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International review of market power mitigation measures in electricity markets

A report for the Australian Competition and Consumer
Commission

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Executive Summary

This report has been prepared at the request of the Australian Competition and Consumer Commission (ACCC) to assist in the current inquiry into the supply of retail electricity and the competitiveness of retail electricity prices. The ACCC has asked HoustonKemp Economists (HoustonKemp) to undertake a review of market power mitigation measures applied in electricity markets around the world. We understand that this is with a view to identifying potential remedies that could be applied in the Australian National Electricity Market (NEM), should the inquiry uncover concerns regarding the current operations of the market.

Our approach to the review involves conducting a broad survey of the approaches adopted in international jurisdictions to mitigate market power. Based on this review, we develop several case studies that focus on potential policy and regulatory interventions that we view as being most pertinent to the ACCC's inquiry.

To this end, we also provide high-level commentary on the applicability of the mitigation measures in the NEM. A more thorough examination of the appropriateness of the measures for application in the NEM would be needed should they be considered for addressing any specific concerns identified by the ACCC.

The jurisdictions we examined as part of our review include:

- the United Kingdom;
- the European Union (EU);
- the United States (ie, PJM, California, New York and Texas);
- Singapore;
- Canada (Ontario and Alberta);
- New Zealand; and
- Ireland.

Our report examines:

- monitoring and responding to the use of market power in power generation;
- monitoring and responding to the use of market power by gentailers;¹ and
- interactions between risk management and market power.

Monitoring and responding to the use of market power in power generation

To mitigate the exercise of market power, all of the jurisdictions that we examined implement a mixture of both ex-ante measures (those that aim to restrict behaviour of firms to avoid the exercise of market power before it occurs) and ex-post measures (those that assess whether market power has been exercised in the past and impose penalties where appropriate).

Our review of this topic assesses the following case studies:

- Case Study 1: Undesirable Trading Situations in New Zealand;
- Case Study 2: Ex-post identification of market power in Alberta;
- Case Study 3: Ex-ante rules for market power mitigation in the Electricity Reliability Council of Texas (ERCOT) market;

¹ Gentailers are companies with ownership interests in both power generation and retail

- Case Study 4: Ex-ante pivotal suppliers tests in the PJM;
- Case study 5: Restriction on the exploitation of transmission constraints in the United Kingdom; and
- Case Study 6: European Union (EU) rules for restricting market manipulation in trading markets.

Summary of ex-post measures

The United Kingdom, New Zealand and the EU tend to rely on anti-trust legislation, conduct rules and ex-post enforcement to mitigate market power. These jurisdictions tend to be less prescriptive about behaviours or circumstances that need to be prohibited or curtailed through ex-ante measures.

The New Zealand electricity market applies a concept known as 'undesirable trading situations', where the Electricity Authority has the ability retrospectively to alter prices when it deems inappropriate behaviour has occurred. This unique approach provides the Electricity Authority with significant retrospective power for mitigating the exercise of market power.

For EU countries, limited ex-ante structural measures are imposed from an EU level, with the predominant form of monitoring and enforcement of market conduct being conducted through the Regulation on Wholesale Energy Market Integrity and Transparency (REMIT). REMIT is the primary legislation that governs market participant conduct, stipulating various activities that are prohibited in EU energy markets and providing a basis for ex-post regulatory action.

Summary of ex-ante measures

In general, markets in North America tend to rely more heavily on ex-ante measures to prevent the exercise of market power, relative to other jurisdictions. This typically includes incorporating features in the market design to restrict market outcomes under specific conditions. These ex-ante measures are common in those jurisdictions that have capacity markets, since these markets tend to impose more control over the characteristics of capacity that enters the market.²

The ERCOT market provides a useful example of the use of ex-ante measures, given its market design similarities to the NEM. ERCOT placed a 20 per cent restriction on the market shares of participants as part of industry restructuring and implements a 5 per cent lower bound on market shares, below which firms are not considered to be able to exercise market power. ERCOT also limits prices in its market dispatch for generators that are subject to non-competitive constraints. This is defined by a Herfindahl-Hirschman Index (HHI) exceeding 2,000 for those generators on the import side of the constraint.

Elsewhere in the United States where capacity markets are in place, such as Pennsylvania New Jersey Maryland (PJM), New York and California, the independent system operator (ISO) applies pivotal supplier tests. These are tests that evaluate whether a supplier is needed to relieve a constraint in the network. Those suppliers that fail the test have their offers capped in order to restrict the ability of generators to influence short term prices.

A common theme across all jurisdictions is the use of market monitoring and reporting on the operation of the wholesale electricity market. Typically, this involves reporting on the competitive performance of the market with the purpose of identifying, on an ex-post basis, the abuse of market power. There are varying approaches to monitoring – some jurisdictions in the US outsource the function to private consultancies while in others this is the role of statutory authorities.

² For instance, capacity markets typically have explicit capacity targets as opposed to the market determined capacity levels of an energy-only market and the extent to which intermittent generators can contribute to capacity requirements, and so earn capacity revenue, is based on assessments of their generation profile by regulators, rather than driven by market forces.

Application to the Australian context

The market rules in Australia afford a great deal of freedom to market participants with regards to their bidding conduct in the wholesale market. Most approaches adopted in the other jurisdictions involve placing additional restrictions on market participants relative to those applied in the NEM, to further mitigate the risk that market participants harmfully use their market power. In considering the applicability of these measures in the NEM, the ACCC should consider:

- the impact on dynamic efficiency and investment incentives due to reductions in high prices – bid mitigation procedures, pivotal supplier tests and conduct rules would all have consequences for NEM spot prices and bidder behaviour in periods of scarcity of supply and congestion, with the resultant price being important for ensuring sufficient investment, particularly in the NEM with its energy-only market design;
- the benefits and costs of placing further restrictions on bidding behaviour, the types of behaviour that would seek to be restricted and the extent to which these currently occur in the NEM;
- the changes to market parameters that may be required in the event of additional restrictions on bidding or prices – current parameters such as the Market Price Cap are based on the existing market design and price setting process; and
- potential impacts on enforcement costs through additional monitoring requirements under more detailed conduct rules.

Monitoring and responding to the use of market power by gentailers

The current status of vertical integration within different jurisdictions is heavily related to the structural reform that has been undertaken in the jurisdiction. Where structural separation between networks and retail has not occurred, the role of wholesale/retail integration (commonly referred to as gentailing) is minimal. Markets outside of Australia with vertical integration include, for example, New Zealand, United Kingdom, PJM, Spain, Ireland and Singapore.

Our review of this topic assesses the following case studies:

- Case Study 7: Secure and Promote License conditions in the UK; and
- Case Study 8: Restrictions on generation and retailing in US jurisdictions.

Summary of international approach to mitigating gentailer market power

Vertical integration is playing a more prominent role in electricity markets in jurisdictions around the world. In light of this trend, concerns have been raised in numerous jurisdictions regarding the impact of gentailing on spot and contract market outcomes.

In the United Kingdom, Ofgem has expressed concerns about the impact that gentailers have on liquidity in the contracting market and access for new entrant retailers, primarily due to the physical hedge that vertical integration affords gentailers. In response, Ofgem has put in place the Secure and Promote license conditions in an attempt to improve liquidity and access for new entrants in retail markets. The conditions introduced minimum service standards for when independent retailers engaged with large generators, market making obligations on the “Big 6” gentailers and reporting requirements on the largest generators activities in the day-ahead market.

Another approach is the use of vesting contracts in Singapore, which have been in place since 2004 and mandate forward contracting. This is designed to mitigate the incentive for vertically integrated firms to exercise market power. However, vesting contracts are playing a declining role, with a reduced share of mandated contracts being required. The Energy Market Authority has been increasingly relying on

alternative measures to mitigate market power, as well as its strong power under the relevant legislation to prosecute any abuses of market power.

In the United States, the approach to vertical integration varies significantly across jurisdictions. For instance, ERCOT requires legal separation of businesses involved in retail and generation. This stems from the unbundling approach ERCOT took to its energy market restructuring reforms and provides greater transparency with regards to the operations at each level of the supply chain. In the case of the PJM, the distinction between capacity and energy markets in the United States jurisdictions, and the corresponding disentanglement of remuneration for capacity and consequences of the exercise of market power in energy markets, may have helped mitigate market power problems associated with vertical integration in the PJM.

Application to the Australian context

No obligations currently exist on NEM market participants to promote liquidity in contract markets and access for new entrants. The UK approach of encouraging liquidity through the Secure and Promote Licence Conditions would require a substantial change to the contracting markets that operate alongside the NEM. Given the bilateral and confidential nature of the current contracting activities of generators, implementing such a scheme would require a substantial change to the level of transparency regarding the operation of contract market.

Should the ACCC identify contract market access for new entrants as a key area of concern, anecdotal evidence from the UK experience suggests that such an intervention may help such participants enter the market and so increase competitive pressure in the market.

Structural separation rules, like those historically applied in the United States, would be a significant departure from the existing NEM market structure and light-touch regulatory approach and so would present practical and political challenges.

Interactions between risk management and market power

There are two main approaches employed to address concerns regarding market power in contracting markets:

- regulated contracting mechanisms; and
- trading behaviour and transparency rules.

Our review of this topic assesses the following case studies:

- Case Study 9: Secure and Promote License conditions in the UK; and
- Case Study 10: Restrictions on generation and retailing in US jurisdictions.

Summary of international approach to risk management and market power

Regulated contracting mechanisms are relatively uncommon in competitive energy markets and appear to be declining further. For instance, Ireland has moved away from its direct contracting arrangements as part of its recent market reforms and transition towards adopting the EU market design. Singapore continues to use a vesting contract regime, but the level of vesting contract quantities has decreased over time. A recent review undertaken by the Energy Market Authority sought to find alternative means to mitigate market power in the Singapore wholesale market – indicating that the Authority is seeking to move away from the vesting contract regime in the future.

Policies aimed at conduct and transparency in contracting markets appear to be a more common approach employed by regulators. For instance, the contracting market in New Zealand has a significant degree of transparency in relation to the actions of participants. The regime, known as the hedge disclosure system, is

designed to facilitate transparent hedge and futures markets. It requires that market participants submit various information regarding their activity in contracting markets so that other participants can view and compare contract details – enabling them to assess the competitiveness of their own contracting arrangements.

As discussed in relation to approaches to mitigating market power in the context of gentailers, the Secure and Promote license conditions in place in the UK are an attempt to address concerns with contracting in the context of vertical integration. The purpose of the conditions is to mitigate concerns regarding contract market liquidity in the presence of gentailing.

Application to the Australian context

Regulated contracting mechanisms, such the Vesting Contract regime applied in Singapore, have historically applied in the NEM (with the introduction of Tasmania to the NEM) and so, are not without precedent. However, the introduction of such a mechanism would be a substantial change from the light-touch regulatory approach currently adopted in the NEM and the implications of such a regime for incentives faced by market participants would need to be investigated thoroughly.

Increasing the transparency of activities in the contract market would be a less interventionist approach to seeking to address potential market power concerns in contracting markets. Increased transparency in contracting in the NEM would improve the ability of regulatory bodies to ensure that outcomes in contract markets are consistent with effective competition. However, implementing such an approach may increase the risk of collusive outcomes in the contract market, facilitated by the improved information, and the perceived risks of regulatory intervention in the contract market.



1. Introduction

On 27 March 2017, the Commonwealth Treasurer directed the Australian Competition and Consumer Commission (ACCC) to undertake an inquiry into the supply of retail electricity and the competitiveness of retail electricity prices. The terms of reference provide the ACCC with wide scope to investigate all aspects of the market that influence retail price outcomes.

On 22 September 2017, the ACCC published its preliminary findings, which included an initial analysis of the key issues pertaining to the retail supply of electricity and factors influencing affordability. Several areas were identified for further analysis in its final report. The final report is expected to be completed by 30 June 2018, and will detail the ACCC's findings and, if needed, any recommendations for remedies to be adopted.

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Our approach to the review involves conducting a broad survey of the approaches adopted in international jurisdictions to mitigate market power. Based on this review, we develop several case studies that focus on key policy and regulatory interventions that may be most pertinent to the ACCC's inquiry.

To this end, we also provide high-level commentary on the applicability of the mitigation measures in the NEM. A more thorough examination of the appropriateness of the measures for application in the NEM would be needed should they be used to inform measures to address specific concerns identified by the ACCC.

The jurisdictions that we have examined as part of our international review include:

- the United Kingdom;
- the European Union (EU);
- the United States (PJM, California, New York and Texas);
- Singapore;
- Canada (Ontario and Alberta);
- New Zealand; and
- Ireland.

The remainder of the report is structured as follows:

- section 2 provides an overview of market power and competition concepts relevant to electricity markets;
- section 3 details our international review of approaches to address market power concerns in power generation;
- section 4 details our international review of approaches to address concerns about the abuse of market power within vertical integrated power generation and retail businesses (ie, gentailers); and
- section 5 details our international review of approaches to addressing the interaction of financial risk management tools (ie, hedging products), and market concentration.

2. Market power and competition in electricity markets

A key concern with any market is the potential for firms to exercise their market power. In electricity markets, the unique physical characteristics of electricity – where generation needs to be matched instantaneously by demand – and congestion in transmission networks means electricity markets have special characteristics with regards to the way firms exercise their market power.

Recognising this, many jurisdictions around the world have developed sophisticated rules for controlling market outcomes to limit the extent to which firms exercise market power. The purpose is to retain the benefits of competitive market interactions, while reducing the risks that market power is exercised.

In this section, we detail the theoretical and practical considerations for the mitigation of market power in wholesale electricity markets. We do not intend to present an exhaustive discussion of market power in wholesale electricity markets, but rather identify the key concepts required to interpret the case studies and findings of our international review.

2.1 Market power in a wholesale electricity market

The concept of market power and, more specifically, the exercise of market power is not easily defined. This is because, in principle, the possession of market power by a market participant is not, in-and-of-itself, harmful. Rather, markets rely on firms earning above normal profits (ie, exercising a degree of market power) to create incentives for innovation and new entry and so drive improvements in the efficiency of supplying goods and services.

Concerns about market power only arise when it is both substantial and sustained, ie, when the actions of firms bring harm to consumers through reducing competitive pressure that might otherwise occur in the market.

Consistent with this principle competition legislation aims to prohibit firms exercising substantial market power where this can be presumed to harm consumers. Australian law defines the boundary between possessing market power and its use for an anti-competitive purpose or effect by stipulating that conduct by a firm with substantial market power is a contravention of the *Competition and Consumer Act 2010* if:³

it has the purpose, effect or likely effect of substantially lessening competition.

The market design principles on which the rules governing the operation of the National Electricity Market (NEM) are based explicitly state that the National Electricity Rules (NER) are not intended to control anti-competitive behaviour of market participants and by implication that anti-competitive behaviour in the NEM is to be governed by competition law.⁴

Nevertheless, the NER provide several principles that guide the design and operation of the electricity market, namely:⁵

3.1.4 Market design principles

(a) This Chapter is intended to give effect to the following market design principles:

³ CCA, Section 46.

⁴ National Electricity Rules, 3.1.4(b).

⁵ National Electricity Rules, 3.1.4(a).

(1) minimisation of AEMO decision-making to allow Market Participants the greatest amount of commercial freedom to decide how they will operate in the market

(2) maximum level of market transparency in the interests of achieving a very high degree of market efficiency, including by providing accurate, reliable and timely forecast information to Market Participants, in order to allow for responses that reflect underlying conditions of supply and demand;

...

When investigating the potential exercise of market power in an electricity market, it is important to acknowledge the unique characteristics of these markets, namely, that:

- electricity must be produced (or discharged from storage) to meet demand simultaneously and at all points in time; and
- transmission constraints and generator outages can cause abrupt changes to supply.

The combination of these two characteristics may mean that circumstances arise where firms are able to influence the market price. In the absence of effective competition or restrictions on conduct of firms, there may be significant scope for participants to exercise their market power and cause harm to consumers.

Reflecting these unique characteristics of wholesale electricity markets, numerous regulatory bodies in jurisdictions around the world sometimes go beyond general anti-trust legislation to specify additional practices that are prohibited to reduce the risks associated with the harmful exercise of market power.

2.2 General mechanisms for mitigating market power in electricity markets

In all competitive electricity markets, restrictions are placed on the actions of participants. These restrictions are required to encourage efficient operation of the market by coordinating market participants, ensuring that accurate information is made available to market participants, and prevent actions that may be detrimental to the efficient operation of the market. An example of such rules is the bidding in good faith rules applied in the NEM.⁶

However, in most jurisdictions around the world, additional measures are put in place specifically to target the exercise of market power, and so go beyond the restrictions on participant behaviour under general anti-trust legislation.

Mechanisms for market power mitigation can be classified as either *ex-ante* or *ex-post* measures. Ex-ante measures are those that involve setting rules that restrict behaviour of firms with the aim of avoiding the exercise of market power prior to it occurring. These ex-ante measures can be structural in nature, ie, restrictions on the market share of participants, or that target or prohibit specific conduct, eg, administrative pricing in circumstances when transmission constraints bind and firms may otherwise have undue influence over prices.

Ex-post measures are designed to assess whether market power has been exercised in the past. Typically, ex-post measures are accompanied by a specification of principles that market participants should uphold, or forms of conduct that is prohibited. Subsequent regulatory action seeks to prove that participant behaviour was in breach of these principles or rules. These frameworks rely on the incentives resulting from enforcement and associated penalties to ensure that market participants do not exercise market power in circumstances where they might otherwise have the ability and incentive to do so.

⁶ The bidding in good faith rule has been rephrased to clarify that 'offers, bids and rebids must not be false or misleading', see section 3.8.22A of the National Electricity Rules.

Trade-offs exist between, on the one hand, relying on ex-ante measures that may introduce inefficiency through overly restricting behaviour and, on the other, relying on ex-post measures, which can be costly and contentious in the absence of specific conduct rules.

The appropriate balance of ex-ante and ex-post measures is dependent on numerous aspects of the regulatory, legal and political context, so there are no general principles that can be readily applied across jurisdictions to specify the appropriate balance of mitigation measures.

Jurisdictions also differ to the extent that these market power mitigation measures err on being more or less prescriptive regarding participant behaviours. The decision regarding the appropriate level of prescription reflects the risk preferences of individual regulators.

By being more prescriptive, regulators risk inhibiting conduct that does not in fact constitute a harmful exercise of market power (ie, a false positive). This can affect the efficient operation of the market and so reduce the benefits that competition might otherwise provide to consumers.

By being less prescriptive, and relying on general anti-trust legislation, principles for the identification of the exercise of market power after the fact, or general market incentives, there is a risk that the harmful exercise of market power occurs but remain undetected, thereby creating negative outcomes for consumers (ie, a false negative). As a result, when deciding how best to mitigate the use of market power, policymakers must consider the trade-off between false positives (and the associated costs of reduced market efficiency) and false negatives (and the associated negative consequences).

However, it is important to recognise that prescriptive and less prescriptive measures can act in a complementary manner. For example, market conduct that is considered as undesirable but would not constitute a harmful use of market power can be curbed through the use of prescriptive mechanisms, while market power abuses can still be dealt with under general anti-trust laws. This complementarity may explain why, in many jurisdictions, there is a mixture of prescriptive conduct rules as well as standard anti-trust legislation.

2.3 The relationship between market design and mechanisms for market power mitigation

The design of a wholesale electricity market influences the methods by which regulators can both detect the harmful use of market power and enforce measures for mitigating it. Market design elements that have a bearing on the implementation of mechanisms for mitigating market power include:

- whether the market has a separate capacity market, or is an energy-only market design;
- wholesale market clearance price formulation;
- bidding rules and regulations; and
- day-ahead market with balancing mechanism or real-time market.

An understanding of the market design of each jurisdiction is critical as it informs the regulatory framework implemented, as well as the potential scope and impacts of regulatory interventions.

2.3.1 Capacity markets and energy-only markets

When considering options for mitigating market power, one must differentiate between energy-only markets and capacity markets. This is because under these two market design types the role and interpretation of short term prices is fundamentally different.

In an energy-only market (such as the NEM), generators recover their fixed costs through spot market revenues and contract revenues which are driven by spot market outcomes. Therefore, prices need to rise

above the short run marginal costs of the marginal generator to ensure the cost of the generation plants is recovered. It follows that in this context, high price events are critical for ensuring adequate investment in capacity.

However, under the energy-only market design it is difficult to distinguish between those high price events that are legitimately providing signals for investment in new capacity from those that might represent an exercise of market power. The fundamental characteristics of this type of market mean that the impact of any market power mitigation measures on legitimate price signals needs to be considered carefully.

In contrast, under a capacity market design, generators recover their fixed costs through capacity payments and, therefore, do not require high price events to recover their costs. Thus, the case for explicit additional restrictions is clearer under a capacity market design. Under this market design, with the exception of scarcity pricing conditions,⁷ short run prices should be more reflective of short run marginal costs and therefore, monitoring market pricing outcomes is more straightforward owing to a clearer benchmark with which to compare prices.

However, such a market design does not fully harness competitive pressure within the market to signal new capacity investment requirements and so can lead to higher prices compared to an energy-only market design. See Case Study 4 for a discussion of mitigation measures applied in capacity markets.

2.3.2 Wholesale market clearance price formulation

Wholesale electricity markets can have different processes for the formulation of the market clearing price. The processes differ over two primary elements, namely:

- the geographic definition over which the price is applied; and
- the frequency of the pricing interval.

In the NEM, prices are set on a regional basis, with separate prices for each of the five regions in the market. Prices are set at a 'regional reference node' in each region, ie, nominal locations within the network, and the pricing for generation and loads is calculated by adjusting the price at this node by estimates of losses.

In a market with a more localised geographic definition for price formulation, ie, nodal pricing, the scope for individual firms unilaterally to influence prices is generally increased (owing to the fact that there will be fewer generators in each node), while markets with more aggregated pricing, ie, zonal pricing, tend to reduce the ability and incentive for firms to influence prices and therefore, the harmful use of market power. The effect of the geographic market definition is highly dependent on the topology of the transmission network and the impact of network congestion on the transportation of electricity from generators to loads.

In addition, less frequent price periods can decrease the ability and incentive for generators to influence prices. In markets where prices are determined based on outcomes over a longer period time (eg, hourly basis) generators are more able to react within the pricing period. This reduces the benefits to firms of seeking to influence market outcomes over a short period. In contrast, where prices are determined on a shorter time scale (eg, five minutes) individual generators may be able to take advantage of short term changes in supply and demand to influence prices.

In the NEM, prices are set on a five-minute basis, although financial settlement presently occurs based on averages of these 5-minute prices over a 30-minute period. Looking ahead, the 30-minute settlement period is to be reduced to 5-minute intervals.

⁷ Scarcity pricing occurs when supply is not sufficient to adequately meet demand and prices are determined through an alternative means, eg, a fixed price or a formulaic approach varying with market conditions.

2.3.3 Bidding rules and regulations

Bidding rules and regulations influence the ability and incentive for firms to exercise market power through governing the ability for firms to respond to changed market circumstances through their bids. In particular, a trade-off exists between bidding rules that restrict the ability of firms to react to and exploit short term conditions to influence prices, and those that allow generators to respond to changing supply and demand conditions.

A key dimension of bidding rules is the timing of gate closure for bidding (ie, the time after which bids can no longer be made or amended). A shorter time between gate closure and dispatch means that bidders are less able to respond to changes in technical and market related information, thereby reducing their ability to influence prices.

In the NEM, generators are allowed to rebid up to the start of each 5-minute dispatch interval and so have the ability to respond to very short-term changes in market conditions. When rebids are made less than 15 minutes before the start of the dispatch interval, bidders must submit additional detail as to the reasons for their rebid.

2.3.4 Day-ahead market with balancing mechanism or real-time market

Day-ahead markets are markets that allow market participants to buy and sell energy on a day-ahead basis. Balancing markets work in conjunction with day-ahead markets to coordinate the dispatch of generation. While day-ahead market transactions are typically financial in nature, bids in balancing markets are associated with physical obligations to dispatch generators.

Real-time markets, such as the NEM, do not have financial transactions conducted through a formal day-ahead market but, rather, all financial transactions are conducted through either the real-time market or other forward contracting arrangements.

Scheduling energy on a day-ahead basis facilitates coordination between market participants and provides information on the supply and demand conditions that are expected to exist for each dispatch interval of the subsequent day. Preselling energy in the day-ahead market reduces the ability and incentives for generators to exercise market power in the balancing market since generators that have transitory influence over prices in the balancing market only earn revenue on the proportion of energy sold through that market.

Some jurisdictions enforce mandatory participation in the day-ahead market, while, other markets have voluntary participation. Regulatory agencies are able to set restrictions on behaviours in the day-ahead market that reduce the incentive and scope for participants to exercise market power in the balancing market. For example, in response to an Ofgem proposal to intervene and set mandatory trading requirements, the “Big 6” firms took voluntary action to commit to selling a proportion of their capacity on a day-ahead basis.⁸

2.4 Impact of an increasing prevalence of ‘gentailers’

Vertical integration occurs when firms have ownership interests in multiple markets in the supply chain. Historically, vertical integration in the electricity sector occurred across generation, transmission, distribution and retail operations. In many jurisdictions, as electricity market reform was undertaken, vertically integrated electricity providers were disaggregated by separating generation from their transmission and distribution operations. This separation allowed for the creation of a competitive wholesale generation market and facilitated the buying and selling of energy across broader geographic areas.

In more recent times some jurisdictions have separated retail operations from network businesses, to allow competition for the provision of services to end consumers. In response to this, some retailers and/or generators have combined generation and retail operations to take advantage of the efficiencies that this

⁸ see <https://www.ofgem.gov.uk/electricity/wholesale-market/liquidity>, accessed 29 March 2018.

integration can bring. Firms that have both generation and retail operations are typically called 'gentailers'. In this report, we use the term 'vertical integration' to refer to this form of integration between markets, ie, firms that have interests in both the generation and retail sectors or 'gentailers'.

Gentailers are believed to lower the cost of generation and retailing electricity to consumers by decreasing the hedging requirements for these firms, and through the potential elimination of double marginalisation.⁹ A gentailer is insulated from fluctuations in wholesale prices to the extent that their own generation of electricity, consumption from their own consumers, are aligned. This reduces the need to purchase financial hedges to manage wholesale market price risks, and so consequently lowers their total cost to supply consumers.

The prevalence of gentailers in a market does not in-and-of-itself lead to a reduction in competition. However, in many competitive electricity markets, concerns have arisen about the impact of gentailers on financial contract markets and the supply of appropriate risk management products to competing retailers.

A number of measures have been adopted to respond to this concern in jurisdictions where vertical integration is prevalent. For example, in the United Kingdom, Ofgem introduced the Secure and Promote License conditions to encourage liquidity in contract markets and access to risk management products for smaller retailers given the potential impact of gentailers on these markets.

2.5 Forward markets and contracting

Participants in wholesale electricity markets use financial contracts to manage the risks associated with participation in the market. Both generators and retailers have an incentive to enter into forward contracts to reduce the risks associated with participation in the market by way of reducing the volatility in their spot market revenues (for a generator) or costs (for a retailer).

When generators sell their energy through forward contract markets, incentives for the exercise of market power in short term markets is reduced. When a generator has sold energy in this manner, it does not receive the spot price for the quantity of generation that has been pre-sold and therefore the benefits to the generator of adopting a strategy aimed at inflating prices are reduced. However, where the market structure does suggest some market power, this will manifest as higher forward contract prices. Therefore, policies that encourage forward contracting can reduce the ability and incentives for firms to exercise market power.

Typically, forward contracting is conducted through two means, namely:

- bilateral trades – a trade between two parties, typically undertaken on an over-the-counter basis; and
- public exchanges – public exchanges that facilitate ongoing trading between buyers and seller for financial products.

Bilateral trades tend not to be transparent and therefore, other market participants and regulatory authorities have less oversight of contracting activities undertaken on this basis. Public exchanges on the other hand provide a means for all market participants to participate and tend to provide more transparency for market participants and regulators. The level of transparency of public exchanges and the nature of the trades undertaken varies with each market.

Transparency regarding contracting has been encouraged in many jurisdictions to monitor the actions of firms and contracting behaviour in an attempt to identify or deter the exercise of market power. We discuss approaches adopted in other markets to creating transparency in contracting markets in Section 5.

⁹ Double marginalisation refers to mark-ups applied by firms (that possess market power) at multiple levels within the supply chain.

3. Monitoring and responding to the use of market power in power generation

Market power in wholesale electricity markets is a key concern for regulatory bodies in competitive electricity markets globally. Different wholesale electricity market designs have different properties regarding the risk of firms having excessive influence over prices, and thereby potentially being in a position to engage in the harmful exercise of market power. Typically, the extent to which firms may be able to influence wholesale prices is one dimension in a complex set of trade-offs that exist in designing the rules that govern wholesale electricity markets.

In general, giving firms a large degree of freedom to respond to changes in market conditions, such as in the Australian context, in many cases also means creating the risk that they will be able to take advantage of market conditions and influence price should competition not act as a sufficient constraint. Conversely, the excessive imposition of rules that govern the bidding behaviour of generators runs the risk of introducing market inefficiencies through restricting the ability of generators to respond to changing market conditions.

3.1 Overview

All jurisdictions that we examined, have a mixture of different types of measures, both ex-ante and ex-post, for mitigating the exercise of market power.

3.1.1 Ex-ante measures

In general, markets in North America tend to include more ex-ante measures to prevent the exercise of market power, relative to other jurisdictions. This typically includes incorporating features in the market design to contract market outcomes under specific conditions.

Ex-ante measures typically arise in the context of structural separation and are more common in those markets that have a capacity market, as these markets tend to impose more control over the characteristics of capacity that enters the market. For instance, capacity markets typically have explicit capacity targets as opposed to the market determined capacity levels of an energy-only market and the extent to which intermittent generators can contribute to capacity requirements, and so earn capacity revenue, is based on assessments of their generation profile by regulators, rather than driven by market forces.

In the United States, the Electric Reliability Council of Texas (ERCOT) placed a 20 per cent restriction on the market shares of participants as part of industry restructuring and currently places a 5 per cent lower threshold on market shares, below which firms are not considered to be able to exercise market power. In addition, ERCOT limits prices in its market dispatch for those generators that are subject to non-competitive constraints, as defined by a Herfindahl-Hirschman Index (HHI) exceeding 2,000 for those generators on the import side of the constraint.

In many jurisdictions in the US, eg, the Pennsylvania New Jersey Maryland Interconnection (PJM), the New York Independent System Operator (NYISO) and the California Independent System Operator (CAISO), the system operator applies pivotal supplier tests (ie, a test that evaluates whether a particular supplier is needed to relieve constraints in the network) to restrict the ability for generators to unduly influence short term prices. Suppliers who fail pivotal supplier tests are typically offer-capped to ensure that they do not unduly influence the price.

3.1.2 Ex-post measures

The United Kingdom, New Zealand, Alberta and the European Union (EU) tend to be less prescriptive about specific behaviours or circumstances that need to be prohibited or curtailed through ex-ante measures. In

general, these jurisdictions tend to rely on anti-trust legislation and ex-post enforcement of rules stipulating appropriate behaviours for the assessment of whether market power has been exercised.

The New Zealand electricity market has a concept known as an ‘undesirable trading situation’, where the Electricity Authority can retrospectively alter prices when it deems inappropriate behaviour has taken place, but the conduct is not covered elsewhere in the *Electricity Industry Participation Code*. This unique approach gives significant power to the Electricity Authority in retrospectively mitigating the exercise of market power.

In the EU, limited structural measures are put in place and monitoring and enforcement of market power is conducted through the Regulation on Wholesale Energy Market Integrity and Transparency (REMIT), the primary legislation that governs market participant conduct in wholesale electricity markets throughout the EU. The policies stipulate a number of activities that are prohibited in EU energy markets and therefore provides a basis for ex-post regulatory action against market participants that appear to have engaged in the prohibited activities.

All jurisdictions have a form of market monitoring and reporting on the operation of the wholesale electricity market. Typically, this involves reporting on the competitive performance of the market with the purpose of identifying, on an ex-post basis, the potential exercise of market power.

3.2 Case Study 1: Undesirable trading situations in New Zealand

3.2.1 Overview of the New Zealand electricity market

The New Zealand electricity market is a liberalised market with a competitive spot market, established derivatives trading market, and a competitive retail sector. The system is dominated by hydro generation, which accounted for 56 per cent of electricity generation in 2016.¹⁰ The industry is dominated by five major gentailers - three of which remain majority state-owned - and so the extent of generation/retail integration in the market is significant.¹¹

The market itself is energy-only with mandatory participation. Pricing is determined on a nodal basis with separate spot prices set for each node (exit or injection point on the grid), of which there are 248 (52 injection points and 196 exit points) across the country.¹² There is no explicit cap on wholesale prices. However, a ‘scarcity pricing’ mechanism effectively places an upper limit on prices.¹³

Transpower is the transmission system operator and is responsible for managing the dispatch of plants. Reflecting the geography of the country, constraints on flows over the interconnection between the North and South Island means that price separation can occur between these two main regions of the country.

3.2.2 Undesirable trading situations

A key mechanism used to mitigate against the abuse of market power in the New Zealand electricity market is the designation of an ‘undesirable trading situation’. The New Zealand Electricity Authority (EA) defines an undesirable trading situation (UTS) as:¹⁴

any situation –

- (a) that threatens, or may threaten confidence in, or the integrity of, the **wholesale market** that cannot be resolved under the Code [the *Electricity Industry Participation Code 2010*]; and

¹⁰ International Energy Agency, *Energy Policies of IEA Countries: New Zealand 2017 Review*, 2017, p 21.

¹¹ International Energy Agency, *Energy Policies of IEA Countries: New Zealand 2017 Review*, 2017, p 18.

¹² see <https://www.ea.govt.nz/operations/wholesale/spot-pricing/how-spot-prices-work/>, accessed 27 March 2018.

¹³ If the weighted average spot price exceeds NZ\$20,000/MWh, then prices are adjusted down so that the weighted average price is equal to \$20,000/MWh.

¹⁴ Electricity Authority, *Guidelines for Participants on Undesirable Trading Situations*, 20 June 2016, p 7.

- (b) that, in the reasonable opinion of the **Authority**, cannot satisfactorily be resolved by any other mechanism available under this Code (but for the purposes of this paragraph a proceeding for a breach of clause 13.5A is not to be regarded as another mechanism for satisfactory resolution of a situation).

The market rules give the EA significant discretion in the declaration of a UTS. UTSs are deemed to have occurred ex-post by the EA, following the submission of a claim form by market participants alleging the misconduct. The Electricity Authority reserves the right retrospectively to impose administered pricing (amongst other remedies, see below) during periods of time deemed to part of an undesirable trading situation. However, the EA is unable to initiate an investigation after more than ten business days from when the situation occurred.

The specification of the conditions under which market activities can be classified as a UTS is not prescriptive, rather, the EA relies on precedents set through previous UTS decisions for clarification regarding what may constitute a UTS. However, the Electricity Authority does highlight specific examples of conduct that may be construed as an UTS (though the list is not exhaustive). These are:¹⁵

- manipulative or attempted manipulative trading activity;
- conduct in relation to trading that is misleading or deceptive, or is likely to mislead or deceive;
- unwarranted speculation or an undesirable practice;
- material breach of any law;
- a situation that threatens orderly trading or proper settlement; and
- any exceptional or unforeseen circumstance that is contrary to the public interest.

Where the EA deems there to be sufficient evidence of a UTS occurring, it has several actions it can take to correct the UTS. These include any combination of the following:¹⁶

- directing that an activity be suspended, limited or stopped, either generally or for a specified period;
- directing that the completion of trades be deferred for a specific period;
- directing that any trades be closed out or settled at a specified price; and/or
- directing a participant to take any actions that will, in the Authority's opinion, correct or assist in overcoming the undesirable trading situation.

The number of UTS reported in New Zealand has been on the decline – only one has been reported since 2013. Interestingly, in this period the EA amended the *Electricity Industry Participation Code* to include explicit provisions for pivotal supplier situations. Criteria were introduced to convey to market participants how they can remain in the 'safe harbour', ie, how to ensure they maintain a high standard of trading conduct and therefore avoid regulatory intervention. These are:¹⁷

- offers all of its available capacity – energy and reserve – that is able to operate in a trading period;
- acts to submit, revise, or withdraw an energy or reserve offer in a timely manner after receiving the information that triggered this action; and
- when it is a pivotal supplier, either:
 - > prices and quantities in its offers do not result in a material increase in the price in the region where it is pivotal (assessed by comparing prices in the immediately preceding trading period or another comparable trading period in which it was not pivotal);

¹⁵ Electricity Authority, *Electricity Industry Participation Code 2010*, 6 November 2017, Part 5 p 1.

¹⁶ Electricity Authority, *Electricity Industry Participation Code 2010*, 6 November 2017, Part 5 p 2.

¹⁷ Electricity Authority, *Improving the efficiency of prices in pivotal supplier situations*, 4 June 2014, pp 2-3.

- > offers when pivotal are generally consistent with its offers when not pivotal; and
- > derives no financial benefit from an increase in the price in the region where it is pivotal.

It is likely that the fall in the number of reported UTSs is linked to the amendment of the broader conduct code, not least because an event must not be addressed elsewhere in the conduct code to qualify as an UTS.

3.2.3 Application to the Australian context

Under the regulatory framework applicable in the NEM, there is no mechanism for ex-post adjustment to prices based on the discretion of the regulator. In circumstances where conduct was found to be in breach of the market rules or anti-trust legislation, punitive action would be taken but this would stop short of retrospectively adjusting market outcomes.

While the New Zealand and Australian market have some similarities, there are notable differences that should be considered when assessing the applicability of such an approach in the Australian context:

- pricing in New Zealand is determined on a nodal basis, with separate prices set for 248 locations, as opposed to a regional basis in the NEM - and so the scope for bidding activities of individual generators to lead to undesirable localised spot price outcomes is higher in New Zealand; and
- there are other rules in the NEM that limit undesirable pricing outcomes – for example, the administered price cap¹⁸ plays a similar role in mitigating the impact of high prices to the extent that it involves setting prices in circumstances of prolonged high prices.¹⁹

The introduction of a similar mechanism in the Australian context would increase the options available to regulatory bodies to intervene in the market and exert more control over price outcomes. In assessing the appropriateness and feasibility of such an approach, the following should be considered:

- the likelihood that additional powers would be exercised;
- the extent to which the additional discretion afforded to the regulator would create a stronger disincentive for market participants to exercise any market power;
- the impact on investment incentives of the additional uncertainty created by an additional threat of regulatory intervention; and
- the degree of specification of the conditions under which ex-post regulatory action could be taken, the penalties to be imposed when violations occur, and the conditions under which an appeal mechanism for decisions could be triggered – these would determine the extent of uncertainty created for market participants and the strength of the deterrent created by the mechanism.

3.3 Case Study 2: Ex-post identification of market power in Alberta

3.3.1 Overview of the Alberta electricity market

The Alberta energy market began its transition to a liberalised market in 1996, with full deregulation occurring in 2001. The market is relatively small (average load in 2016 was 9,075 MW)²⁰ and currently operates as a mandatory energy-only market.

However, Alberta is in the process of a market reform process which will see it transitioning to a capacity market system. The purpose of the transition to a capacity market is to help ensure the reliability of the

¹⁸ National Electricity Rules, chapter 3, subsection 14

¹⁹ This administered price cap is triggered when the sum of trading interval prices over a period of 7 days exceeds the cumulative price threshold. For 2017/18 the cumulative price threshold was set at \$212,800.

²⁰ Alberta Electric System Operator, *AESO 2016 | Annual Market Statistics*, February 2017, p 2.

electricity system, increase price stability and provide greater revenue certainty for generators.²¹ The transition to a capacity market is anticipated to be complete by 2021.

3.3.2 Ex-post identification of market power – Market Surveillance Authority vs TransAlta

The identification and prosecution of the exercise of market power in Alberta is one of the few examples of a successful prosecution within an energy-only market. The prosecution was made under regulations contained in the legislation which governs the Alberta energy market (the *Electric Utilities Act 2003*), with the case resting on successfully identifying the intentional withholding of capacity through planned outages.

Specifically, the Market Surveillance Authority (MSA) successfully prosecuted TransAlta in 2016 for timing its discretionary outages to harm competition. There were four outages from November 2010 to February 2011, all of which could have been timed for the off-peak period but in practice occurred during a peak or super peak period. For example, during the fourth outage the capacity of TransAlta's offline plant was 383 MW during the peak and super peak periods, from a typical dispatch capacity of 387 MW. There was also evidence of marked alterations to TransAlta's bidding behaviour at their operational powerplants:

- altered bid at Poplar Creed (58 MW) from less than \$30/MWh to over \$890/MWh; and
- altered bid at Sundance 5 (53 MW) from less than \$30/MWh to over \$888/MWh.

The capacity outage of 383 MW coupled with the altered bidding activity across other powerplants meant a total reduction in supply of 494 MW. This led to a total dispatch of 7,646 MW and a system marginal price of \$645.89/MWh, while the MSA estimated the counterfactual price of the same level of dispatch to be \$28.66/MWh – a price increase of 2,100 per cent. As a result, the MSA alleged that TransAlta had violated Section 6 of the *Electric Utilities Act*, and that they had engaged in conduct that was contrary to Sections 2(h) and 2(j) of the Fair, Efficient and Open Competition (FEOC) Regulations. The FEOC Regulations deemed to have been violated state that following conduct is prohibited:

2(h) restricting or preventing competition, a competitive response or market entry by another person, including:

(i) a market participant directly or indirectly colluding, conspiring, combining, agreeing or arranging with another market participant to restrict or prevent competition, and

(ii) a market participant engaging in predatory pricing or any other form of predatory conduct;

2(j) manipulating market prices, including any price index, away from a competitive market outcome;

Throughout the course of the inquiry, the Alberta Utilities Commission (AUC) found that TransAlta had timed the discretionary outages based upon market conditions, rather than the need to protect life, property or the environment. This was found to be the case on each of the four outages. The AUC found that each of these outages could have occurred during off-peak hours and, as such, concluded that TransAlta planned the outages for peak and super-peak periods so as to maximise profits. Based upon these conclusions, a consent decree was agreed to with a total administrative penalty of over \$50 million (Canadian) imposed.

3.3.3 Application to the Australian context

The Alberta energy market under its current market design has many characteristics in common with the NEM, being a mandatory energy-only market. Therefore, the prosecution of a market participant for harm to competition provides a useful case study for a measure with potential applicability within the Australian context.

The primary difference between the Alberta market and the NEM with regards to the lessons to be learnt for the NEM, is that the legislation that TransAlta was found to have violated is more prescriptive with regards to

²¹ see <https://www.aeso.ca/aeso/training/guide-to-understanding-albertas-electricity-market/>, accessed 23 March 2018.

the conduct that is prohibited relative to the legislative framework for the NEM. In particular, there is no explicit restriction on the ability for generators to engage in behaviour that ‘manipulates’ market prices away from a competitive outcome in the NEM and so it remains unclear that the behaviour engaged in by TransAlta would be in violation of Australia’s NEM rules.

Although the behaviour of TransAlta did give rise to substantial price increases, these were not prolonged, and so the materiality of the price impact in the context of the broader market is less than the short-term price changes would indicate. Price changes of the order of magnitude of those exhibited during the periods cited in the TransAlta case, routinely occur in the operation of the NEM for a variety of reasons.

To establish a legislative environment similar to that which led to the successful prosecution of the arguments made in the TransAlta case, would require implementation of more specific rules in the NEM regarding allowable conduct by market participants. In considering the implementation of similar rules, the ACCC should consider:

- the likelihood that generators in the NEM would consider emulating the behaviour exhibited by TransAlta – significant vertical integration and a higher market price cap may reduce the incentives for withholding capacity during peak periods in the NEM relative to the Alberta market in 2011;
- whether the behaviour exhibited by TransAlta should be prohibited in the NEM – while the behaviour of TransAlta harmed consumers through reducing the efficiency of short term dispatch outcomes, if the behaviour persisted, the higher prices would create price signals for new entrants to enter and compete with TransAlta in the longer term;
- whether such conduct rules risk excessive ‘false positives’ – ie, prohibiting exercise of transitory market power that may otherwise occur in an effectively competitive market – and so reduce dynamic efficiency; and
- whether such conduct rules would increase or decrease enforcement costs – being more permissive of the conduct or behaviour would decrease enforcement costs but explicit conduct rules may avoid the challenges associated with enforcement under general anti-trust legislation.

3.4 Case Study 3: Ex-ante rules for market power mitigation in ERCOT

3.4.1 Overview of the ERCOT electricity market

The ERCOT market is one of the most competitive electricity markets in the United States.²² The design of the ERCOT market is net-pool and energy-only with both day-ahead and real-time markets. In contrast to other competitive markets in the United States, the ERCOT market does not have a capacity market mechanism.

Deregulation in the Texan energy sector began in 1999 with the vertical separation of monopoly utility firms and the opening up of the market to competition. The previous system of vertically integrated utilities was unbundled into retail providers, generators and distribution and transmission firms (see Case Study 7 for further discussion). Currently, gentailing plays a minor role in the liberalised Texan market.²³ Only the two largest firms operating in the market, TXU and NRG energy have interests in both the generation and retail markets.

²² Hartley, P, Medlock III, K and Jankovska O. *Electricity Reform and Retail Pricing in Texas*, Center for Energy Studies | Rice University’s Baker Institute for Public Policy, June 2017, p 3.

²³ Ibid, p 2, 9.

The electricity market in Texas has a mixture of generation technologies. Nuclear and coal fired generation is used for baseload power. However, the market is dominated by gas fired generation, with a share of 44 per cent.²⁴

3.4.2 Ex-ante rules for market power mitigation

Texas state legislation provides a prescriptive set of rules regarding the allowable behaviour of electricity utilities.²⁵ Relative to other comparable energy-only markets around the world, ERCOT has arguably the most comprehensive set of ex-ante rules to protect against abuse of market power.

The mechanisms used include both structural and behavioural regulations. The primary structural regulation is a restriction on market share by any utility to at most 20 per cent in each power region. In addition, utilities that were operating at the time of the market reforms were required to separate wholesale and retail operations (see Case Study 7 further discussion).²⁶ While this requirement persists today, firms with large generating position have re-established interests in the retail market through affiliates, as is permitted under the business separation requirements of Texas.

In addition to these structural regulations, significant behavioural regulations are also in place. These include:

- bid mitigation (which is a process of bid price capping, explained in greater detail below) to ensure prices are not increased due to limited competition when the transmission network is constrained;
- prohibitions on activities by market participants that:
 - > adversely affect customers through the use of unfair, misleading, or deceptive practices;
 - > materially reduce the competitiveness of the market;
 - > disregard the effect on the reliability of the system; and
 - > interfere with the efficient operation of the market;
- the option for market participants to enter into a voluntary market power mitigation plan to reduce regulatory risk of future actions against them; and
- a condition that firms with less than 5 per cent generation market share are ruled, a priori, not to have ERCOT wide market power.

Bid mitigation is a process undertaken as part of dispatch planning that aims to limit the ability of firms to control prices in the context of network congestion. The process involves first designating constraints within the network as either 'competitive' or 'non-competitive'. In this context, 'competitive' constraints are those that meet the conditions that:

- the Herfindahl-Hirschman Index (HHI) index of capacity on the import side of the constraint is less than 2,000; and
- the capacity of a market participant and their affiliates is not pivotal, ie, it is not required to meet demand on the import side of the constraint; this condition excludes nuclear generation and minimum energy capacity of baseload coal power stations.

As part of the bid mitigation process, a reference price is set by simulating dispatch in the market while only considering competitive constraints. Bid offers are then capped at the maximum of the reference price and the mitigated offer cap, which is an estimate of the marginal cost of a marginal gas fired generator. This bid

²⁴ EIA, Texas State Profiles and Energy Estimates, Net Electricity Generation by Source, December. 2017.

²⁵ see <http://www.statutes.legis.state.tx.us/Docs/UT/htm/UT.39.htm>, accessed 27 March 2018.

²⁶ see <https://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.342/25.342.pdf>, accessed 27 March 2018.

mitigation has a particularly important role in the context of nodal pricing, where the risk of single firms having control over localised prices is higher.

The behavioural regulations in place in the ERCOT market are similar in nature to those in place in other jurisdictions with energy-only markets, such as New Zealand and the EU, and are focused on defining behaviour that is deemed to be undesirable. For instance, in 2007 TXU was issued a violation notice for market activities it undertook in 2005. Upon referral from the Public Utility Commission of Texas (PUCT), the independent market operator (Potomac Economics) conducted an investigation and concluded that TXU had the ability to substantially increase prices in the balancing market as its energy offers were required to meet demand.²⁷ Potomac Economics further concluded that TXU abused this position – offering its energy into the market at substantially above its marginal cost – constituting an abuse of market power.²⁸

As part of the settlement process, TXU entered into a voluntary market power mitigation plan. Voluntary market power mitigation plans allow for generators to adopt more specific guidelines to reduce the risk of action by the regulator taken against them. Indeed, strict adherence to the plan constitutes an absolute defence against market power allegations (provided the alleged activity is covered by the plan).²⁹

3.4.3 Application to the Australian context

As with New Zealand and the EU, the ex-ante rules in place in the ERCOT market are more prescriptive than the rules in place in the NEM. In particular, the market rules are significantly more prescriptive with regards to the conduct that is prohibited in the market.

Unlike the New Zealand case, there is no explicit scope for ex-post setting of administered pricing, though intervention in price setting occurs in real time based on formulae defined on an ex-ante basis.

The two measures adopted in the ERCOT market of most interest to the Australian context are: (1) the bid mitigation procedure; and (2) voluntary mitigation plans.

Bid mitigation is common in capacity markets, particularly in the US, but less so in energy only markets. The ERCOT market is an exception to this rule, being an energy-only market. In considering the application of a bid mitigation procedure in the NEM, the ACCC should consider:

- the importance of bid mitigation in the context of nodal pricing – in the ERCOT market, generators are more likely to be able to influence specific nodal prices, while this is less so in the NEM where prices are set across broader geographic areas;
- the frequency with which bid mitigation would occur – there are limited locations within the NEM where transmission network congestion would give rise to ‘non-competitive’ constraints and so it may be that bid mitigation would only apply infrequently;
- the market impacts of bid mitigation – in conditions where bid mitigation would occur, the process would likely materially influence price outcomes;
- implications for NEM market design parameters – market design parameters, such as the Market Price Cap, are determined based on an assessment of the likelihood and frequency of high prices events – should high price events be curtailed under a bid mitigation scheme, then the appropriateness of these parameters would need to be reconsidered;
- the increased risk of ‘missing money’, ie, insufficient revenues for generators to recover their capital costs through market revenues, and so, the potential for under-investment if generators are not able to recover these costs; and

²⁷ Public Utility Commission of Texas, *Report to the 81st Texas Legislature | Scope of Competition in Electric Markets in Texas*, January 2009, p 22.

²⁸ *Ibid.*

²⁹ Public Utility Commission of Texas, *Texas Administrative Code: Title 16, Part II*, 13 September 2006, Chapter 25 Subchapter S p 25.504–1.

- the costs associated with implementing the scheme – the mitigation procedure would need to be incorporated into the market dispatch process undertaken by the Australian Energy Market Operator (AEMO).

Voluntary market power mitigation plans, or similar schemes, are not utilised in the same formal manner in other markets as they are in the ERCOT market. Such measures have a more important role to play in a market with a substantial risk of regulatory action, as these plans would be a means by which firms could mitigate this risk. Owing to the more prescriptive ex-ante rules in place in the ERCOT market, the threat of regulatory intervention may be perceived to be higher relative to the NEM.

It is not necessary for a regulatory agency to have a predetermined framework for establishing voluntary market power mitigation plans. Owing to their voluntary nature and the fact they would likely be bespoke for each market participant, agreements could not be entered into between regulators and market participants without such a framework. However, there may be benefits in establishing a common framework should numerous such plans be developed.

In considering the development of a framework for implementing voluntary mitigation plans in the NEM, the ACCC should consider:

- the expected uptake of such plans – the current reliance on anti-trust legislation to mitigate market power in the NEM and the limited regulatory discretion in addressing market power concerns would likely mean that, without other changes, the take up of voluntary mitigation plans would likely be limited;
- the types of behaviour that would be covered in a voluntary mitigation plan, ie, the specific behaviours of market participants that are to be prohibited under the plan;
- the potential reduction in enforcement costs and litigation for both market participants and regulatory bodies through providing clear frameworks that more accurately specify the prohibited activities for specific market participants; and
- the costs of developing such plans and negotiating with market participants as to their content.

3.5 Case Study 4: Ex-ante tests in the PJM electricity market

3.5.1 Overview of the PJM electricity market

The PJM wholesale electricity market has been operating on a competitive basis since 1997.³⁰ The PJM is a large market, with market participants having a peak load of 145,636 MWs in 2017.³¹

The PJM has limited vertical integration with only five generators having a modest interest in the retail market.

The energy market operates under a capacity market mechanism and consists of both a day-ahead and real-time market. A notable feature of the PJM is that the independent market monitoring function is outsourced to a private company (Monitoring Analytics in the case of the PJM). However, this is not overly unusual in the US context – other jurisdictions such as ERCOT also outsource the market monitoring function.

3.5.2 Ex-ante tests of abuse of market power

Pivotal supplier tests identify times when a small set of suppliers are able to meet demand, particularly during periods of network constraint. During these circumstances, the system operator implements administered pricing for these generators. The three pivotal supplier test is applied in all markets, ie, real-time energy market, day-ahead energy market, regulation market and the capacity market. This enables targeted mitigation of market power in the relevant market.

³⁰ PJM, *PJM Markets Factsheet*, 16 March 2017, p 1.

³¹ see <http://www.pjm.com/~media/committees-groups/committees/mc/20170323-state-of-market-report-review/20170323-2016-state-of-the-market-report-for-pjm.ashx>, accessed 28 March 2018.

In the specific case of the PJM, the three pivotal supplier test considers whether the level of excess supply results in an adequately competitive market structure. It measures the degree to which the supply from three suppliers is required to meet the demand for relief of a constraint. This then defines the relevant market. In the energy market, the supply tested is the constraint relief megawatts for a specific constraint. The two variables that predominantly underpin the three pivotal supplier test are:³²

- demand – consisting of the incremental, effective MW required to relieve the constraint; and
- supply – consisting of effective MW of supply incrementally available to relieve the constraint at a distribution factor greater than or equal to the distribution factor used by the PJM in operations.

The three pivotal supplier test proceeds as follows:

- each supplier (from 1 to N) is ranked from the largest to the smallest MW of eligible supply; and
- suppliers are tested in order – beginning with the three largest suppliers.

While the general procedure described above applies to the application of the three pivotal supplier test in each market, the exact inputs and mechanics differ.

Box 3.1 below outlines how the three pivotal supplier test is implemented in the varied markets of the PJM, as well as mitigation measures activated should suppliers fail the test.

Box 3.1: Implementation of the three pivotal supplier test in separate markets

Depending on the market being considered, the mechanics of the PJM's three pivotal supplier test are slightly different. Specifically, in the:³³

- energy market:
 - > the three pivotal supplier test evaluates whether there is sufficient supply available to alleviate a constraint while maintaining a competitive structure;
 - > determines whether any single generation owner, in combination with the two largest suppliers, is required (ie, pivotal) to meet the energy needs to relieve the constraint;
 - > calculated using the following formula – $RSI3_j = \frac{\sum_{i=1}^N(S_i) - \sum_{i=1}^2(S_i) - S_j}{D}$ where:
 - D = required relief;
 - $\sum_{i=1}^N(S_i)$ = total available supply;
 - $\sum_{i=1}^2(S_i)$ = available supply from the two largest suppliers; and
 - S_j = available supply of the supplier being tested;
 - > where the three pivotal supplier test returns a score of less than or equal to one, all three suppliers are deemed to be jointly pivotal and their resources are offer-capped:
 - the offer is capped at the lower of the market-based offer or the cost-based offer; and
- regulation market:
 - > the three pivotal supplier test is conducted on an hourly basis;
 - > calculated using an analogous formula to above, with minor differences:
 - D = regulation requirement; and
 - $\sum_{i=1}^N(S_i)$ = total regulation supply; and

³² Monitoring Analytics, *Overview of Three Pivotal Supplier Test*, 4 December 2015, slide 7.

³³ PJM, *Mitigation and Shortage Pricing in PJM Interconnection*, 28 October 2014, pp 4-6.

- > similarly to above, where the three pivotal supplier test returns a score of less than or equal to one, all three suppliers are deemed to be jointly pivotal and their offers are capped:
 - regulation offers are capped at their cost-based offer solely for the hour in which they failed.

The use of a three pivotal supplier test is not unique to the PJM, with similar tests also applied in the NYISO, CAISO, New England Independent System Operator (ISO-NE) and Ontario markets.

3.5.3 Application to the Australian context

The three pivotal supplier test outlined in this case study is similar in principle to the bid mitigation procedure applied in the ERCOT market, ie, prices are mitigated under circumstances where individual or small groups of generators may have the ability to influence spot prices. However, the pivotal supplier test outlined in this case study has been applied in markets with capacity payments mechanisms, as opposed to energy-only markets like the ERCOT market and the NEM. Wholesale spot prices have fundamentally different interpretations under these two market designs and so processes that seek to mitigate high spot price outcomes cannot be directly compared across these market designs – see the discussion in Section 2.3.1.

In light of the differences in market design between the NEM and the PJM and other markets which this form of test is applied, care needs to be exercised in assessing the appropriateness of these tests. In considering the application of these tests in the NEM, the ACCC should consider:

- the increased risk of ‘missing money’, ie, insufficient revenues for generators to recover their capital costs through market revenues, and so, the potential for under-investment if generators are not able to recover these costs;
- the impact that the imposition of these tests and associated pricing restrictions would have on the locational investment signals sent by the market for transmission or generator investment to alleviate the constraints;
- the frequency with which the test would be satisfied given existing transmission network and ownership arrangements;
- the mechanism by which the parameters required to specify the test would be developed; and
- the impact of implementing such a measure on parameters in the current market design, eg, the market price cap, which have been determined on the basis of the current market design.

3.6 Case Study 5: Restrictions on the exploitation of transmission constraints in the United Kingdom

3.6.1 Overview of the UK electricity market

The United Kingdom electricity market currently operates with a capacity market and day-ahead and real-time markets for energy. In 2011, the UK government announced a series of significant changes to the market under the Energy Market Reform package.³⁴ The reforms, implemented in 2013, had two main elements, namely:

- introduction of a capacity market mechanism to ensure adequate investment in generating capacity; and
- introduction of a contracts-for-difference (CfD) scheme to subsidise the expansion and integration of renewable generation;

Both of these schemes have been operating since their implementation in 2013, albeit with delays to the CfD auctions meaning only two auction rounds have been held since their introduction.

³⁴ UK Parliament, *Planning our electric future: a White Paper for secure, affordable and low-carbon electricity*, July 2011.

In recent times, the market has been dominated by six large, vertically integrated firms that were the incumbents of the energy industry. Together, these firms accounted for slightly under 90 per cent of domestic customers and generated close to 70 per cent of all electricity in the country in 2016.³⁵

3.6.2 Restrictions on the exploitation of transmission constraints

Ofgem has long had concerns that there is the potential for electricity generators to exploit market conditions and charge excessive prices to the system operator during periods of transmission constraints. While transmission constraints can occur under normal network conditions due to supply and demand patterns, they can be triggered or exacerbated by both transmission and generation outages. The central problem is that during periods of transmission constraint, the system operator possesses a limited set of options to purchase reduced generation from particular geographic regions. The constrained set of options that are available to the system operator create market conditions whereby generators can potentially charge higher than market prices for balancing services. These additional costs ultimately fall on the consumer.

Ofgem introduced a Transmission Constraint Licence Condition (TCLC) in 2012 to address the concerns of generators exploiting periods of transmission constraint.³⁶ While initially only introduced for a five-year period, a subsequent review of the licence has led to the TCLC becoming a permanent fixture in Ofgem's regulatory structure – it now forms part of the Generation Licence as a Standard Licence Condition.

The core restriction of the TCLC is that 'the licensee must not obtain an excessive benefit from electricity generation in relation to a Transmission Constraint Period'.³⁷ For the purposes of the TCLC, obtaining excessive benefit from electricity generation in relation to a transmission constraint period is defined as:³⁸

- the licensee and the system operator enter into, or have entered into, relevant arrangements which related to a transmission constraint period; and
- under the relevant arrangements and in connection with a reduction in electricity generation in the transmission constraint period, either:
 - > the licensee pays, or seeks to pay, the system operator an excessively low amount; or
 - > the licensee is paid, or seeks to be paid, an excessive amount by the system operator.

To date, there has been action taken against firms for breach of the license conditions. For instance, in 2015 energy company SSE was fined \$100,000 by Ofgem for breaching the TCLC by reporting a pricing signal that resulted in the company receiving excessive constraint payments during a period of transmission constraint.³⁹

However, in its guidance regarding the TCLC, Ofgem states that the purpose of the condition is not to prevent generators on the import side of binding transmission constraints from charging high prices. Rather, the prohibition is on the manipulation of output quantities. Ofgem states:

"the TCLC does not prohibit excessively high offers during import constraints in the absence of output manipulation. The rationale for this is that (in the absence of output manipulation) such price spikes may be a true reflection of scarcity of generation, and hence a reasonable investment incentive."

³⁵ Competition and Markets Authority, *Energy market investigation final report*, 24 June 2016, p 3.

³⁶ Ofgem, *Draft Transmission Constraint Licence Condition Guidance*, 3 February 2017, pp 3-4.

³⁷ Ofgem, *Decision to introduce the Transmission Constraint Licence Condition (TCLC) as a standard licence prohibiting potential abuse of transmission constraints*, 17 May 2017, p 9.

³⁸ *Ibid.*

³⁹ see <https://www.ofgem.gov.uk/publications-and-updates/sse-pay-100000-energy-action-scotland-over-constraint-payments>, accessed 29 March 2018.

In contrast to the approaches adopted in US jurisdictions, which seek to mitigate bids on an ex-ante basis, the TCLC lays out the expected behaviour of participants and then would seek to prosecute generators for breach of the license conditions.

3.6.3 Application to the Australian context

The NERs currently contain no rules with regards to generator conduct in the presence of transmission constraints. The intention of the NERs is to allow generators to engage in profit maximising behaviour, which creates price signals for new investment to alleviate network congestion. The intention of these price signals is to encourage new entry or investment in transmission to mitigate these high prices.

Instances of manipulation of the quantity of capacity offered through bids to exacerbate the impact of transmission constraints is only prohibited to the extent that it is deemed to be a breach of general anti-trust legislation.

Imposition of a license condition, like the TCLC, may reduce the enforcement costs associated with prosecuting instances of the abuse of market power through the manipulation of bid quantity offers, through more precisely describing behaviour that should be prohibited. This may lead to an increased likelihood of prosecuting less egregious instances of bid manipulation.

Should evidence be found of generators increasing wholesale prices through the exploitation of transmission constraints and manipulation of capacity offers, then such a rule may reduce prices during these periods and reduce the risks of unserved energy through insufficient capacity being offered. However, whether such an approach would lead to a change in behaviour over and above existing anti-trust legislation is not clear.

In summary, in considering the appropriateness of such an intervention, the ACCC should consider:

- implications for enforcement costs of precisely specifying prohibited behaviour from generators in the presence of binding transmission constraints;
- the likelihood of such a condition leading to changes in behaviour from market participants; and
- potential implications for dynamic efficiency of changing incentives for new investment.

3.7 Case Study 6: EU rules restricting market manipulation in trading markets

3.7.1 Overview of EU regulatory structure

The regulatory framework in the EU is unique in the sense that it transcends national borders. While member nations all have their own energy regulators that operate autonomously, the market rules are made at the EU level and must be implemented by member nations (though there are provisions for exceptions). Further, provisions exist in the market legislation that require the institutions at the national level to work collaboratively across borders to advance competition in energy markets.

The transition to establishing this single internal competitive market for electricity began in late 1996, when a directive was issued detailing common energy market rules to be implemented across member countries. This was subsequently reinforced by the latest round of EU energy market legislation (referred to as the third package). A major component of the third package was the establishment of the Agency for the Cooperation of Energy Regulators (ACER), which was created to undertake the following roles:⁴⁰

- drafting guidelines for the operation of cross-border gas pipelines and electricity networks;
- reviewing the implementation of EU-wide network development plans;
- deciding on cross-border concerns if national regulators cannot agree or if asked to intervene; and

⁴⁰ see <https://ec.europa.eu/energy/en/topics/markets-and-consumers/market-legislation>, accessed 27 March 2018.

- monitoring the functioning of the internal market including retail prices, network access for electricity produced from renewables, and consumer rights.

The role of ACER is effectively to facilitate cooperation amongst the various national regulators of member nations and to intervene when disputes arise – ensuring the smooth functioning of the internal energy market. While ACER does also have market monitoring functions, any potential harmful conduct that is identified is referred to the relevant national regulator for formal investigation and sanctioning (if required).

3.7.2 The Regulation on Wholesale Energy Market Integrity and Transparency (REMIT)

The central piece of legislation regarding safeguarding competition in the EU energy market is the Regulation on Wholesale Energy Market Integrity and Transparency (REMIT). Coming into effect in December 2011, REMIT was the first legislation that established an EU wide framework that:⁴¹

defined market abuse, in the form of market manipulation, attempted market manipulation and insider trading, in wholesale energy markets;

introduced an explicit prohibition for market manipulation, attempted market manipulation and insider trading in wholesale energy markets;

established a new framework for the monitoring of wholesale energy markets to detect and deter market manipulation and insider trading; and

provided for the enforcement of the above prohibitions and the sanctioning of breaches of market abuse rules at a national level.

The market monitoring function falls under the purview of ACER, which is tasked with collecting and analysing the data to identify potential breaches of the market conduct provisions. However, any allegation is subsequently referred to the relevant national regulator for investigation.

Article 2(2) of REMIT sets out the precise definition of market manipulation as it is to be interpreted under the legislation. However, given the potential difficulty for market participants to interpret the legal definitions set out in the legislation, ACER publishes a guidance document on how the definitions will be applied. Specifically, ACER identifies four broad types of market manipulation:⁴²

- false and/or misleading transactions;
- price positioning, ie, securing the price of one of several energy products at an artificial level;
- transactions involving fictitious devices and/or deception; and
- dissemination of false and misleading information.

Box 3.2 below provides examples highlighted by ACER in the guidance documents of conduct by market participants that would be considered to contravene REMIT regulations.

Box 3.2: Examples of conduct that breach REMIT regulations regarding market manipulation

The guidance document issued by ACER on the REMIT regulations, provides the following examples of behaviour that is contrary to the REMIT regulations:

- false/misleading orders/transactions and price positioning:

⁴¹ ACER, *Questions and Answers on REMIT*, 16 June 2017, p 6.

⁴² ACER, *Guidance on the application of Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency*, 22 March 2018, p 34.

- > **wash trades** – entering into arrangements for the sale or purchase of a wholesale energy product when there is no change in beneficial interests or market risk, or where these are transferred between parties who are acting collusively;
- > **improper matched orders** – transactions where both buy and sell orders are entered into at or near the same time, with the same price and quantity by different but colluding parties;
- > **placing orders with no intent to execute** – entering orders which are higher/lower than the previous bid/offer of the relevant market participant to mislead the market about demand and supply for that good at a given price;
- > **marking the close** – deliberately buying or selling wholesale energy products at the close of the market to alter the closing price of the product concerned;
- > **cross-market manipulation** – trading on one market to improperly position the price of a wholesale energy product in a related market;
- > **artificial pricing** – actions which cause prices to artificially fluctuate from equilibrium levels with no justification, eg, physical withholding of capacity without justification; and
- > **transmission capacity hoarding** – acquiring all or part of available transmission without using it or without using it effectively;
- transactions involving fictitious devices/deception:
 - > **dissemination of false or misleading market information through media** – publishing false information with the intention of moving the price of a wholesale energy product in a way that is favourable to the publisher;
 - > **pump and dump** – taking a long position in a wholesale energy product and then undertaking further buying activity or releasing misleading information to increase the price of that product;
 - > **circular trading** – executing a sell order with the knowledge that an offsetting buy order is being placed at the exact same time; and
 - > **pre-arranged trading** – two commodity dealers trading with each other at prices upon which they have agreed in advance; and
- dissemination of false and misleading information:
 - > **spreading false/misleading information through the media** – posting information which contains false or misleading statements about a wholesale energy product which is admitted to trading on an organised market; and
 - > **other behaviour designed to spread false/misleading information** – as above but not related to the media, eg, moving physical commodity stocks to create an artificial impression as to the demand and/or supply of that commodity.

3.7.3 Application to the Australian context

In the NEM no specific conduct rules for energy markets like the REMIT regulations exist. Instead, the combination of the NER and general anti-trust legislation is relied upon for managing the conduct of market participants. The REMIT regulations augment procedural market rules and general anti-trust legislation by setting out specific conduct that will be considered to be market manipulation in energy trading markets.

The EU is comprised of a more heterogenous set of jurisdictions than those that comprise the NEM and covers a more diverse set of legal contexts. As such, implementing a common set of conduct rules that negate the previous jurisdictional anti-trust laws for managing the conduct of firms may be more important.

The homogeneity of legal frameworks applicable across jurisdictions within the Australian market means that overarching rules for market conduct that augment these laws may not be as important.

Nevertheless, providing clearer guidance to market participants through a legal binding conduct framework may reduce enforcement costs and, therefore, increase the likelihood that forms of market manipulation may be prevented relative to the current measures applied in the NEM. Such conduct rules may also enable the prohibition of behaviour that may fall short of breaching the section 46 unilateral conduct provisions of the *Competition and Consumer Act 2010*, yet may still be undesirable in the context of the wholesale electricity market.

In summary, in assessing the appropriateness of implementing conduct rules like the REMIT regulations, the ACCC should consider:

- the types of behaviour that it seeks to prohibit under these regulations, that are not currently prohibited under existing anti-trust legislation or market rules and the rationale for why these behaviours should be prohibited;
- the frequency with which these behaviours may have been engaged in by market participants;
- the implications for static and dynamic efficiency and investment signals of placing additional restrictions on the behaviour of market participants; and
- the costs associated with developing and implementing such conduct rules.

4. Monitoring and responding to the use of market power by gentailers

Gentailers are firms that have ownership interests in both the wholesale and retail sectors of the electricity market. In theory, gentailers reduce the total cost of delivering energy through the efficiencies associated with natural hedging of generation and load. The potential cost of vertical integration across wholesaling and retailing electricity arises from its potential impact on competition and, in particular, the threat of new entry. Where gentailing is dominant, a new entrant must enter multiple markets simultaneously to obtain the same cost advantages and so compete with existing market participants.

The current status of vertical integration within different jurisdictions is heavily related to the structural reform that has been undertaken in the jurisdiction. In markets where structural separation between networks and retail has not been undertaken, the role of integration between wholesale and retail is minimal. Markets outside of Australia with vertical integration include, for example, New Zealand, United Kingdom, PJM, Spain, Ireland and Singapore.

4.1 Overview

Vertical integration is playing a more prominent role in competition in electricity markets in jurisdictions around the world. In light of this trend, concerns have been raised in numerous jurisdictions regarding the impact of gentailing on spot and contract market outcomes.

In the United Kingdom, Ofgem has put in place the Secure and Promote license conditions in an attempt to improve liquidity and access for new entrants in retail markets. However, analysis by Ofgem indicates that the benefits of this policy are not clear at this stage. Despite this, as part of its Energy Market Review, the Competition and Markets Authority (CMA) concluded that vertical integration was unlikely to be having a detrimental effect on competition and indeed may be having a positive effect on competition in the market.

While these appear to be contradictory stances, this appears to be a result of the broader assessment of the Secure and Promote license conditions being undertaken by Ofgem relative to its use in the CMA's energy market report. For instance, in the CMA's energy market report, the Secure and Promote license conditions are cited as dampening concerns regarding vertical integration and liquidity.⁴³ This is consistent with Ofgem's analysis that since the introduction of the conditions, some measures of liquidity have improved.⁴⁴ However, Ofgem's current review encompasses more than purely whether the conditions have increased liquidity – a key dimension of the review is identifying other factors such as the costs of the policy. It is in this sense that the benefits of the policy are not clear as, while liquidity may be improving, Ofgem does not have a full understanding of the other, potentially unintended, consequences of the conditions.

In Singapore, vesting contract arrangements have been in place since 2004 to mandate forward contracting, thereby mitigating the incentive for vertically integrated firms to exercise market power. However, the role of vesting contracts has diminished over time with a declining share of mandated contracts being required. Increasingly, the Energy Market Authority has been relying on other measures to mitigate market power and the strong power under the *Electricity Act 2001* to prosecute abuse of dominant positions.

In the US, vertical integration is most prominent in the ERCOT market and the PJM. However, ERCOT requires legal separation of businesses involved in retail and generation, which creates additional transparency with regards to operations at each level of the supply chain. The distinction between capacity and energy markets in US jurisdictions, and the corresponding disentanglement of remuneration for capacity

⁴³ CMA, *Energy market investigation – Final report*, 24 June 2016, p 321 para 7.38.

⁴⁴ Ofgem, *Secure and Promote Review: Consultation*, 25 July 2017, p 4.

and market power rents in energy markets, may have helped mitigate market power problems associated with vertical integration in the PJM.

4.2 Case Study 7: Secure and Promote licence conditions in the UK

Contracting and trading in the UK is conducted through over-the-counter trades (OTC) and independent exchanges, such as N2EX and EPEX. Trading occurs on intraday and day-ahead bases with longer term contracting typically done through OTC contracts.

See section 3.6 for further background on the UK market.

4.2.1 Secure and Promote licence conditions

The Secure and Promote licence condition was introduced in March 2014 by Ofgem, stemming from concerns that poor wholesale electricity market liquidity was acting as a barrier to effective competition – the results of which ultimately impact on consumers. The licence condition focuses on liquidity and is designed to improve independent retailers’ access to the wholesale market and ensure that the market provides the products and price signals that all companies need to compete effectively. Specifically, the rules have three liquidity objectives:⁴⁵

- promote the availability of products that support hedging by introducing minimum service standards for trading between retailers and large generators – known as the Supplier Market Access (SMA) rules;
- promote robust reference prices for forward products through market making obligations on the six large gentailing companies; and
- secure near-term market liquidity through a reporting requirement of day-ahead trading for large gentailers and large generators.

Figure 4.1 summarises the interventions that are designed to address the liquidity objectives discussed above.

Figure 4.1: Secure and Promote licence condition objectives



Source: see Figure 1, Ofgem, *Wholesale Power Market Liquidity: Annual Report 2015*, 9 September 2015, p 9.

⁴⁵ see https://www.ofgem.gov.uk/system/files/docs/2017/07/liquidity_consultation_july_2017_final_0.pdf, accessed 24 March 2018.

The following provides more detail on the specific interventions for the first two objectives set out by Ofgem, that is, SMA rules and the market-making obligation. While the third objective has no specific intervention, monitoring requirements are in place to enable Ofgem to evaluate whether the Secure and Promote Licence is achieving its objectives.

4.2.2 Supplier Market Access (SMA) Rules

The aim of the SMA rules is to ensure that independent retailers can access the wholesale market on acceptable terms. The rules were introduced in response to persistent concerns that independent retailers were constrained in setting up trading agreements – hindering their access to the wholesale market. As a result, smaller market participants were finding it difficult to enter the market and compete effectively.

To address these issues, the SMA rules set out minimum service obligations that retailers can expect when negotiating agreements with the largest generators in the market. This is designed to improve the ability of independent retailers to gain access to products better suited to their needs, while also ensuring credit and collateral terms offered are transparent. Further, the rules create an environment where negotiating with all eligible retailers is not treated as a low priority, generating incentives conducive to trade and therefore competition. While the large generators are able to set their own credit arrangements, it must be done in a non-discriminatory manner that does not disadvantage independent retailers. To ensure this is the case, the licence agreements include a process for establishing credit worthiness, which must be followed, with the rationale for credit decisions required to be transparent.

4.2.3 Market-making rules

The market making rules are targeted at encouraging competition in the generation and retail markets by ensuring the availability of necessary hedging products at a price that is reflective of its true market value. To this end, the rules require that the obligated licensees publish the prices at which they are willing to buy or sell a range of mandated products for up to two years in advance of delivery. Specifically, the bid-offer prices must be published for the full duration of two one-hour windows in every business day, with each product type having a bid-spread ceiling.

4.2.4 Evaluation of Secure and Promote licence condition

Central to the implementation of the Secure and Promote licence condition was to leave the condition in place for a substantial period of time (defined as a minimum of three years) before reviewing its effectiveness, so as to ensure the possibility of drawing robust conclusions.⁴⁶ As part of the consultation process, numerous changes to the rules have been proposed, predominantly in relation to the market-making obligation.⁴⁷ Specifically, the proposed changes to the licence conditions are designed to mitigate rising costs of the market-making obligation during periods of volatility. Submissions to the latest round of consultation closed in February 2018 and the matter is currently awaiting a final decision.

4.2.5 Application to the Australian context

No obligations like those included in the Secure and Promote licence conditions currently exist in the NEM. Market participants have no obligations to seek to increase contract market liquidity or access for other participants and are free to enter into contracts and participate in trading according to their own needs.

Similar to the UK, the presence of gentailers is a key feature of the NEM. One reason behind the introduction of the Secure and Promote licence condition was to address concerns regarding the potential negative impacts of gentailers on contract market liquidity and access. It may be the case that implementing a measure like the Secure and Promote licence condition would lead to an increase in the liquidity in the

⁴⁶ Ofgem, *Secure and Promote Review: Consultation*, 25 July 2017, p 4.

⁴⁷ Ofgem, *Secure and Promote Review: Consultation on changes to the special licence condition*, 13 December 2017, p 14.

contract market in the NEM and improve access for new entrants – however, evidence from the UK suggests that this is not inarguably the case.⁴⁸

These potential benefits need to be balanced against the potential costs associated with such measures, including:

- costs associated with market participants discharging their market making obligation – Ofgem estimates these to be approximately \$2.9m per licensee per year;⁴⁹ and
- potential impacts for market efficiency of market participants entering into contractual positions that they otherwise would not.

In addition, owing to the bilateral and confidential nature of the current contracting activities of generators, implementing such a scheme would require a substantial change to the level of transparency regarding the operation of the contract market.

4.3 Case Study 8: Restrictions on generation/retailing in US jurisdictions

Jurisdictions in the United States have taken many different paths in deregulation and restructuring of electricity markets. In general, vertical integration in jurisdictions with competitive markets is far less common than in other parts of the world, with the exception of the PJM. This is largely due to:

- requirements for vertical separation as part of the restricting process in some jurisdictions; and
- the prevalence of utility companies that retain a significant role in retail electricity sales.

Further, the California energy crisis⁵⁰ has resulted in a cautious approach to energy deregulation in many US jurisdictions.

One example of electricity market restructuring that is often cited as a success (though this is not universally accepted)⁵¹ is Texas. One of the defining features of the restructuring that occurred in Texas is that there was a proactive unbundling of vertically integrated incumbents – electricity services were separated into generation, transmission and distribution, and retail providers. While there was an initial grace period, this requirement for structural separation was legislated in 2003 (consumer choice was established in 2002). Specifically, Chapter 25 of the Substantive Rules Applicable to Electric Service Providers, Subchapter O (Unbundling and Market Power) requires that:⁵²

...(d) **Business separation...**

...(2) Each electric utility shall separate its business activities and related costs into the following units: power generation company; retail electric provider; and transmission and distribution utility company. An electric utility may accomplish this separation either through the creation of separate nonaffiliated or separate affiliated companies owned by a common holding company or through the sale of assets to a third party...

This is further reflected in the reporting rules of the same legislation, which require cost separation across the different components of the supply chain. Specifically:⁵³

⁴⁸ Ofgem, *Secure and Promote Review: Consultation on changes to the special licence condition*, 13 December 2017, p 9

⁴⁹ Ibid

⁵⁰ Shortly after market liberalisation retail electricity prices reached all time highs with generation capacity shortages forcing temporary power outages, see <https://www.eia.gov/electricity/policies/legislation/california/subsequentevents.html>, for a discussion.

⁵¹ Hartley, P, Medlock III, K and Jankovska O. *Electricity Reform and Retail Pricing in Texas*, Center for Energy Studies | Rice University's Baker Institute for Public Policy, June 2017, p 3.

⁵² see <https://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.342/25.342.pdf>, accessed 28 March 2018.

⁵³ see <https://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.344/25.344.pdf>, accessed 28 March 2018.

...(2) **Functional cost separation.** All electric utilities shall separate their costs into nine categories, relating to the following functions, as defined by S25.341 of this title (relating to Definitions):

- (A) generation;
- (B) transmission;
- (C) distribution;
- (D) transmission and distribution utility metering system services;
- (E) transmission and distribution utility billing system services;
- (F) additional retail billing services;
- (G) transmission and distribution utility customer service;
- (H) competitive energy service; and
- (I) other unregulated services.

As the subchapter title of the legislation suggests, the unbundling provisions were designed to mitigate the market power of incumbent electric utilities as the market opened to competition. The logic here is clear – a market cannot effectively open to competition if the incumbent that has the capability of supplying the entire market is not appropriately separated. While Texas employed the method described above, many other states used force, or encouraged divestment of assets to reduce the ability of one firm to supply the entire market, as well as to encourage entry through the sale of generation assets.⁵⁴

While competition at the wholesale level is important when transitioning to a competitive electricity market, it is only half the story – competition at the retail level is equally as important. In order to encourage entry into the restructured market at the retail level, the Public Utility Commission of Texas introduced the price-to-beat mechanism. Under this arrangement (which operated until 2007), retail electric providers affiliated with former bundled utilities were required to offer a set of rates to certain retail customers (based on demand and location within the distribution area).⁵⁵ These rates were subject to Commission approval as were any changes. The rationale was to stimulate market entry by providing a clear price signal that new entrants could undercut – theoretically securing part of the market by doing so.

In contrast to Texas and many other jurisdictions that placed restrictions on vertical integration as they transitioned to a competitive market, the PJM did not implement any such restrictions.⁵⁶ Rather, the majority of firms remained vertically integrated across wholesale and retail markets. It is important to note that Texas is also unique in that the incumbent utility is not required to service customers who do not choose a retail provider. In contrast, the regional incumbent energy provider in the 13 other states with competitive electricity markets are obliged to service those customers that do not elect a retail provider, on a basis that passes through the competitive wholesale price.⁵⁷ Further, there are differences between Texas and other jurisdictions in the extent to which the retailer engages with the customer. For instance, ERCOT retail providers have full ownership over the customer relationship (excluding outages) while in New York, New England and the PJM, services such as billing are performed by the local distribution company.⁵⁸

⁵⁴ Warwick, W. *A Primer on Electric Utilities, Deregulation, and Restructuring of U.S. Electricity Markets*, May 2002, p 6.7.

⁵⁵ see <http://www.puc.texas.gov/industry/Electric/rates/Default.aspx>, accessed 28 March 2018.

⁵⁶ Mansur, E. *Upstream Competition and Vertical Integration in Electricity Markets*, *Journal of Law and Economics*, February 2007, p 126.

⁵⁷ Littlechild, S. *The regulation of retail competition in US residential electricity markets*, University of Cambridge Energy Policy Research Group, 28 February 2018, p 3.

⁵⁸ *Ibid*, p 18.

4.3.1 Application to the Australian context

The different approaches to electricity market restructuring adopted in the United States provide useful case studies on the different evolutionary paths of electricity markets and the impact of key design choices on market structure. The examples of markets operating under different industry structures presented above are relevant to the Australian context should interventions aimed at changing the structure of the market in response to market power concerns be contemplated.

While the ERCOT market is an example of a successful competitive electricity market with limited vertical integration, seeking to emulate these outcomes in the Australian context by reducing the role of vertical integration through ownership restrictions would be a substantial change to existing market arrangements, and so would give rise to numerous challenges and costs. The reduction in potential harm to consumers, due to mitigating the harmful use of market power, would have to be considerable to balance the additional regulatory burden, transitional costs and reductions in market efficiency of enforcing any form of ownership restrictions.

We also note that relative to other jurisdictions, vertical integration in the NEM may yield higher benefits owing to the high market price cap. A high market price cap means that physical hedging may provide a particularly cost-effective means of risk management, relative to financial hedging.



5. Interactions between risk management and market power

The tools that retailers use for risk management tend to take a similar form in the majority of electricity markets globally.

In very broad terms, forward contracting between generators and retailers is typically used to mitigate retailer exposure to short run price fluctuations and to hedge the bulk of energy demand. To complement these forward contracted positions, retailers use short term trading and derivatives products to manage their residual risk exposure. Firms with vertical integration across wholesale and retail have a physical hedge and, therefore, are partially insulated from the wholesale price risks and so, have a lower aggregate demand for financial risk management products.

Depending on the industry structure and regulations pertaining to risk management products and trading, the interactions between risk management and the exercise of market power by firms differs. In particular, circumstances that give rise to a reduced quantity of contracts available to smaller retailers may inhibit the ability for retailers to manage their risks.

5.1 Overview

Internationally, mitigation measures aimed at addressing market power concerns in contracting have two approaches:

- regulated contracting mechanisms; and
- trading behaviour and transparency rules.

Overall, regulated contracting mechanisms are not common and are potentially becoming less so. Ireland has moved away from its direct contracting arrangements as part of its recent market reforms and transition towards the EU market design. However, it is currently considering what market power mitigation measures may be required under its new market design.⁵⁹

Singapore's vesting contract regime is still in place; however, the level of vesting contract quantities has decreased over time. The recent review undertaken by the Energy Market Authority sought to find alternative means to mitigate market power in the wholesale market in Singapore reflecting a desire to move away from vesting contracts in the future.

Policies aimed at conduct and transparency in contracting markets are a common approach adopted by regulators in managing the risks of exercise of market power in contracting markets.

In New Zealand, a significant degree of transparency exists with regard to the actions of participants in contract markets. This provides a good basis for the Electricity Authority to oversee contracting activities by participants and provide a disincentive for firms to seek to exercise market power in these markets.

As discussed in Section 4.2, the Secure and Promote License conditions in place in the UK are an attempt to address concerns with contracting in the context of vertical integration. However, the benefits of these contracting measures have been difficult to identify as Ofgem is yet to fully understand the costs associated with the policy.

⁵⁹ Industry Guide to the I-SEM, EirGrid, 2017, p. 17.

5.2 Case Study 9: The use of vesting contracts and risk management in Singapore

5.2.1 Overview of the Singapore electricity market

The Singapore energy market has been progressively opened to competition since 2001.⁶⁰ However, until recently, consumer choice has only existed for large businesses, ie, those with average monthly consumption of at least 2,000 KWh. Commencing in April 2018, the Energy Market Authority is expanding customer choice to households and small businesses by conducting a soft launch of what is referred to as the Open Electricity Market – currently non-contestable consumers in the region of Jurong will have the right to choose their electricity supplier. Part of the reason for the trial is to collect feedback to improve the customer experience before customer choice is implemented nationally.⁶¹ At the wholesale level, the market operates as a mandatory energy-only market with nodal pricing for generators.

Given that customer choice is only just expanding to households and small businesses, the dominant retailer to residential customers is SP Group – the Market Support Services Licensee (MSSL). While SP Group is not vertically integrated (it owns no generation assets), there are a number of gentailers active in the Singapore market (eg, YTL PowerSeraya and Senoko Energy).

5.2.2 Vesting contracts and risk management

Vesting contracts were imposed at the beginning of 2004 with the objective of curbing the market power of large, incumbent retailers by reducing the incentives for generators to distort wholesale market prices. As a result, vesting contracts are mandatory for the three largest generators and optional for other generators. The mechanism is designed to promote efficiency and competition in electricity supply to directly benefit consumers.⁶²

Vesting contracts are bilateral agreements signed between generation companies and SP Group. Generation companies are required to sell a specified level of electricity (the vesting contract level) at a specified price (the vesting contract price) – removing the incentive for generators to exercise market power by withholding capacity and artificially increasing the spot price.

The vesting price is set taking into account long run marginal cost (LRMC) of the most efficient generation technology that accounts for a minimum of 25 per cent of total electricity demand in the country.⁶³ The contract quantities for each generator are determined based on a proportion of the capacity of each generator.

In 2016, the Energy Market Authority (EMA) in Singapore undertook a review of the vesting contract regime with the view to identifying alternative means for mitigating market power in the future. The review cited two reasons why alternative means for mitigating market power are being considered, ie:⁶⁴

- negative impacts on long terms resource adequacy; and
- incentives for deferring retirement of less efficient capacity to be allocated more vesting contract quantities.

The review concluded that phasing out the vesting contracts regime and transitioning to a ‘balanced market regime’ would be the most appropriate way forward. In addition to the above shortcomings of the vesting contract regime, this conclusion is based on the following observations:

⁶⁰ see https://www.ema.gov.sg/Electricity_Market_Liberalisation.aspx, accessed 22 March 2018.

⁶¹ Ibid, accessed 3 April 2018.

⁶² see https://www.ema.gov.sg/Licensees_Electricity_Vesting_Contracts.aspx, accessed 22 March 2018.

⁶³ see https://www.ema.gov.sg/Licensees_Electricity_Vesting_Contracts.aspx, accessed 22 March 2018.

⁶⁴ EMA, *Review of the Vesting Contract Regime*, Final Determination Paper, 30 September 2016.

- phasing out the vesting contract regime would reduce intrusion in the market and regulatory burden; and
- a pivotal supplier test with administrative prices for pivotal generators would not be required because the impact of transmission congestion in the Singaporean market is not substantial.

5.2.3 Application to the Australian context

Vesting contracts have been used in a number of jurisdictions around the world, including Australia (ie, when Tasmania entered the NEM), as a way of managing market power concerns. A vesting contract regime can be effective at minimising the opportunities and incentives for market participants to abuse market power, however, there are costs associated with the implementation of such a measure. These include:

- vesting contracts inhibit price signals from providing appropriate incentives for efficient investment in generation;
- depending on the application, vesting contracts may create incentives for inefficient retirement of generation capacity; and
- implementation and enforcement costs associated with introducing and managing the scheme.

Owing to the potential for material impact on investment incentives facing generators, regulated contracting arrangement should be only considered in circumstances where there is a very clear concern about the abuse of market power.

5.3 Case Study 10: New Zealand electricity market hedge disclosure system

5.3.1 Overview of the New Zealand electricity market

The New Zealand electricity market operates alongside a derivatives market to allow market participants to hedge their wholesale market positions, in a manner similar to the Australian NEM. See section 3.2 for additional detail on the New Zealand electricity market.

5.3.2 Electricity market hedge disclosure system

The Electricity Authority views a transparent hedge or futures market with robust forward prices and easy access for new entrants as essential to promoting competition, reliability and efficiency in the wholesale and retail electricity markets.⁶⁵ This led to the creation of the electricity hedge market disclosure system, which is governed by Part 13, Subpart 5 of the *Electricity Participation Code 2010*.

The purpose of the disclosure system is to allow interested parties to view and compare contract details, as well as generate historic contract curves as a means of assessing the competitiveness of the hedging market across a variety of contract types. Specifically, hedge arrangement disclosures apply to contracts for differences, fixed-price physical supply contracts and options contracts.⁶⁶ Further, those parties entering into a hedging contract can use the information of historical contracts to assist in the negotiation process.

The type of hedging contract entered into dictates the information that must be disclosed, as well as the timeframe for disclosure after the trade date. For instance, contracts for differences and options contracts must be disclosed within five business days, while the other risk management contracts must be disclosed within ten days.

With regard to the specific information required for disclosure, options contracts require the following:⁶⁷

⁶⁵ see <https://www.ea.govt.nz/operations/wholesale/hedges/>, accessed 21 March 2018.

⁶⁶ Electricity Authority, *Electricity Industry Participation Code 2010*, 6 November 2017, Part 13 Subpart 5 p 125.

⁶⁷ Ibid.

- the trade date;
- the effective date;
- the end date; and
- the quantity.

The disclosure requirements for contracts for differences and fixed-price physical supply contracts are greater. Specifically, the following must be disclosed:⁶⁸

- whether the contract is a contract for differences or a fixed physical supply contract;
- the trade date;
- the effective date;
- the end date;
- the quantity;
- whether or not the contract applies to all trading periods within its term;
- whether there is an adjustment clause;
- whether there is a force majeure clause;
- whether there is a suspension clause; and
- whether there are any other clauses providing for the pass-through of certain costs, levies or tax or some form of carbon-related cost.

Further disclosure requirements also apply depending on the duration of the contract, including the price and relevant grid zone area of the contract for contracts for differences, and fixed-price physical supply where the term is less than ten years.

Given the information provided as part of the disclosure system is commercially sensitive, safeguards are in place to protect anonymity. Specifically, New Zealand is divided into five disclosure zones and each hedge price is adjusted by a location factor, meaning it is entered into the disclosure system as if it was assigned to a representative zone in each node. While the location-adjusted hedge price is publicly available, the parties to the hedge are not named nor is the actual hedge price ever entered into the system.

5.3.3 Application to the Australian context

The level of transparency in the New Zealand contract market is substantially higher than the contracting arrangements that currently operate alongside the NEM. Therefore, implementation of such a policy in the NEM would be a substantial change to the current operation of the contracting market.

In considering the application of a similar policy in the context of the NEM, the ACCC should consider whether:

- transparency regarding bilateral contracts in Australia would enable regulator authorities to observe the contracting behaviour of participants more readily, and so be able to better assess competitiveness of contracting behaviour of firms, particularly vertically integrated firms; and
- increased transparency may increase the risks of tacit collusion in contracting behaviour, through providing better visibility of rivals' contracting behaviour – this can be partially mitigated through appropriately setting the level of information made available to participants and the timeliness of this information.

⁶⁸ Electricity Authority, *Electricity Industry Participation Code 2010*, 6 November 2017, Part 13 Subpart 5 p 125.



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