
# Assessing generation – transmission mergers in the NEM

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# Executive Summary

The report investigates the possible competition concerns stemming primarily from vertical integration between transmission and generation. The context of the report is the proposed acquisition by Singapore Power (SP) of TXU Australia (TXU).

## VERTICAL INTEGRATION AND MARKET POWER: AN ANALYTICAL FRAMEWORK

Economic theory suggests that there are two channels by which vertical integration can improve the profitability of firms' activities. The first of these is through securing operational efficiencies. For vertical integration to improve efficiency, it must be a superior arrangement to arms-length contractual arrangements. Whether or not any efficiency gains result from any particular integration is a matter of empirical observation. A second channel through which vertical integration could enhance profitability is by increasing the incentive to exercise market power.

Vertical integration is generally more likely to result in the exercise of market power if at least one of the segments of the integrated entity is a monopoly. Firms in such circumstances are much more likely to have the incentives and ability to leverage the power they have in one market to restrict competition in another. For instance, if the monopolistic segment supplies an essential input or provides an essential service to downstream or upstream firms, it may attempt to foreclose competition through a range of discriminatory practices. These include favouring affiliates and refusing to deal with its affiliate's rivals, raising input prices or the cost of service, and through cross-subsidisation.

## VERTICAL INTEGRATION AND TRANSMISSION

Electricity transmission is characterised by a number of features, notably economies of scale and low elasticity of end-user demand, which make it a natural monopoly activity. Transmission Network Service Providers (TNSPs) fulfil a number of specific functions which are essential to other market participants, and for which few or no substitutes can be found. A vertically integrated entity involving transmission is therefore likely to have market power as well as the incentive and ability to undertake a number of actions to leverage the market power held in transmission into contestable generation and retail markets.

Possible actions include:

- Restricting access to the transmission network by delaying or degrading connections;
- Restricting the quantity and quality of the transmission service provided or pursuing improvements in network performance for its affiliated interests; and

- Sharing commercially sensitive information regarding competing generators with its affiliated generator or retailer.

Vertical integration could also present opportunities for regulatory evasion, for instance, through the smuggling of costs of unregulated businesses into an affiliated regulated business.

In practice, a variety of different regulatory approaches can and have been adopted to remedy perceived problems associated with vertical integration involving transmission and other activities. At one end is strict structural separation, under which the joint ownership of transmission and other electricity assets is prohibited. At the other end are regimes allowing vertical integration, but relying on behavioural rules (such as informational ring-fencing or accounting separation) to prevent the integrated entity from exercising market power. In general, behavioural rules have proved to be less effective in addressing market power concerns than structural separation. This in part reflects the inherent limitations on the ability of a regulator – primarily due to pervasive informational asymmetries – to detect and curtail both the range of opportunities an integrated entity has to exercise market power and the behaviour in which it may choose to engage. It is not clear whether the devotion of additional resources to regulatory supervision would have significant benefits in this respect.

## CHARACTERISTICS OF SP AND TXU

TXU is a diversified energy business with interests in retail *and* distribution activities for both electricity and gas, as well as electricity generation, via the Torrens Island Power Station (TIPS) in South Australia. TXU also has a Master Hedge Agreement (MHA) and fuel contract with Ecogen Energy (Ecogen), the operator of Victorian peaking plant, which may give TXU an interest and a degree of effective control over Ecogen. However, we emphasise that we have not seen the MHA or fuel contract. Finally, there is always the possibility that TXU may invest in constructing further generation assets in Victoria or South Australia.

SP owns PowerNet, the owner and operator of the bulk of the shared Victorian transmission network. PowerNet is governed by a range of regulatory and contractual arrangements, including the:

- National Electricity Code (NEC);
- Access undertaking to the ACCC;
- Transmission licence;
- Victorian System Code;
- Network Agreement with VENCorp; and
- Connection agreements with connected parties.

These arrangements impose obligations on PowerNet in a range of areas including, in broad terms:

- New connections and connection performance;
- Interconnector and shared network availability and performance; and
- Provision of reactive power, which, by stabilising voltages, supports network transfer capability.

Most of the regulatory and contractual obligations in these areas are relatively vague, referring to "reasonable" or "best endeavours". However, there are some financial incentives based on objective measures of network performance.

PowerNet performs a number of functions in the NEM. While VENCorp, the Victorian system planner, sets the "technical envelope" for PowerNet's network, PowerNet still has substantial freedom as to when planned network outages occur and how much reactive power is provided to maintain network capability. NEMMCO has a role in network operation, but this is largely limited to ensuring system security is maintained. PowerNet is obliged to make offers to connect to its network, but again the terms upon which connection is offered are imprecise. PowerNet has no role in planning shared network investment – the prime function of VENCorp – but PowerNet may tender for proposed augmentations.

PowerNet has access to a wide range of information through its ownership of the Victorian Network Switching Center (VNSC). This information exceeds the information available to market participants and includes:

- SCADA data, providing real time disaggregated data on generator output and various network elements – TNSPs have access to all this information for their regions whereas generators only have access to real time information of their own output;
- Pre-dispatch data published by NEMMCO – TNSPs have access to pre-dispatch information on generator availability broken down by generator whereas market participants only have access to aggregate generator availability for the region;
- Short- and Medium-term Projected Assessment of System Adequacy (STPASA and MTPASA) – again, TNSPs have generator availability by generator but participants have this only on an aggregate basis;
- Schedule of planned network outages – all Code Participants have access to this information but TNSPs are not required to adhere to the schedule they communicate officially to NEMMCO; and
- Generator technical information gathered from the management of new and existing connections.

## POTENTIAL CONCERNS WITH THE SP/ TXU TRANSACTION

The proposed integration of PowerNet and TXU could create competition concerns if:

- It could be said that at least one of the original firms had market power; and
- The combined firm had the incentive and ability to exercise that power in generation and/or retail activities notwithstanding the regulatory and contractual constraints around the entity's behaviour.

The second question may be complicated. Therefore, it can be broken down into two separate questions:

- How might the entity choose to exercise market power in generation and/or retail activities assuming it was not subject to any regulatory or contractual constraints; and
- Given regulatory and contractual constraints, is the entity likely to exercise market power in the ways suggested.

This means there are three separate stages to the analysis.

### Market power

As previously noted, PowerNet owns and operates the bulk of the Victorian shared transmission network. Although electricity from a generator is not required to travel through a transmission network to reach customers, in reality, opportunities for by-pass of the network are likely to be very marginal on both the demand and supply side. Therefore, the relevant market is for transmission services in Victoria and we submit that PowerNet has power in that market.

### Opportunities for PowerNet/TXU to exercise market power in the absence of constraints

The acquisition of TXU by SP will lead to an integrated entity combining, *inter alia*, transmission (PowerNet), generation and retail electricity assets (TXU).

The basic incentive for such an integrated entity would be to increase its profits either by:

- Increasing operational efficiencies; or
- Exercising market power.

The former possibility is outside the scope of this report. The principal mechanism for the integrated entity to exercise market power would be through leveraging its monopoly power in the transmission market to increase returns on its generation and retail assets. The sources of the firm's ability to engage in such practices are:

- Its roles and responsibilities in the Victorian system; and
- Its access to more information than other market participants.

### *Transmission and generation*

Specifically, from a generation perspective, the integrated entity could seek to promote more sales for its plants and higher wholesale prices in Victoria and South Australia. It may therefore have incentives to increase, for any given level of demand, the revenues of its generating assets. To achieve this, it could:

- Employ bidding strategies to maximise profits given (private) information about the availabilities and outputs of rival generators;
- Delay generator connections or reduce the evacuation of other generators' power;
- Reduce the power transfer capability of the Victorian network and interconnects (for example, by reducing the volume of electricity transported from Latrobe Valley and other rival generators to Melbourne and other load centres in Victoria and South Australia, from the Snowy region into the Victorian and South Australian regions, and possibly from the Victorian region to the South Australian region); and
- Manipulate the inter-regional settlement residue allocation process.

It should also be borne in mind that, beyond the actual exercise of market power by the integrated entity, the perception of other market participants may matter. If the integrated entity can generate the perception that, say, investment in generation is riskier than in the absence of integration, the effect may be to raise barriers to entry in generation.

### *Transmission and retail*

The integrated entity would also have incentives to favour its retail operations. For example, it could have incentives to:

- Delay or degrade the reliability of connections for loads of rival retailers; and
- Shift costs from contestable retail activities to monopoly regulated transmission activities to reduce retail costs and boost profitability and market share.

## Likelihood of PowerNet/TXU exercising market power given constraints

Whether these actions will be undertaken at any particular point in time would depend on their profitability, and testing this would require a substantial amount of further information. Further information would also be required to measure the practical impact of these types of behaviour. Both these aspects would need to be the subject of a separate investigation.

### *Informational advantages and generator bidding*

In regard to generator bidding, an integrated entity combining transmission and generation assets could use informational advantages gained though the transmission component (for example, on other generators' planned and actual outputs and planned outages) to support the development and implementation of

its own generators' bidding strategies. It is unclear whether existing ring-fencing provisions, which are predicated on structural separation, would curtail information flows within an integrated company. Even if ring-fencing provisions were to be augmented, experience in other jurisdictions suggest that their continued enforcement cannot be taken for granted. This is because vertical integration opens up a raft of additional opportunities for profitable information-sharing, which regulators have, in practice, been unable to prevent.

### *New Connections*

PowerNet could exercise its role in connecting new generators or loads in a discriminatory way, through delays or through substandard service. PowerNet is currently required to respond to connection requests within 65 days of receiving all reasonably required information. Within this requirement, it could implement faster timelines for preferred generators. Alternatively, it could delay the start of the 65 day period through onerous requests for information. Thus PowerNet has more discretion than is apparent at first sight in handling requests for connection. Even if PowerNet were considered to be in breach of the requirement imposed by the ESC to make an offer on fair and reasonable terms, it is unclear what remedies are available. In particular, revocation of its transmission licence appears to be an extreme measure if litigation involves only a few participants. In practice, experience in jurisdictions outside Australia suggests that where behavioural regimes allow flexibility – either implicitly or explicitly – on issues such as timing, such flexibility will be exploited.

### *Reduction of shared network and interconnector capabilities*

The integrated entity could use its control of transmission to manipulate shared network and interconnector capability. It could:

- Plan or reschedule outages at times to suit its generation (or retail) interests or harm rivals' interests;
- Engineer "unplanned" outages for similar purposes;
- Reduce provision of reactive power to reduce voltage limits on network transfer capability; and
- Reduce network capability by limiting the power evacuation of key "gatekeeper" generators (gatekeeper generators can influence network capability through their generation patterns – Southern Hydro is in this position in Victoria).

There are legal and financial constraints on these types of behaviours.

Legal

Legal constraints on opportunistic manipulation of network capability are relatively weak.

For example, while TNSPs are required to notify the market of the timing and duration of planned outages, the TNSP is not obliged to adhere to these times. NEMMCO may prevent planned outages going ahead, but only for system security reasons.

Unplanned outages are, by definition, not typically subject to formal review by either NEMMCO or VENCorp.

There are reactive power requirements in the Victorian System Code and Network Agreement, but the obligations are phrased in terms of "reasonable" or "best" endeavours, which are ambiguous and difficult to enforce, owing mainly to the fact that breaches of these obligations are difficult to establish.

There are also vague obligations in the NEC, System Code and Network Agreement to, broadly speaking, operate the network in a reasonable manner – for example, to apply "good electricity industry practice". Once again, these obligations are notoriously difficult to define and therefore detect and enforce.

The weakness of legal constraints in mainly a reflection of the fact that they were not designed to constrain an integrated entity that would seek to leverage its TNSP function to favour its other activities. The existing arrangements for the operation of the network fundamentally rely on the goodwill and good practice of the relevant parties.

It may be possible to enhance these legal obligations by giving VENCorp or NECA a more active role in preventing opportunistic behaviour. This would probably require changes to the NEC, System Code or Network Agreement to increase the precision of definitions and increase penalties for non-compliance.

Financial incentives

The Network Agreement Availability Incentive Scheme and the ACCC's regulated revenue cap for PowerNet may help constrain PowerNet/TXU from degrading network capability. Together these arrangements provide potential rewards or penalties for network performance of approximately 3% of PowerNet's regulated revenue.

Whether these incentives are enough to have this effect is an empirical issue. For example, assuming a penalty of $5,000/hour for unavailability of the Heywood interconnector, if TIPS was dispatched at 1000 MW, an outage of the interconnector for one hour would be profitable if it led to an increase in the South Australian price of more than $5/MWh. However, at peak times, such an action could cause the price to rise by $100/MWh or even $1000/MWh or more, making the manipulation highly profitable.

Going forward, if existing financial incentives were found to be inadequate, they could, in principle, be increased. The key issues would be:

- Implementation – the Network Agreement is a contract, not a regulatory instrument; and
- Form of penalties – increases in rebate rates would increase penalties *and* rewards. This could potentially lead to inefficient over-investment in preventing outages or a transfer from customers to the integrated entity, even if it did not exercise market power.

These issues could be managed, but they would require detailed consideration.

***Manipulation of Inter-regional Settlements Residue Auction Process***

A related concern is whether PowerNet could schedule transmission outages to profit from the inter-regional settlements residue auction process by, for example, acquiring IRSR units cheaply and then subsequently changing the timing or duration of inter-connector outings or de-ratings to increase the value of these units. This would reduce participant confidence in the value of IRSR units and damage inter-regional trade. The main constraint on this is NEMMCO's ability to exclude from the auction any party it believes to be acting on behalf of, or in concert with, a TNSP.

***Cost shifting contestable business costs into the regulated cost base.***

As a business that is regulated on a building-block basis, PowerNet has an incentive to maximise its allowed regulated costs, regardless of whether it is integrated or not. Integration would potentially afford PowerNet/TXU opportunities to shift costs from its contestable activities (generation and retailing) to the regulated transmission cost base. This would increase transmission charges to all market participants, but it would reduce the costs of the contestable activities and provide them with advantages over rivals. Cost-shifting would be more of a concern in electricity retailing because of the low margin nature of the activity.

While regulation may limit the extent to which regulated costs are inflated, integration increases both the opportunities for cost shifting as well as the difficulties of detection. This is due to the similarities between the assets of the different businesses and the frequent difficulties in drawing clear boundaries between asset and cost attribution between energy businesses.

However, given that TXU already owns retail and distribution business, the issue is the scope for *additional* cost-shifting from contestable to regulated activities allowed by the proposed transaction. Coming to a view on the magnitude of this additional cost shifting would require very detailed information on TXU's businesses.

## CONCLUSIONS

Overall, this paper concludes that the acquisition of TXU by SP gives grounds for concern regarding the exercise of market power in the wholesale and retail markets. A common thread running through the various scenarios set out is that **existing** governance and regulatory arrangements for the electricity industry are likely to be insufficient to curb opportunistic behaviour by an integrated entity. This is primarily a reflection of the fact that the **existing** governance and regulatory arrangements were not designed to deal with market power originating from the integration of transmission (a monopolistic activity) and generation/retail (contestable activities).

Consequently, a key issue is whether a modified regulatory regime, additional regulatory resources, and/or modifications to the financial incentives available under various contractual arrangements could better control an integrated entity's incentives or ability to exercise market power. Experience from overseas

jurisdictions suggests that strengthened behavioural regimes (tighter ring-fencing and disclosure requirements for example), in the absence of structural separation, have a limited impact on curbing the exercise of market power. This in turn reflects, in part, limitations on the capability of regulators to verify compliance and to pick out instances of anti-competitive behaviour. It is not clear from experience elsewhere whether this capability could be much improved by the devotion of additional resources to regulators.

If regulatory action is initiated retrospectively through litigation, itself a costly process, the lag between abuse and the implementation of action could further aggravate welfare costs. Moreover, a perception by participants that the containment of market power is uncertain could itself act as a barrier to entry.

# 1 Introduction

The Australian Competition and Consumer Commission (the Commission) has retained Frontier Economics (Frontier) to consider the competition concerns associated with vertical integration between electricity transmission and generation businesses, in the context of the proposed acquisition of TXU Australia (TXU) by Singapore Power (SP).

## 1.1 THE PROPOSED TRANSACTION

SP has entered into a sale and purchase agreement to purchase 100% of TXU from TXU Corporation, for an enterprise value of $5.1 billion.[1] TXU comprises a portfolio of energy assets, including:

- Ownership and operation of the 1,280MW gas-fired Torrens Island Power Station in South Australia;
- Electricity distribution to over 500,000 customers in the eastern suburbs of Melbourne and the eastern half of Victoria;
- Gas distribution along 8,000km of pipeline to over 432,000 customers in the Western and North-Western areas of Melbourne and 19 regional centres in Central and Western Victoria;
- Retail energy supply to approximately 530,000 electricity and 430,000 gas customers;
- The Western Underground gas storage facility with a capacity of more than 12PJ;
- A 33% stake in the SEA Gas pipeline; and
- A Master Hedge Agreement (MHA) for 95% of the output of Ecogen.

SP has an existing presence in Victoria through its 100% interest in SPI PowerNet (PowerNet). PowerNet owns and operates the 6,000 km high voltage electricity transmission network in Victoria. SP acquired PowerNet in July 2000.

The proposed transaction therefore results in common ownership and control of regulated electricity transmission and distribution assets and competitive generation and retail activities in the NEM.

## 1.2 BACKGROUND

A key feature of electricity industry reforms in Australia was the separation of network activities (transmission and distribution) from competitive activities (generation and retail).[2] Ownership of distribution assets in conjunction with

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1 Source: Singapore Power, *Singapore Power Makes Second Follow-on Acquisition in Australia*, Press Release, 26 April 2004.

2 For an in-depth treatment of the principles underpinning the NEM, please refer to Appendix 1.

generation and/or retailing assets was allowed subject to separation in accounting functions. Transmission assets could not be held conjointly with any other type of asset. In the case of Victoria, a further separation between transmission planning, on one hand, and transmission asset ownership and operation, on the other, was adopted.[3] Structural separation was seen as the most effective mechanism for managing the potential for (regulated) monopoly transmission businesses to use their market power to advantage in the areas of the market subject to competition. Some state governments also imposed restrictions on the extent of cross-ownership in the electricity industry in the transition to full retail competition. For example, legislation in Victoria restricts the extent of cross ownership between distribution, generation and transmission licensees. The emphasis on structural separation in the creation of the National Electricity Market (NEM) mirrored approaches that have been taken in some, but not all, overseas jurisdictions (see section 4.2).

Following the implementation of the reforms, and within the context of the operation of the competitive NEM, cross-ownership issues have moved from being a policy issue for consideration of the Government to being an issue for the Commission, as enforcer of the *Trade Practices Act* (TPA). It is within this context that Frontier has been asked to assist the Commission in consideration of generation and transmission mergers. At the same time, it is recognised that specific decisions on the implementation and enforcement of legislation are liable to have broader policy implications.

## 1.3 TERMS OF REFERENCE

The Commission is considering whether the proposed transaction is likely to have the effect of substantially lessening competition (SLC) under the TPA. To assist in its consideration the Commission has asked Frontier to provide advice on a number of questions:

- What competition concerns are raised by the common control of electricity transmission and generation facilities?
- To what extent are these concerns mitigated by the separation of network planning and network ownership in Victoria?
- To what extent are these concerns mitigated by the role NEMMCO plays in coordinating network outages in the NEM?
- Is common ownership of generation facilities in South Australia and transmission facilities in Victoria a concern?

[3] The roles and functions in Victorian electricity transmission are discussed in more detail in Appendix 1.

This paper develops a framework setting out why and how firms pursue vertical integration and applies that framework to the proposed SP/TXU transaction. In short, the integrated PowerNet/TXU entity would seek to maximise profits across its full portfolio of assets, including electricity generation, transmission, distribution and retailing assets, by exploiting:

- Its informational advantage over other market participants; and
- Its ability to influence the performance of the Victorian transmission network.

This paper focuses on coordination between transmission and generation for the purpose of maximising the joint profits of *those activities*. For this reason, it is important to note that this paper may present an incomplete competition analysis of the proposed transaction to the extent that the integrated entity's interests in distribution and retailing create different or offsetting incentives to its interests in generation and transmission. However, we make some brief comments on the impact of integration between transmission and retail activities.

## 1.4 STRUCTURE OF THIS REPORT

This report is structured as follows:

- Section 2 discusses the economics of vertical integration generally, and the relationship between vertical integration and the exercise of market power;
- Section 3 considers the economics of transmission networks, and the incentives this creates for vertically integrated transmission companies;
- Section 4 discusses the regulatory responses to vertical integration involving electricity transmission in Australia and overseas;
- Section 5 considers the proposed transaction in more detail;
- Section 6 discusses the specific concerns raised by this particular transaction, and the extent to which these concerns are mitigated by the allocation of the roles and functions in the Victorian transmission industry or other mechanisms; and
- Section 7 sets out our conclusions.

# 2 Framework for vertical integration

This purpose of this section is to develop a framework that will underpin the analysis of real-world transmission and generation mergers, including the proposed acquisition of TXU by SP.

In principle, firms engage in vertical integration to increase their overall profits. This can occur in two key ways, which are not mutually exclusive:

- Vertical integration can yield operational efficiencies; and
- Vertical integration can establish or increase the incentives and/or ability to exercise market power.

Although the merged firm benefits in both circumstances, the outcomes for consumers under the alternative scenarios diverge significantly. The distinction is therefore important in the present context because the statutory test in section 50 of the TPA asks whether a transaction would substantially lessen competition in a market. The purpose of this is to safeguard against mergers that lead to a decrease in consumer welfare through the exercise of market power. For this reason, it is important to consider that there may well be vertical mergers that are driven by operational efficiencies and do not necessarily facilitate the exercise of market power.

## 2.1 VERTICAL INTEGRATION AND OPERATIONAL EFFICIENCY

### 2.1.1 Vertical externalities and operational efficiency

Vertical integration involves a firm merging with another operating in the same production chain. Economic theory views vertical integration as one possible mechanism by which an upstream and downstream producer can jointly enhance the efficiency of their operations (from the point of view of their own profitability, though not necessarily from an overall social welfare perspective). The scope for operational efficiency gains exists principally because of the existence of externalities. That is, decisions made by one party over a range of variables (price, production, investment in assets, promotional effort, and so on) affect the profitability of the other, even though this impact may not be fully captured by the party making the decision. Autonomous decisions may therefore lead to sub-optimal outcomes. Specific externalities that may exist in the case of transmission activities are discussed in Section 3.

As one example of such externalities, consider the basic vertical externality between a producer of an intermediate good and a retailer, where both operate in imperfectly competitive markets. Any decision taken by the downstream firm to increase demand for its goods has an incremental effect on the demand for the goods of the upstream provider. However, the latter supplies the good at a price in excess of marginal cost, so that the downstream firm's cost is different from what its cost would be under an integrated structure (i.e. marginal cost). Therefore, the downstream firm does not take into account the incremental

impact of its decisions on the profit of the upstream firm. As a consequence, the downstream firm will chose a price that is too high, or a level of promotional effort that is too low, in the sense that neither maximise aggregate profits. This result is the direct consequence of the double mark-up or double marginalisation that arises from the separate operation of the upstream and downstream producer. Eliminating double marginalisation is unambiguously welfare enhancing if both firms are monopolists. Welfare effects are ambiguous if one firm operates in a competitive market.[4]

However, the existence of potential efficiency gains is not in itself a sufficient condition to justify vertical integration. Arms-length, contractual solutions offer an alternative to a hierarchical solution. For example, the double marginalisation problem could be addressed through the choice of contract specifying a two-part tariff containing a franchise fee.[5] Similarly, synergies between firms may also be achieved through contractual arrangements. As emphasised by Teece and Williamson, the key to determining whether production within a single firm is superior, on efficiency grounds, to production across unrelated firms, is the "facility with which the common input or services can be traded across markets".[6] In other words, a merger may only be preferable to arms length market arrangements when contracting between firms is difficult or costly.

### 2.1.2 Information, incentives and contracts

The key difficulty with contractual arrangements lies in the fact that agents have incomplete information. Contracts are likely to be incomplete as it becomes prohibitively expensive, *ex ante*, to describe and verify all relevant states of the world.[7] Where verification is costly it is difficult to determine contract terms, and even if this were possible, monitoring performance will be problematic.[8] In such circumstances, one or both parties may have incentives to engage in opportunistic behaviour, through *ex-post* attempts to optimise their share of profits. This "*ex post* haggling' is a source of costs.[9] Moreover, the uncertainty associated with *ex post* opportunistic behaviour will adversely affect decisions taken by parties (on investments, promotional effort, and the like) at the outset.

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4 See Tirole (1988), *The Theory of Industrial Organisation*, MIT Press.

5 Tirole, *op.cit.*

6 Williamson, O (1975) *Markets and Hierarchies: Analysis and Antitrust Implications*, Free Press.

7 see Hart, O. and J. Moore (1998), "Foundations of incomplete contracts", STICERD Discussion Paper No. TE/98/358

8 Williamson, O. (1975), *Markets and Hierarchies: Analysis and Antitrust Implications*, Free Press.

9 Teece, D. (1980) "Economies of scope and scale of the enterprise", *Journal of Economic Behaviour and Organisation 1 (223-247).*

The costs of incomplete information and their attendant consequences on contracts are likely to be amplified in the following circumstances:

- **Inability by parties to pre-commit to avoid (repeated) re-negotiation of the contract.** [10] This is partly a logical extension of the argument made above that it may be prohibitively expensive to describe all relevant states of the world. In particular, some of these states may, *ex post*, shift bargaining power to one party over the other, and therefore increase the scope for opportunism and "hold-outs".
- **Product heterogeneity.**[11] This arises when either the input or the retailed good is characterised by qualitative aspects which are subject to variation and which are differently valued in the market. The greater the heterogeneity, the more difficult it is for contracts to account for differing states of nature.
- **Asset specificity of investment decisions.**[12] That is, investments pay off at a future date only if the person undertaking the investment is able to have access to an asset or a class of assets. In the event the investor does not own the asset, the issue becomes who *does* own the asset and with how many people the investor will have to negotiate in order to access the asset. The greater the degree of asset specificity, the greater the cost of incomplete information and contracts on current investment decisions.
- **Incentive misalignment.**[13] This arises when managers of different firms respond to different commercial drivers, leading them to impose costs on the other firm(s). For example, one manager might be driven by the desire to minimise the costs associated with a transport task, whereas the other manager is driven by an objective to maximise sales receipts. Profit sharing agreements may not work if one party is able to misrepresent costs and earnings. Contractual arrangements may not be able to sufficiently specify disciplining mechanisms.

### 2.1.3 Information, incentives and vertical integration

#### *Benefits of vertical integration*

In the light of these arguments, how would vertical integration be a superior response to contractual arrangements in addressing the goal of improved operational efficiency? One basic argument would be to suggest that the transmission of information and the observation of behaviour are simply easier under an integrated structure than under separation.[14] Joint decision making

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10 See Hart. O and J. Moore, *op.cit*

11 Williamson, O., *op.cit*

12 Grossman, S. and O. Hart (1986), " The costs and benefits of ownership: A theory of vertical and lateral integration", *Journal of Political Economy*, Vol. 94, No. 4.

13 Williamson (1980), *op.cit.*

14 Arrow, K. J. (1975), "Vertical integration and communication", *Bell Journal of Economics,* Vol. 6, pp. 173-85.

increases adaptability to unforeseen shocks. A more fundamental argument, however, is to suggest that vertical integration opens up a range of instruments, particularly those designed to address managerial behaviour, that cope better with information-related hazards.

How might this happen? At a simple level, one could argue that it is much easier to decree, by executive *fiat*, what a decision maker (manager) might do under an integrated structure than under a separated one.[15] At a more complex level, vertical integration could be analysed as the transfer of "residual rights of control".[16] Such rights basically allow the holder to make decisions in the absence of any contractual specification, or where contracts are silent. The holder of these rights can create disciplines that may not otherwise have existed. In particular, under joint operation, the possibility exists of firing individual managers who do not act in the overall interests of the company. Under a separated structure, each firm would only have the possibility – apart from that of firing its own managers – of severing its relationship with the partner firm as a whole rather than specific managers of the partner firm whose incentives are not properly aligned with the first firm.[17]

More generally, there will be greater incentives for managers to undertake actions that will boost joint profits if managerial remuneration is tied into the joint profits of the firm. When investments are asset specific, managers will have the incentive to undertake the optimal level of investment when assets are under the control of an indispensable common owner overseeing all managers, rather than if assets were concentrated or divided amongst subsets of managers or owners.[18]

These arguments help us to understand how "internal trading changes the incentives of the parties and enables the firm to bring managerial control devices to bear … thereby attenuating costly haggling and disruptions and other manifestations of non-cooperative behaviour".[19]

### *Drawbacks of vertical integration*

It is important to note, however, that integration is not without its costs, or else firms would simply keep on integrating. This observation was raised by Coase, when he posed the question if the firm benefits from the efficiencies of integration, why is not "all production carried out in one big firm?' [20]

In particular, integration may itself lead to distortions in managerial incentives, because it may have simply shifted the incentives for opportunistic behaviour, rather than have removed them. For instance, managers may have fewer

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15 Coase, R. H. (1937), "The nature of the firm", *Economica 4*.

16 Grossman, S. and O. Hart (1986), *op.cit.*

17 Hart, O. and J. Moore (1990), "Property rights and the nature of the firm", *Journal of Political Economy,* Vol. 98, no. 6.

18 Hart, O. and J. Moore, *op.cit.*

19 Teece (1980), *op.cit.*

20 Coase, Ronald (1937) The theory of the firm, *Economica* 4, 386-405.

incentives to innovate if the owner expropriates returns from investment. Moreover, in a setting where there are intra-firm negotiations, control of residual rights will affect bargaining power. If benefits from these rights and enhanced bargaining power are positively linked to investment, then there may be incentives for one party to, *ex ante*, over-invest (because control of residual rights give it a better *ex post* bargaining position), and for the other to under-invest.

The net efficiency effect of vertical integration, relative to non-integration, depends on:

- Whether investment by the right holder is more important than investment by the party not holding the right; and
- Whether over-investment by the party holding the rights is less of a problem than under-investment by that same party were it not to hold those rights. [21]

Finally, even under an integrated structure, employee performance may not be properly disciplined owing to weak internal control, incompatible information systems, or unfamiliarity with the nature of work undertaken by employees of what was hitherto a different organisation. In such conditions, internal enforcement *may* in fact be weaker than the enforcement, through the external judicial system, of contracts between independent firms, notwithstanding the limitations of these contracts.[22]

### 2.1.4 Conclusion

One would expect to observe vertical integration if it performs better than non-integrated (arms length) arrangements in securing efficiencies of operation and other savings. Whether vertical integration is the preferred choice depends on:

- The balance of costs and benefits arising from integration; and
- How the balance of costs and benefits compares with the balance of costs and benefits of arms-length (non-integrated) solutions

It may be that as a matter of empirical analysis, there is little or no scope for integration to secure any net benefit in terms of operational efficiency. In that case, the establishment and use of market power would be a more significant driver for integration.

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21 Grossman, S. and O. Hart (1986), *op.cit.*

22 Williamson, O (1988), " The logic of economic organisation",. *Journal of Law, Economics, and Organisation, Vol. 4*, pp. 65-93.

## 2.2 VERTICAL INTEGRATION AND MARKET POWER

### 2.2.1 Incentives for the exercise of market power

To the extent that a vertical merger improves operational efficiency, it may potentially raise few competition concerns.[23] However, vertical integration could also be driven by, or lead to, the creation and exercise of market power, particularly market foreclosure. The precise circumstances in which the links between vertical integration and market power operate have been the subject of debate. One school of thought is that market power is typically enhanced by the elimination of the independent provision of substitutes, whereas vertical integration typically involves the elimination of independent provision of complements.[24] On this view, vertical integration between firms operating in competitive markets is less of a concern than horizontal integration. It is also argued that attempts to exercise market power by a vertically integrated firm may not work, for a number of reasons.[25] An upstream component of a vertically integrated firm may attempt to foreclose downstream rivals by limiting rivals' access to needed inputs or raising the costs of obtaining them. However, this would not be a tenable strategy if other input suppliers do not also raise input prices (which they may not if downstream firms' input demands are elastic), or if other downstream firms could integrate with upstream firms. Indeed, in a situation where there are a number of upstream and downstream firms, the link between integration and foreclosure is sensitive to a variety of assumptions regarding the strategic responses of firms, and parameters such as final and input demand elasticities.

It therefore appears that for vertical integration to give rise to concerns regarding market power, a necessary condition is that at least one of the firms involved has both the ability and incentive to exercise market power. For example, in industries characterised by extensive networks, such as the electricity industry, vertical mergers can, in certain instances, increase entry barriers with consequent implications for prices to customers.[26] Models in which vertical integration does not lead to foreclosure assume that there is some degree of (imperfect) competition in upstream and downstream markets. For this reason, it is worthwhile exploring what factors may make the ability and incentive to foreclose stronger when one of the parties is a monopolist.

The basic incentive for foreclosure can be characterised as an attempt by a monopolist to fully exercise its market power across other markets. Competition in the downstream market (in the case of an upstream monopolist) may be seen

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23 Vaney, Christine (1995), Vertical merger enforcement challenges at the FTC, www.ftc.gov/speeches/varney/varta.htm

24 See Brennan. T (2001)., "Vertical market power as oxymoron: getting convergence mergers right"., *Resources for the Future Discussion Paper 01-39*.

25 See Ordover, J., G. Saloner, and S. Salop (1990), "Equilibrium vertical foreclosure", *American Economic Review,* Vol.18, 1., March.

26 Vaney, Christine, *op cit.*

as reducing monopoly profits. Hence the monopolist may find it useful to restrict competition, and may do so by devising vertical restraints.[27] This has additional benefits because the unintegrated monopolist faces the problem of being unable to commit to restricting output. If a downstream operator claims that the restricted output and associated price set by the monopolist were unviable, the monopolist would have an incentive to increase output and reduce price. Vertical integration allows the upstream monopolist to control the behaviour of the downstream entity, and hence restrict output as originally planned.

Alternatively, under vertical integration, the monopolist may attempt to foreclose competition by refusing to deal with rivals to its affiliate, or by raising input prices to those rivals. The monopolist may also engage in cross subsidisation of the affiliate to increase market share. For foreclosure to be a viable strategy for the integrated firm, it is necessary that the adverse effect on the monopolist from lost (or reduced) demand from rival downstream firms be more than offset by the increase in profits accruing from the (future) gain in market power of the downstream segment of the integrated firm. This is more likely to occur over an extended time period if competition is reduced and prices can be raised by the affiliate over a larger customer base.

### 2.2.2 Vertical integration and regulatory evasion

A monopolist may seek to take advantage of vertical integration to (re) appropriate market power and monopoly profits that were curbed through the implementation of a regulatory regime. One possible scenario through which this may happen is cost-transfer. For example, a downstream monopolist may pay higher input prices to its affiliate, even if this affiliate were less cost competitive than rivals. (This is analogous to the "raising rivals' input prices" scenario when the upstream firm is a monopolist). Higher costs could be passed off to the consumer – if the practice is undetected by the regulator – through the regulated asset base.[28] Alternatively, costs from unregulated activities of the affiliate could be smuggled into the regulated cost base, and if undetected by the regulator, are then passed on to the consumer. Thirdly, the monopolist may implement a vertical price "squeeze". This could arise, for instance, when an upstream regulated monopolist supplies a vital input to retailers, and also competes on the retail market. The margin between the retail price and the wholesale price could be set at a very small value, effectively making retail activities unviable for retailers competing with the integrated firm. The operation of a price squeeze is in this respect very close to predatory pricing.

In practice, in order for a monopolist to use vertical integration as a means of regulatory evasion, it is necessary that some limitations be assumed about regulatory capacity. For example, it could be argued that that the regulator is unable to evaluate all purchase contracts, or that the resource costs of being in a position to do so would be very high. Even if certain aspects of the interaction

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27 Tirole, J, *A Theory of Industrial Organisation.*

28 See Frankena, M. W., and B. Owen (1994), *Electric Utility Mergers*, Praeger.

between the monopolist and its affiliate and with non-affiliates could be monitored, others may escape such surveillance. For instance, even if the pricing of transactions were perfectly monitored, levels and quality of service (for example the maintenance of transmission lines) may not be.

Difficulties associated with stopping a monopolist using vertical integration to evade regulatory disciplines appear considerable, particularly in industries in which the regulator is dependent on information provided by the regulated entity. This tends to be the case in most utilities. For instance, the United States Department of Justice argued that:

> *"Regulators may have great difficulty in policing [practices such as that of artificially inflating the price of internal transactions] if there is no independent market for the product (or service) purchased from the affiliate".*[29]

### 2.2.3 Conclusion

The question of whether a vertically integrated entity involving a monopoly in one market has the incentives and ability to exercise market power is a matter of empirical investigation, and not one that can be determined *a priori*.

The existence of a monopoly is neither a:

- *Necessary* condition (there are models in which vertical integration in the presence of upstream and downstream competition leads to foreclosure); nor
- *Sufficient* condition (the costs of business foregone through raising rivals' prices could be greater than the benefits),

to conclude *a priori* that the exercise of market power is inevitable.

At the same time, there are a number of intuitively plausible reasons to suppose why the exercise of market power in such a situation is more likely. In particular, imperfect or costly regulation creates incentives and ability to exercise market power in order to re (appropriate) monopoly profits. Under a longer time horizon, the balance of incentives to foreclose competition in an affiliate's market may swing in favour of exercising market power.

## 2.3 FRAMEWORK SUMMARY

There are two fundamental drivers for vertical integration:

- The enhancement of profits through the securing of operational efficiencies, and other sources of cost savings; and
- The enhancement of profits through the exercise of market power.

In particular, it was argued that for vertical integration to be considered as a rational response to efficiency-related drivers, it needed to be superior to alternative arms-length arrangements. The purpose of the substantial lessening of competition (SLC) test under section 50 of the TPA is to safeguard against

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[29] United States Department of Justice (1984), *Merger Guidelines*, Washington D.C.

instances of vertical integration driven by the second set of reasons – the exercise of market power. The preceding analysis provides the tools that would be useful in identifying whether an instance of vertical integration has or is likely to have undesirable properties from the point of view of the test.

It is of course possible that an instance of vertical integration comprises both efficiency related elements and market power considerations. The worst-case scenario would be that of a vertical merger which did not respond to any clear efficiency logic, *and* which increased the ability and incentive to exercise market power. Intermediate cases are:

- Where there are *neither* obvious operational efficiency drivers for the merger, *nor* an increase in the ability and incentive to exercise market power; and
- Where the merger does optimally respond to underlying efficiency drivers *as well as* increases the ability and incentive to exercise market power.

Given that the proposed acquisition is to be assessed in the first instance under section 50, the scenarios of immediate relevance are the worst-case scenario and the second of the intermediate cases, since both could involve a SLC.[30]

In order to establish which of the above scenarios best describes vertical mergers involving electricity transmission, the following sections examine:

- The economics of transmission activities (section 3); and
- Experiences in regulating transmission activities (section 4).

30 The exact balance of costs and benefits under the second intermediate cases is not relevant under section 50 determinations, but would to deliberations made pursuant to an application for authorisation.

# 3 Economics of electricity transmission networks

The previous section established a general theoretical framework for assessing vertical integration, including the possible anti-competitive consequences of a vertical merger. One finding was that a vertical merger is more likely to create competition concerns where one or both entities have power at their stage of the production process.

This section provides an overview of electricity transmission to identify the features of transmission that lead to transmission entities having market power and requiring regulation. This section also draws on the framework developed in section 2 to indicate the range of possible actions a vertically integrated transmission/generator may undertake to utilise its power in one activity to increase its combined profits from both activities.

## 3.1 KEY ECONOMIC CHARACTERISTICS OF TRANSMISSION

### 3.1.1 What is transmission?

***Transport aspects***

Transmission is a long-distance bulk transport service for electricity between producers (generators) and consumers. It comprises:

- Connection to a network; and
- Transport between points within the network.

In most cases, transmission is a necessary intermediate service in the delivery of power to customers. It complements the service of power generation by transporting power across long distances to loads. However, as with most other transport services, transmission is not a physically necessary part of the production process, but a means of providing a commodity to consumers at lower cost than would otherwise be the case. This means that electricity can be produced and consumed without the use of transmission services, albeit often at much higher cost. For this reason, at least on the margin, local (embedded) generation and demand-side management (DSM) may be substitutes for transmission services. Nevertheless, for the bulk of electricity provision, transmission is a component of the chain of supply.

***System operation aspects***

In practice, transportation of electricity through a transmission network involves a bundle of services, which can be provided by one or several entities. The key services are:

- Network ownership and maintenance;
- Network planning and development;
- Network operation;
- Scheduling and dispatch; and
- Maintenance of system security.

In many power systems, the last two services are referred to as system operation functions.

### 3.1.2 What are the key characteristics of transmission compared to generic industries?

***Economies of scale***

Transmission services typically exhibit economies of scale across the range of activities outlined above.[31] Economies of scale in transmission arise in several ways:

- First, the *unit* capital cost of developing a transmission line falls as the capacity of the line increases. This is partly because some of the costs of developing a transmission line are fixed and do not vary with line capacity, and partly because even when costs do rise with transmission capacity they tend to rise by a smaller proportion. For this reason, it is cheaper to build one line of large capacity than to match that overall capacity with two lines of smaller capacity; and
- Second, many of the non-capital costs of providing transmission services do not vary greatly with output. For example, the costs of ownership, maintenance and operation tend to vary by less than the quantity of electricity transported through a network. In the case of system operation functions, more than a single system operator is either not feasible or leads to higher unit costs. The only costs that tend to vary with provision of transmission services are transmission losses and constraints and these are small compared with capital and operating costs.

[31] The term "economies of scale" refers to a situation where the cost of producing one unit of a good or service decreases as the volume of production increases. The converse situation in which the cost of producing a unit of a good or service increases as the volume of production increases is known as diseconomies of scale. Economies of scale tend to occur in industries with high capital costs in which those costs can be distributed across a large number of units of production.

The existence of significant economies of scale in the provision of transmission services implies that it is likely to be *inefficient* to either:

- Develop transmission capacity in small increments; or
- Duplicate transmission networks.

Left to market forces, economies of scale in transmission are likely to result in the formation of a monopoly. For example, if a firm develops a transmission line to a new load centre, it is likely to be uneconomic for another participant to develop a competing line. This is the key reason why transmission networks are often regulated monopolies over particular geographic areas, as in the NEM regions, England and Wales, New Zealand and other jurisdictions.

### *Externalities*

Externalities or spillover effects are pervasive in electricity networks and are a further rationale for regulation. Externalities arise in both network development and operation.

Electricity flows in a meshed alternating current (AC) network follow Kirschoff's Law – that is, they follow the path of least resistance. This can create complications in detecting the effect of an augmentation. For example, a weak link connecting two generator nodes could reduce the transfer capability from the cheaper generator to load. Therefore, network development may have unintended positive or negative effects for other parties. If these externalities are significant and the costs of contracting between transmission investors and other parties (both 'winners' and 'losers') are also significant, the market could provide an inefficient level or type of transmission investment.

Another common type of externality affecting transmission is the 'pecuniary externality'. Due to economies of scale and the inelasticity of demand for electricity (see below), transmission investment can have a significant effect on prices at the points or nodes it is between. This means some of the price impacts of a transmission investment may fall, at least initially, on parties other than the investor. For example, an existing transmission line between nodes A and B could be constrained, leading to a price differential between the nodes of $10/MWh. Augmenting the line between the nodes may be efficient, but if the effect of the augmentation is to reduce constraints and thereby reduce the price differential to, say, $0/MWh, it may be unprofitable for the investor to develop the augmentation if its only source of revenue is arbitrage between the nodes. The investor would need to capture some proportion of the benefits that accrue to other parties, by perhaps signing contracts with beneficiaries before the augmentation was developed. If the transactions cost of the investor contracting with beneficiaries was significant and this prevented the investor being able to capture enough of a share of the pecuniary benefits that result from the augmentation, the investment may not go ahead. Therefore, network

development on the basis of market signals may lead to underprovision from a social welfare perspective.[32]

At the same time, pecuniary externalities may also affect investment in other electricity infrastructure such as generation. These externalities will not create too many problems so long as they are relatively small – that is, if the externalities are small relative to the size of the overall investment.

#### *Low elasticity of end-user demand*

The demand for electricity is very inelastic – that is, unresponsive to price – at least in the short term, for all relevant price ranges. This means that a firm in the electricity supply chain with market power will have strong incentives to use that power to raise prices and profits. While this may have limited efficiency (as opposed to wealth) impacts in the short term, in the long term, high electricity prices will have negative impacts on other sectors of the economy and are likely to harm overall economic welfare. Consequently, an activity such as transmission that is a key part of the supply chain and has natural monopoly characteristics typically requires some form of price and/or revenue regulation in order to prevent transmission entities from harming economic efficiency. Indeed, the National Electricity Code (NEC) states that one of the key objectives of the regulatory regime for transmission entities is to prevent monopoly rent extraction (clause 6.2.2(c)).

## 3.2 TRANSMISSION INCENTIVES WHEN VERTICALLY INTEGRATED

As noted above, the economic characteristics of transmission and its role in the supply of electricity suggest that some form of regulation is required to promote efficient outcomes, especially in the longer term. This requirement for regulation exists even where the transmission provider is a stand-alone entity. As outlined in section 2.2, the main ways that a vertically integrated entity can use its market power to increase its profits are based on foreclosing the market and regulatory evasion. These are discussed below.

### 3.2.1 Foreclosure

#### *Transmission and generation*

In the context of vertical relationships between transmission and generation, there are a number ways, in the absence of regulation, that a vertically integrated operator could increase its profits by assisting its generation activities. This may or may not involve damaging the interests of rival generators. These behaviours are examples of the integrated firm's incentives – discussed in the previous

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32 See Tamblyn J, "Managing Electricity Transmission Network Congestion", *APEC Energy Regulators Forum No. 9*, Kuala Lumpur, May 17-18 2001, pages 9-10. See also Cameron L, "Transmission Investment: Obstacles to a Market Approach", *Electricity Journal*, March 2001, pages 25-38.

section – to limit or raise the price of access to monopoly services in order to foreclose competition and increase its profits:

- **Refuse/cut/degrade connection** – a vertically integrated entity can foreclose rival generators' access to the wholesale market by restricting rivals' access to the transmission network. This may fall short of complete denial of access. For example, the transmission operator may delay or stall new connection applications or time maintenance of connection assets to align with peak demand events. This would tend to raise wholesale prices and boost the profits of the integrated firm. Such incentives are often strong in electricity markets because of the low elasticity of demand for electricity, which means that even a small reduction in available supply could lead to a very large increase in wholesale prices.
- **Downgrade/reduce transportation** – in addition to actions that specifically affect the power evacuation capabilities of rival generators, the transmission operator may reduce the overall quantity or quality of the transmission service, thus restricting overall supply to the market. Depending on the allocation of responsibilities between the transmission entity and the system operator, a transmission operator may be able to downgrade the transfer capacity of an existing transmission line. The rationale for such action would be similar to that for refusing a connection or disconnecting a generator – to reduce supply and increase prices. Even if the dispatch of the transmission entity's generation interests were affected by the downgrade, the integrated entity could increase its combined profits. In the context of the NEM, this could involve a downgrading of both intra and inter-regional transmission assets, depending on the assets of the transmission asset owner in question.
- **Bias investment in favour of generation interests** – if a vertically integrated transmission/generation entity had control over shared network investment, it could invest in the grid to improve the sales of its own generation interests, without doing the same for other generators. Presumably, a transmission entity will have some discretion as to which network projects it should invest in and could select those projects that favoured its generation plant. This would have a similar impact to the conduct described above regarding degrading other generators' connections.
- **Share commercially sensitive information** – to the extent that a transmission operator had access to private information about a competing generator, this could be provided to the transmission entity's portfolio generator to aid its bidding strategies in the wholesale market and in settlement residues auctions. This would only be an issue if the information did not enter the public domain until it was too late for other market participants to respond in a similar manner.

If control over transmission activities were combined with control over system operation, then in addition to reinforcing the concerns outlined above, the combined entity could favour its portfolio generator in dispatch. Presumably, scheduling and dispatch activities would be subject to rules, as they are for standalone system operators (such as NEMMCO). However, even within these

rules, there is often a great deal of discretion left to the system operator as to how it conducts dispatch.

#### *Transmission and retail*

If transmission is combined with retail interests, similar incentives could apply to the entity. For example, the entity may have an incentive to delay or degrade the direct connection of a new large load that was contracted to a rival retailer. This could be used as a strategy to encourage the load to move to the integrated entity's retail business. Similarly, the integrated entity could reduce the reliability of power delivery to the directly connected load by taking unnecessary outages on the shared network that supplied the customer.

### 3.2.2 Evasion of regulation

#### *Transmission and generation*

Another concern with respect to vertical integration between transmission and generation is the ability of the vertically integrated firm to evade regulations designed to limit the returns of the transmission business.[33] For example, where regulation seeks to constrain the exercise of the market power of the transmission entity through building block-style revenue cap regulation, the vertically integrated firm may have an incentive to attempt to engage in cost transfer from its unregulated generation business to its regulated transmission business. Specifically, to the extent that the regulatory arrangements permitted the transmission business to recover its capital or operating expenditure or a return on its asset base, the integrated firm may seek to transfer assets or attribute expenditures of the generator to the transmission activity. Whether this would be feasible for the merged entity would depend on the relevant regulatory rules and processes applicable to the transmission business.

#### *Transmission and retail*

Once again, similar considerations apply with respect to transmission and retail integration. For example, an integrated retail and transmission business would have incentives to transfer costs from the contestable retail business to the regulated network business. Given the low margins that prevail in electricity retailing, even a relatively small degree of cost smuggling could increase the margin of the integrated firm and enable it to increase market share and profits.

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33 Refer to section 2.2.2 for a more general discussion on vertical integration and regulatory evasion.

# 4 Regulatory responses to vertical integration of transmission

Having established the economic characteristics of transmission, and the incentives this creates for vertically integrated transmission entities, this section considers the regulatory responses to vertical integration in transmission. We begin by outlining a range of potential regulatory approaches, before discussing the approaches to managing vertical relationships in transmission in Australia and overseas.

## 4.1 REGULATORY APPROACHES TO VERTICAL INTEGRATION

In practice, a variety of approaches can be and have been adopted towards vertical integration involving transmission activities. These are:[34]

- **Structural separation –** of asset ownership, with the imposition of line-of-business restraints prohibiting the owner of transmission assets from entering other activities;
- **Operational unbundling** – through which the ownership and control of transmission assets are separated. The owner of transmission assets may also own assets in other segments of the electricity supply chain, but control of the transmission assets and system operation decisions lie in the hands of an independent systems operator;
- **Corporate separation** – contestable and non-contestable activities are carried out by legally separate entities. Prohibitions apply to the transfer of funds between them, and the communication of information;
- **Integrated structures with behavioural rules –** this involves retaining or permitting an integrated structure covering transmission and contestable activities, but imposing internal behavioural constraints. These include:
  - functional or managerial separation – under which activities are carried out by distinct divisions within the same firm, often with strict ring-fencing guidelines to limit the flow of information between these; and
  - accounting separation – the preparation of separate accounts for the contestable and non-contestable business, again often in conjunction with ring-fencing requirements limiting the flow of cost information;
- **Behavioural measures** – such as the development of access regimes, to ensure that under vertical integration, the transmission provider implements non-discriminatory access to its services; and to ensure that monopoly prices are not charged.

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34 See for instance, International Energy Agency (2000), *Electricity Market Reform: An IEA Handbook*.

The first of these measures, full structural separation, addresses both the ability and incentive of the transmission provider to exercise market power in a manner that would foreclose upstream of downstream competition.[35] On the other hand, separation of activities within an integrated structure would, *a priori*, affect the ability, rather than the incentive, to exercise market power in an anti-competitive manner. The same would also apply to other behavioural measures.

It should be noted that these approaches are often used in combination to mitigate perceived adverse consequences of market power. Accounting separation could go hand in hand with access regimes that prescribe non-discriminatory prices. Full structural separation would still require behavioural constraints, such as price cap regulation, to restrain monopoly pricing by the transmission provider.

A critical point to note is that the selection of any particular approach carries implications for the overall architecture of regulation, and indeed is reflective of the underlying prevailing regulatory 'philosophy'. Thus, in jurisdictions requiring full structural separation in the ownership of transmission assets from other assets, the regulator's focus lies primarily in preventing monopoly pricing by the transmission entity and ensuring operational efficiency. Standards are set to ensure minimum levels of service, while information disclosure requirements are set to facilitate the establishment of the price/revenue cap and the regulation of capital expenditure.[36]

On the other hand, in jurisdictions where structural separation in ownership is not enforced, the accompanying regulatory measures would need to differ. In particular, behavioural rules and constraints would need to carry a heavier burden in safeguarding against market power. In particular, the regulator would have to concern itself with ensuring both that the transmission provider did not set monopoly prices, *and* that the transmission provider did not engage in discriminatory practices (as outlined in section 2.2.2). Heavy informational disclosure requirements and close scrutiny would also be needed to detect (and deter) cross-subsidisation. The regulator would have to ensure that the integrated entity remained unable to use information to the detriment of unintegrated competitors in upstream of downstream markets, or that such competitors were disadvantaged through various practices such as selective compliance with maintenance standards.

It follows from this that any change in the application of one measure is likely to require a change in accompanying measures. For example, a relaxation of a rule requiring full structural separation would require new forms of regulation (for example, increased disclosure requirements and the implementation of ring-fencing) that were adapted to the new incentives and opportunities that may arise for the exercise of market power. Existing institutional arrangements may not

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35 Note that the transmission provider will still, regardless of separation, have the incentive to charge monopoly prices.

36 See New Zealand Ministry of Commerce, *Light-Handed Regulation of New Zealand's Electricity and Gas Industries.*; Newberry (1998).

have been designed to cope with the new incentives or opportunities to exercise market power. The question that then arises is whether regulation is an effective substitute for structural separation.

The following sections provide an overview of international experience in order to explore how structural separation compares to other regulatory alternatives.

## 4.2 PRACTICAL EXPERIENCE

Observations of regulatory practice in OECD countries show that a variety of approaches have been adopted to the ownership and operation of transmission and other assets. [37] The United Kingdom (England and Wales), most States within Australia,[38] New Zealand, Norway and Sweden, have opted for structural separation between transmission providers and other segments of the electricity market. In some of the jurisdictions, the state retained control of transmission assets. In the Australian NEM States, a further separation was in introduced between the entity owning transmission assets and the system operator (NEMMCO).

Most jurisdictions within the United States opted for functional separation (managerial and accounting ring-fencing) and operational separation between transmission network functions and systems operation. Canada, Denmark and Italy appear to have opted for corporate separation, while Germany and the Netherlands have opted for managerial separation. France has implemented accounting separation, supported by access regulation, within a largely integrated model.

Faced with this diversity of international experience and practice, a question that arises is whether any lessons might be drawn about what desirable approaches to vertical integration and transmission activities. The OECD, in its recommendation concerning structural separation in regulated industries stated that:

> *"When faced with a situation in which a regulated firm is or may in the future be operating simultaneously in a non-competitive activity and a potentially competitive complementary activity, Member countries should carefully balance the benefits and costs of structural measures against the benefits and costs of behavioural measures. The benefits and costs to be balanced include the effects on competition, effects on the quality and cost of regulation, the transition costs of structural modifications, the economic and public benefits of vertical integration, based on the economic characteristics of the industry under review."* [39]

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37 see OECD (2001), *Restructuring Public Utilities for Competition,* and Bergman, L. G. Brunekreeft, C. Doyle, N-H von der Fehr, D. Newberry, M. Pollitt, and P. Regibeau (1999), *A European Market for Electricity? Monitoring European Deregulation*, Centre for Economic Policy Research, London.

38 The process of reform in Australia, and its underlying rationales are discussed in more detail in Appendix 1.

39 OECD (2001), *OECD Recommendation of the Council Concerning Structural Separation in the Regulated Industries.*

This recommendation sets out a number of dimensions along which to assess arrangements regarding vertical integration, as well as a change in these arrangements. The investigation is thus an empirical one. Factors that could determine the outcome of the assessment include amongst other things, the demands placed on regulatory resources, and the details of how industry operators interact.

A cross-country study on the determinants of performance measures in the generation sector found, *inter alia*, that:

- Separation of generation and transmission along with increased private ownership increased efficiency (proxied by the utilisation rate); and
- Separation of generation and transmission improves the quality of supply.

In neither case does the presence of access regimes have any explanatory power.[40]

Country-specific experience in transmission regulation tends to point towards the drawbacks of permitting the integrated ownership of transmission and other assets, conditional on behavioural rules. In the light of enforcement experience in the United States since 1995, the Federal Energy Regulatory Commission (FERC) argued that existing behavioural rules based on functional separation, in particular through managerial and information ring-fencing, and non-discriminatory (open) access,[41] had not secured competitive benefits.

> *"Vertically integrated transmission providers have found numerous ways to delay or prevent entry of competitors, some within the existing rules, and some by exceeding reasonable discretion afforded to the transmission provider. All of these are difficult to monitor or prevent with behavioural rules".*[42]

The discriminatory practices identified in specific disputes brought before the FERC primarily concerned included:

- Transmission providers reneging on long term contracts in order to service its native load growth;
- Transmission providers delaying responses to requests for services by not respecting agreed timelines, and/or by expansively interpreting tariff procedures;
- Scheduling advantages to the integrated transmission provider over rival competitors;
- Advantages in the resolution of energy imbalances;
- Discrimination in the calculation of available transmission capability;

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40 Steiner, F. (2000), "Regulation, Industry Structure and Performance in the Electricity Supply Industry", OECD Working Papers No. 238.

41 These requirements were set out in Order No. 888 of the FERC.

42 FERC (2002), *Remedying Undue Discrimination Through Open Access Transmission Service and Standard Electricity Market Design – Notice of Proposed Rulemaking,* Docket No. RM01-12-000.

- Transmission providers could manipulate Open-access Same-time Information Access (OASIS) postings[43], or engage in prohibited (off-OASIS) communications with affiliates;
- Reservation of excessive amounts of capacity, thus blocking the ability of competitors to access service; and
- Transmission providers dispatching their own generation to service their load in a way requiring transmission curtailments that affect competing generators.

In the final analysis, it was recognised that behavioural rules and constraints, coupled with functional separation, left intact the incentive to engage in anti-competitive behaviour. While the existing regulatory architecture could constrain such behaviour in some instances, it was nevertheless inadequate as a deterrent.

In electricity markets, where power is auctioned on a half-hourly basis, there are limits to what may be achieved by a regulator through the implementation of behavioural rules.

> *"A well-resourced regulator, through persistence and vigilance, could hope to limit the anti-competitive activity of the incumbent, but the outcome is unlikely to be as much competition as would arise in the absence of the incentive to restrict competition…Hemming in transmission owners behaviour, though possible in theory, will be difficult to maintain in practice. Successfully containing their behaviour at one time and place may provide little assurance of containing it later or elsewhere".*[44]

The argument here is as much about regulatory capacity, and what a regulator could be reasonably expected to achieve, as anything else. The reasoning appears to find resonance in other jurisdictions and industries. A number of European countries have gone beyond the European Commission's directive (EC96/92EC) (which contained a minimal requirement of accounting separation and informational ring-fencing), and have implemented (or are considering implementing) operational separation, or full separation.[45]

Experience in different countries suggests that transmission regulation relying heavily on behavioural rules appears to perform negatively within the framework for assessment set out in the OECD recommendation. In particular, such arrangements are resource-intensive in their implementation, and relatively weak in safeguarding against anti-competitive behaviour. Regarding transmission regulation in Denmark, the OECD argued that corporate separation was insufficient to guard against discriminatory practices. Operational separation of transmission operation and asset ownership could supplement corporate separation, but would nevertheless require substantive regulatory resources to administer in the absence of full structural separation. The Danish Competition Authority itself recognised that structural separation was the most effective

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43 Transmission operators are required to make available to all market participants information relating to transmission and network operation ( generator output, loads, voltages, and so forth).

44 Federal Trade Commission, cited in OECD (2002), "Restructuring Public Utilities for Competition", *OECD Policy Brief.*

45 See OECD (2001), *op.cit.*

means of guarding against discriminatory practice.[46] Similarly, the OECD argued that common asset ownership in transmission and generation in the Netherlands[47] would require costly, and potentially ineffective, regulation.

The Monopolies and Mergers Commission (MMC) in the United Kingdom made a similar argument regarding corporate separation in the gas industry, stating that the creation of separate subsidiaries for transport and trading, and the implementation of 'Chinese Walls" could not guarantee competitive benefits. Difficulties encountered through the 1980s in curbing anti-competitive behaviour of British Gas was an important factor in motivating the UK government's decision to opt for structural separation at the outset when it decided to initiate reforms to the electricity industry in 1989.[48] The experiences also formed that basis on which the MMC, in 1992, recommended full structural separation in the Gas Industry. The MMC argued that the competitive gains would outweigh the costs of restructuring, transitional costs and costs incurred through the loss of economies of scope.[49]

In the light of recent experience in the United States, the FERC proposed to strengthen transmission regulation by requiring that interstate transmission providers become independent operators, hand their facilities to independent operators, or contract the operation of facilities to independent providers.[50] In effect, FERC proposed to give the choice between operational unbundling and full vertical separation. The FTC has argued that "divestiture represents the cleanest type of structural remedy for transmission discrimination by severing the ties that create the incentive to discriminate". Indeed, even with the separation of transmission operation and network function, the scope for at least some of the activities identified by the FERC (see footnote 42 above) to continue would remain intact. Similarly, in its critique of the European Commission's Gas Directive, the International Energy Agency argued that "should divestment/ sell-off of the transportation part from all other energy-related activities be legally possible and practical, this would be the preferred option".[51]

In Australia, the ACCC has acknowledged that structural reform in the electricity industry has reduced the likelihood that regulated activities could be used to subsidise contestable activities.

"Nevertheless, future acquisitions are not ruled out, and in certain circumstances, the NEC allows for some generation assets to be included in a network owner's regulatory asset base. Moreover, it is possible that the networks of the future will

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46 OECD (2000), *Background Report on Regulatory Reform in the Electricity Industry (Denmark).*

47 OECD (2000), *Background Report on Regulatory Reform in the Electricity Industry (Netherlands)*

48 OECD (2002), Regulatory reform in gas and electricity and the professions, *OECD Reviews of Regulatory Reform*, Paris.

49 ibid. In the event, the 1995 Gas Act settled for corporate separation.

50 FERC (2002), *op.cit.*

51 OECD (2001), *op.cit.*

grow into businesses quite unlike the electricity networks of the past and provide a range of contestable services. For example:

- Connection assets may, in some circumstances, be contestable and not included in the regulatory asset base;
- Additional revenue may be generated from engineering consultancy services; and
- Other related services, such as telecommunications, may generate revenues that are not subject to the revenue cap.

The Commission does not at this stage propose to publish accounting or auditing guidelines under the Transmission Ring Fencing Guidelines but does not rule out the need for change and/or additional provisions at some future date."[52]

On this basis, the Commission developed the transmission ring-fencing guidelines.[53] However, from the above discussion, it does not appear that these guidelines were (in their present form) intended to guard against the consequences of a full integration of transmission and contestable generation interests.

To sum up, assessing the relative merits of different approaches to vertical integration and the regulation of transmission activities is an empirical question. A significant body of findings suggest that limited forms of separation, though supplemented by behavioural rules, insufficiently constrain the ability and incentives of structurally integrated entities to exercise market power. Moreover, such regulatory arrangements are onerous in their demands on the regulator's resources. Even if a regulator were well-resourced, it may not be able to constrain or prevent the exercise of market power across all (possibly hypothetical) scenarios in which an integrated may have the ability and incentive to exercise market power.

Operational separation (that is, the separation of transmission operation and network functions) can provide certain safeguards, over and above those that may be afforded by, for instance, corporate or functional separation. Nevertheless, some regulators have formed the view that operational separation falls some way short of structural separation as a means of constraining the exercise of market power.

## 4.3 KEY FINDINGS

This section has highlighted the different regulatory approaches taken to vertical integration involving transmission. Both practice and experience vary across jurisdictions. As illustrated in Appendix 1, the regulatory arrangements adopted in the context of the NEM favour the structural separation of transmission from other activities. This choice was adopted in the context of broader policy decisions taken during the implementation of reforms to the electricity industry,

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52 ACCC (1999), *Draft Statement of Regulatory Principles*, section 13.2, pages 133-134.

53 ACCC (2002), *Transmission Ring-Fencing Guidelines*.

and is therefore embedded in the wider architecture for the regulation of the NEM.

A significant body of findings suggest potential pitfalls with forms of regulation relying on corporate or functional separation, perhaps supplemented by behavioural rules and/or operational unbundling. These methods appear to have weaknesses in constraining the ability and incentive to exercise market power. Taking into account these findings, the question that remains is whether similar concerns could be shown to arise in the case of the SP/TXU transaction. This in turn requires a detailed analysis of the two entities and their operation, including the existing contractual and regulatory arrangements and the extent to which these arrangements constrain the ability of the entities to engage in particular behaviour. This analysis will be presented in the following sections.

# 5 The proposed transaction

The extent to which the proposed transaction is likely to lead to a substantial lessening of competition depends on the particular characteristics of the assets involved, and associated contractual and regulatory arrangements. This section considers the nature of the relevant assets and the associated contractual and regulatory arrangements in more detail. Section 5.1 provides an overview of the transaction. Section 5.2 describes the TXU portfolio. Section 5.3 describes PowerNet, focussing on the allocation of the roles and responsibilities for electricity transmission in Victoria and information available to PowerNet in comparison to information available to ordinary market participants. The potential for the transaction to lead to a Substantial Lessening of Competition is considered in section 6.

## 5.1 OVERVIEW

As outlined in section 1.1, SP has entered into a sale and purchase agreement with TXU Corporation to acquire a 100% stake in TXU Australia. We have assumed that the structure of the acquisition has not yet been finalised, but that it will give SP control of TXU Australia.[54] The sale is expected to be finalised in the third quarter of 2004, subject to regulatory approvals.[55] SP does not have plans to sell any of TXU's Australian assets.[56] The proposed transaction would result in common ownership and control of regulated electricity transmission assets with other competitive electricity market activities. The following sections consider the characteristics of the TXU and PowerNet assets, contracts and regulatory arrangements in more detail.

## 5.2 TXU

### 5.2.1 Corporate structure

TXU Australia is a wholly owned subsidiary of TXU Corporation. TXU Corporation is listed on the New York Stock Exchange. TXU Corporation owns its Australian interests through a series of holding companies (see Figure 1). TXU Australia in turn owns its Australian assets through five wholly owned subsidiaries.

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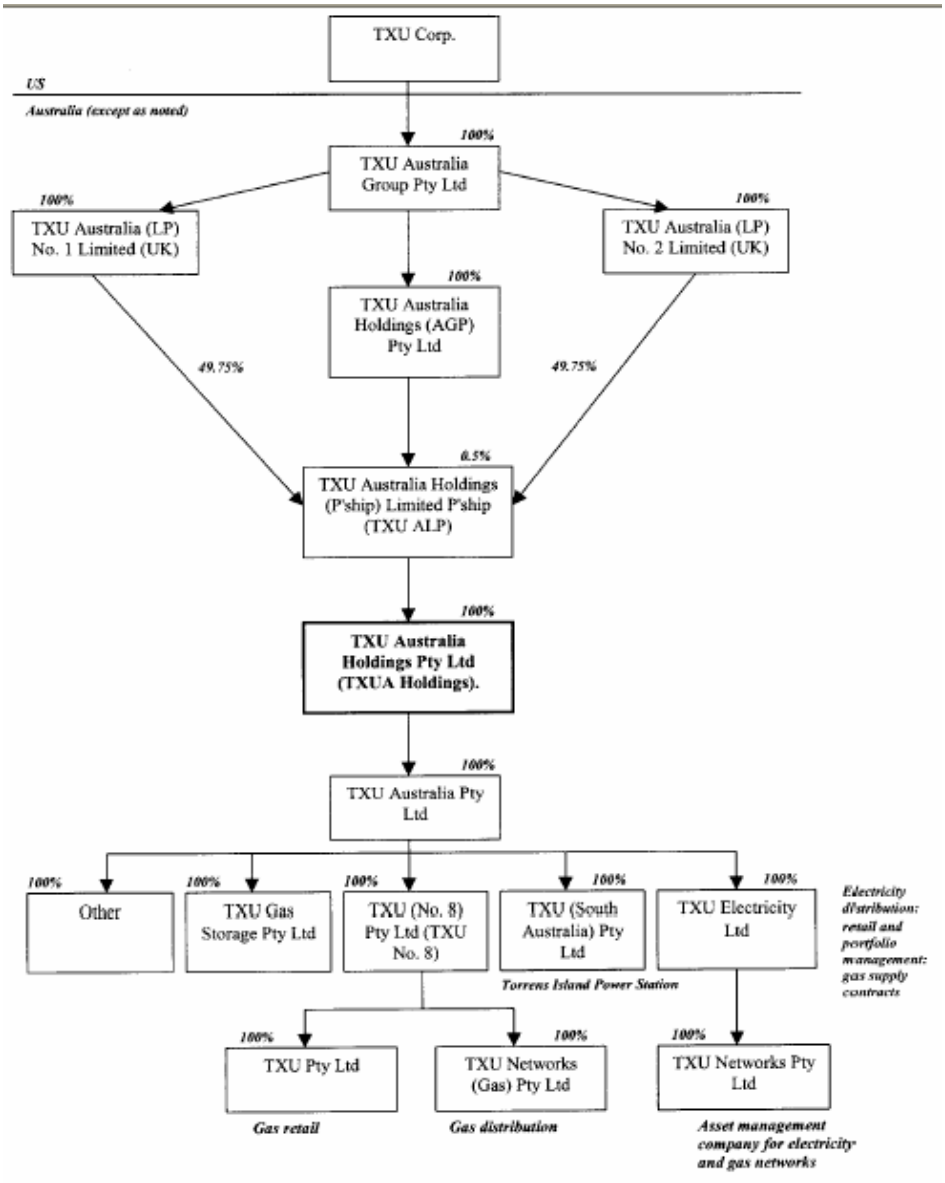
54 Letter from Geoff Carter, Minter Ellison to Mark Pearson, Australian Competition and Consumer Commission, 7 April 2004, Section 2.2, p6.

55 TXU website (http://www.txu.com.au/global/news_feature.asp ), 9 June 2004.

56 TXU website (http://www.txu.com.au/global/news_feature.asp ), 9 June 2004.

Figure 1 Structure of TXU Australia




*Source: Letter from Geoff Carter, Minter Ellison to Mark Pearson, Australian Competition and Consumer Commission, 7 April 2004, Section 1.3, p5.*

### 5.2.2 Activities

TXU Australia is engaged in a number of activities in the gas and electricity industries in South East Australia. The majority of TXU's interests are in Victoria and South Australia and were acquired at the time of privatisation.

### *Victorian electricity distribution*

TXU operates the electricity distribution business servicing over 500,000 customers in the outer eastern suburbs of Melbourne and the eastern half of Victoria. TXU acquired this business, and the stapled electricity retail business jointly known as Eastern Energy, at privatisation.

### *Electricity retail*

TXU has electricity retail operations in Victoria, South Australia, NSW and Queensland. TXU's electricity retail presence is largest in Victoria, as a result of TXU's acquisition of Eastern Energy retail franchise. TXU retails to around 530,000 electricity customers in Victoria.

### *Victorian gas distribution*

TXU operates the gas retail distribution business servicing the northwestern areas of metropolitan Melbourne and 19 regional centres in central and western Victoria. TXU's gas distribution network comprises over 8,000km of pipeline and services over 432,000 customers. TXU acquired one of the three gas distribution businesses, Westar, at privatisation.

### *Gas retail*

TXU retails gas to over 430,000 customers in Victoria, and has smaller retail operations in NSW and Victoria. TXU purchased one of the three gas retail businesses, Kinetik, at privatisation.

### *Electricity generation*

TXU owns Torrens Island Power Station (TIPS), a gas fired power station with a generating capacity of 1,280MW located at Torrens Island in Adelaide. TXU purchased a 99 year lease for the power station, then known as Optima, from the South Australian Government. TIPS consists of two adjacent power stations, which typically operate in a peaking role (see Table 1).

Table 1: TIPS

| Power station | Registered capacity | Fuel | Capacity factor (2002 calendar year) | Capacity factor (2003 calendar year) |
|---|---|---|---|---|
| **TIPS A** | 480MW (4 units x 120MW) | Natural gas and fuel oil | 6.1% | 2.7% |
| **TIPS B** | 800MW (4 units x 200MW) | Natural gas and fuel oil | 33% | 27.2% |

*Source: Registered capacity from NEMMCO, List of Generators and Scheduled Loads, v84, 4 June 2004;Fuel source from TXU Australia website (http://www.txu.com.au/generation/generation.asp), 11 June 2004; 2002 capacity factors calculated by Frontier Economics using NEMMCO trading interval generation and registered capacities; 2003 capacity factors from e-risk.*

Both TIPS A and TIPS B are capable of burning fuel oil in addition to natural gas.

TXU notes that TIPS enables it to engage in a number of strategic and tactical activities in the Australian NEM including:[57]

- Trading wholesale electricity in the NEM;
- Offering hedging contracts to retailers;
- Offering capacity contracts to generators and retailers (these are physical supply contracts that give the counterparty the right to bid TIPS' capacity into the NEM); and
- Providing ancillary services to NEMMCO.

### *Victorian underground gas storage*

TXU owns the western underground gas storage facility (WUGS), located at the onshore Iona field at Port Campbell in western Victoria. TXU acquired the facility from the Victorian Government at privatisation. The facility is a major "swing" volume supply source for the Victorian gas system. This means that the gas stored in WUGS can help counter major excesses of demand for gas on a particular day or days. WUGS has a holding capacity of 12PJ, and a processing capacity of 320TJ/day, although limitations on the Victorian gas transmission mean that processing capacity is typically constrained to around 240TJ/day. WUGS connects directly to the SEA Gas pipeline, enabling withdrawals and injections to both the South Australian and Victorian networks and facilitating replenishment from the newly developed offshore Otway gas fields.

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57 Source: TXU Australia website (http://www.txu.com.au/generation/generation.asp ), 9 June 2004.

### *SEA Gas pipeline*

TXU owns a 33% interest in the recently commissioned SEA Gas pipeline. International Power, Origin Energy and TXU all own equal shares in the pipeline. The SEA Gas pipeline runs from WUGS at Port Campbell in Victoria to Adelaide in South Australia, connecting with the Minerva gas processing plant at Iona, Pelican Point Power Station in Adelaide and TIPS. The pipeline has a capacity of 125PJ per annum. The uncompressed pipeline was commissioned in January 2004. Commissioning of the full compression capability is expected in January 2005.

### *Tallawarra Power Station Site*

TXU owns the 600ha Tallawarra Power Station Site, on the shore of Lake Illawarra, 13 km south of Wollongong in NSW. TXU purchased the site from the NSW Government in 2003. The coal-fired Tallawarra Power Station was decommissioned in the mid 1990s. It is understood that TXU has the option to develop a new generation facility on the site at some stage in the future.[58]

### *Master Hedge Agreement*

TXU has a 20 year contractual arrangement with Ecogen Energy (Ecogen), known as the Master Hedge Agreement (MHA). However, we emphasise that we have not been given access to this document for the purposes of this report.

Ecogen owns two gas fired power stations in Victoria:

- The 500MW Newport Power Station (Newport), located at Williamstown in Melbourne; and
- The 432MW Jeeralang Power Station (Jeeralang), located 157km east of Melbourne in the La Trobe Valley.

Both power stations tend to operate in a peaking role.

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58 Letter from Geoff Carter, Minter Ellison to Mark Pearson, Australian Competition and Consumer Commission, 7 April 2004, Section 1.3, p6.

Table 2: Ecogen

| Power station | Registered capacity | Fuel | Capacity factor (2002 calendar year) | Capacity factor (2003 calendar year) |
|---|---|---|---|---|
| **Newport** | 500MW (1 unit x 500MW) | Natural gas and distillate | 13.3% | 6.5% |
| **Jeeralang A** | 204MW (4 units x 51MW) | Natural gas and distillate | 0.6% | 1.3% |
| **Jeeralang B** | 228MW (3 units x 76MW) | Natural gas and distillate | 1.8% | 1.3% |

*Source: Registered capacity from NEMMCO, List of Generators and Scheduled Loads, v84, 4 June 2004; Fuel source from Prime Infrastructure, "Prime Infrastructure to Acquire Ecogen generation assets", Media Release, 13 December 2002.; 2002 capacity factors calculated by Frontier Economics using NEMMCO trading interval generation and registered capacities; 2003 capacity factors from e-risk.*

TXU Electricity (formerly Eastern Electricity) entered into the MHA in May 1999 with the Victorian Government-owned entity Generation Victoria. The MHA was transferred to Ecogen as part of the privatisation of Ecogen by sale to AES Transpower (AES). In December 2002 AES sold Ecogen to a consortium consisting of Prime Infrastructure (50%) and Babcock and Brown (50%).[59] Babcock and Brown has sold part of its interest to institutional investors, and continues to manage the investment on their behalf.

In addition to the MHA, we understand TXU has entered into a long term Fuel Supply Agreement (FSA) with Ecogen

In light of Ecogen's contracts with TXU in relation to electricity hedges and fuel, there is a question of whether and to what extent these contracts provide TXU with a degree of interest in and control of Ecogen.

## 5.3 POWERNET

This section describes:

- The key assets included in the PowerNet portfolio (section 5.3.1);
- The regulatory instruments and contracts governing PowerNet's activities (section 5.3.2);
- The roles and responsibilities of PowerNet vis-à-vis the roles of VENCorp and NEMMCO in the Victorian transmission system (section 5.3.3); and
- The information that PowerNet has access to and how it exceeds information available to market participants (section 5.3.4).

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[59] Prime Infrastructure, *Prime Infrastructure to Acquire Ecogen generation assets,* Media Release, 13 December 2002.

### 5.3.1 Assets

PowerNet's transmission system serves all of Victoria covering an area of approximately 227,600 square kilometres and a population base of approximately 4.5 million. The network is built around a 500 kV backbone running from the major generating source in the Latrobe Valley, through Melbourne, and across the southern part of the state to Heywood, near the South Australian border. This backbone is designed to support the major load centres (Melbourne and the Portland aluminium smelter) and is surrounded by:

- A 220 kV ring around the Melbourne metropolitan area supplying 220 kV/66 kV terminal stations;
- An inner and outer ring of 220 kV/66 kV terminal stations in country Victoria supplying the regional centres; and
- Three interconnections with NSW and one with South Australia.[60]

PowerNet owns most of the Victorian shared network, as well as some components of connection equipment such as generator switchbays.

### 5.3.2 Regulatory instruments and contracts governing PowerNet's activities

PowerNet is governed by a number of bodies through a number of instruments or contracts. Table 3 summarises these arrangements.

| Body | Instrument/Contract | Activity |
|---|---|---|
| NECA | National Electricity Code (NEC) | Transmission connection, development, performance requirements |
| ACCC | Access undertaking<br>NEC | Network access, prices, revenue cap, other (eg ring—fencing) |
| Essential Services Commission (ESC) | Transmission licence<br>Victorian System Code | All network services |
| VENCorp | Network Agreement | Shared network services |
| Connected party | Connection agreements | Connection services |

Table 3: Governance of PowerNet

60 SPI PowerNet (2002), *SPI PowerNet's Revenue Cap Application, for the period 1 January 2003 to 31 March 2008*, page 6.

The subsequent sub-sections discuss the role of each of these instruments/contracts in governing the conduct of PowerNet.

### *National Electricity Code*

As a transmission network service provider (TNSP), PowerNet is subject to the National Electricity Code (NEC). The NEC obliges PowerNet to, *inter alia*, comply with certain requirements in Chapter 5. This includes:

- The required process for new connections to PowerNet's network, as well as the technical standards that apply;
- An obligation to manage, maintain and operate its network in accordance with "good electricity industry practice" and Australian Standards, although there does not appear to be provision for a penalty in the Regulations for breach of this obligation; and
- Power system performance and quality of supply standards set out in schedule 5.1 and in connection agreements. Even though penalties apply for breach of Schedule 5.1 (up to $100,000 plus $10,000 per day)[61], the requirements in that Schedule for intra- and inter-regional network service are quite vague. For example, the requirement for intra-regional network service is that: "In the satisfactory operating state, the power system must be capable of providing the highest reasonably expected requirement for power transfer (with appropriate recognition of diversity between the individual peak requirements and the necessity to withstand credible contingency events) at any time."

Chapter 6 of the NEC governs transmission pricing for the shared transmission network. Under the NEC, the ACCC has the role of setting revenue caps for TNSPs. The ACCC's latest revenue cap decision on Victorian transmission networks requires PowerNet to, *inter alia*, meet performance targets for measures of transmission availability and outage duration. The revenue cap decision provides for penalties and rewards of up to 0.5% of PowerNet's allowed revenue if its performance is substantially below or above (respectively) its historical performance.

### *Access undertaking*

PowerNet has an access undertaking to the ACCC under section 44ZZA of the TPA. The access undertaking obliges PowerNet to, *inter alia*, make available its network in accordance with "good electricity industry practice" and Australian Standards.

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61 See *National Electricity (South Australia) Act* 1996, section 13 and *National Electricity (South Australia) Regulations* 1996, Schedule. NB – the power transfer obligations in schedule 5.1 of the NEC are imposed through clause 5.2.3(b).

### *Transmission licence*

PowerNet's transmission licence imposes a number of requirements, mainly related to new connections.

### *System Code*

PowerNet is bound by the Victorian System Code. This requires PowerNet to, *inter alia*, use its "best endeavours" to:

- Develop and implement plans to maintain transmission performance to meet reasonable customer expectations and minimise the risk of asset failure (clause 11);
- Ensure the performance of its transmission network is consistent with benchmark standards. These standards impose limits on the frequency and duration of forced outages for transmission lines and set minimum availability percentages for transmission equipment. PowerNet must provide a report of its network performance against the benchmarks to the ESC, VENCorp and all connected parties (clause 100.5 and Attachment 11); and
- Maintain supply quality, in terms of voltage levels (and implicitly, reactive power) to within +/- 5 or 10% of stipulated levels (clause 110.2).

### *Network Agreement*

The Network Agreement between PowerNet and VENCorp has been in place since 1994 and has been amended a number of times. In terms of network performance, the most relevant provisions are:

- An obligation on PowerNet to use reasonable endeavours to provide network services including node-to-node power transfer capability in accordance with the requirements of attachment 2 (which sets out the relevant transmission line power transfer capabilities);
- Requirements to use reasonable endeavours to provide switching capability, system security, stabilisation, voltage and reactive control capability in accordance with certain requirements (clause 4.1 and attachments 3 and 4)
- The Availability Incentive Scheme in attachment 12 that provides for PowerNet to pay up to $13,290 (indexed) per hour for each hour that a transmission element is out of service. The $13,290/line/hour figure is for a 500 kV line from the Latrobe Valley to Melbourne during peak times. Peak periods are generally between 10am and 11pm on weekdays between mid-November to mid-March outside of the Christmas – New Year period.[62] Penalties for lower voltage lines are typically lower. Penalties are nil for many lines at off-peak times to encourage off-peak outages for maintenance purposes. There are also penalties for unavailability of other transmission equipment such as transformers and reactive devices. These payments are capped at $12 million per annum (indexed). Put into context, this compares

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62 See Annexure 2 to Attachment 12.

with an allowed regulated revenue of $212.4 million for PowerNet for 2003/04 (approximately 5.6% of allowed revenues). Based on historical performance, we understand that PowerNet would be required to make payments of approximately $6 million per annum to VENCorp, so the scheme effectively provides for potential performance penalties and rewards of up to approximately 2.8% of PowerNet's allowed revenue. This scheme operates in addition to the financial incentives in PowerNet's revenue cap set by the ACCC; and

- Requirements for coordination of outages and maintenance between VPX (now VENCorp) and PowerNet (in attachment 10). For example, PowerNet is required to abide by an outage schedule for the following week. However, the penalty for changing outage schedules appears to be only costs associated with the rescheduling.

***Connection agreements***

PowerNet has connection agreements with most generators, distributors and high-voltage customers in Victoria. These agreements mainly contain technical information on connection assets. However, we understand that some agreements contain incentive schemes for availability of connection assets, similar to the incentives contained in the Network Agreement with VENCorp. However, we have not seen direct evidence of this.

***Summary***

Therefore, in summary, PowerNet is effectively subject to two types of performance regulation:

- *Legal* obligations to make "reasonable" or "best" endeavours to meet performance benchmarks or provide certain capabilities as well as obligations to operate its network in accordance with 'good electricity industry practice' in the NEC, System Code and Access Undertaking; and
- *Financial* rewards and penalties contained in the Availability Incentive Scheme with VENCorp and the ACCC's revenue cap decision. Together, these provide potential penalties and rewards of about 3% of PowerNet's allowed revenue.

### 5.3.3 Roles and responsibilities

This section sets out an outline of the respective roles and responsibilities of various parties in the planning, development, operation and maintenance of the Victorian transmission system.

***General***

TNSPs

TNSPs own, plan and operate the transmission network. These responsibilities are split in Victoria between:

- VENCorp, who plans and contracts for augmentation of the shared network; and
- PowerNet, who owns, maintains and operates the bulk of the existing shared network and develops and maintains most connection assets.

Therefore, there is a clear delineation in Victoria between shared network planning/investment on the one hand, and maintenance and operation on the other.

NEMMCO

NEMMCO, as system operator, is responsible for system security. NEMMCO's interests in the operation of the transmission system are principally derived from the objective of maintaining power system security rather than promoting (other) positive economic consequences of transmission operation.

### *Technical envelope*

TNSPs

TNSPs define the "technical envelope" for the transmission network. This involves specifying matters such as thermal line limits and network capabilities. TNSPs' approaches to setting the technical envelope vary, with different TNSPs adopting more or less conservative ratings.

In the case of Victoria, VENCorp defines the technical envelope of the transmission network based on information provided by PowerNet. This involves providing a set of equations or tables that explain how the capability of the network depends on the:

- Operation and availability of physical network elements such as transmission lines, transformers, capacitor banks and static var compensators (SVCs)[63]; and
- A range of other factors such as generator bidding behaviour, reactive conditions and ambient temperature.

The operation and availability of most shared network elements is within the control of PowerNet. However, as discussed above in section 5.3.2, PowerNet is subject to a number of contracts and instruments that limit or constrain its discretion to operate the network as it sees fit.

It is worth noting that because of these instruments and agreements and the division of responsibilities in Victoria, PowerNet's discretion to set the technical envelope is probably smaller than other TNSPs in the NEM such as TransGrid and Powerlink.

NEMMCO

NEMMCO takes the transmission system technical envelope as provided by the TNSP to develop constraint equations used for scheduling and dispatch. NEMMCO conducts due diligence to ensure that the network specifications are

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63 Capacitor banks and SVCs are reactive devices that are required to enable lines to achieve their full capability, especially in hot weather.

consistent with a secure power system. This involves conducting limited sample studies, which are not as exhaustive as those conducted by the TNSP.

NEMMCO may take a more conservative view of the technical envelope than a TNSP if NEMMCO believes that more conservative ratings are required to maintain security. However, if NEMMCO believes that the TNSP has taken an overly conservative view of the technical envelope, then while NEMMCO may discuss this with the TNSP, NEMMCO will not itself redefine upwards the capability of the TNSP's network.

### *Outages*

TNSPs

TNSPs must provide to NEMMCO and publish data on the planned nature, timing and duration of shared network outages for the following 13 months that the TNSP believes will have or are likely to have a material effect on transfer capabilities. However, clause 3.7A(a) of the Code makes it clear that TNSPs are not bound to comply with an outage programme and that timing of outages may vary from what has been published.

Under the Victorian System Code, VENCorp may conduct an *ex post* review of system incidents to determine in order to assess the adequacy of the Victorian system performance. However, it is not clear whether there are any consequences for PowerNet if it is found to be responsible for the event (clause 310).

NEMMCO

TNSPs must receive permission from NEMMCO prior to proceeding with a planned outage of the shared network. NEMMCO will only refuse permission for an outage if it believes system security would be compromised.

NEMMCO is required to publish reviews where:

- The spot market has been suspended (Code clause 3.14.3); and
- Significant power system operating incidents have occurred (Code clause 4.8.15).

NEMMCO receives technical information to inform these reviews from Code Participants (who are obliged to cooperate) and also receives data on the status of network equipments such as line circuit breakers, transformers, capacitor banks and SVCs. These data are generally reliable indicators of what equipment has become unavailable, although they do not necessarily indicate why equipment has become unavailable.

Nevertheless, NEMMCO does not conduct a forensic audit of TNSPs' equipment or network to ascertain what occurred. If in completing its report, NEMMCO finds something that appears inconsistent with its understanding of events, it will attempt to engage with TNSPs through the National Electricity Market Operational Committee (NEMOC) process, in order to understand the underlying facts. But NEMMCO has no ability to impose sanctions on TNSPs for behaving in ways that reduce market surpluses, other than where system security is concerned.

In general, PowerNet has a great deal of (lawful) discretion in terms of determining maintenance schedules and taking shared network outages. The existing arrangements for the operation of the network and the management of planned and unplanned outages fundamentally rely on the goodwill and good practice of the relevant parties.

***New connections***

TNSPs

TNSPs manage applications for new connections to their transmission networks. Chapter 5 of the Code outlines the process between a connection enquiry and finalisation of a connection agreement, as well as the technical standards that apply.

In Victoria, a Code derogation applies that allocates TNSP responsibilities in relation to new connections between VENCorp and PowerNet. In general:

- PowerNet deals with issues relating to the dedicated connection assets; and
- VENCorp deals with any implications for the shared network.

In addition, PowerNet is bound by its transmission licence. The licence requires, *inter alia*, that:

- PowerNet make an offer to connect an applicant within 65 days of receiving all reasonably required information; and
- An offer is made on fair and reasonable terms.

In all cases, including what information should be required by PowerNet to enable connection, what is reasonable is ultimately determined by the ESC.

New connection assets are funded directly by Market Participants and (unlike shared assets) may be developed by the participant itself. However, the assets must conform to PowerNet's requirements and policy for the precise allocation of connection asset costs is a matter for the individual TNSP.

NEMMCO

NEMMCO's involvement in new connections is relatively limited. As with other network matters, NEMMCO is involved in so far as system security is affected by a new connection. NEMMCO is not involved in other matters such as quality of supply. NEMMCO's role is to conduct due diligence of connection agreements provided by the TNSP in a similar manner as for the definition of the network technical envelope. That is, NEMMCO is likely to raise objections if system security might be affected by a new connection but is unlikely to raise objections if the new connection is conservatively rated or specified.

***New shared network investment***

TNSPs

Under Chapter 5 of the Code, TNSPs are responsible for planning and developing new regulated shared network assets within their jurisdictions. Shared

regulated network investment must meet the requirements of the ACCC's regulatory test, which TNSPs are obliged to apply.

In Victoria, VENCorp undertakes system planning and identifies where there is a need for investment in either transmission or transmission alternatives to meet reliability standards or increase market benefits of the system. If VENCorp identifies such a need or opportunity, it either:

- Conducts tenders for transmission or non-transmission investment if the relevant investment is deemed to be contestable; or
- Seeks an offer from PowerNet where the relevant investment involves an augmentation to PowerNet's network and must be non-contestable.

In respect of non-contestable augmentations, PowerNet is obliged in accordance with its transmission licence, to provide an offer that is "fair and reasonable". If there is a dispute, the meaning of fair and reasonable is ultimately determined by the ESC.

There is a potential interdependence between contestable and non-contestable projects. VENCorp may initially consider that a particular need or opportunity is contestable. However, if it transpires that non-transmission options are not possible or practicable, it may (subject to the ESC's approval – see clause 8 of VENCorp's transmission licence) re-characterise the problem as requiring an augmentation to PowerNet's network. Therefore, the project effectively becomes non-contestable and PowerNet is faced with the obligation to make fair and reasonable offers for development of the augmentation.

NEMMCO

NEMMCO's role in new shared network investment is primarily through:

- Its general role in maintaining power system security; and
- Its position on the Inter-Regional Planning Committee (IRPC). The IRPC produces technical reports that examine whether it will have an effect on power transfer capability (Code clause 5.6.3)

### *Ancillary services*

Generators and TNSPs' networks are built to provide quantities of ancillary services. For present purposes, the most important ancillary services are those related to network control, such as reactive power.

The provision of reactive power can have a major effect on the power transfer capability of networks. Reactive power supports voltage control in an alternating current (AC) network. Voltage control is important to maintain a stable system. However, the transportation of reactive power across a transmission system consumes transmission resources that could be used to transport 'real' power. Therefore, a fall in the local provision of reactive power could lead to the need to transport reactive power, which in turn could reduce a network's real power transfer capability. There are some legal requirements in the System Code and Network Agreement regarding PowerNet's provision of reactive power. However, these are relatively vague (see section 6.4.3 below).

At the same time, payments under the Availability Incentive Scheme apply to outages of reactive equipment.

Consequently, in many cases, TNSPs such as PowerNet will be able to influence network capability by freely changing the provision of reactive power by its network if they believe that the benefits of doing so outweigh the costs.

### 5.3.4 Access to information

Market participants and TNSPs have access to a substantial amount of information about the NEM market and power system, although in most cases, TNSPs have access to more detailed and less aggregated data than market participants.

The information that PowerNet (as TNSP) has access to includes:

- ***SCADA data*** – TNSPs receive real-time (updated every 4 seconds) data on the output of all generators in their jurisdiction, as well as the status of all their network elements, voltage levels, line flows, etc. Market participants currently have access only to real-time information on their own output, and slightly delayed information on regional demands and interconnect flows;
- ***Pre-dispatch information*** – NEMMCO must publish (to the market) day-ahead forecast information on loads, aggregate generating plant availability, supply and ancillary service surpluses or deficits, interconnector transfer capabilities, network constraint and spot prices. Market participants only have access to their own bids and aggregate pre-dispatch information whereas TNSPs have, in addition, access to the availabilities of each plant within their region (NEC clause 3.8.20);
- ***PASA*** – NEMMCO must publish data (to the market) on projected assessment of system adequacy, which includes forecasts of demand, generator availabilities and interconnector and other transmission constraints. Short-term PASA (STPASA) covers the 6 trading days after the day covered by pre-dispatch information whereas medium-term PASA (MTPASA) covers the 24 month period starting from the end of STPASA. Market participants have access to aggregate generator availabilities for each NEM region through the PSA process, whereas TNSPs have, in addition, access to the availabilities of each plant within their region (NEC clause 3.7);
- ***Planned network outages*** – as noted above, TNSPs must provide to NEMMCO and publish data on the planned nature, timing and duration of network outages for the following 13 months that the TNSP believes will have or are likely to have a material effect on transfer capabilities. The NEC makes it clear that TNSPs are not bound to comply with an outage programme and that timing of outages may vary from what has been published. Importantly, we understand that information published should not include information about outages relating to connection assets that could indicate when a particular generator was going to be out of service. Nevertheless, TNSPs will have this information. (NEC clause 3.7A); and

- ***Data collected as part of the new connections process*** – as discussed above, new connections are generally negotiated between PowerNet and the connecting party under the terms of the NEC and PowerNet's licence. Through this process, PowerNet is able to request significant technical information about a generator that may not be available to other participants.

In general, TNSPs need real-time information on their networks for network management and need specific PASA information to plan network outages. However, it is not clear whether TNSPs need all the *additional* information they are currently provided with (over and above what the market as a whole receives). Some of the information was required at the start of the market, when TNSPs assisted NEMMCO to perform its system operation functions. This role has gradually diminished over time. In any case, TNSPs may have a right to some or all of the information under the NEC.

In Victoria, system and network information is received by the Victorian Network Switching Centre (VNSC). A key question is whether the VNSC can and should be transferred to another entity (such as NEMMCO or VENCorp) or alternatively, whether the VNSC can be adequately ring-fenced to ensure that information received by VNSC is not provided to TXU. While we have not discussed this issue directly with PowerNet, it is likely that PowerNet needs detailed power system information to plan outages and operate its transmission network. This is because even though it is true that VNSC used to be operated by Victorian Power Exchange (VPX), suggesting that it may not be necessary for PowerNet to operate VNSC, PowerNet still received detailed network information at that time. This indicates that even if VNSC were transferred to another party, information from VNSC would still need to be provided to PowerNet. Importantly, network switching functions in other jurisdictions are carried out by the transmission asset owner.

# 6 Potential Concerns: The PowerNet/ TXU entity and market power

## 6.1 INTRODUCTION

### 6.1.1 Rationale for integration of PowerNet and TXU

The framework developed in section 2 acknowledged that firms pursue vertical integration in order to maximise profits.

If the acquisition of TXU by SP went ahead, the integrated PowerNet/TXU entity would seek to maximise profits across its full portfolio of assets, including electricity generation, transmission, distribution and retailing assets. As noted above, this paper focuses on coordination between transmission and generation for the purpose of maximising the joint profits of *those activities*. Nevertheless, we make some general comments on retail operations.

A vertically integrated PowerNet/TXU would receive a regulated return on its transmission assets that is largely invariant to electricity transported. Further, we understand that PowerNet's shared network assets are protected from regulatory optimisation risk This means that subject to the financial incentives under the Availability Incentive Scheme and the regulated revenue cap, the returns from PowerNet/TXU's transmission assets are relatively certain and difficult to increase. Therefore, in order to maximise its combined profits, the integrated entity's key incentive would be to increase the returns on its generation and retail assets.

Profits of the integrated entity from generation and retailing could be increased in two ways:

- Operational efficiencies leading to cost reductions; and
- Increased opportunities for the profitable exercise of market power.

In some cases, vertical integration can yield operational cost efficiencies without increasing the incentives or ability of the integrated firm to exercise market power. The potential for such efficiencies to arise in the context of the proposed transaction will not be discussed in this paper. The proponents may have made the rationale for the transaction clear in their representations to the Commission.

As argued in section 2.2, economic theory provides strong arguments that suggest that incentives to exercise market power are likely to arise in cases of vertical integration involving a (regulated) monopoly business and contestable segment(s). In particular, vertical integration of this nature is liable to create incentives to leverage market power in the contestable segments. The existence of such incentives was discussed in section 3.2 above and is well established in the literature covering international experience in the electricity industry and in other energy markets (see section 4). Indeed, the need to respond to such incentives are a prime motivator for regulatory arrangements, and in particular the decisions to enforce structural separation taken in a number of jurisdictions.

Importantly, we stress that in relation to each opportunity to exercise market power, the perception of actual and potential market participants is as important as the reality of the situation. For example, by creating the impression that investment in generation is riskier than it was prior to the transaction, PowerNet/TXU could effectively raise barriers to entry into generation and increase the ability of its generation assets to raise prices and profits.

### 6.1.2 Pre-requisites for the exercise of market power

In order for the integrated firm to pursue profits through the exercise of market power it must have both:

- Power in a relevant market; and
- The incentive and ability to exercise that power in another market *given relevant regulatory and contractual constraints*. .

The latter question may be extremely complicated as it essentially involves a weighing up of the profits that an integrated entity could earn from exercising market power with the costs and other constraints it faces in undertaking that exercise of market power.

In order to simplify the analysis, it may be worthwhile separating the potential benefits of exercising market power from the potential costs. Therefore, the following sections will break up these issues in respect of the integrated PowerNet/TXU entity in the following way:

- Whether the integrated entity has market power (section 6.2);
- The potential opportunities for the integrated entity to exercise market power, in the absence of regulatory and contractual constraints (section 6.3); and
- Given regulatory and contractual costs and constraints, whether the integrated entity is actually likely to exercise market power in the ways discussed (section 6.4).

## 6.2 MARKET POWER OF THE INTEGRATED ENTITY

We submit that the integrated entity will, through its ownership of the bulk of the Victorian transmission network, have market power in at least one market.

### 6.2.1 Demand substitutability

Section 3 discussed the economics of transmission networks. The services provided by transmission are fundamentally connectivity to a network and transportation within that network. Although it may be possible to by-pass these services at the margin, we consider transmission to be a service with no practicable substitutes in demand.

Considering transportation first, almost all electricity presently traded in Victoria travels through PowerNet's network. The physics of AC electricity networks and present regulatory arrangements imply that it is impossible for a party directly or indirectly connected to PowerNet's network to avoid using PowerNet's network

to transport electricity and paying transmission charges. With respect to connection, certainly for producers and consumers of electricity located in Victoria, there are no viable substitutes to PowerNet as a network provider. Victorian generators and consumers cannot be connected to a network other than PowerNet's unless they physically shift into another State. This is highly unlikely to occur in the absence of extreme events occurring.

### 6.2.2 New entry

As discussed in section 3 in relation to the economics of transmission networks, the cost characteristics of transmission (such as economies of scale) mean that barriers to entry into electricity transmission are extremely high. Electricity transmission is likely to be a natural monopoly activity at any point in time and one would not expect to observe the parallel provision of transmission services by competing entities. It is true that there is provision in the NEC for unregulated interconnectors operated by market network service providers (MNSPs) and two such interconnectors have been in operation (Murraylink and Directlink). However, MNSPs have not provided a node-to-node service, meaning that they do not allow complete by-pass of the incumbent TNSP's network, and this is even less likely in the future given the conversion of Murraylink to a prescribed (regulated) service and the application of Directlink to also convert to a prescribed service.

For all of these reasons, we submit that the relevant market in which PowerNet has power is the Victorian electricity transmission market.

## 6.3 POTENTIAL OPPORTUNITIES TO EXERCISE MARKET POWER (ASSUMING NO CONSTRAINTS)

A key question in the present case is how the integrated entity could choose to exercise its market power, assuming it faced no constraints from its regulatory or contractual arrangements. The opportunities for exercising market power arise from the factors discussed in section 5.3 above:

- PowerNet/TXU's role in network operation and maintenance, including:
  - managing planned outages, maintenance activities and overall network operation;
  - managing applications for new connections relating to dedicated connection assets, and responding to applications as per the conditions specified in its transmission licence;
  - undertaking non-contestable network augmentations (as per licence obligations). It may choose to bid for contestable augmentations; and
  - the provision of ancillary services, such as reactive power, that can have a major impact on network capability; and
- PowerNet/TXU's informational advantages over other market participants:

- SCADA Data – information on *all* regional generator outputs and network flows;
- pre-dispatch information – on *individual* generator availabilities;
- short and medium term Projected Assessment of System Adequacy (STPASA and MTPASA) – including *information* on individual availabilities;
- planned network outages – which PowerNet may change at will; and
- data collected as part of a connection application.

On the basis of these arrangements, PowerNet/TXU could choose to take advantage of its market power through:

- Cooperation between its transmission and generation activities (section 6.3.1); and
- Cooperation between its transmission and retail activities (section 6.3.2).

Experience in other jurisdictions suggests that integrated entities benefiting from informational advantages are able to use such advantages to the detriment of competitors.[64]

### 6.3.1 Transmission and generation

In the absence of contracts, PowerNet/TXU's generation returns are a positive function of the volume of electricity sold from its plant and the price of electricity in the regions PowerNet/TXU generates electricity.

Therefore, generally speaking, in the absence of contracts, PowerNet/TXU as a transmission and generation entity would seek to promote:

- More sales for its plant;
- Higher wholesale prices in South Australia and possibly Victoria; and in the longer term;
- Generator asset sales and higher barriers to entry into generation.

At a practical level, these interests would create incentives for PowerNet/TXU to use its resources to:

- Bid its plant in a way to maximise profits given information about the availability of other generators;
- Delay new generator connections or reduce the evacuation of power by other generators;

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64 See FERC (1998), *The Washington Water Power Company*, 83 FERC 61097, Docket No. ER98-852-000: and FERC (1999), *Aquila Energy Marketing Corporation v Niagara Mohawk Power Corporation, Niagara Mohawk Energy Marketing Inc.,* 87 FERC 61328, Docket No. EL99-62-000. In both cases, the TNSP was found to have engaged in unauthorised communications with affiliates, leading to preferential treatment, and displacement of competition. In both cases, secret communications were undertaken despite express requirements that such communications comply with transparency requirements implemented through the Open-Access Same-Time Information System

- Reduce power transfer capability of the Victorian network, including imports from the Snowy region and possibly reducing exports to the South Australian region; and
- Manipulate the inter-regional settlement residue process.

The incentives for these behaviours and the mechanism by which an integrated PowerNet/TXU could implement them are discussed below.

### *Opportunistic generator bidding*

An integrated entity combining transmission and generation assets could use the informational advantages, gleaned through the transmission component, to support the bidding strategies of its generators. As already observed, competing generators generally have access only to aggregated pre-dispatch data on generator availability, which is not in real time. As a market participant, TXU receives detailed bidding information relating to every generator – but the morning after the bids were used. This means that, in practice, a particular bidding strategy carries the risk that other generators may respond in ways that reduce the profitability of the strategy.

The bidding advantage for a combined PowerNet/TXU entity lies in the receipt by VNSC of *real-time* SCADA information on generator outputs and through more detailed pre-dispatch and PASA information. This would give the combined entity a very good idea of the operating conditions and performance of various generators. The integrated entity could use this information to engage in bidding strategies that had higher probabilities than otherwise of being profitable.

### *Delay generator connections and reduce evacuation of other generators' power*

For a given level of demand in Victoria and South Australia, the less power supplied by other generators in Victoria and South Australia (and via the Snowy interconnect), the greater the demand for the entity's power. This could lead to increased sales volumes for PowerNet/TXU and higher wholesale prices being achieved in the relevant regions. Therefore, PowerNet/TXU would have incentives to limit, delay or otherwise reduce the evacuation of other generators' power through their connection assets.

It is possible that PowerNet/TXU would have incentives to harm the interests of other generators *per se*, even if this did not have an immediate positive impact on its operating profits. Electricity generation is a relatively high-fixed cost activity. Importantly, the NEM is an energy-only market, where generators are expected to earn a return on their variable *and fixed* costs through wholesale prices. In an energy-only market, generators – especially peakers, but to some extent all generators – earn a great deal of their revenues in a few half-hours per annum when demand and prices are high, or expected to be high (in the case of contract revenue). This means that even if PowerNet/TXU could reduce other generators' revenues infrequently for short periods of time by, say, reducing power evacuation, this may seriously damage their revenues and profits.

If PowerNet/TXU were able to harm a competitor generator to the point of bankruptcy, it is likely that the competitor would offer its generation assets for sale. PowerNet/TXU may seek to acquire these assets to increase its market share in generation, although this would be the subject of a separate investigation process by the ACCC.

It is worth emphasising again that harming the interests of other generators is a matter of perception as much as reality. If PowerNet could, through its behaviour, create a climate of uncertainty about the returns of other generators, this could increase the perceived risk of investing in generation and hence reduce the attractiveness of third party investment in generation. Other things being equal, this would effectively increase barriers to entry into the production of electricity in the wholesale market. For example, NEM participants are likely to value an investment-grade credit rating and greater uncertainty could threaten this.

***Reduce power transfer capability of the Victorian network and interconnects***

For the same reasons as it would seek to reduce evacuation of power from rival generators, PowerNet/TXU could have incentives to reduce the volume of electricity transported:

- From Latrobe Valley and other rival generators to Melbourne and other load centres in Victoria and South Australia;
- From the Snowy region into the Victorian and South Australian regions; and *possibly*
- From the Victorian region to the South Australian region (depending on prices and other market conditions in both regions and PowerNet/TXU's expected dispatch levels for the TIPS and (possibly) the Ecogen plant).

Reduced volumes in the first two cases would increase sales opportunities and would be likely to increase wholesale prices in (at least) the relevant regions.

The incentive to alter flows on the interconnects between Victoria and South Australia would depend on whether PowerNet/TXU considered it more profitable – given its generation portfolio – to achieve higher sales and higher prices in:

- Victoria, in which case it would seek to maximise exports in South Australia or minimise imports from South Australia; or
- South Australia, in which case it would seek to achieve the opposite.

The mechanisms available to PowerNet/TXU to manipulate interconnector and shared network capability arise from its ability to:

- Programme planned network outages in a way that suits its generation interests or harms other generators, given the information it has about other generator outputs and availabilities going forward;
- Engineer "unplanned" outages that have a similar effect;

[With respect to both the above actions, network transfer capability can fall a great deal if a network element unexpectedly fails. For example, the removal of a single transmission element can reduce the Snowy to Victoria import limit from 1900MW to 600MW.]

- Reduce provision of reactive power to lower network transfer capability. As discussed in section 5.3.3 above, reactive power can influence the capability of the network to deliver 'real' power; and
- Reduce network capability by limiting the power evacuation of key "gatekeeper" generators (gatekeeper generators can influence network capability through their generation patterns and provision of reactive power – Southern Hydro is in this position in Victoria.)

***Manipulate inter-regional settlement residue (IRSR) process***

Another concern is whether the combined entity could use information available to it and its ability to schedule transmission outages to profit from the inter-regional settlements residue (IRSR) auction process.

PowerNet/TXU as generator (or retailer) could participate in IRSR auctions and acquire IRSR units for interconnectors over which PowerNet/TXU as TNSP could affect the transfer capability for. This would create incentives for the entity to acquire IRSR units relatively cheaply at times interconnector outages were not scheduled and then to subsequently change the timing or duration of interconnector outages or de-ratings so as to increase the value of the units. If this occurred, it would reduce participant confidence in the value of IRSR units and damage inter-regional trade. If more NEM regions were created within Victoria in the future with accompanying IRSR rights, even trade within Victoria could be harmed.

### 6.3.2 Transmission and retail

TXU's interests in retailing electricity could offset some of the incentives for a combined PowerNet/TXU entity to increase wholesale prices, but create some additional anti-competitive incentives.

Taking the offsetting impact first, TXU supplies many small customers on tariffs that are overseen by the Victorian Government. The Government has a reserve pricing power, which gives it a significant ability to quasi-regulate retailers' tariffs to this group of customers. TXU also supplies other customers on tariffs that are fixed under contract for a period of time. In fact, it is likely that TXU is a "net retailer" in the NEM. Hence, PowerNet/TXU could have an interest, at least in the short term while contracts contain fixed tariffs, in *lower* wholesale prices.

However, there are a number of ways that the impact of PowerNet/TXU's retail interests in offsetting the combined entity's incentives to increase wholesale prices could be mitigated:

- If PowerNet/TXU entered into sufficient wholesale contracts with other generators, so that it became largely indifferent to high wholesale prices from a retail perspective;

- To the extent that higher wholesale prices could be passed through to retail customers over time under retail contracts or with Government acquiescence; and
- If the combined entity sold its retail interests, which we presume would not require regulatory approval *per se*.

Integration of transmission and retail functions could potentially create additional anti-competitive incentives. Drawing on the discussion in section 3.2 above, the incentives of an integrated transmission and retail business would include:

- Delaying/degrading connection or reliability of rivals' loads – in order to encourage the load to contract with PowerNet/TXU's retail business; and
- Shifting costs – from the competitive retail business to the cost base of the regulated transmission activity to improve the profitability and market share of its retail operation.

### *Delaying connection to or degrading reliability of rival retailer loads*

In addition to having incentives to delay or degrade rival generator connections, an integrated PowerNet/TXU could have incentives to delay or degrade the reliability of connections to, or affecting, the loads of rival retailers.[65] For example, if PowerNet/TXU could delay the new connections process, prospective new loads may choose to be served by PowerNet/TXU's retail arm rather than an alternative retailer to avoid the risk of a delayed or unreliable connection. As with other opportunities for anti-competitive conduct, even potential loads' *perceptions* of delay or reliability risks could be important in reducing retail competition, particularly if PowerNet/TXU retail tariffs were not substantially higher than rivals' tariffs.

### *Cost smuggling from contestable to regulated activities*

It should be noted from the outset that, as a business that is revenue regulated on a building-block basis, PowerNet has an incentive to maximise its allowed regulated costs. This incentive exists whether or not PowerNet is combined with other electricity businesses.

However, the integration of PowerNet with other energy businesses may increase the scope for the inflation of PowerNet's costs. The existing TXU business combines a large number of energy activities. If this entity were combined with PowerNet, there could be significant opportunities to smuggle costs from the contestable activities (generation and retailing) to the regulated transmission cost base. Even if cost smuggling was not blatant, there are likely to be common costs between the activities, such as head office and administrative costs, which could reasonably be attributed to the transmission business. While this would increase transmission charges to all market participants, it would reduce the costs of the contestable activities and provide them with advantages over rivals.

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65 The load may not need to be directly connected to the transmission network for this to be a risk.

Cost smuggling would be more of a concern in electricity retailing because of the low margin nature of the activity. For example, if net retail margins were, say, 2% and transmission accounted for 10% of domestic customer electricity costs, a 5% increase in transmission costs (as a result of smuggling costs from the competitive business) would allow the integrated entity to charge a 25% less retail margin (1.5% net margin instead of 2%) for a domestic customer and not lose any money.

At the same time, given TXU's interests in distribution networks, it may already be engaged in some degree of cost smuggling towards regulated activities. The issue would be whether the proposed transaction would provide valuable *additional* opportunities for cost smuggling.

## 6.4 REGULATORY AND CONTRACTUAL CONSTRAINTS ON EXERCISING MARKET POWER

The previous section described ways in which PowerNet/TXU could use its market power, combined with its roles, responsibilities and informational advantages, to increase profits from its generation and retail activities. This section will discuss the key regulatory and contractual constraints that might prevent or discourage the behaviours discussed above. Whether or not PowerNet/TXU would, on balance, still find it profitable to engage in anti-competitive behaviour is an empirical question.

Constraints on the following behaviours are discussed:

- Transmission and generation issues:
  - Opportunistic generator bidding;
  - Delaying generator connections or reducing evacuation of other generators' power;
  - Manipulation of network transfer capability, including interconnection capability, through various means – for example, planned and unplanned outages and provision of reactive power; and
  - Manipulation of the inter-regional settlements residue auction process; and
- Transmission and retail issues:
  - Delaying new rival load connections or degrading the reliability of rival retailers' loads; and
  - Cost shifting contestable costs into the regulated cost base.

### 6.4.1 Constraints on opportunistic generator bidding

There are no ring-fencing provisions in regard to the flow of information from VNSC to the remainder of PowerNet, given that this information is essential to the network operation and maintenance activities of PowerNet. Current ring-fencing provisions limiting flows of information from PowerNet to other

participants are established on the basis that PowerNet is a separately owned entity.[66] It is unclear, however, whether these ring-fencing provisions would restrict information flows *within* an integrated company. If this were not the case, augmented informational ring-fencing could be implemented in future to curtail the possible flow of market sensitive information from the transmission segment of the integrated entity to the operator of generation assets. The ACCC's previous statement on this matter in its draft statement of regulatory principles (see note 52 above) indicated that it could amend the guidelines if circumstances changed, such as through future acquisitions. This could in principle curtail the ability to engage in "insider trading", on condition that the requirements are effectively enforced. However, experience elsewhere suggests that effective enforcement of behavioural restraints cannot be taken for granted because of the inherent difficulties of monitoring and detecting breaches of such regulation. (see for example, the discussion in relation to British Gas, or the findings of the FERC in the USA, presented in section 4.2 of this paper.[67])

### 6.4.2 Constraints on delaying generator connections or reducing evacuation of other generators' power

Key regulatory and contractual constraints currently on PowerNet in relation to the new connection process and management of connection assets include:

- NEC requirements to make connection offers on "fair and reasonable" terms and in accordance with a defined process;
- Transmission licence requirements to make an offer to connect on fair and reasonable terms and within 65 business days of receiving all reasonably required information; and
- In respect of existing connections, possible incentive schemes contained in connection agreements.

#### *Requirement to offer connection*

Notwithstanding the requirement to make a connection offer, the question that arises is whether the integrated entity could nevertheless exercise its role in connecting new generators in a discriminatory way, such as through delays or substandard services. For example, PowerNet/TXU could take a time closer to the full 65 days to respond to connection requests made by some participants, while following faster timelines for requests by its own interests. PowerNet/TXU could also delay the start of the 65 day time period through onerous requests for information needed to demonstrate compliance with standards (it is presently left to PowerNet to determine what information is required). In principle this could extend the waiting period for an offer for connection well beyond 65 days. Existing arrangements therefore provide a significant degree of flexibility to

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66 see ACCC (2002), *Statement of Principles for the Regulation of Transmission Revenues – Transmission Ring-Fencing Guidelines*. The Guidelines begin with the requirement that TNSPs not engage in "related" activities i.e. generation, retail or distribution.

67 see also FERC (1998) and (1999). *Op.cit.*

PowerNet – more than is apparent at first sight – as to how it implements requests for connections.

### *"Fair and reasonable" terms*

Though PowerNet is required to provide the connection on "fair and reasonable" terms, it is unclear *a priori* what satisfies this requirement. If this became an issue with the integrated entity, the matter would have to be adjudicated by the ESC (or NECA), which could cause further delay and may impose further costs to the plaintiff. Finally, it is unclear as to what penalties may be imposed, or what remedies may be required. Current provisions do allow for a revocation of licence, but the extreme nature of this measure makes it an unlikely choice in the event of litigation involving one generator.

### *Incentives schemes in connection agreements*

To the extent that PowerNet faces financial incentives to maximise connection capability in some of its connection agreements, penalties applicable under these agreements for reduced connection performance may offset its incentives to engage in anti-competitive behaviours. We understand that some connection agreements provide financial incentives for PowerNet to maximise availability of connection assets, although perhaps only those entered into pre-privatisation. However, as with incentive schemes relating to shared network performance (see below), whether incentives for good performance outweigh incentives for poor performance is an empirical matter that requires detailed information about PowerNet/TXU's business.

Experience in other jurisdictions suggests that where behavioural regimes allow flexibility on issues such as timing of responses to connection applications, these will be exploited.[68] The relative weakness of external constraints is a reflection of the fact that they were not geared to deal with discriminatory practices that an integrated entity could have an incentive to pursue.

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68 see FERC (2001), *Order Granting Complaint and Directing Charges to Interconnection Procedures, Kinder Morgan Power Company vs Southern Services, Inc.*, Docket No. EL01-115-000. The case arose when Kinder Morgan submitted an interconnection application to Southern (an integrated entity combining transmission and generation activities). The FERC had established timelines for responding (either positively or negatively) to applications. In practice, applications for reviews were drawn out, with Southern defending lengthy reviews on the grounds of project complexity and data requirements. The FERC found that Southern's application processes were neither just nor reasonable, and discriminated against customers' ability to develop new projects. Southern's practices had the effect of extending actual times periods for review well beyond statutory timelines in certain cases. FERC found this created excessive amounts of commercial uncertainty for generators.

### 6.4.3 Constraints on manipulation of shared network and interconnector capability

There would be a number of constraints on PowerNet/TXU's opportunities to exercise market power through the manipulation of shared network and interconnector capability. As discussed in section 5.3.2 above, these can be split between:

- Legal constraints in regulation and contracts; and
- Financial incentives in regulation and contracts.

***Legal constraints***

Outages

PowerNet's ability to plan outages to favour its generation interests may be somewhat limited by legal obligations contained in the NEC. As noted in section 5.3.2, NEC obligations require a schedule of outages to be published in advance, but there is no obligation on the TNSP to abide by the schedule. Similarly, the Network Agreement obliges PowerNet to comply with planned outages for the following week, but the costs of not doing so appear to be relatively small.

Approval for planned outages proceeding is granted by NEMMCO on the basis of their impact on overall system security, but if a planned outage does not compromise system security, a TNSP is free to proceed with or reschedule a planned outage.

By contrast, unplanned outages cannot, by definition, be subject to an advance approval procedure. Therefore, while NEMMCO's oversight of system security may provide some check on the extent to which planned outages could be manipulated, there appears to be little preventing PowerNet from engineering "unplanned" outages (when one has not actually occurred) in order to reduce interconnector or shared network capability.

NEMMCO may undertake investigations into specific system events (see section 5.3.3 above). However, it is not clear whether NEMMCO's investigations would have any legal (or financial) implications for the TNSP unless they were taken forward by another party. Under the System Code, VENCorp may conduct a review of system incidents, but again the implications of these reports are unclear.

Reactive power

As discussed in section 5.3.3 above, provision of reactive power can have a major impact on network and interconnector capability, by controlling voltages within the network. However, requirements on networks for provision of reactive power are relatively vague. The present NEC arrangements appear to work on the basis that TNSPs provide reactive power as part of their role as TNSPs and this function is funded through their regulated revenues. Therefore, it is unlikely that PowerNet/TXU would be specifically penalised under the NEC for taking action to provide a lesser amount of reactive power than it has in the past.

The System Code imposes obligations on PowerNet to use "best endeavours" to maintain voltages within +/- 5 or 10% of stipulated levels (depending on the voltage at the point of supply[69]). However, even if a breach of this vague provision could be established, it is unclear what the consequences of breach of this provision are.

The Network Agreement also imposes an obligation on PowerNet to use "reasonable endeavours" to provide voltage and reactive control capability services from certain facilities in accordance with agreed settings.[70]

Maximisation of network capability

The NEC, PowerNet's access undertaking, the System Code and the Network Agreement all impose general obligations on PowerNet to operate the network in, broadly speaking, a reasonable manner. For example, as noted in section 5.3.2 above, the NEC requires PowerNet to operate its network in accordance with "good electricity industry practice" and in a manner so a to maximise power transfer capability. The access undertaking also refers to good electricity industry practice.

Parts of the Network Agreement and System Code seek to impose more specific obligations. The Network Agreement obliges PowerNet to use "reasonable endeavours" to meet specified node-to-node power transfer capabilities and the System Code requires PowerNet to use "best endeavours" to meet specific benchmark standards for forced outages and transmission equipment availability.

The main problems with these general obligations are that they are notoriously difficult to define and therefore detect and enforce. This is because they rely on ambiguous terms such as "good electricity industry practice" and "best endeavours".

For a regulator or counterparty to prove that PowerNet behaved in a way that violated these broad obligations, they would probably need to show a deliberate and sustained pattern of conduct linked to certain market conditions. Generators are handicapped in this respect by the low level of information available to them (leaving aside interconnector flows and the performance of their own (generation) connection assets). While NEMMCO and VENCorp may have (or could be given) access to the necessary information to audit PowerNet's behaviour during certain events, it should be borne in mind that under current arrangements, neither party undertakes this type of role.

Therefore, the legal restraints on self-serving network operation appear to be relatively weak in themselves. This is mainly a reflection of the fact that they were not designed to constrain an entity that would seek to leverage its TNSP function to favour its other segments. As mentioned in section 4.2, evidence from other jurisdictions points to outage scheduling and maintenance practices as sources of opportunistic conduct.[71] The fact that this behaviour has resulted in legal action

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69 See System Code, clauses 110.2.1-110.2.2.

70 Clause 4 and attachment 4.

71 FERC (2002), op.cit.

in other jurisdictions suggests that such behaviour is detectable only over a period of time, and only once significant damage has already been done.

It may be possible to enhance regulatory arrangements, for example, by giving, say, VENCorp or NECA a more active role in seeking to prevent opportunistic behaviour. This would probably require changes to the NEC or Network Agreement to:

- Increase the precision of vague definitions; and also probably to
- Increase penalties for non-compliance.

Further, the expansion of regulatory resources and technical expertise required to monitor and audit all conduct affecting shared network and interconnector capability to an effective level would be considerable. Even then, experience elsewhere has shown that such a heavy-handed role is unlikely to be successful.

Finally, we believe that revocation of PowerNet's transmission licence by the Victorian Government is probably not a credible threat because PowerNet owns and operates the bulk of the shared network – unless PowerNet immediately transferred ownership of its assets to another party upon having lost its licence, there would be no viable alternative provider of long-distance transmission services in Victoria. Consequently, a shut down of PowerNet's network precipitated by a loss of licence would leave almost all Victorian customers without power.

***Financial constraints***

PowerNet is subject to two main financial incentive schemes that relate to outages of transmission lines, outages of reactive equipment and network performance more generally. These schemes should provide some constraint on PowerNet reducing network performance in order to benefit its associated competitive activities.

The relevant schemes are the:

- Network Agreement Availability Incentive Scheme; and
- ACCC revenue cap for PowerNet.

Together, these schemes put approximately 6% of PowerNet's revenue "at risk". That is, if PowerNet performs much better or worse in terms of network outage frequencies or durations, or equipment availabilities, it could gain or lose approximately 3% of its regulated revenue (see section 5.3.2 above).

Whether or not these financial incentives are sufficient to discourage opportunistic behaviour by an integrated PowerNet/TXU is an empirical matter.

To take a very simple example, under the Network Agreement, the outage rebate rate for each circuit of the double-circuit 275 kV Heywood interconnector at peak times is $2,330/hour (indexed). Assuming that TIPS was dispatched to 1000MW, if PowerNet could construct an "unplanned outage" of this interconnector and pay a rebate of, say, $5,000/hour, it would "break-even" from its conduct if it could raise the South Australia price by just $5/MWh for one hour (ignoring TIPS' contracts and the entity's retail position). If the action

increased South Australian prices by $100/MWh for one hour, PowerNet/TXU as a TNSP/generator could stand to gain a net $95,000 *per hour* ($100,000 - $5,000). At extreme peak summer times, it would not be unrealistic for such an action to increase South Australian prices by $1,000/MWh per hour or more, which could potentially benefit the entity one million dollars-plus per hour.

In order to work out the optimal overall strategy for a combined PowerNet/TXU, it would be necessary to have access to a detailed financial model of all its electricity businesses. This would allow us to examine trade-offs between generation and retail profits and penalties to the transmission business resulting from manipulation of the network.

Going forward, if existing financial incentives under the Network Agreement or the regulated revenue cap were found to be inadequate, they could be increased to discourage manipulation of network performance. For example, penalties for line outages could be increased several-fold. Other things being equal, this would increase the risks that opportunistic outages would not be worthwhile. Increasing financial penalties is likely to be a more effective means of controlling PowerNet/TXU's incentives than the imposition of additional *legal* constraints, although it would require some consideration. The key issues would be:

- Implementation – the Network Agreement is a contract between two parties, not a statutory or regulatory instrument that can be directly altered by Government. According to VENCorp, there have been several unsuccessful attempts in recent years to amend the Network Agreement; and
- Form of penalties – if all that occurs is outage rebate rates in the Network Agreement are increased, this will increase the penalty for poor performance, but also automatically *increase the reward* for good performance. PowerNet would effectively be over-compensated for actions that reduce outages. This could potentially lead to over-investment in transmission performance or at least a wealth transfer from transmission customers to PowerNet if network improvements could have been achieved with smaller incentives. Hence customers could be worse off even if PowerNet does not exercise its market power. An alternative might be to have different outage rebate rates for different outage levels, although this would complicate the current relatively simple scheme.

The latter issue would also arise in relation to a change to the incentive scheme in the regulated revenue cap. However, the ACCC scheme is already based on historical outage rates, which should make it easier to adjust so that differential incentives were imposed for increases or decreases in network performance relative to historical performance.

### 6.4.4 Manipulation of Inter-Regional Settlements Residue Auction Process

NEMMCO has the ability under the IRSR rules to exclude certain parties from the auction process if NEMMCO believes on reasonable grounds that the person is acting on behalf of, or in concert with, a TNSP. Indeed, we understand that TXU has already been warned that a *prima facie* case for exclusion would exist if

the acquisition went ahead. It is also probable that manipulation of the IRSR over a period of time, would be detected by NEMMCO making such behaviour unsustainable.

On the other hand, given TXU's significant multi-regional asset portfolio, excluding TXU from the auction process may have negative consequences. For example, it may lower average IRSR unit sale prices, leading to a lower reduction in transmission charges to end-use customers. This could place NEMMCO in the position of making difficult compromises.

### 6.4.5 Delaying rival retailers' load connections or degrading supply reliability

The constraints in place to prevent or deter PowerNet/TXU from harming the connection or reliability of supply to rival retailers' loads are similar to the measures in place to prevent similar conduct with respect to rival generators (see section 6.4.2 above). These are:

- The requirement in PowerNet's transmission licence to make an offer to connect the applicant within 65 business days of receiving all reasonably required information;
- The requirement imposed by the NEC and PowerNet's transmission licence that the offer to connect be made on "fair and reasonable terms"; and
- Possible incentive schemes contained in connection agreements. It is not clear whether any such schemes exist in relation to load connections. If there are, then the question would be similar to where other schemes are in place – whether the benefits from engaging in the conduct is outweighed by the cost. Once again, this is an empirical question.

### 6.4.6 Smuggling contestable business costs into the regulated cost base

PowerNet's costs are presently regulated by the ACCC under the Commission's revenue-capping responsibility for the Victorian transmission network.[72] This would limit the degree to which PowerNet/TXU could inflate its transmission costs with the costs of other activities. However, as with any form of regulation – particularly cost of service regulation – there are likely to remain opportunities to exploit informational asymmetries between the regulated business and the regulator. While, as stated, the same incentives are likely to exist even in the absence of vertical integration, integration between PowerNet and TXU is likely, on the margin, to increase the opportunities for cost-shifting and increase the difficulty of detection. This is primarily because of:

- The similarities between the assets of the different businesses; and
- The frequent difficulties in drawing clear boundaries between asset and cost attribution between energy businesses.

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72 ACCC (2002), *Decision, Victorian Transmission Network revenue Caps 2003-2008*.

At the same time, it was noted above that TXU already had interests in electricity retail and distribution activities. Therefore, the marginal impact of combining transmission with retail and distribution assets may not be substantial. Understanding this fully would, as with the other behaviours outlined in this section, require more detailed information to ascertain.

## 6.5 CONCLUSIONS

This section considered whether an integrated PowerNet/ TXU entity would be likely to exercise its market power in various ways, given the regulatory and contractual constraints and costs it faces. This analysis involved several steps:

- Whether a combined PowerNet/TXU entity would have market power in at least one market – we submitted that it would have power in at least the market for transmission services in Victoria;
- Whether, in the absence of regulatory or contractual constraints, the integrated entity could benefit from exercising market power in various ways; and
- Given regulatory and contractual costs and constraints, whether the integrated entity is actually likely to exercise market power in the ways discussed.

We found that *prima facie*, there are strong incentives for PowerNet/TXU to exercise power to improve the profits of its generation and retail activities. A number of possible scenarios were hypothesised, based on the specific characteristics of the electricity industry (generation and transmission activities in particular).

However, there are also a number of regulatory and contractual constraints or incentives on the entity to not exercise its power in those ways. In this context, whether PowerNet/TXU would, on balance, actually find it possible and worthwhile to engage in anti-competitive conduct to benefit its contestable businesses is an empirical issue. Testing the profitability of the various strategies would require substantial information about the entity's financial and contract positions in all sectors of its business. Nevertheless, a common theme running through the various behavioural scenarios set out is that existing governance and regulatory arrangements for the electricity industry were not designed to curb opportunistic behaviour of an integrated entity. For example, existing regulations (such as vague requirements to maximise transfer capability) and behavioural rules (such as requirements to offer connection on fair and reasonable terms) were developed to regulate the effects of market power associated with the natural monopoly characteristics of transmission. They were not geared to deal with incentives to exercise market power resulting from the integration of a natural monopoly with an entity operating in a contestable market – cases where incentives for discrimination exist.

The question remains as to whether *augmented* external constraints and regulatory oversight could curb the ability of the integrated entity to exercise market power. Some limited improvements could be expected through, for example, stricter

supervision of informational ring-fencing or of outage and maintenance activities. However, evidence accumulated elsewhere suggests that curbing the ability of an integrated entity to exercise market power is an onerous task. Owing to inherent limitations in regulatory capacity – primarily derived from information asymmetries – it usually is not possible to comprehensively verify compliance with various behavioural rules, or to pick out each instance of anti-competitive behaviour as it happens. Action tends to be initiated (often through litigation, itself a costly process) after anti-competitive effects have accumulated over a period of time. The lags between the exercise of market power and the initiation of action against it (if any) contribute to aggravating welfare costs. Furthermore, perceptions by market participants that there is uncertainty as to whether market power would be successfully contained could itself act as a barrier to entry by deterring investments. Increasing financial incentives may not be the solution either, if such an approach effectively leads to the integrated business extracting rents from the regulator, at customers' expense.

# 7 Conclusions

The paper has presented an analysis of the acquisition of TXU by SP, within a general framework for assessing vertical integration involving electricity transmission and generation assets. It discussed theoretical arguments regarding vertical integration in general and in the electricity industry in particular. It presented an overview of lessons of experience gained in other jurisdictions regarding the handling of vertical integration in electricity and other energy industries. The paper then examined the nature of TXU and SP's operations and assets, and the contractual and regulatory arrangements to which they are subject.

On this basis, the paper argued that the acquisition of TXU by SP gives grounds for concern regarding the exercise of market power in the wholesale and retail electricity markets. In particular, it was argued that the integrated entity could have the incentive and the ability to exercise market power to promote its generation and retail interests and harm the interests of rivals. It was also argued that regulatory and other external institutional constraints would be of limited effectiveness in restraining the exercise and the effects of such market power.

The incentive to exercise market power stems from the monopolistic nature of PowerNet (itself a reflection of the economics of transmission), and its integration into an entity with assets in contestable markets. Specifically, the integrated entity faces the incentive to leverage its monopoly power in the transmission market to increase returns on its generation and retail assets. The integrated entity would therefore seek to promote more sales for its plants, and higher wholesale prices in Victoria and South Australia. To achieve this, it may seek to:

- Reduce the evacuation of other generators' power;
- Reduce the volume of electricity transported; and/or
- Reduce the power transfer capability of the Victorian network and interconnects.

It may also seek to promote its retail business at the expense of rivals.

The ability of the integrated entity to act on such incentives stems from two sources.

- PowerNet/ TXU's role in network operation and maintenance; and
- PowerNet/ TXU's informational advantages over other market participants.

The combination of the integrated firm's informational advantages and PowerNet's roles and responsibilities could be used to support a number of different practices that could reduce competition.

Key opportunities, consistent with experience in jurisdictions outside Australia include:

- The manipulation of generator bidding;
- The planning of outages and maintenance activities;

- The manipulation of network capability;
- The manipulation of the inter-regional settlements residue auction process;
- The development of new connections; and
- Cost shifting of unregulated costs into the regulated asset base.

This list is meant to be illustrative, rather than exhaustive. Furthermore, ascertaining the likelihood of the integrated entity engaging in such behaviour at any point in time, and the practical market consequences, would require access to a substantial amount of information, and would need to be the subject of a separate investigation.

The extent to which an integrated entity is able to exercise market power is influenced by the extent of regulatory and other institutional restraints it faces, and the ease (or otherwise) with which its behaviour may be detected. The report argued that existing regulatory and industry governance arrangements could be insufficient to curb the opportunistic behaviour of the integrated entity. This is to a large extent a reflection of the fact they were not designed with a view to constraining the types of behaviour that could arise were a TNSP to be integrated into an entity operating in the contestable markets of generation and retail. In particular, behavioural rules relating to informational ring-fencing, or the requirement to make connection offers on fair and reasonable terms, were developed on the basis of structural separation between transmission and other activities.

More generally, the paper argued that it was unlikely that augmented regulatory constraints would contain the exercise of market power by the integrated entity. While some limited improvements could be expected, experience in overseas jurisdictions suggests that reliance on regulatory oversight and on behavioural rules, in the absence of structural separation, is insufficient to curtail the scope and exercise of market power. Regulators are unlikely to have the resources and information to detect the range of, often subtle, actions that a TNSP may engage in. Even in cases where such behaviour was detected, action against it would in all likelihood involve litigation. This itself is costly, and the likelihood of lags between the exercise of market power and the implementation of action against it (if any) would contribute to aggravating welfare costs. Furthermore, perceptions by market participants that there is uncertainty as to whether market power would be successfully contained could itself act as a barrier to entry by deterring investments. Increased financial penalties for poor network performance may be more successful at curbing the exercise of market power. However, this would have to be carefully considered and implemented so that customers were not made worse off.

# Appendix 1 The Australian electricity industry

## RATIONALE FOR REFORM

### Pre-reform industry structure

During the 1980s and most of the 1990s, electricity in South-East Australia was provided by public owned utilities that undertook activities throughout the vertical chain (generation, transmission, distribution and retail, and in some cases fuel supply) and were protected by regulatory and institutional barriers.

The lack of competition and commercial disciplines on these monopoly utilities led to substantial over-investment in generating capacity (particularly in Victoria and NSW) and little integration of electricity systems between states.

The reform of the electricity supply industry was intended to reduce electricity prices by:

- Creating commercial pressures to reduce costs in generation and retail supply;
- Making better use of the existing generation assets, including through interconnection between separate State power systems; and
- Improving price signals to customers to improve the efficiency of electricity usage and to investors to prevent over-investment in new capacity.

### Key reform drivers

In 1989, as part of the Commonwealth Government's program for structural reform of the economy, the Industry Assistance Commission was commissioned to review the impact of charges for government supplied goods and services on the competitiveness of Australian industry.[73] The Industry Assistance Commission's report estimated that achievable reductions in capital requirements and manning levels would reduce electricity production costs by some $820 million annually.[74]

The results of the 1989 Industry Assistance Commission report led the Prime Minister to refer the electricity and gas sectors to the Industry Commission. The terms of reference required the Industry Commission to:[75]

- Report on the institutional, regulatory or other arrangements subject to influence by governments which led to inefficient resource use; and
- Advise on courses of action to reduce or remove such inefficiencies.

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73 Industries Assistance Commission, *Government (Non Tax) Charges* Volume 1, 1989, p xvii.

74 Industries Assistance Commission, *Government (Non Tax) Charges* Volume 1, 1989, p49.

75 Industry Commission, *Energy Generation and Distribution Volume II*, 1991, pxviii.

In 1991 the Industry Commission presented the results of its review, which concluded that reform of the electricity and gas sectors was urgent.[76]

The Industry Commission identified the lack of commercial disciplines imposed by competition as the primary source of this inefficiency.[77] The Industry Commission determined that there was a need to develop initiatives to promote competition in the electricity industry, including:

- Separate ownership of generation, transmission and distribution functions;
- Breaking up existing publicly owned generating capacity to form a number of independent generating bodies;
- Forming a public body to acquire and operate all transmission assets in New South Wales, Victoria, Queensland, South Australia and Tasmania;
- Creating multiple distribution franchises in states where currently they do not exist; and
- Requiring all transmission and distribution bodies to provide open access.[78]

## The establishment of the NEM

The recommendations of the 1991 Industry Commission report for reform of the electricity sector became the basis of a blueprint for the future of the electricity sector. The National Grid Management Council (NGMC) was established to consider arrangements for an interstate network covering those states mentioned in the Industry Commission report.[79]

The NGMC subsequently made a number of recommendations about the proposed features of the NEM. These recommendations included:

- *"direct customer to generator access;*
- *non-discriminatory access to the interconnected transmission network;*
- *no barriers to interstate trade to entry for new participants in generation or retail supply;*
- *uniform trading rules across South and East Australian ESI."*[80]

The NGMC also made recommendations about regulatory arrangements for the NEM, which included the establishment of:

- *"a national regulator for market conduct;*

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76 Industry Commission, *Energy Generation and Distribution Volume I*, 1991, p2.

77 Industry Commission, *Energy Generation and Distribution Volume II*, 1991, p2.

78 Industry Commission, *Energy Generation and Distribution Volume I*, 1991, p23.

79 National Grid Management Council, *The Structure of an Interstate Transmission Network for Eastern and Southern Australia*, March 1993, p1.

80 National Grid Management Council, *National Electricity Market and Common Trading Arrangements, An Information Paper*, January 1993, page 7.

- *a Code of Conduct with national general regulatory oversight for three areas: network connection and access, network pricing, and market rules and operation. The NGMC recommended oversight should include pricing oversight of uncompetitive market segments where necessary;*
- *a national advisory body (the NGMC) to provide governments with information on the monitoring/ oversight of a Code of Conduct for planning of future system developments;*
- *State regulation for three areas: franchise customer pricing, environment and safety."*[81]

## National Competition Policy and regulation in the electricity industry

Reforms to the electricity industry and the development of regulatory principles relating to it were influenced by the concurrent development and adoption of a National Competition Policy. The recommendations of the Committee of Inquiry, established to develop framework for the national competition policy, that affected the electricity supply sector most significantly were:

- The removal of the immunity from the *Trade Practices Act* of government owned businesses under the 'Shield of the Crown' doctrine;
- The structural reform of public monopolies, which included:
  - separation of regulatory and commercial functions of public monopolies;
  - the separation of natural monopoly and potentially competitive activities; and
  - the separation of potentially competitive activities into a number of smaller, independent business units;
- Access to essential facilities which involved the adoption of a new legal regime under which firms could be given the right of access to specified 'essential facilities' (facilities that cannot be duplicated economically) on fair and reasonable terms;
- Prices oversight for monopolies to deal with those circumstances where all other competition policy reforms had proven inadequate; and
- The establishment of the National Competition Council (NCC) to oversee the proposed competition regime and the Commission to undertake the regulatory functions previously provided by the Trade Practices Commission and the Prices Surveillance Authority.[82]

The Council of Australian Governments agreed to the recommendations made by the NGMC agreed to implement reforms broadly in line with those

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81 National Grid Management Council, *Regulatory Arrangements for a National Electricity Market*, October 1993, p4.

82 Independent Committee of Inquiry, *National Competition Policy*, Australian, August 1993, pp xxi – xxxvi.

recommended by the Independent Committee of Inquiry into the National Competition Policy.[83] Thus, the recommendations of both the NGMC and the Independent Committee of Inquiry provided the underlying framework for the structural reform underpinning the creation of the NEM. The adoption of the National Competition Policy recommendations provided the framework for regulation of the NEM. Specifically, the approach chosen combined the structural separation of transmission activities from others, and the development of behavioural rules, such as those governing non-discriminatory third party access.

## ELECTRICITY SUPPLY INDUSTRY REFORM

This section summarises the key electricity supply industry reforms introduced in the NEM jurisdictions, particularly in Victoria.

### Victoria

Electricity in Victoria was historically provided by the State Electricity Commission of Victoria (SECV). The SECV was disaggregated in 1993 and 1994 to form a number of separate companies. The generating activities of the SECV were separated into five main generating companies:

- Loy Yang Power;
- Yallourn Energy;
- Hazelwood Power;
- Ecogen Energy; and
- Southern Hydro.

There were a number of other power stations in Victoria, which were not established as separate generating companies at that time, due to historical contracting arrangements. These power stations include:

- Loy Yang B (which is owned by Edison Mission Energy, and was managed under a physical contract);
- Anglesea power plant (owned by Alcoa and used to supply the aluminium smelter at Point Henry, traded into the NEM by the SECV); and
- Energy Brix Australia.[84]

The transmission activity was separated into two separate companies:

- PowerNet Victoria (now SPI PowerNet) which owns the transmission network; and
- VENCorp, which is responsible for transmission planning.

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83 National Competition Commission, *Compendium of National Competition Policy Agreements*, 1998.

84 Office of State Owned Enterprises, Department of the Treasury, Victoria, *Reforming Victoria's Electricity Industry: A Competitive Future for Electricity – A Summary of Reforms*, December 1994, p52.

Five companies were created with the combined responsibility for distribution and retail supply within a particular geographic area:[85]

- Powercor, with responsibility for distributing and retailing electricity in Western Victoria;
- Eastern Energy, with responsibility for distributing and retailing electricity in Eastern Victoria;
- Citipower, with responsibility for distributing and retailing electricity in the City of Melbourne;
- Solaris, with responsibility for distributing and retailing electricity in the Western suburbs of Melbourne; and
- United Energy, with responsibility for distributing and retailing electricity in the Eastern suburbs of Melbourne.

Privatisation of the Victorian electricity industry commenced in 1995. All the companies created during the industry restructuring, with the exception of VENCorp and the SECV, were privatised. Some assets have or are being sold again since the initial privatisation of the Victorian electricity supply industry.

## Other NEM jurisdictions

### *Generation*

Like the Victorian reforms the historically state-owned generation sector in other NEM jurisdictions was separated to create a number of competing generating companies. Generation assets in SA are privately owned while in NSW and Queensland the Government owns or trades almost all generators, even though they have created multiple competing generator companies. Generation companies in the NEM earn revenue from the wholesale market, or spot market, and associated contractual arrangements.

### *Transmission*

In all NEM jurisdictions the bulk of transmission assets were separated from other electricity industry assets and placed within separate companies during the reform of the electricity supply industry. Generators own some transmission connection assets in certain NEM jurisdictions, such as Victoria.[86]

In NSW and Queensland the transmission companies are Government-owned, while in South Australia the transmission company has been privatised.

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85 Office of State Owned Enterprises, Department of the Treasury, Victoria, *Reforming Victoria's Electricity Industry: A Competitive Future for Electricity – A Summary of Reforms*, December 1994, p37.

86 We understand that in Victoria, generators often own equipment such as generator busbars, but that PowerNet owns the remainder of power station switchyards. By contrast, we believe that this line between connection and shared network assets is different in NSW, where the generator busbars make up part of the shared network, owned by TransGrid. However, to our knowledge, these divisions have not been formally tested.

In NSW and Queensland the transmission companies own the transmission network and have responsibility for network development and maintenance. In South Australia, like Victoria, there is a separate organisation responsible for network planning (Electricity Supply Industry Planning Council). The transmission companies operate the transmission network in cooperation with NEMMCO.

The reforms provided open access arrangements for transmission assets. A key aspect of these arrangements is the regulation of transmission prices in the NEM to prevent transmission companies from charging monopoly rents (with some exceptions).

### *Distribution and retail*

As part of the reform process, distribution and retail assets were placed within companies separate from the generation and transmission activities. Historically, customer service (retailing) systems were closely meshed with the distribution system which incorporated customer related activities such as metering, customer connection and disconnection services, fault reporting and repairs. Untangling these arrangements to create two distinct activities is a time consuming and expensive process.

To avoid the direct costs (that is, the costs of creating two new separate business systems) and the indirect costs (that is, delays in the reforms) of untangling the potentially competitive activity of electricity retailing from distribution, Governments chose instead to create combined distribution and retail businesses and to rely on regulation to prevent these businesses from using their relationship in an anti-competitive manner. This included establishing:

- 'Ring fencing' arrangements to separate the provision of distribution services from other, competitively provided services (i.e. retailing, generation, engineering works and services). In the main, this 'separation' of business activities was effected through different forms of accounting separation;
- Regulation of network prices and third party access arrangements for use of the distribution network by competing retailers; and
- Establishing Codes of Conduct to prevent to flow of commercial information regarding the use of the network by competing retailers.

In all NEM states, companies were created with the combined responsibility for distribution and retail supply within a particular geographic area. In NSW there are now four combined distribution/retail businesses. In South Australia the Government created a single combined distribution/retail business. The buyer of the combined distribution/retail business in South Australia, CKI, subsequently entered into a commercial agreement with AGL to separate and buy the retail component of that business. The distribution and retail businesses in NSW and Queensland remain state owned.

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