, generators will want to sell contracts to cover  $X$  units of output and retailers will want to buy contracts to cover  $X$  units of retail sales. The contract market is balanced, in as much as supply equals demand.
- If one firm becomes vertically integrated, so that its generator assigns  $V$  units of its output to its affiliated retailer, that still leaves generators wanting to sell  $X$  minus  $V$  units by contract, and retailers wanting to buy  $X$  minus  $V$  units. The contract market is still balanced, as before.

Vertical integration between upstream and downstream businesses within a supply chain withdraws an equal amount of supply and demand from both sides of the market. Supply and demand remain in the same balance as before and there is no reason for the competitive price to rise. Vertical integration in and of itself has no implications for access by standalone companies to contracts for hedging.

Even if competition in a market is imperfect, vertical integration need not in practice withdraw any net supply from the market or provide any reasons for prices to rise. In my experience, even vertically integrated firms remain engaged with the market; if and when the opportunity arises, they buy up any sources of production with lower costs than their in-house generation, and they sell to customers bidding higher prices than their own retail business. Hence, just combining two businesses into one firm does not affect its net supply to the market or its impact on competition.<sup>14</sup>

Of course, contract markets may operate imperfectly in some conditions. However, as the examples in Chapter 4 demonstrate, regulators tend to express concern over access to contract hedging opportunities for reasons other than vertical integration.

### 3.2. Liquidity in Contract Markets

The other commonly expressed concern over vertical integration arises from its potential impact on liquidity, particularly in markets trading contracts with a short duration (one year or less). Again, my experience suggests that these concerns are misplaced and that remedies designed to address them are ineffective or counter-productive.

Liquidity is a difficult concept to define or measure, but generally refers to a situation where traders can enter a market at any time to make a transaction (i.e. a sale or purchase) at the prevailing market price. In the electricity industry, liquid short-term markets offer two main advantages: they allow small firms to adjust their contract portfolio as their forecast production and sales change (“risk management”); and they produce market prices which act as a guide to efficient operations (“price discovery”).

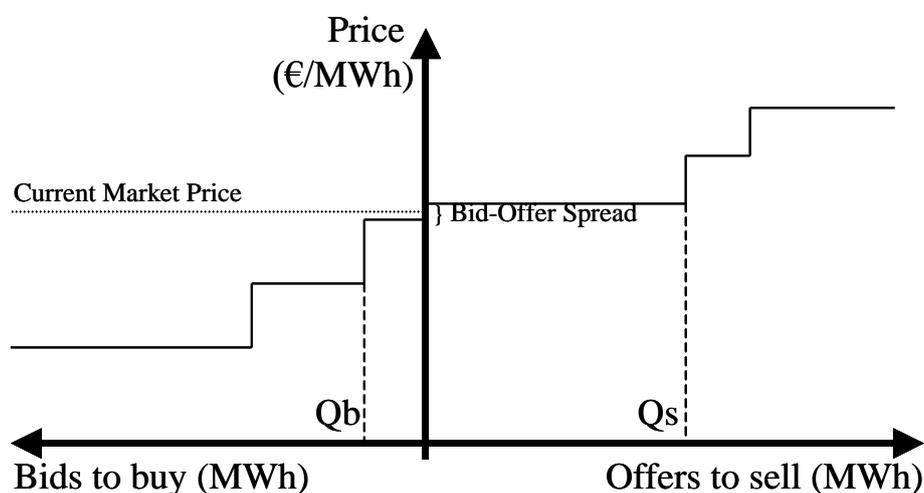
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<sup>14</sup> A good example of vertical integration is found in owner-occupied housing. People who live in houses that they own are acting as both landlord (owner) and tenant (occupant), vertically integrating two roles. However, leaving aside market imperfections like taxes, moving costs and landlord-tenant laws, this form of vertical integration does not *in and of itself* diminish competition in the market for rental houses, compared with a situation in which more occupants rent houses from landlords.

As a proxy for liquidity, analysts may collect data on the volume of trade (based on the assumption that large volumes can absorb additional trades with ease), on the volume of contract offers and bids (“market depth”), and/or on the narrowness of trading margins (i.e. on the “spread” between the price of offers to sell and the price of bids to buy). Figure 3.1 and the attached text explains how these market characteristics affect the pricing of electricity contracts and market liquidity.

However, none of these proxy variables defines liquidity, or provides a complete measure of liquidity. Mandating an increase in such a proxy will not necessarily increase liquidity. In practice, liquid markets emerge as the product of favourable underlying conditions, which such regulatory interventions would only harm.

**Figure 3.1**  
**Illustration of Market Depth**



**Spreads:** In the figure above, offers to sell are shown to the right of the central axis, whilst bids to buy are shown to the left. The lowest price offer is more expensive than the highest price bid. The difference between them is the “spread” (variously, **bid-offer spread** or **bid-ask spread**), which provides a margin for traders and brokers. Wider spreads tend to discourage trading and to indicate less liquid markets.

**Market Depth:** The lowest price offers cover the volume  $Q_s$  on the right hand side, beyond which quoted prices start to rise. The highest price bids cover the volume  $Q_b$  on the left hand side, beyond which quoted prices start to fall. These changes in quoted prices may reflect imperfections in the market, or else just differences in the cost of production from different sources (e.g. the fuel costs at different generators). Small trades – purchases up to  $Q_s$ , sales up to  $Q_b$  – can be made at the prices being offered and bid at present. However, larger sales would exhaust the volumes available at these prices and shift the price to a new level. The gap between  $Q_b$  and  $Q_s$  indicates the “depth” of the market, i.e. traders’ ability to buy and sell at current market prices.

### 3.2.1. Conditions for liquidity

Liquidity is the *outcome* of a competitive market process, and it can be discouraged by regulatory interventions. It is not a pre-condition for competition that can be imposed by regulation. Liquid markets emerge:

- (1) because many traders need to buy and sell contracts of a particular kind on a regular basis (i.e. they frequently see conditions changing unpredictably);
- (2) because prices for those contracts are determined by competitive processes (not by dominant players or by regulation); and
- (3) because financial institutions are prepared to enter the market on a speculative basis (adding market depth and volume).

Electricity markets may spawn liquid contract markets, but are often un conducive to the conditions listed above, even in competitive conditions:

- (1) At a fundamental level, the flow of information into electricity markets may be too little or too late to prompt frequent trading;<sup>15</sup>
- (2) Electricity markets rarely operate without regulation or the threat of regulatory intervention and reforms; and
- (3) Actual or threatened regulation discourages financial institutions from entering the market (as would unregulated problems with competition).<sup>16</sup>

For these reasons, it would be wrong for regulators to demand that every electricity industry produces a vibrant and deeply liquid contract market. International experience of such markets has indeed been disappointing.

### 3.2.2. Impact of VI on liquidity in electricity markets

Despite the natural limits on the potential for liquid contract markets in any electricity industry, some regulators have identified vertical integration as a barrier to liquidity. In response, in order to boost liquidity, they have imposed, or have considered imposing, some additional duty on vertically integrated electricity companies, such as an obligation to trade on short term contract markets (a “trading obligation”), or at least to post offers and bids on such markets (a “market maker obligation”). The intention of such obligations is to increase liquidity, and hence to assist hedging and to promote competition. As illustrated by the

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<sup>15</sup> The failure of a generator plant (an “outage”) provides an interesting case to illustrate these points. From time to time, any generator may fail (“trip”) and its output fall to zero. When that happens, it is too late in many electricity markets to replace the generator’s output with a contract, because the trading has closed and the immediate shortfall must be treated as an imbalance. The owner of the generator may search around for a replacement contract to cover the next few hours or days, whilst the outage lasts, but such events are too infrequent to form the basis for liquid trading. Looking further ahead, to the next month or quarter, the outage may have no impact on the trading of longer term contracts, since the owner will expect the fault to be repaired by that time and the generator to be running as expected.

<sup>16</sup> This point may seem obvious, although some commentators suggest that traders should simply “factor in” the risk of regulation. That suggestion is ill-informed, because regulation conveys an advantage to “insiders” which is not merely a risk. Any firm that is dominant, or any firm that is discussing a possible intervention with the regulator, possesses superior information about future prices, and therefore has an advantage over industry “outsiders” such as financial institutions. Outsiders will then shun the market because, without the benefit of the information available to others, they *expect* to trade at a loss.

discussion in Section 4.2 below, such obligations have usually proven ineffective or even counter-productive.

In my view, the lack of success of such obligations is attributable in large part to one significant factor: vertically integrated electricity companies already trade as many short-term contracts as standalone companies, so the obligations do not act as a binding constraint on them, and forcing additional trades would be nigh on impossible.

### **3.2.3. Trading strategies at vertically integrated generator-retailer companies**

In my discussions with the management of vertically integrated electricity companies in Europe, several have explained to me that the vertically integrated structure of their firm only supports an initial (internal) allocation of hedging contracts at the start of a trading year. (In the absence of vertical integration, it is likely that at least some of this volume would have passed from the generator to the retailer via contracts.) This initial allocation usually covers only a share of the forecast generation output (or retail sales) of that company. Because future generation output and retail sales are uncertain, traders must leave room to adjust the portfolio and to seek out other opportunities later.

This initial allocation of this share of output by vertically integrated firms, a year or so in advance of delivery, does not affect the ability of the electricity industry as a whole to support a liquid market in contracts. The degree of liquidity (i.e. the volume and depth of trade) in contract markets depends on how each generator and retailer interacts with shorter term markets after this allocation has taken place. In these markets, generators and retailers follow a similar trading strategy, whether or not they are vertically integrated.

The forecast pattern of a firm's generation output rarely matches the forecast pattern of its retail sales. Even if the total volumes are the same, their forecast timing (and value) will differ. After the initial allocation, even a vertically integrated firm has to engage in some trading over the next year or so, to compile and to maintain a portfolio of contracts that matches (1) forecast output and purchases to (2) forecast demand and sales. This trading tends to be spread out over a long period (to avoid reliance on the contract price prevailing at any one moment, and to avoid swamping the market with a large transaction) and to take place at unpredictable intervals (as traders pick the best times to enter the market). The intermittent nature of these sales is both a response to the illiquidity of the market (to avoid moving prices against the trader) and a hindrance to the emergence of a truly liquid market (since volumes traded on any one day or at any particular hour are small and unpredictable<sup>17</sup>).

Furthermore, the contract portfolio that the firm must compile does not remain constant. As the time of delivery approaches, various factors cause the firm's forecast of its generation output and the forecast of its retail sales to change *independently of each other*. Each change in one of these forecasts creates a need to adjust the firm's contract portfolio, to maintain its hedging, and so sends the firm into the short-term contract market. A rise or fall in forecast generation prompts the firm to make an offer to sell or a bid to buy, respectively. A rise or fall in forecast retail sales prompts a bid to buy or an offer to sell, respectively.

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<sup>17</sup> This condition holds even if trading concentrates around certain dates, like the start of a month, quarter or year.

Since forecast generation changes independently of forecast retail sales, a vertically integrated firm acts at this stage like two standalone companies, trading at some times on behalf of its generator business, and at other times on behalf of its retail business. Vertical integration is of little or no help at this stage and it does not affect the volume of trading.<sup>18</sup>

### 3.3. Implications for Electricity Markets

Vertical integration has sometimes led to concern over liquidity in electricity markets. However, it has relatively little impact on proxy measures of liquidity, let alone actual liquidity. Where the design of the electricity market allows hedging by contract, many vertically integrated firms continue to trade contracts as if their generation and retail businesses were separate. On the other hand, many other factors can prevent electricity markets from becoming liquid – particularly regulatory interventions.

For a number of theoretical reasons, therefore, it is unreasonable to expect “high” levels of liquidity in every competitive electricity market. It is also wrong to treat vertical integration as the cause of “low” liquidity.

In the following chapter, I explore the experience of vertical integration, based on a number of electricity markets of which I have first-hand knowledge.

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<sup>18</sup> Very occasionally, the generator business’s desire to sell (buy) a contract of volume X MWh may coincide with the retail business’s desire to buy (sell) a contract of a similar volume, Y MWh. In such – admittedly rare – cases, the firm’s wholesale trading office may identify an opportunity to match the offer and bid internally, at least up to the smaller of the two volumes X and Y, leaving the difference to be traded on the market. In practical terms, the rarity of such events means that they have little impact over overall market liquidity.

## 4. International Experience with Vertical Integration

In this chapter, I discuss several issues associated with vertical integration. In doing so, I draw upon my experience of working on vertical integration in particular electricity markets, namely: Great Britain, the Netherlands, New Zealand and Ireland. These examples each have individual lessons for observers from other markets, but they also exhibit common trends. In general, international experience suggests that many of the concerns expressed over vertical integration are without foundation. The lessons I draw from this experience are relevant to conditions in Australia.

### 4.1. Vertical Integration as a Competitive Response

Vertical integration can be present in a liberalised electricity market as the continuation of a previous company structure, as in Ireland and the Netherlands, but it can also emerge (and/or be retained) as an efficient competitive response to fundamental market conditions.

For instance, in Britain, the government introduced a new form of market in 2001 which imposed a punitive “dual-pricing” system on imbalances between production and contract sales or between contract purchases and retail sales. The punitive element of this pricing system greatly increased the cost of running an imbalance. It therefore strengthened the incentive to integrate generation and retail businesses (which reduces total imbalances) and it made survival as a standalone generator or retailer more difficult.

The British regulator has frequently considered measures intended to offset this disadvantage to standalone firms. The proposed measures either impose equivalent disadvantages on integrated firms, or they force integrated firms to offer some form of help to independent new entrants. Both forms of intervention in the market distort competition in ways that may not help consumers in the long run, rather than solving the underlying problem. The British regulator recently started to eliminate the punitive element of imbalance pricing (by moving to the European standard of a single imbalance price). Reliance on contract trading, rather than vertical integration, may therefore re-emerge as a competitive strategy.

In New Zealand, vertical integration has arisen as a topic of policy debate, but regulatory agencies there have recognised that problems in the market (such as large market shares in generation and low liquidity) stem from other causes and would not be solved by prohibiting vertical integration. Indeed, the government of New Zealand acknowledged that allowing vertical integration would be beneficial for efficiency and competition:

“Separating generation from retailing is unlikely to materially enhance competition in the wholesale and retail markets because:

- To the extent that generator market power exists in the wholesale market from time to time, vertical separation is unlikely to fix it
- Generators and retailers are likely to seek to replace their current arrangements through contracting (albeit at a higher cost and complexity compared to vertical integration).”<sup>19</sup>

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<sup>19</sup> NZ Cabinet Paper (2006), paragraph 98.

Detailed investigations of electricity market problems have therefore found vertical integration to be pro-competitive – i.e. a competitive response to underlying difficulties, which reduces costs and lowers prices to consumers.

## 4.2. Vertical Integration and Liquidity

In each of the case studies, regulatory debates have at some point focused on the relationship between vertical integration and liquidity in contract markets. These debates spring from the same two claims already mentioned: (1) that vertical integration diminishes liquidity; and (2) that, given vertical integration, measures to promote liquidity would enhance competition. In practice, these debates – and experience of measures imposed after the debates – show that both claims are incorrect.

With regard to the first claim, many electricity markets with vertical integration support as much liquidity, and operate just as competitively, as they would without vertical integration. They do so because the liquidity of an electricity market depends on the underlying conditions of supply and demand, and is not limited by the level of vertical integration.

As explained in section 3.2.1, liquid markets will not emerge if some players possess market power (i.e. large market shares), or if regulators and politicians intervene (or threaten to intervene) whenever prices rise. Even in perfectly competitive conditions, the risks to electricity prices and outputs may not prompt enough trading to provide liquidity. The competitive level of liquidity must be assessed for each market individually, and may be quite low.

Furthermore, there is little evidence that vertical integration between generation and retailing significantly reduces contract trading volumes, due to the separate trading by generation and retail businesses within a vertically integrated firm, as described in section 3.2.3 above.

Evidence of confusion about the link between vertical integration and liquidity can be found in the ACCC's preliminary report on the Retail Electricity Pricing Inquiry. There, the ACCC discusses the apparent lack of liquidity in South Australia:

“Limited access to hedging products appears to be a significant concern in South Australia. The ACCC is also aware of at least one retailer which has chosen not to enter SA due to contract liquidity issues. A number of retailers have indicated to the AEMC that there is limited access to competitively priced risk management products, and that this is a barrier to entry, particularly in South Australia. [footnote omitted]

Figure 3.11 clearly demonstrates the lack of liquidity in the South Australian market. It has only a very small volume of hedging contracts traded as compared to other NEM regions. The volume of hedge contracts traded in South Australia has averaged less than two-thirds of underlying market volumes, compared to trades more than double underlying market volumes in other regions.”<sup>20</sup>

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<sup>20</sup> ACCC (2017), *Retail Electricity Pricing Inquiry: Preliminary report*, 22 September 2017, page 103.

Figure 3.11 shows that annual contract trade volumes are less than annual NEM electricity sales (“electricity demand”) in South Australia. In comparison, New South Wales, Queensland and Victoria all achieve annual contract trade volumes that are about twice the level of annual NEM electricity sales in each state. These observations are set out in a section headed “Impact of vertical integration”, just below box 3.6 on “Vertical integration in NSW”. The clear implication is that the lack of liquidity in South Australia is due to vertical integration. However, the facts given by the ACCC do not back up this conclusion.

Earlier in the same section of the ACCC report, Figure 3.9 shows that vertically integrated retailers (as identified in the surrounding text) have similar market shares in New South Wales and South Australia. The total market share of the three largest retailers in the NEM (AGL, Origin and Energy Australia) is actually higher in New South Wales than in South Australia.<sup>21</sup> Yet Figure 3.11 in the ACCC report shows that New South Wales has a higher contract trade volume than South Australia (both in absolute terms, and relative to “electricity demand”). This evidence gives the ACCC no grounds for concluding that vertical integration reduces liquidity.

Both Australian and international experience provide other possible explanations for differences in liquidity. The ACCC notes that “Intermittent wind and solar generators typically play a limited role in the contract market, meaning that liquidity has reduced over time.”<sup>22</sup> South Australia has an unusually high proportion of wind-powered generation (43%) relative to the other NEM areas (0%-10%), and so would be expected to have lower liquidity. The explanation may lie simply in the provision of a feed-in tariff to renewable generators which insulates them from market price risk and reduces their incentive to hedge (a problem that has arisen in Ireland, in particular.) Even if the output of wind farms is eventually traded through the electricity market, unpredictable variation in the quantity of output makes hedging impossible with firm contracts (a problem in New Zealand, where information about hydro risks enters the market too late to permit hedging). Neither of these phenomena is connected with vertical integration.

Even though a decline in liquidity is not directly attributable to vertical integration, measures to promote higher volumes of contract trading have been implemented at various times in Great Britain and New Zealand as an “antidote” to vertical integration. (Such measures were considered in the Netherlands and in Ireland, but were rejected in both cases.) Curiously, the electricity markets sometimes held up as liquid and competitive by regulators in these cases (such as Nord Pool, Germany and even Britain) often have a high degree of vertical integration than the countries in question. In any case, the measures adopted in Great Britain and New Zealand have been largely unsuccessful in increasing the volume of contract trading, apparently managing only to shift trading volumes into the markets being promoted, and away from other markets.

Thus, vertical integration does not necessarily reduce contract trading and measures intended to restore the “competitive” level of trading have little or no impact. Vertical integration is a

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<sup>21</sup> In the main text on vertical integration, on page 102 of the report, the ACCC quotes figures for vertical integration by state, but these figures are not strictly comparable, since some refer to one company, others to groups of companies.

<sup>22</sup> ACCC (2017), *Retail Electricity Pricing Inquiry: Preliminary report*, 22 September 2017, page 118, referring to the Finkel Review of June 2017.

competitive response to underlying market conditions and produces the level of contract trading appropriate to those conditions.

### 4.3. Vertical Integration and Access to Hedging

Sometimes, beneath the discussion of vertical integration and contract markets, there lurks a related topic which is often confused with *liquidity*. That is the question of *access* to hedging products.

Neither generators nor retailers can survive in an electricity market for very long if they are fully exposed to the wholesale spot price. Vertical integration of generation and retailing allows the two businesses to “share” their (opposing) risks of spot price fluctuation. Signing contracts to hedge the spot risk provides an alternative solution for standalone generators or retailers (and for part of a vertically integrated firm). Liquid short-term contract markets help such firms fine-tune their contract portfolios as conditions change, but such trading is of secondary importance. Their primary need is a contract (or contract portfolio) in the first place. This need is not met by frequent re-trading of multiple contracts for the same energy (as required for a liquid market), but by the chance to obtain a single contract (for each unit of forecast output or sales) as a starting point for hedging.

If vertically integrated firms are looking for lower-cost sources of production or higher-priced sales, as suggested above, then independent generators and retailers will not face any competitive problem. In practice, large firms may be reluctant to sign contracts with small firms because of genuine concerns over creditworthiness. Regulators may then have to decide if competition would be enhanced and consumers would be better off, if they underwrote uncreditworthy competitors. To do so, regulators can force incumbent firms to bear the cost of financial guarantees required to trade with small firms, or they can ask markets and exchanges to spread such costs over all their members – but in either case the cost will be passed on to consumers. Such policies have little to do with vertical integration and are more concerned with finding ways to subsidise new entry (by potentially inefficient firms).

However, the Irish electricity market provides an example where the regulator could not take for granted the tendency for vertically integrated firms to offer contracts to other traders. The incumbent generator-retailer, ESB, is dominant in both sectors. It is also the only major electricity company in the Irish market to possess a surplus of generation over retail sales. The Irish market suffers from a substantial and chronic shortage of hedging contracts, because of the large volume of renewable generation that is covered by feed-in tariffs (and which therefore faces no market price risk). ESB’s competitors all have a deficit of generation and must therefore acquire at least some hedging contracts from ESB (even if they trade among themselves).

The Irish regulators therefore faced two problems. First, ESB was state-owned and under less pressure than other firms to manage its price risk by selling contracts for its surplus generation. Second, by deliberately withholding such contracts, ESB could put other retailers at a competitive disadvantage (a strategy known as “foreclosure” in competition policy). Retailers could not solve this problem through further vertical integration, given the chronic deficit of generation exposed to market price risk.

To overcome these specific problems, the Irish regulators force ESB to sell contracts of a particular type, at regulated prices – the so-called “Directed Contracts”. These contract sales allow other retailers to gain access to hedging contracts, either direct from ESB or by trading with other, more competitively minded, firms that have bought Directed Contracts from ESB.

Similar proposals had emerged earlier in the Netherlands, under the name of Virtual Power Plants or VPPs. The Dutch regulator noted that obligations to offer VPPs had been imposed in France and some other countries, but in conditions where state ownership and/or near-monopoly positions made it unlikely that the incumbent would offer such contracts voluntarily. Respondents to the consultation pointed out that similar conditions did not apply in the Netherlands and that in Dutch conditions the companies might be obliged to sell VPPs at low prices, which would harm competition, instead of enhancing it. The Dutch regulator eventually decided against imposing any obligation to issue VPPs.

The Irish regulators also considered forcing ESB and other large electricity firms to trade in short-term contract markets to promote liquidity. However, again, respondents to the consultation presented evidence that such policies would harm competition, in this case by increasing the deficits of the companies affected and exposing them even further to anti-competitive action by ESB. In the end, therefore, the Irish regulators have held back from imposing a trading obligation, pending observation of how new market arrangements will work.

The Irish decisions illustrate the difference between mandating (one-off) *access* to hedging contracts and promoting (repeated) contract trading to increase *liquidity*. Whereas other experience shows the ineffectiveness of measures to promote liquidity (as explained in the previous section), the Irish proposals show how measures to increase access may be beneficial, but only in very specific conditions. These conditions do not apply in the deregulated electricity markets of Australia.

#### **4.4. Implications for Electricity Markets**

These case studies illustrate the economics of vertical integration set out in chapter 2 and highlight the type of concerns about vertical integration listed in chapter 3. They also illustrate how vertical integration is a reaction to low liquidity, rather than a substitute for it. As a result, the measures to promote liquidity in these examples have had little or no effect, with the volume of trade remaining at or around the level that would have happened anyway.

## 5. Conclusions

The following sections show my conclusions, as derived from previous chapters.

### 5.1. Economic Reasons for Vertical Integration

Chapter 2 sets out the economic reasons why separate businesses integrate “vertically” (i.e. along the supply chain).

- Vertical integration is an alternative to coordinating the supply chain through markets and contracts.

Firms chose vertical integration when markets and contracts provide a less effective or more expensive way: (1) to dispose of output and procure supplies; (2) to ensure the quality of a product or service; or (3) to manage risks.

The need to coordinate production and procurement has sometimes encouraged vertical integration in the electricity industry, but only in electricity markets with no centralised spot market (or efficient central dispatch). A more widespread reason for vertical integration of generation and retailing businesses is to manage risks more efficiently.

- In electricity markets that lack the conditions required to foster liquid contract markets, vertical integration is an efficient competitive response to risk, which reduces the cost of risk management.

These cost reductions enhance the ability of vertically integrated companies to compete in the market. Standalone companies have to find equivalent efficiencies from other sources if they wish to remain in business.

- Vertical integration therefore reduces costs throughout the market and puts downward pressure on prices to consumers.

### 5.2. Regulatory Concerns about Vertical Integration

Chapter 3 discusses some of the concerns that regulators have expressed over the vertical integration of generator and retailer businesses and concludes that few of these concerns arise from vertical integration *per se*. (In the absence of vertical integration, it is likely that at least some of this volume would have passed from the generator to the retailer via contracts.)

#### 5.2.1. Competition

- Vertical integration *per se* does not diminish competition or increase market prices.

Vertical integration does not change the balance of supply and demand either in the “physical” market for wholesale electricity or in the market for hedging contracts. Indeed, in competitive conditions, the cost reductions made possible by vertical integration would reduce prices to consumers.

- The conclusions of the report by Frontier Economics on vertical integration within the NEM are consistent with the economic theory of vertical integration in electricity

markets, and also with my own experience of vertical integration in the electricity markets of other countries.

### 5.2.2. Liquidity

- Increased vertical integration does not necessarily reduce liquidity in contract markets.

The conditions for high liquidity are often absent from an electricity market, meaning that contract markets will be illiquid, whether or not generators and retailers are integrated. Indeed, vertical integration is often a competitive response to illiquidity. Moreover, vertically integrated electricity companies continue to trade short-term contracts in a manner broadly similar to standalone generators and retailers, because generator and retailer businesses within a vertically integrated firm face separate and independent risks. Liquidity then settles at the level determined by underlying market characteristics, not by the degree of vertical integration.

Electricity industries that do not support a highly liquid trade in contracts can still operate competitively in the markets for generation and retail supply to customers.

Some energy regulators have obliged vertically integrated firms to trade like standalone firms, through a variety of measures intended to promote liquidity. Since vertically integrated firms already apply trading strategies similar to those of standalone firms, one would expect these measures to have little or no effect on trading volumes. That prediction is confirmed by the experience of such measures. In the examples of Britain and New Zealand, these obligations seem merely to have shifted a given volume of trading into the products covered by the obligations.

### 5.2.3. Access to Hedging

- In some markets, a specific combination of circumstances prevents some generators and retailers from gaining access to hedging contracts, causing regulatory concern.
- In practice, such a combination of circumstances is rare; it does not apply in Australia.
- Vertical integration by itself does not provide grounds for concern in this respect, because competing firms have an incentive to trade contracts even if they are vertically integrated.

Vertical integration does not alter the balance of supply and demand in the market for hedging contracts, and so does not intrinsically harm competition. However, some combinations of circumstances can lead to certain generators and retailers being denied access to hedging contracts. As a result, they are unable to compete effectively.

Sometimes, energy regulators impose special contract trading obligations, when they have grounds to fear that one or more companies will hamper competition by withholding hedging contracts from their competitors. In Ireland, discussion of this problem revealed that the problem derives from a complex combination of circumstances and is not due to vertical integration – indeed, some of the firms that are unable to hedge are vertically integrated.

Fortunately, these combinations of circumstances are not widespread, and do not apply in the deregulated electricity markets of Australia.

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