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ECONOMISTS
GROUP

International review of rebidding activity and regulation

FINAL

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1 Introduction

1.1 Background

1. CEG-Asia Pacific has been asked by the Australian Energy Market Commission (AEMC) to undertake a review and comparative assessment of regulation relating to rebidding activity in overseas jurisdictions.

2. We understand the request for this review and assessment relates to a rule change request from the South Australian Minister for Mineral Resources and Energy in relation to the bidding in good faith provisions in the National Electricity Rules (NER). This rule change request would expand the operation of the existing 'good faith' provisions in the NER. Key effects of the request would be to:

   - limit rebidding to situations where there has been a "significant and quantifiable change in price, demand or other data published by the AEMO" or "other material circumstances";
   - require generators to be able to demonstrate that rebids were made in good faith – recasting the good faith provisions in the negative; and
   - establish a set of objective information on which the AER may assess that bids have not been in good faith – removing the requirement for the AER to demonstrate that the bidder had a positive intention not to honour the bid.

3. The AEMC is presently undertaking a consultation on the requested rule change as to whether it would meet the objective of promoting "efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity" as required by the National Electricity Objective (NEO).

4. The primary task in this review was to survey the approach used by regulators around rebidding in relevant international markets and undertake a comparative assessment with the approach taken in the NER. The international markets we considered were:

   - The Albertan electricity market in Canada;
   - The Singaporean electricity market;
   - The New Zealand electricity market;
   - The French electricity market;
   - The Texan electricity market in the United States; and
   - The Pennsylvania New Jersey Maryland (PJM) electricity market on the eastern seaboard of the United States.

5. The national electricity market (NEM) is an energy-only market which allows rebidding up until the time of dispatch, subject to the existing good faith provisions. For each market we provide an:

   - overview of the market which identifies the principle features of the market design in so far as it relates to energy bidding and rebidding; and
   - outline of the different approaches taken in international electricity markets to regulating generator bidding and rebidding behaviour, including energy rules and regulation (e.g., price caps and gate closures), and any relevant competition law.

6. In the overview section of this report, we provide our observations regarding the lessons that can be learned from each market, having regard to the different characteristics of the markets surveyed.

1.2 Structure of this Report

7. The remainder of this report provides the results of our review for each of the jurisdictions:

   - **section two** provides an overview of the results of our analysis;
   - **section three** provides our summary for Alberta;
   - **section four** provides our summary for Singapore;
   - **section five** provides our summary for New Zealand;
   - **section six** provides our summary for France;
   - **section seven** provides our summary for Texas; and
   - **section eight** provides our summary for PJM.

2 Overview

8. In this section we briefly discuss the proposed rule change, the NEM and its approach to regulating rebidding behaviour and summarise observations of our international survey.

2.1 The NEM and its Approach to Rebidding

9. The National Electricity Market (NEM) is a compulsory spot market (or pool) in which generators sell their electricity to retailers, who resell electricity to end-customers.[1] The pool operates to bring generators and retailers together on a real-time basis by matching supply and demand through a centrally coordinated dispatch process (managed by the Australian Energy Market Operator, or AEMO).

10. Generators are required to submit day-ahead dispatch offers for each 30-minute trading interval, but may rebid the following day in response to changing demand and supply conditions. Generators may rebid up to the time of dispatch (subject to technical limitations on the time taken for bids to be processed into the market – which is a matter of minutes). AEMO takes the final bids and dispatches generators to meet the prevailing demand on the principle of the most cost-efficient means from sources.[2]

11. The competitive process within the NEM is designed to deliver efficient pricing outcomes in terms of ensuring demand is met at the lowest possible cost (promoting productive efficiency) and providing signals for new investment in generation and demand management (promoting dynamic efficiency). One of the most desirable features of the NEM is that it can provide efficient market outcomes by offering a platform for generators and retailers to pursue their own private interests. The pursuit of profits by market participants is an essential feature of the market delivering efficient outcomes.

12. Despite this, the efficient operation and market outcomes of the NEM may be harmed by particular generator bidding strategies. For example, the gaming of technical constraints on transmission links, strategic withdrawal of bids and late bidding strategies may distort prices leading to inefficient supply being called on by the market and prevent demand from efficiently responding to supply conditions.

13. It is for this reason that market rules have been adopted which attempt to deter this type of generator behaviour. These rules include the good faith bidding provisions

[1] Whilst the pool is compulsory, generators and retailers may protect themselves from price volatility by entering into hedge contracts that fix a price.

[2] The most cost-efficient outcome will depend on the location of supply and demand and on transmission link conditions.

which were incorporated into the operation of the NEM in 2002. Generally speaking, the good faith provisions seek to prevent generators from making bids they intend to resile from; as such bids are likely to be associated with a strategy that is inconsistent with efficient pricing outcomes. Nevertheless, the provisions do represent an attempt to require generators not to pursue their self-interest in the market (in economic jargon, they are not incentive compatible rules[3]). As such, the design and enforcement of such rules is likely to raise particular issues.

14. Parallels can be drawn between good faith provisions and general competition laws that seek to prevent anticompetitive behaviour by firms with market power. In competition law cases, a Court must assess whether conduct has an anticompetitive purpose or is the acceptable pursuit of profits that is a feature of workably competitive markets. Parties in such cases commonly have a safe harbour in behaviour that would be engaged in by firms without market power.

15. In the current context, generators engaging in late rebidding are in a position to influence the market price without necessarily being in a position of market power.[4] An inherent feature of a continuous real-time market is that bids must close at some time. Hence, if the gate closure is at a fixed time, there may always be the potential for a generator to engage in a late bidding strategy. In other auction markets, this strategy may be addressed by adding time to the auction when a new bid is made.[5]

2.2 Overview of International Survey

16. We have surveyed a range of electricity markets. These include a number of 'energy-only' markets due to their potentially greater relevance to the NEM. We have however, included markets with other features including those with day-ahead markets (e.g., France) and capacity markets (e.g., PJM). In such markets, rebidding behaviour may be equally relevant to the extent that the prices determined in energy markets are relevant for settling significant quantities of supply.

17. A key observation from our survey is that all markets have some mechanism or rule to ensure that bids have some substance to them at the time they are made. That is, each market appears to have arrangements to ensure that bids reflect a genuine intention of generators to supply at the relevant price.

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3 A market mechanism is incentive compatible if it creates unilateral incentives for participants to engage in desired conduct.

4 For this statement we are characterising a generator as having market power as one that could raise prices to that level even if other generators had the ability to respond.

5 A novel option that might be considered is to make the gate closure at an uncertain time, say a random time between five and 60 minutes before dispatch.

18. At one end of the spectrum, markets have physical transactions that complete well ahead of delivery (e.g., day-ahead market in the PJM). In the PJM there is a day-ahead settlement at the market price and day-ahead bids are carried over to the real-time balancing market (they cannot be amended). At the other end of the spectrum, markets rely on behavioural rules against market manipulation to ensure that bids reflect demand and supply conditions and/or are made in good faith (such as those in Alberta and Texas). For energy-only markets that have uniform prices, such as the NEM, this appears to be the norm.

19. We understand that issues relating to late rebidding may be perceived as a reason to amend the rules relating to the timing of gate closure and the ability to vary bids. In the NEM, generators may amend bids (in good faith) up until dispatch. A number of markets have thought about the issue of gate closure timing and the conditions on which offers can be varied (e.g., Singapore and Alberta). It appears that those markets recognise the trade-off between an early gate closure and the efficiency of the market (i.e., giving market participants time to respond to changing market circumstances (e.g., by amending bid quantities and/or prices)).

20. Similarly, price caps in the market may be a tool to mitigate late rebidding conduct. However, in 'energy-only' markets, price spikes in high demand periods are needed to ensure that generators have the capacity to recover their fixed costs. In such markets, high prices are also needed to signal to investors to build new capacity for the market. Price caps mute these efficient price signals.

21. Our general observations are that:

    - markets around the world recognise the benefits of having credible bids being submitted as early as possible (e.g., to allow demand forecasting and demand-side participation); however
    - markets around the world equally recognise the benefits from allowing energy trading close to the time of dispatch. For example, the closer trading to the time of dispatch means that trading can more quickly respond to price spikes; and
    - in energy-only markets, the existence of price caps mutes the signal for efficient investment and, potentially, the ability of generators to cover their fixed costs. Whilst lowering the price cap may limit the benefit from spiking prices, it may harm the efficient operation of the market.

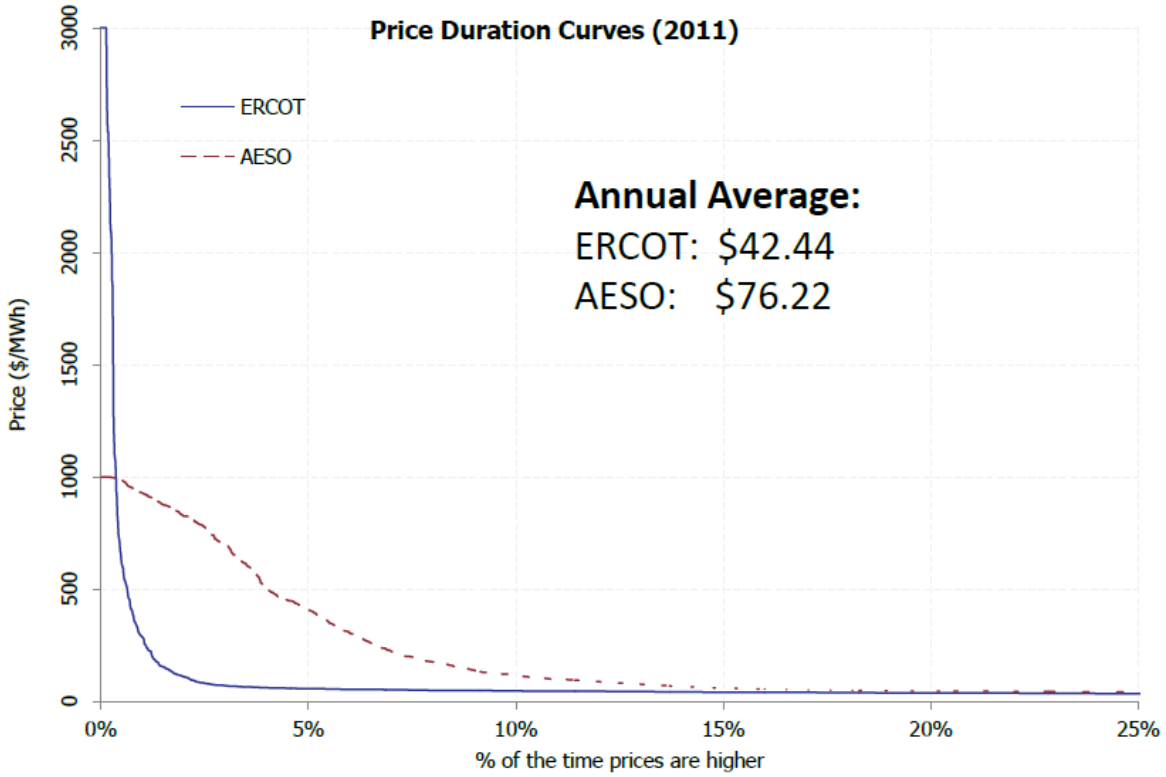
2.2.1 Alberta

22. Alberta is a mandatory energy-only market like the NEM. Therefore, like the NEM, the price of energy must over time be sufficient for generators to recover the fixed costs of building generation capacity and to signal efficient investment or withdrawal of future capacity. This is an essential element of energy-only markets such as those in Alberta and in Texas (which we discuss below).

23. In Alberta, the exercise of unilateral market power to raise prices is seen as consistent with this element of the market. Despite this, energy-only markets commonly impose caps that limit price spikes. In Alberta, the price cap is relatively low when compared to other energy-only markets such as Australia, New Zealand and ERCOT, at CAD999.99/MWh.

24. Such price caps not only have the effect of constraining the exercise of unilateral market power but also other behaviour that might spike prices (such as late re-bidding). The price duration curve in Figure 1 for the Alberta Electric System Operator (AESO) indicates that prices are closer to the price cap for a greater proportion of time than in ERCOT, which has a higher cap. It appears that since the low price cap in Alberta limits the ability of generators to cover their fixed costs through price spikes, generators collectively bid prices closer to the cap for a higher proportion of time in order to recover costs.

Figure 1 Price duration curve for Alberta (and ERCOT)



25. Unlike the NEM, the market in Alberta has a gate closure two hours prior to energy being dispatched. This means that the opportunity for other generators to respond to price spikes (say, driven by late re-bidding) is substantially delayed relative to the NEM.

26. In Alberta, the regulator (the Market Surveillance Authority) has issued guidelines relating to conduct in which a generator seeks to extend its market power by creating an impediment to other generators competitively responding to a bid. Arguably, sustained, systematic late re-bidding may be seen as creating an impediment to a competitive response. This conduct does not automatically result in enforcement action but may be "subject to investigation and potential enforcement action".

2.2.2 Singapore

27. Singapore is a mandatory energy-only market like the NEM. Therefore, like the NEM, the price of energy must over time be sufficient for generators to recover the fixed costs of building generation capacity and to signal efficient investment or withdrawal of future capacity.

28. A substantial portion of the energy supply in Singapore is subject to vesting contracts. The Energy Market Authority (EMA) set the level of vesting contract at 65% in 2004, and rolled it back to 40% in 2014.[6] Generators that have entered into vesting contracts will not benefit from conduct that spikes the price in the energy market.

29. The Singaporean market has a relatively high price cap at US$4,500, though not as high as that in the NEM. It also has a relatively late gate closure at five minutes before dispatch, though rebidding after 65 minutes before dispatch can only be for defined reasons including additional quantities at the same price and operational issues. Variations made after the 65 minute gate closure are automatically subject to investigation.

30. In 2006, the gate closure in Singapore was reduced from two hours. A key reason for the reduction was that it would enable market participants to react to changing market or plant conditions closer to real-time by offering more capacity of their online generating units should there be high forecasted prices caused by a shortfall in offered Energy, Reserve or Regulation. This would help moderate price spikes in a tight supply situation although this may not be true if offline generating units have to be brought in because they generally take at least two hours to be run up.

31. The *Electricity Act* provides behavioural rules that may capture systematic late rebidding. The Act prohibits:

    - any action which aims to or has the effect of preventing, restricting or distorting competition in any wholesale electricity market. Such actions include, inter alia, fixing prices or other trading conditions, and limiting or controlling electricity generation, any wholesale electricity market, or investment in the electricity industry; and

[6] Energy Market Authority (2013) *EMA's procedures for calculating the components of the vesting contracts,* pp. 3-14.

- any conduct which amounts to the abuse of a dominant position in any wholesale electricity market if it may affect trade within Singapore. Conduct constitutes abuse if, inter alia, it imposes unfair prices or other trading conditions or limits electricity generation or any wholesale electricity market to the prejudice of consumers.

2.2.3 New Zealand

32. New Zealand is a mandatory energy-only market like the NEM. In order to signal efficient investment or withdrawal of future capacities, generators must be able to recover fixed costs through the price of energy. The energy price is uniform and is determined by the marginal producer.

33. Generators must submit offers by 1pm on the day prior to trading. They may revise or cancel their offers up to two hours prior to the trading interval. Unlike the NEM, changes to offers within the two hour window must be for a genuine physical reason.

34. New Zealand does not have an explicit maximum price that can be set in the wholesale market. However, a high effective maximum price of $20,000/MWh has been established by a system of 'scarcity pricing' introduced by the Authority in October 2011, which came into force 1 June 2013. Furthermore, during a 2011 occurrence of an undesirable trading situation (UTS), the Authority capped prices at $3,000/MWh, as described below.

35. A UTS is a situation "that threatens or may threaten, confidence in, or the integrity of, the wholesale market" and that cannot otherwise be solved by the *Electricity Industry Participation Code 2010* (the Code).[7] The Code allows the Electricity Authority (the Authority) to investigate the development, or possible development, of a UTS. Examples of UTSs include, inter alia, manipulative or attempted manipulative trading activity and conduct in relation to trading that is misleading or deceptive, or is likely to mislead or deceive.[8]

36. The Authority conducted an investigation into an alleged UTS relating to spot prices of approximately $20,000/MWh during planned outages on 26 March 2011. An offer revision by Genesis Energy the day before was followed by a series of offer revisions that resulted in low priced energy being repriced at higher rates. The Authority concluded that a UTS did develop but that Genesis Energy's behaviour was not

7 Electricity Authority (2014) *Electricity Industry Participation Code 2010 Part 1 – Preliminary provisions*, p. 61.

8 Electricity Authority (2014) *Electricity Industry Participation Code 2010 Part 5 – Regime for dealing with undesirable trading situations*, p. 1.

unlawful.[9] In response to the UTS occurring, the Authority decided to cap the prices at one of Genesis's power stations at $3,000/MWh for certain trading periods on 26 March and to reset prices at the other Genesis power stations to be based on the offer structure at the beginning of the day. The Authority noted that the $3,000/MWh offer price cap removed the effect of the market squeeze component of the UTS whilst still maintaining incentives on participants in line with a workably competitive market.

2.2.4 France

37. In France, electricity can be traded on the over-the-counter (OTC) market or on the European Energy Exchange (EEX), which operates spot and derivative trading. EPEX Spot is a sub-market on which short-term trading in power (day-ahead and intraday spot products) for Germany, France, Austria and Switzerland takes place.

38. On EPEX Spot, transactions in the day-ahead market are effected by matching supply and demand orders by auction, after a period during which orders entered in the 'order book' by market participants are accumulated but not executed. The auction is blind such that the order book and transactions are anonymous.

39. The order book opens 45 days before delivery and closes at noon the day before delivery. During this time, orders can be modified at will. After gate closure, no more bids can be amended and the uniform auction price for each hour of the next day will be calculated. According to EPEX SPOT's Operational Rules, EPEX Spot may trigger a 'Second Auction' if the market is in curtailment (imbalance of purchases and sales leading to out-of-scale prices) or if the auction leads to a price that can be considered as abnormal given current market conditions (one or several hourly prices are significantly different from the other hours of the day or from the same hour(s) of a comparable day).

40. EPEX SPOT currently assesses whether a Second Auction will be triggered based on hourly prices hitting or exceeding the lower and upper price thresholds of -150€/MWh and 500€/MWh, respectively.

41. The intraday market allows trading closer to real-time, from 3pm the day before delivery up to 45 minutes before delivery. Transactions in the intraday market are effected by continuously matching supply and demand orders entered into the order book for immediate execution. The EPEX Spot price cap is 3,000€/MWh.

42. REMIT is a European Union (EU) framework for monitoring wholesale energy markets that defines and prohibits market manipulation and abuse. The REMIT broadly sets out four types of market manipulation, including (i) false/misleading

9 Electricity Authority (2011) *Final decision on the Undesirable Trading Situation of 26 March 2011, and final decision on actions to correct the Undesirable Trading Situation of 26 March 2011.*

transactions; (ii) price positioning; (iii) transactions involving fictitious devices/deception; and (iv) dissemination of false and misleading information.

43. In accordance with REMIT the EPEX Spot Code of Conduct establishes rules prohibiting abusive practices affecting wholesale energy markets and aims to prevent and detect Exchange Members' misbehaviour in order to operate the market in a fair and transparent manner.

44. The Code of Conduct prohibits market manipulation, including false or misleading behaviour, collusion, and price positioning behaviour. It states that exchange members must commit to fairness towards EPEX Spot and the other exchange members.

45. The Code of Conduct states that all orders submitted on the exchange must have due economic justification for which EPEX Spot is entitled to look for by requesting explanations to such orders.

46. The Code of Conduct forbids exchange members from entering into any transaction or issuing any orders without a due economic justification, placing orders with no intention of executing them, or giving false or misleading signals as to the supply of, demand for, or price of physical power contracts. This Code forbids exchange members from:

- securing the price of physical power contracts at an artificial level (unless the person who entered into the transaction or issued the order to trade establishes a legitimate reason for doing so and that the transaction or order to trade conforms to accepted market practices on EPEX Spot markets);
- artificially causing prices to be at a level not justified by market forces of supply and demand, including actual availability of production, or transportation capacity, and demand; and
- conducting cross trades[10] with no real economic justification and/or with the purpose of influencing exchange prices.

2.2.5 ERCOT

47. ERCOT is an energy-only market like the NEM. To attract new generation entry in an energy-only market, prices over time must be high enough for generators to cover their fixed costs as well as their variable costs of operation.

48. ERCOT's energy market operates on a day-ahead and a real-time basis. Generation offers and load bids for the day-ahead market close at 10am on the day prior to the operating hour. Offers and bids that are accepted by the system operator in the day-ahead market are financially binding on market participants. In advance of the real-

[10] A transaction where an exchange member is both on the buy-side and the sell-side for the same product.

time market, rebidding is permitted during an "adjustment period" between 6pm the day prior and 60 minutes prior to the operating hour. The ability to rebid is only restricted by compliance with ERCOT's reliability requirements. Offers and bids made and accepted by ERCOT are physically binding on market participants.

49. Unlike the NEM, generators in ERCOT are not required to sell their energy to the common pool. The vast majority of financial transactions occur in bilateral contracts outside the ERCOT pool, with participants able to indicate to ERCOT their "self-scheduled" status.

50. The maximum price permitted in ERCOT is relatively high at US$7,000/MWh, rising to US$9,000/MWh on 1 June 2015. However, there are further restrictions upon price, including:

- a scarcity pricing mechanism which tracks cumulative earnings and restrains maximum prices to US$2,000/MWh when net margins exceed a defined threshold; and
- offer mitigation, which may restrict the ability of generators to achieve very high localised prices in constrained areas of the network.

51. The Public Utilities Commission of Texas enforces the Chapter 25 Substantive Rules which includes rules relating to the wholesale electricity market. The Rules prohibit activities such as market manipulation, fraudulent or misleading behaviour and collusion or market power abuse. However, entities with less than 5% capacity share are deemed not to possess market power under a provision popularly known as "small fish swim free".

2.2.6 PJM

52. Unlike the NEM, PJM is not an energy-only market. PJM has a sophisticated capacity market that procures capacity and reserves up to three years in advance of supply (known as the reliability pricing mode (RPM)). The capacity market is compulsory for load-serving entities (i.e., they must acquire expected demand plus a reserve margin).

53. PJM also has day-ahead and real-time energy markets that are each settled separately. The day-ahead market does not allow any rebidding. Bids for the day-ahead market close at 12pm the day before trading for evaluation by PJM. At 4pm, PJM produces the day-ahead local marginal prices (and congestion charge) and load schedules. It then opens a two-hour rebidding period for generators that were not selected in the day-ahead market to bid into the real-time market. At 6pm the day before dispatch, bidding for the real-time market closes.

54. There are a number of additional constraints in the PJM against the exercise of unilateral market power and behaviour that might result in price spikes. These include a relatively low price cap of US$1,000/MWh and a requirement for

generators to supply cost-based offers (based on fuel costs) to be used if they are deemed to have market power.

55. FERC regulates the PJM as a federal public utility under the *Federal Power Act* (2005) and must approve its operating rules as being "just and reasonable". The FERC has a number of market behaviour rules codified in regulation and a specific anti-manipulation rule that makes it unlawful for PJM market participants:

    i. to defraud using any device, scheme or artifice (i.e., intentional or reckless conduct);

    ii. to make any untrue statement of material fact or omit a material fact; or

    iii. to engage in any act, practice or course of business that operates or would operate as a fraud or deceit.

56. This broad rule mirrors elements of United States securities law, for example, Section 10(b) of the *Securities Exchange Act*.

57. Recently, FERC has undertaken a number of high-profile enforcement investigations for alleged breaches of its anti-manipulation rule. In July of 2013, FERC found Barclays and five of its traders to have manipulated energy markets in California. FERC found that Barclays had engaged in trades that were not consistent with demand and supply conditions in the market – in fact, many were avoidable loss making transactions in the physical market, but were profitable to Barclays because of fixed-for-floating swap positions it had taken in financial market.

Table 1 Summary of wholesale electricity markets

	Description	Auction design	Gate closure	Price cap	Market behaviour rules	Structural issues
Alberta	Mandatory energy-only market	Uniform price	2 hours before settlement interval Volume changes may be made after gate closure but only be for "acceptable operational reasons"	C$999.99/megawatt hour (MWh) for energy prices	The Market Surveillance Administrator enforces market rules. Rules define and prohibit 'undesirable conduct'. Conduct must be for business purposes only and not for misleading or manipulative purposes	All electricity through pool One large gentailer Cogeneration a key feature
Singapore	Mandatory energy-only market	Uniform price	Effective gate closure of 65 mins (after which offers are subject to market surveillance investigation) Firm gate closure of 5 mins	S$4,500/MWh for energy prices	The Market Surveillance and Compliance Panel enforces Market Rules on behaviour. The Market Assessment Unit monitors for anti-competitive agreements and abuse of dominant positions	40% vesting contracts Several major 'gentailers'
New Zealand	Mandatory energy-only market	Uniform price	2 hours prior to the trading interval Changes to bids or offers within the 2-hour window must be for a genuine physical reason.	There is no explicit cap on prices but a scarcity pricing mechanism ensures that prices cannot exceed NZ$20,000/MWh.	The *Electricity Industry Participation Code 2010* administered by the Electricity Authority. The Code gives the Authority wide discretion to address undesirable trading situations which may arise due to manipulative, misleading or speculative behaviour.	5 gentailers account for around 91% of generating capacity and 97% of demand. Generally, generators are required to make offers to the system operator.
France	Mandatory day-ahead and intraday	Uniform price set in the day-ahead market	Day-ahead market - orders open 45 days before delivery	€3,000/MWh	The exchange code of conduct prohibits market manipulation, collusion and	Generation highly concentrated (~85% state owned)

	Description	Auction design	Gate closure	Price cap	Market behaviour rules	Structural issues
	energy markets	The intraday market features continuous trading where bids and offers are matched as they arrive.	and close at 12pm the day before delivery. Intraday market - 45 mins before delivery		artificial trades to influence prices. REMIT is an EU framework for monitoring wholesale energy markets that defines and prohibits market manipulation and abuse	State owned monopoly regulated
ERCOT	Voluntary day-ahead and real-time energy markets	Nodal design with uniform marginal pricing at each location Offers made and accepted in the day-ahead market are financially binding. In the real-time market, they are physically binding	10am the day before for the day-ahead market 1 hour before the operating hour for the real-time market	High system wide offer cap is currently US$7,000/MWh, rising to US$9,000/MWh on 1 June 2015 However, if recovery in a year is high then prices may be constrained to the low system wide offer cap of US$2,000/MWh	Chapter 25 Substantive Rules policed by the Public Utilities Commission of Texas which prohibit fraudulent or misleading behaviour, creating artificial congestion or engaging in collusion or withholding of production (whether economic or physical)	Generation and load entities can contract directly, through brokers or on the Intercontinental Exchange Only 5% of energy is transacted through ERCOT's energy markets
PJM	Voluntary day-ahead and real-time energy markets. Annual capacity auction	Locational marginal prices in both the day-ahead and real-time markets Uniform prices at each location	12pm the day before for the day-ahead market 6pm the day before for the real-time market	US$1,000/MWh for energy A shortage pricing mechanism allows the price cap to rise to US$2,700/MWh during periods of reserve shortage	Under the *Energy Policy Act 2005* the Federal Energy Regulatory Commission has jurisdiction to investigate and fine entities for engaging in market manipulation by way of fraudulent or deceptive conduct	Substantial vertical integration The 6 largest retailers account for 90% of generation capacity in 2008

3 Alberta, Canada

3.1 Introduction

58. The electricity market in Alberta comprises a wholesale market, an operating reserves market, a dispatch down service market, a forward market, and a retail market.

59. The wholesale electricity market consists of a mandatory power pool, in which generators are required to offer available generation by submitting price and quantity pairs indicating offers to generate.

60. The Alberta Electric System Operator (AESO), which was established under the provisions of the Alberta *Electric Utilities Act (EUA),* operates the Albertan power pool.

61. The power pool is a spot market where the price is set in real-time through a mechanism whereby generators are dispatched as required to balance total load with supply. The price, or System Marginal Price (SMP), is set by the marginal producer.

62. As an energy-only market, pool prices in Alberta's electricity market must be sufficiently high to allow generators to cover their operating costs and recover their capital costs.

63. Electricity in Alberta can be exported and imported to and from neighbouring jurisdictions via transmission connections (or interties). The availability of energy imports into Alberta can exert a downward pressure on the price of electricity as imports are offered into the Alberta market at zero Canadian dollars (CAD)/ megawatt hour (MWh). In 2009, average import and export capacity was about 600MW and 360MW respectively.

3.2 Wholesale Market Design

3.2.1 Objectives

64. The design of Alberta's wholesale market aims to ensure system reliability and a competitive electricity price for consumers, as well as provide a reliable price signal for investors regarding the future need for generation.

65. As an energy-only market, it is designed so that fixed costs can be recovered without distorting the incentive for new investment, with minimal market interference.

3.2.2 Power pool design

66. Each day, generators must submit their offers to the power pool for the following seven days.

67. Following the Phase I Market Policy or '*Quick Hits'* rule changes, implemented by the AESO in December 2007, generators above five megawatts (MW) "must offer, must comply", which means that they are required to offer all of their available capacity to the market unless they have an Acceptable Operational Reason (AOR) for not being able to do so.

68. The AESO then provides a seven-day assessment of how tight the market is expected to be in terms of the volume of supply relative to the demand but does not provide a forecast of the pool price beyond two hours out.

69. Price/quantity offers are made for 60 minute intervals. Every minute, supply offers, submitted by market participants and dispatched by the system controller, set the System Marginal Price (SMP). Each hour, the pool price is calculated by averaging all 60 of these one-minute SMPs. The pool price is then posted to the AESO website and is used in financial settlement to calculate payments to suppliers and charges to wholesale customers. The AESO defines a settlement interval as the period lasting 60 minutes for which the ISO financially settles energy amounts and the load settlement system calculates distinct load estimates.

70. Unlike many other organised electricity markets, wholesale market participants in Alberta are free to unilaterally engage in strategies to attempt to move the pool price, as long as they do not impede competitive responses. Furthermore, there is no mechanism to administer prices or offers at some proxy of cost.[11]

3.2.2.1 Gate closure

71. Gate closure occurs two hours before the settlement interval in order to provide some time separation between market activity and the physical delivery of energy. Volume changes may be made after gate closure but only for "acceptable operational reasons".

72. The gate closure was modified following the aforementioned 'Quick Hits' rule changes. Previously, generators had to submit all their offers by noon the day ahead.

3.2.2.2 Energy restatements

73. Prior to the '*Quick Hits'* rule changes, generators were allowed to submit one offer variation, or 'Locking Restatement', at any time following the day-ahead offer for any

[11] Market Surveillance Administrator (Aug 2012) *Alberta Wholesale Market – A description of basic structural features undertaken as part of the 2012 State of the Market Report* (http://albertamsa.ca/uploads/pdf/Archive/2012/SOTM%20Basic%20Structure%20083012.pdf).

reason, including a change in an operational or market condition. Locking Restatements submitted within 30 minutes or during the settlement interval had to be for an AOR.

74. Alberta's Department of Energy[12] formulated policy recommendations to create offer stability, reduce the volatility of offer restatements immediately prior to and during the settlement interval and prevent real-time price-chasing. As a result, the *'Quick Hits'* rule changes were introduced and allowed market participants for the first time the flexibility to change their offer prices and volumes any time they wanted up to two hours before the settlement interval.

75. In its discussion paper, *Price Restatement Period Review* (24 Jan 2012), the AESO explains that the Alberta Department of Energy (DOE) recommended that intra-Alberta generators have the ability to restate their offer price (consistent with the then current locking restatement format) up to two hours prior to the start of the delivery, but does not explain why the two-hour threshold was recommended. This recommendation was made to address the short-term adequacy issues and create offer stability in the merit order so that it may be dispatched in a more efficient manner and prevent real-time price-chasing.[13]

76. The discussion paper explains that the market design prior to the two hour gate closure "allowed market participants to restate their offers up to the time of delivery allowing offers to be changed while they were being dispatched. This ability to restate combined with no obligation for participants to respond to dispatches created volatility and uncertainty with respect to the price signal and could have deterred certain generators, such as long lead time and peaking units, from participating in the market. Additionally, the system controller did not have a consistent picture of supply and demand in the hours ahead. As a result, the market design prior to Quick Hits was seen to cause short-term adequacy issues and a change in the market design was required to balance market facilitation and system reliability."

77. After consultation on the T-2 offer restatement, the AESO stated that, while it agreed with comments from stakeholders that there may be benefits in reviewing the price restatement period in terms of increased market responsiveness and efficiency, a revision of the relevant ISO rule was outside the scope of the consultation. The AESO further stated that it would continue to consider the Price Restatement Period in its

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12 Alberta Department of Energy (6 June 2005) *Alberta's Electricity Policy Framework: Competitive – Reliable – Sustainable* (http://www.energy.alberta.ca/Electricity/pdfs/AlbertaElecFrameworkPaperJune.pdf).

13 AESO (24 Jan 2012) *Price Restatement Period Review* (http://www.aeso.ca/downloads/PRPR_Discussion_Paper_Final.pdf). Documents regarding this consultation can found here: http://www.aeso.ca/market/25090.html.

ongoing market evolution efforts but that such a review was not identified as a priority for 2013.[14]

78. The current ISO Rules (Section 203.3) state that, prior to gate closure, pool participants can make changes to their offered price (price restatement) and volume (MW restatement).

79. After gate closure, generators can still change their offered volume – but not their offered price –only if the offer variation is associated with an AOR, that is, under circumstances related to either the safety of the generating asset or the public, the repositioning of the asset to serve the stand-by operating reserves market or to manage physical or operational constraints, or an occurrence of force majeure, inter alia.[15] The process for MW restatements is described in the linked information document.[16] The AESO may refer MW restatements to the MSA for investigation. As discussed elsewhere, the MSA can issue penalties for breach of the ISO Rules.

80. The ISO Rules (Section 203.3) require pool participants to submit the reason(s) for submitting a MW restatement if it is submitted after gate closure. The same rules apply to price and MW restatements regarding bids.

81. In 2013, the AESO consulted stakeholders regarding a gate closure closer to real-time and concluded that, while it agrees that there may be benefits in reviewing the price restatement period in terms of increased market responsiveness and efficiency, a revision of the relevant ISO rule was not then a priority.

3.2.2.3 Price limits

82. Generators can offer their power to the pool at a price between the price floor of CAD0/MWh and the offer cap of CAD999.99/MWh.

3.2.3 Published data

83. The AESO publishes:

    i. unit-specific offers with masked IDs at the end of each trading hour in the form of block-wise energy offer data, the Historical Trading Report (HTR), and

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14 AESO (6 Mar 2013) *AESO and MSA Market Data Transparency Consultation – Response to Stakeholder Comments and Next Steps* (http://www.aeso.ca/downloads/MSA__AESO_March_6-Joint_Consultation-Final.pdf).

15 See AESO (Jul 2014) *Consolidated Authoritative Document Glossary* (http://www.aeso.ca/downloads/Consolidated_Authoritative_Document_Glossary_(July_2_2014).pdf).

16 http://www.aeso.ca/downloads/2012-009R_Restatements_(Posted_Version).pdf

ii. unit-specific offers with IDs with a two-month lag in the form of energy market merit orders.

84. The HTR is published hourly, five to 10 minutes after the end of every settlement interval. It discloses all market participants' offer prices and the volume offered at each price but does not identify the assets associated with the offers. Nevertheless, the Market Surveillance Administrator (MSA) states that "*sophisticated market participants can decode the report with a high degree of certainty and therefore know the price and volume their counterparts were prepared to sell at, effectively their competitive intentions, and this is repeated 24 times each day, 7 days a week.*"[17]

85. Currently, the MSA and AESO are holding consultations to either end the publication or reduce the granular offer information of the HTR following concerns that it serves as a mechanism for, and has been used by, some of the dominant Alberta-based generators to coordinate the setting of wholesale electricity prices (see subsection 3.3.4.4 below).[18]

3.2.4 Demand-side participation

86. Loads may choose to make bids to the market but very few choose to do so, according to the MSA. Most loads act as price takers although approximately 200-300MW of load does directly participate in the real-time market by monitoring conditions and choosing to reduce consumption in the face of high pool prices. Since these loads do not make bids, they operate outside the market by responding to price without a dispatch. From the perspective of competition, price responsive loads limit the ability of generators to exercise market power.

87. In *State of the Market Report 2012* (10 Dec 2012), the MSA explains that a few consumers choose to participate actively in the market. These are mostly industrial loads with flexibility over production processes for which electricity makes up a large portion of total costs. The MSA states that "these consumers can take advantage of low prices and avoid high prices. While few in number, their actions are an important part of the wholesale electricity market, limiting the market power of generators and reducing pool price volatility."

88. The MSA explains that six key loads have been identified as price responsive (primarily involved in the pulp and paper industry), providing up to 300MW of price response at any one time and with much of the response occurring at prices above $100/MWh. The MSA further explains that, in some cases, "price responsive loads

[17] Market Surveillance Administrator (MSA) (Aug 2013) *Coordinated effects and the Historical Trading Report* (http://albertamsa.ca/uploads/pdf/Archive/0-2013/HTR%20Response%20Decision%20Recommendation%20130807.pdf).

[18] MSA (24 March 2014) *Notice to market participants and stakeholders* (http://albertamsa.ca/uploads/pdf/Archive/00-2014/Notice%20re%20HTR%20140324.pdf).

provide other services, including provision of supplemental reserves and Load Shed Service for import (LSSi) that limit price responsiveness." The MSA states that survey work that it conducted indicated that "11 respondents altered production processes in real time to manage pool price risk. Three of these companies also had on-site generation, which may indicate that they varied electricity production rather than their conventional output".[19]

3.2.5 Wholesale market efficiency

89. The MSA suggests that the Albertan wholesale electricity market is providing a reliable price signal for investors regarding the future need for generation. Although market dynamics are relied upon to incentivise investment in new generation projects, if a shortfall in generation was forecasted, the AESO would intervene to maintain reliability. According to the MSA, such an action has never yet been exercised by the AESO, which suggests that the market is working adequately.

90. Furthermore, a report by the Brattle Group (2011) concludes that the current design of the electricity market in Alberta is functioning well. The report points to the fact that energy and ancillary service prices have been relatively low when reserve margins were high, but have increased enough to attract new generation projects when system-wide reserve margins declined. The Brattle Group concludes that it sees no compelling need for major changes in Alberta's electricity market design.

91. Nevertheless, it suggests that efficiency and effectiveness in the market can be improved with some design changes, such as increasing the price cap from CAD1,000/MWh to CAD3,000/MWh. The Brattle Group explains that the relatively low price cap, still currently in place, could limit the potential for demand response. It could also prevent prices from rising to efficiently high levels during scarcity events, preventing suppliers from recovering their fixed costs solely through energy and ancillary services and resulting in "missing money" relative to what is needed to attract and retain sufficient capacity to meet reliability targets.

92. On the other hand, the Brattle Group mentions a relationship between a high price cap and market power, suggesting that the AESO will need to be careful when increasing the price cap in order to prevent opening the market to the potential exercise of market power. The Brattle Group suggests that one option is to "maintain generator bid caps at their existing levels while allowing administrative scarcity prices to rise to higher levels".20

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19 MSA (10 Dec 2012) *State of the Market Report 2012* (http://albertamsa.ca/uploads/pdf/Archive/2012/SOTM%20Final%20Report%2020130104.pdf).

20 The Brattle Group (April 2011) *Evaluation of Market Fundamentals and Challenges to Long-Term System*.

93. There is one vertically-integrated firm which is the largest competitive retailer and also has significant generation assets. In the State of the Market Report 2012, the MSA looked into vertical integration and market power in Alberta. For the vertically integrated firm, the MSA finds no clear relationship between marginal offer price and structural market power, that is, while the participant has the ability to exercise market power it does not do so with that unit. The MSA also explains that cogeneration, a form of vertical integration, is a key feature of the market.[21]

3.3 Wholesale Market Rules and Regulation

3.3.1 Overview

94. Under the *National Energy Board Act*, the National Energy Board is the national independent regulatory agency created to oversee international and inter-provincial aspects of the electricity, gas, and oil industries, such as the construction and operation of interprovincial and international pipelines and power lines, and the export and import of natural gas, oil and electricity.

95. The *Competition Act* is a federal law governing most business conduct in Canada. It contains both criminal and civil provisions aimed at preventing anti-competitive practices in the marketplace.

96. Nevertheless, the regulation of the electricity industry in Canada is principally done at the provincial level. In Alberta, the wholesale electricity market is regulated by various provincial rules and regulations which include the ISO Rules, the *Electric Utilities Act* (1995, amended 2003) (EUA) and the *Alberta Utilities Commission Act* (2007) (AUCA), which includes the *Fair, Efficient and Open Competition Regulation* (2009) (FEOC).

97. The Alberta Utilities Commission (AUC) adjudicates on ISO rules, hearing objections and complaints regarding market rules and standards and determining penalties for non-compliance as appropriate. The Market Surveillance Administrator (MSA) provides the surveillance function of the market and has a mandate, under the AUCA, to monitor, investigate and enforce competition and market rules. The AESO performs a compliance monitoring function, referring any incidents of suspected market participant non-compliance with ISO rules and reliability standards to the MSA.

[21] MSA (10 Dec 2012) *State of the Market Report 2012* (http://albertamsa.ca/uploads/pdf/Archive/2012/SOTM%20Final%20Report%2020130104.pdf).

3.3.2 Market conduct

98. The EUA requires market participants to be responsible for their actions and to ensure their conduct supports the fair, efficient and openly competitive operation of the market. A failure by a participant to support the fair, efficient and openly competitive operation of the market is viewed by the MSA as undesirable conduct.

99. In a report on undesirable conduct and market power, the MSA explains that market participants are required to recognise that, with the possession of market power, comes an increased responsibility to ensure their conduct supports the fair, efficient and openly competitive operation of the market. [22] One type of undesirable conduct is the abuse of market power.

100. In this same report, the MSA sets out some key principles underlying appropriate market conduct. One of the principles is that the conduct of market participants must be for legitimate business purposes only and must not include transactions aimed at misleading others or intended to manipulate market prices which include transactions for which the primary benefit is derived from altering market price, and the use of uneconomic supply resources that results in a material impact on pool price and/or the fair, efficient and openly competitive operation of the market.

101. Nevertheless, the MSA employs a competition law and economics analytic framework in discharging its responsibilities which allows market participants to freely set and implement commercial strategies as long as they do not prevent or lessen competition, that is, undermine the fair, efficient and openly competitive operation of the market.

102. The MSA stipulates that exercise of market power to affect the market clearing price does not face enforcement action unless competition was impeded but that the design of the energy-only market relies on no market participant being able to significantly control market outcomes through the exercise of market power.

3.3.3 ISO Rules

103. According to the AESO website, the purpose of the ISO Rules is to facilitate the safe, reliable and economic operation of the interconnected electric system and promote a fair, efficient and openly-competitive wholesale market for electricity in Alberta.

104. The ISO Rules' Compliance Monitoring section (Section 103.12) states that the AESO must undertake compliance monitoring of market participants, including establishing monitoring programs, processes and procedures.

[22] MSA (Jul 2005) *Undesirable Conduct and Market Power* (http://albertamsa.ca/files/UndesirableConductandMarketPower072605.pdf).

105. The ISO Rules specify that, if the AESO suspects that a market participant has contravened the ISO Rules or reliability standards, it must refer the matter to the MSA.

3.3.4 Alberta Utilities Commission Act (2007)

106. The AUCA consists of several pieces of legislation which regulate Alberta's energy resource and utility sectors.

107. It confers the MSA with a broad mandate including surveillance, investigation, and enforcement to help ensure fair, efficient, and openly competitive electricity and retail natural gas markets in Alberta.

3.3.4.1 Fair, Efficient and Open Competition Regulation (2009)

108. The *Fair, Efficient and Open Competition (FEOC) Regulation,* made under the AUCA, introduced a number of specific prohibitions on the conduct of market participants in the Alberta electricity market, some of which have application to market participant offer behaviour.

109. These prohibitions (*FEOC Regulation*, provision 2) include, inter alia, not offering all electric energy from a generating unit that is capable of operating to the power pool (except under certain circumstances); restricting or preventing competition or market entry; and manipulating market prices away from a competitive market outcome. The MSA takes the position that there are a range of prices which would be consistent with a competitive market outcome, some of which may be associated with static efficiency losses in order to achieve dynamic efficiency gains. Without a capacity market, signals for future investment rely on prices above the marginal cost. For a price change to be considered by the MSA as moving 'away from a competitive market outcome', "market prices would need to be moved a large amount over a short period of time, or a smaller amount over a long period of time away from levels suggested by fundamentals".[23]

3.3.4.2 Market Surveillance Administrator

110. The MSA is an independent agency in charge of the surveillance function of the market. Its mandate includes, inter alia, surveillance, investigation and enforcement in respect of the conduct of electricity market participants, the structure and performance of the electricity market. As part of its ongoing market monitoring, the MSA publishes quarterly reports in which pool prices are analysed and any high prices are explained.

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[23] MSA (2010) *Foundational elements shaping the market surveillance administrator's approach to bids and offers,* p. 13.

111. Under the AUCA (provision 39), the MSA has the mandate to carry out surveillance in the power industry and to investigate matters on its own initiative or on receiving a complaint or referral. It also has the mandate to undertake activities to address contraventions of the EUA and ISO rules including, inter alia, conduct that does not support the fair, efficient and openly competitive operation of the electricity market, and any other matters that relate to or affect the structure and performance of the electricity market. The MSA can negotiate and enter into settlement agreements, and bring matters before the Commission.

112. The MSA must assess whether or not the conduct of electricity market participants supports the fair, efficient and openly competitive operation of the electricity market and whether the person carrying out the conduct complied with or is complying with the EUA and the ISO Rules, inter alia. It must also determine whether the ISO rules are sufficient to discourage anti-competitive practices in the electric industry and whether or not the ISO Rules support the fair, efficient and openly competitive operation of the electricity market.

113. The Alberta Utilities Commission (AUC) Act provides that the MSA can directly enforce penalties. The MSA is granted the power and authority under section 52 of the AUC Act to issue a Notice of Specified Penalty where the MSA is satisfied that a market participant has contravened an ISO rule. The AUC Act also states that the AUC has, "in regard to (…) the enforcement of its orders, the payment of costs and all other matters necessary or proper for the due exercise of its jurisdiction or otherwise for carrying any of its powers into effect, all the powers, rights, privileges and immunities that are vested in a judge of the Court of Queen's Bench." (Article 11).

114. The AUC has authority to make rules regarding Specified Penalties. Specified Penalties are penalties that are imposed by the MSA if the MSA is satisfied that a person has contravened a specific ISO rule. Not all ISO rules have a specified penalty, in which case, Administrative Penalties may apply. The range of Specified Penalties is set out in Rule 19 of the AUC[24] ($500-$1500 for first penalty in rolling 12 month period) whilst Rule 13 of the AUC sets out rules for determining Administrative Penalties.[25]

115. Rule 19 of the AUC states that the MSA must make public any notice of specified penalty issued for a contravention of ISO rules under Section 52 of the AUC Act, no earlier than the receipt of confirmation of payment from the AUC and no later than

[24] Alberta Utilities Commission (AUC) (2013) *Rule 19 – Specified penalties for contravention of ISO Rules* (http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule019.pdf).

[25] AUC (2013) *Rule 13 – Criteria relating to the imposition of administrative penalties* (http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule013.pdf).

45 days after the notice of specified penalty is issued and post the notice on the MSA website.[26]

116. In *Consultation on settlement agreements filed by the Market Surveillance Administrator (MSA)* (17 Dec 2010), the AUC suggests that, regarding settlement agreements, "it is common for the respondents not to contest the finding of the MSA. This is not an unusual concept. In Prohibition Orders approved by the Federal Court under the Competition Act, it is possible even under the criminal provisions for an order to issue without an admission of any criminal liability."

3.3.4.3 Offer Behaviour Enforcement Guidelines (2011)

117. The *Offer Behaviour Enforcement Guidelines* were published by the MSA in order to provide transparency and predictability regarding the MSA's assessment of market participant offer behaviour so that participants can govern themselves accordingly.

118. The MSA employs a competition law and economics analytic framework in discharging its responsibilities. This allows market participants to freely set and implement commercial strategies as long as they do not prevent or lessen competition, that is, undermine the fair, efficient and openly competitive operation of the market.

119. The MSA's guidelines suggest that, although a generator cannot physically withhold its generation from the market under the ISO Rules, it can economically withhold it. The guidelines state that, in relation to offer behaviour, market participants are free to pursue individually profit maximising behaviour that does not impact on rivals' conduct. This would include strategies typically characterised as economic withholding, i.e., offering available supply at a sufficiently high price so that it is not called on to run and where, as a result, the pool price is raised.

120. In its *State of the Market Report 2012*, the MSA justifies allowing such behaviour on the premise that Alberta is an energy-only market and thereby, there is a need to have prices above the marginal costs for existing generators in order to attract new investment. The higher prices that result from economic withholding help recover fixed costs and signal further investment over time that may bring dynamic efficiency gains.

121. However, conduct that seeks to increase profits by weakening or eliminating competition (termed "extension" by the MSA) is of concern to the MSA and may lead to investigation and enforcement actions. The Guidelines state that such conduct would include, inter alia:[27]

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[26] Notice of specified penalties published by the MSA at: http://albertamsa.ca/index.php?page=2013-3

[27] MSA (Jan 2011) *Offer Behaviour Enforcement Guidelines,* p. 10 (http://albertamsa.ca/uploads/pdf/Consultations/Market%20Participant%20Offer%20Behaviour/Decide%20-%20Step%205/Offer%20

- *Enhancing the effect of a unilateral offer strategy by engaging in transactions where the **primary purpose is to reduce the response from competitors to customers**.*
- *Enhancing the effect of a unilateral offer strategy through conduct that breaches ISO rules.*
- *Enhancing the effect of a unilateral offer strategy by providing misleading records to the market or any other person. [emphasis added]*

122. The Guidelines provide an example of conduct that may be seen as preventing or impeding a competitive response:

> *Import ATC for hour ending X is 400MW and Export ATC is 0MW. Prior to T-2, Participant A offers to import 200MW and Participant B to export 200MW. Participant A submits an e-tag for the import shortly before the gate closes at T-20 minutes. At this time, 200MW of exports are now possible but there is insufficient time for Participant B to submit an e-tag for the offered export.*[28]

123. This example arguably has some similarities to late rebidding behaviour where participants might limit the ability of competitors to respond. Such conduct may constitute "extension" as set out in the first point in paragraph 121 above, and therefore be of concern to the MSA.

124. The Guidelines indicate that such conduct may not lead immediately to enforcement but would trigger an investigation and potential enforcement action if it is systematic in nature. The Guidelines state that:

> *… the conduct raises potential concern under Section 2(h) of the FEOC Regulation, since the timing may inhibit the competitive response of others. Observation of a single or small number of events that led to a loss of static efficiency would likely result in the MSA publishing a summary of the event. With evidence of a systematic problem that appeared material in nature, the MSA would seek evidence of the prevention of competition. Based on that the MSA would consider whether to proceed with enforcement action or seek broader changes, such as, modifications to ISO rules or business*

Behaviour%20Enforcement%20Guidelines%20011411.pdf). Hereafter Offer Behaviour Enforcement Guidelines (2011).

28 Offer Behaviour Enforcement Guidelines (2011), p. 22.

practise to remove the constraint on competition (in this case, lack of export ATC) or facilitate competitive response.[29]

125. It is also worth noting that the Guidelines require a determination that the conduct is done with the "primary purpose" of reducing a competitive response.

3.3.4.4 Investigations

126. The MSA publishes annual reports, including an annual Compliance Review and a Report to the Minister, which summarises the activities of the MSA during the year.

127. In the Compliance Review 2013 report, the MSA states that it addressed 83 compliance matters regarding the ISO Rule on Energy Restatements (Rule 203.3) in 2013. According to the MSA, in many cases, participants submitted a restatement after gate closure in order to correct an initial error or omission. In relation to the ISO Rule on Energy Restatements, the report suggests that the MSA issued 9 Notice of Specified Penalty, with fines issued in 2013 totalling CAD4,500.

128. Following an investigation which began in 2011, the MSA concluded in 2013 that TransAlta Corporation and two of its employees had contravened the EUA and FEOC by engaging in anti-competitive conduct in 2010 and 2011, improperly timing outages in order to maximise profits in the pool and forward market.[30] In the Report to the Minister 2013, the MSA reports that this investigation of market conduct led to the filing of a Notice of Request for Hearing with the Alberta Utilities Commission in February 2014.

129. The MSA also reports on concerns raised in late 2012 regarding the AESO's HTR, which makes offer information available in near real time (see subsection 3.2.3 above). The MSA identified events involving some of the dominant Alberta-based suppliers simultaneously engaging in economic withholding, despite the usual incentive to undercut a rival's price in order to increase dispatch and raise overall profitability, resulting in higher than usual prices. The MSA is concerned that the publication of the HTR is harmful to fair, efficient and open competition as it serves as a mechanism for, and has been used by, some of the dominant Alberta-based generators to monitor the competitive intentions of their counterparts and coordinate the setting of wholesale electricity prices hundreds of dollars higher than they otherwise would be. It has therefore recommended that the HTR be removed.

130. It must be noted that the MSA does not identify the issue as being the price level, economic withholding, or inappropriate behaviour by the large Alberta based suppliers, but the process by which these suppliers selected their offer price.

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29 Offer Behaviour Enforcement Guidelines (2011), p. 23.

30 MSA (Feb 26 2014) *Notice to Market Participants and Stakeholders* (http://albertamsa.ca/uploads/pdf/Archive/00-2014/0630%20Notice%20140225v2.pdf).

According to the MSA, the selection of offer prices that incorporates not just general expectations of competitors' offer strategies but detailed knowledge of their counterparts' offer prices does not result in the vigorous competition necessary to sustain an effectively competitive market over the long run.

3.3.5 Electric Utilities Act (2003)

131. The purpose of the *EUA* (Section 5) is to provide a competitive power poll so that an efficient market for electricity based on fair and open competition can develop. It must provide rules such that neither the market nor the electric industry is distorted by unfair advantages, and continue to be a flexible framework under which investment in generation of electricity is guided by competitive market forces.

132. The EUA (Section 6) sets out expectations for market participants to conduct themselves in a manner that supports the fair, efficient and openly competitive operation of the market.

133. The EUA provides the AESO with the authority to make ISO Rules and requires market participants to comply with these rules. It also sets out the duties of the AESO. The AESO must operate the power pool in a manner that promotes the fair, efficient and openly competitive exchange of electric energy, and must monitor the compliance of market participants with rules made under the EUA.

134. The AESO performs a compliance monitoring function, referring any incidents of suspected market participant non-compliance with ISO Rules and reliability standards to the MSA.

3.3.6 Competition Act

135. At a national level, all business conduct in Canada is governed by the *Competition Act*. The act (Section 79) prohibits abuse of a dominant position, which occurs when a dominant firm engages in a practice of anti-competitive acts, with the result that competition has been or is likely to be prevented or lessened substantially.

136. Where abuse of dominance is established, the federal Competition Tribunal has the power to make "remedial orders" prohibiting the continuation of anti-competitive acts. The Tribunal may also order a person to take necessary actions to overcome the effects of the anti-competitive acts. In addition, the Tribunal may also order the payment of penalties of up to CAD10 million.

137. High pricing alone has not been established as an anti-competitive act under the *Competition Act* (Section 79). The Competition Bureau, has stated that high prices do not mean that a particular market is uncompetitive, explaining that "*Canadian businesses are free to set their own prices at whatever levels the market will bear, provided that the high prices are not the result of anti-competitive conduct such as price-fixing or abuse of dominant position.*" Nevertheless, the Canadian Government

announced in its 2014 Budget that it will introduce legislation to address geographic price discrimination which may suggest that the Competition Bureau may become a price regulator in addition to an enforcer of the competition law.

138. It is worth noting that the MSA and the Competition Bureau have recently signed a Memorandum of Understanding (MOU). The MOU states that the "MSA's responsibility for ensuring Alberta's energy markets are fair, efficient and openly competitive runs parallel to the overarching competition oversight of the Competition Bureau. Both agencies have committed to coordinating their activities in this shared space, reducing the possibility of duplication or inconsistency. This greater clarity and predictability should ease the regulatory burden on stakeholders." [31]

3.3.7 Wholesale market efficiency

139. The MSA's *State of the Market Report 2012* found the wholesale electricity market met a high standard described as effective competition, exhibiting:

    i. small static efficiency losses (including those from economic withholding) and dynamic efficiency gains likely to be much greater; and

    ii. wholesale prices over the medium-term no higher than necessary to secure the adequate supply of electricity to consumers.

140. According to Forte Business Solutions Ltd. (2012) *Alberta Electricity Market Assessment* however, the average price levels following the publication of the *Offer Behaviour Enforcement Guidelines* were significantly higher at supply cushions of less than 800MW than in previous years.

141. In the MSA states that, given the absence of capacity markets or other mechanisms in Alberta, it believes that giving too much weight to static efficiency concerns is not appropriate. Furthermore, the MSA declares that conduct inconsistent with static efficiency can be acceptable so long as there is a corresponding benefit to dynamic efficiency (and thus a net efficiency gain).

142. However, the MSA suggests that where static efficiency losses appear to have no corresponding dynamic efficiency gain, it will make recommendations aimed at eliminating or reducing efficiency loss and that, if monitoring for efficiency reveals anticompetitive conduct, it would take enforcement action.

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[31] MSA (3 Mar 2014) *Notice to Market Participants and Stakeholders* (http://albertamsa.ca/uploads/pdf/Archive/00-2014/Notice%20re%20MOU%20with%20the%20Competition%20Bureau%20and%20FERC%20030314.pdf).

4 Singapore

4.1 Introduction

143. The Singapore electricity market was liberalised to ensure competitive electricity prices and improve efficiency. The National Electricity Market of Singapore (NEMS), a fully competitive wholesale and retail electricity market, was established by the *Electricity Act* (2001) and began operating in January 2003.

144. The NEMS comprises:

- a real-time market or spot market for energy, reserve and regulation[32]; and
- a procurement market for ancillary services (other than reserve and regulation).

145. Market participants can trade energy, reserve and regulation in the spot market through the Energy Market Company (EMC), the wholesale market operator. They can also enter into bilateral contracts, which are purely financial arrangements, in order to manage price risk.

146. There are major generation companies that are also dominant retail companies, known as 'gentailers' (e.g. YTL PowerSeraya Pte Ltd and Seraya Energy Pte Ltd; Tuas Power Generation Pte Ltd and Tuas Power Supply Pte Ltd; Senoko Energy Pte. Ltd, etc.).

147. The electricity industry is regulated by the Energy Market Authority (EMA), which is responsible for the market framework and ensuring that the interests of consumers are protected. The Power System Operator (PSO), a division of the EMA, is responsible for ensuring electricity supply and operating the power system.

4.2 Wholesale Market Design

4.2.1 Objectives

148. The aim of the wholesale market design is to encourage the economically efficient scheduling of generation facilities in the short term and provide incentives for new power system investment in the long term. The design principles of the wholesale electricity market are robustness, transparency, equity and fairness, and minimising transaction costs.

32 Reserve capacity is unused capacity available on a stand-by basis to supply energy in an emergency. Regulation is generation capacity that is able to follow the normal variations in load during the dispatch period.

4.2.2 Auction design

149. The spot market uses a form of auction pricing to settle transactions.

150. The real-time dispatch of electricity is determined by the operation of the wholesale spot market run every half-hour. Generators are required to make a standing offer for energy for each dispatch period of each day of the week but are allowed to continually adjust their offers up to the gate closure. The PSO provides the load forecasts and predicted system constraints for each half-hour. The spot market then determines the least-cost dispatch quantities and corresponding market clearing prices.

151. Market prices and dispatch quantities for energy, reserve and regulation are calculated five minutes before the start of each half-hour trading period. This near real-time calculation of dispatched quantities ensures that the market outcomes reflect the prevailing power system conditions and the most recent offers made by generators, and ensures minimum intervention from the system operator to balance generation and load, hence minimal deviation from a competitive market solution.

4.2.2.1 Gate closure

152. There is a firm gate closure five minutes prior to the dispatch period after which the market software cannot accept any changes in offers.

153. There is also an effective gate closure 65 minutes prior to the beginning of the dispatch period. After this effective gate closure, any change in offer, although accepted by the software, is reported by the EMC to the Market Surveillance and Compliance Panel (MSCP) and subject to market surveillance investigation.

154. Prior to a market rule modification effective 19 January 2006[33], the gate closure was two hours prior to the dispatch period. A review by the EMC concluded that market participants supported a one hour gate closure period because it would:

    i. enable market participants to react to changing market or plant conditions closer to real-time by offering more capacity of their online generating units should there be high forecasted prices caused by a shortfall in offered Energy, Reserve or Regulation. This would help moderate price spikes in a tight supply situation although this may not be true if offline generating units have to be brought in because they generally take at least two hours to be run up;

    ii. encourage more responsive biddings based on the most recent market information;

33 Energy Market Company (EMC) (12 Aug 2005) *Notice of market rule modification* (https://www.emcsg.com/f311,9288/EMC_246-EMA-wg_revised.pdf).

iii. reduce a generator's risk of being in an out-of-balance contractual position by allowing it to correct sudden changes in its physical position through trading closer to real-time; and

iv. reduce the need for a generator to justify its offer variations to the MSCP.

155. The EMC noted that a one-hour gate closure period may give rise to 1) a minimum reaction time of only 25 minutes which may have an adverse impact on system security and unit commitment, and 2) greater dispatch uncertainty. The 25 minute reaction time relates to offer variations made between 64 and 60 minutes before dispatch. Schedules are run during this period and offers varied during this four-minute period are not reflected in schedules published five minutes later (55 minutes before dispatch). Rather, they are only captured in the next round of scheduling and published half an hour later (25 minutes before dispatch).[34]

156. The EMC hence recommended that the gate closure period be set to 65 minutes which would ensure that the system operator and generators have a minimum reaction time of 55 minutes to manage system security and unit commitment respectively if a market player submits its offer (or offer variations) very close to gate closure.

4.2.2.2 Offer variations

157. Offer variations or revised standing offers are not to be submitted within 65 minutes immediately prior to the dispatch period to which the offer variation or revised standing offer applies, except:

- where the offered price, other than for additional quantities of energy, reserve or regulation, is the same as that previously offered for that dispatch period; or
- where it is intended to:
  - reflect a generation facility's expected ramp-up and ramp-down profiles during periods following synchronisation or preceding desynchronisation;
  - reflect a generation facility's revised capability during a forced outage;
  - contribute positively to the resolution of an energy surplus situation, by allowing for decreased supply of energy; or
  - contribute positively to the resolution of energy, reserve or regulation shortfall situations in that dispatch period by allowing for increased supply of energy, reserve or regulation, where:

34 Energy Market Authority (EMA) (12 Aug 2005) *Notice of Market Rule Modification* (https://www.emcsg.com/f311,9288/EMC_246-EMA-wg_revised.pdf).

- the shortfall situations were indicated in a system status advisory notice issued by the EMC in respect of an emergency operating state declared by the PSO; and
- at the time of submission of such offer variation or revised standing offer, the EMC has not yet withdrawn, in respect of that dispatch period, such system status advisory notice.

158. A notice by the EMC suggests that offer variations after gate closure may be permitted under certain circumstances typically associated with changes in machine characteristics, forced outages and supply/demand imbalances that threaten system security. Allowing offer variations after gate closure would thereby enable the market to address certain system security issues just before the dispatch period. However, the EMC notes that, if not subject to rules governing the forms of offer change, this may lead to significant changes to the real-time dispatch schedule from the most recent pre-dispatch schedule for the same dispatch period, both in terms of scheduled quantity and clearing prices. The EMC concludes that:

> *"It is therefore imperative that the rules set out the forms of offer changes permissible after gate closure so as to minimise gaming opportunities."*[35]

4.2.2.3 Price limits

159. The upper limit on energy prices for standing offers and offer variations is equal to 4,500 Singapore Dollars (SGD)/MWh (calculated as 0.9 times the Value of Lost Load (VoLL) which is set at SGD5,000/MWh).

160. The upper limit for regulation prices is set at 0.06 times the VoLL, i.e. SGD300/MWh whilst the upper limit for reserve prices stands between SGD3,250/MWh and SGD4,250/MWh depending on the type of reserve.[36]

4.2.3 Published data

161. Currently, the price-quantity energy offers of spot market participants are not disclosed.

162. However, in a consultation paper regarding the disclosure of market information in March 2014, the EMA recognised that the disclosure of offer information could facilitate efficient trading in the spot and futures market but that it could also increase the likelihood of independent exercise of market power or concerted activities among

35 EMC (29 Jan 2004) *Notice of Market Rule Modification* (https://www.emcsg.com/f310,9071/EMC_221-ts_EMA_.pdf).

36 EMA (1 July 2014) *Appendix J – Price Limits And Constraint Violation Penalties* (https://www.emcsg.com/f283,7917/Appendix_6J_Price_Limits_and_Constraint_Violation_Penalties_1Jul14.pdf).

spot market participants to increase the spot price, and potentially lead to strategic bidding behaviours.

163. In June 2014, the EMA decided to make available aggregated energy offer information to all data subscribers and spot market participants with a four-week time-lag by the end of September 2014. The aggregated energy offer information will show, for each half-hour period, each distinct offer price (in SGD/MWh) and the total offer capacity (in MW) at that price. The EMA concluded that a four-week delay would be adequate for short-term tight market conditions to normalise and mitigate informational feedback for strategic bidding in the spot market.

4.2.4 Vesting Contracts

164. The EMA had concerns regarding the degree of market power in the NEMS. The EMA explains that: "With market power, gencos can potentially keep electricity prices near or at the average price cap regardless of the balance between supply and demand. Potentially high pool prices due to market power would remove any incentives for consumers to buy from the pool even if offers from electricity retailers are not attractive."

165. Therefore, on 1 January 2004, the EMA introduced Vesting Contracts aimed to "curb market power of the large incumbent generators in order to promote efficiency and competition in the electricity market for the benefit of consumers" by reducing the incentives of generators to distort pool prices.[37] The Vesting Contracts are contracts for differences ("CfDs") vested on the large incumbent generation companies, for a transitional period, requiring them to sell a specified quantity of hedges at a specified price (the strike price).

166. The Vesting Contracts are between generators and SP Services Ltd, who is the Market Support Services Licensee. They were made mandatory for the three large generation companies: Senoko Energy, YTL PowerSeraya and Tuas Power Generation, and voluntary for other generation companies which were already licensed. The contract quantities for each generator are based on their generation capacity, and the strike price is set at the long-run marginal cost of a new entrant. The EMA set the level of vesting contracts at 65% in 2004, and has rolled it back to 40% in 2014.[38] The level determined by the EMA will gradually fall to 20% by January 2016.[39]

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37 EMA, Frequently Asked Questions on Vesting Contracts (http://www.ema.gov.sg/cmsmedia/Licensees/faq_vc.pdf).

38 Energy Market Authority (2013) *EMA's procedures for calculating the components of the vesting contracts,* pp. 3-14.

39 EMA (2014) *Review of The Vesting Contract Level for the Period 1 January 2015 to 31 December 2016, Final Determination Paper* (http://www.ema.gov.sg/cmsmedia/Consultations/Electricity/22Sep2014Final_Determination_Vesting_Level_2015-2016_final_.pdf).

167. With Vesting Contracts, generators are encouraged to bid some of their generation capacity into the NEMS at competitive levels to ensure that they are dispatched up to the specified quantity of hedges. Since any gain derived from a spot price above the Vesting Contract's strike price will have to be paid as a balancing payment, the generators have no incentive to bid above the competitive price. As a result, Vesting Contracts remove the incentive of generators to withhold their generation capacity in order to push up spot prices in the NEMS.

4.2.5 Demand-side participation

168. There is currently no consumer (demand-side) bidding for energy in the NEMS. The load for each period is estimated by the EMC based on information provided by the PSO.

169. However, following a consultation regarding the implementation of demand response in the NEMS, the EMA has decided to implement a Demand Response Programme, where consumers can offer their loads for scheduling in the energy market. The indicative timeline states that the modification of the Market Rules and necessary system changes in the NEM will take place in 2013-2014 with the commencement of the Demand Response Programme expected in 2015.[40]

170. According to the Final Determination Paper by the EMA (28 Oct 2013), the demand-side bidding process will be introduced "as per current market processes according to Section 6 of the Market Rules, including the submission of demand bids 65 minutes before the actual trading period."[41]

4.2.6 Wholesale market efficiency

171. In the latest annual report, the EMC suggests that operations in the NEMS are stable and efficient. The EMC notes that wholesale electricity prices have generally responded efficiently to changes in the underlying drivers of demand and supply. Further, the EMC reports considerable movement in the market share of market participants and generation technologies, demonstrating healthy competition in the NEMS.

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40 EMA (28 Oct 2013) *Final Determination Paper, Implementing Demand Response in the National Electricity Market of Singapore* (http://www.ema.gov.sg/media/com_consultations/feedback_files/526a18b367d6bFinal_Determination_-_Demand_Response_28_Oct_2013_-_Final.pdf).

41 EMA (28 Oct 2013) *Implementing Demand Response in The National Electricity Market of Singapore* (https://www.ema.gov.sg/cmsmedia/Electricity/Demand_Response/Final_Determination_Demand_Response_28_Oct_2013_Final.pdf).

172. The MSCP also reports on the state of competition and efficiency in the wholesale market. It suggests that productive efficiency improved in 2013 and that prices generally reflected the relative demand and supply conditions.

4.3 Wholesale Market Rules and Regulation

4.3.1 Overview

173. The *Electricity Act* (2001) is the principal legislation governing the electricity sector and the NEMS. In addition, the rights and obligations of the participants in the wholesale and retail markets are set out principally in the Singapore Electricity Market Rules (Market Rules), and in the electricity licences and codes of practice issued by the EMA.

174. The EMA, established under the *Energy Market Authority of Singapore Act* (2001), acts as regulator and competition authority in the electricity and gas industries. The electricity industry is excluded from the *Competition Act* (2004) as the EMA regulates competition issues in the electricity industry.

4.3.2 The Market Rules

4.3.2.1 Introduction

175. The day-to-day functioning of the NEMS is governed by the Market Rules. These require that activities in the wholesale market and the conduct of market participants be monitored in order to:

- identify breaches of the market rules, any market manual or system operation manual;
- identify market flaws; and
- assess whether the underlying structure of the market is consistent with the efficient and fair operation of a competitive market.

4.3.2.2 Offer variations

176. Under the Market Rules, offer variations after gate closure made under circumstances falling outside the defined exceptions are considered rule breaches and enforcement action may be taken.

177. The Market Rules state that the EMC shall report offer variations of revised standing offers submitted after gate closure to the Market Surveillance and Compliance Panel (MSCP) for investigation. They must also provide any factors which could reasonably justify the offer variations or revised standing offer. The MSCP then determines ex-

post if such variations fall within the provided exceptions with any violation without an acceptable cause liable to a penalty.

4.3.2.3 Market Surveillance and Compliance Panel

178. The MSCP is an independent body established under the Market Rules. The MSCP is responsible for monitoring, investigating and reporting the behaviour of market participants and the structural efficiency of the market. It identifies market rule breaches and assesses whether the underlying market structure is consistent with the efficient and fair operation of a competitive market.

179. The MSCP may investigate any activities in the wholesale market, either at the request of a third party or on its own initiative. In circumstances in which the MSCP determines that a market participant is not compliant with the Market Rules, it may take enforcement action, which may include levying a penalty, or may notify the EMA, who may take further actions. The MSCP also recommends remedial actions to mitigate any rule breaches or inefficiencies identified.

180. The Market Rules suggest that the MSCP may enforce penalties directly. The Market Rules (chapter 3) state that if the MSCP determines that a section of the system operation manual, market rules or market manual has been breached, it can take one of several enforcement actions, including directing the market participant to comply with the rules, cease the activity constituting the breach and pay a financial penalty. A direction imposing financial penalties shall be considered to create an obligation under the market rules to pay the amount stated in the direction. The Market Rules state that "all enforcement actions under these market rules shall be administered by the EMC at the direction of the market surveillance and compliance panel."

181. The size of the penalties vary according to several factors (see section 7.2.11 of the Market Rules), including the severity of the breach, the extent to which it was negligent or deliberate, the actions of the market participant on becoming aware of the breach, whether the breach was self-referred, any prior breaches by the market participant, the impact of the breach, etc.

182. The penalties issued are made public. The Market Rules state that, where the MSCP determines that a section of the market rules, a market manual or the system operation manual has been breached, it shall provide to the EMC a report recording the facts and circumstances of the breach and details of any sanctions imposed, and EMC shall so notify the EMA and publish the report.[42]

183. The Market Rules require the MSCP to publish an annual report giving an overview of its monitoring activities, a summary of all complaints, referrals and investigations,

[42] Examples of MSCP determinations: https://www.emcsg.com/f224,83212/MSCP_2013-D4_EMC_22_May_2013.pdf; https://www.emcsg.com/f224,88073/MSCP_2014-D1_EMC_25_Nov_2013.pdf.

and any investigations it had conducted in respect of offer variations reported to it by the EMC. The annual report must also contain the MSCP's general assessment as to the state of competition and compliance within, and the efficiency of, the wholesale market.

4.3.2.4 Market Assessment Unit

184. The Market Rules provide for the Market Assessment Unit (MAU), a division of the EMC, to develop a set of information requirements, under the supervision and direction of the MSCP, to assist EMA to fulfil its obligations with respect to prohibiting anti-competitive agreements and abuse of a dominant position under Sections 50 and 51 of the *Electricity Act*.

185. To carry out monitoring effectively, the Market Rules provide for the MAU to develop a catalogue of the data it acquires and a catalogue of the monitoring indices that it uses to evaluate the acquired data.

186. The MAU is required to make a report, at least quarterly, on its day-to day monitoring and evaluation activities to the MSCP, and must report to the MSCP when it discovers either evidence of phenomena that may require investigation, the possible need for a change to the market rules, or evidence that a market participant may be breaching the market rules. It must also report to the EMA when it receives any complaint, or uncovers any information that may indicate the possibility of anti-competitive agreements or the abuse of a dominant position contrary to Sections 50 or 51 of the *Electricity Act* (see below).

4.3.2.5 Market investigations

187. As per Market Rules requirement, the MSCP annually reports its position with regard to investigation and enforcement activities, including the number of offer variations after gate closure, the number of cases in which the MSCP determined a breach, and any enforcement actions.

188. Over the last five years, the MSCP has not reported any instances of offer variations after gate closure that gave rise to significant concerns nor did they report any high prices resulting from any anticompetitive behaviour.

189. In the first and second quarters of 2014, the MSCP made no rule breach determinations.

190. In 2013, the MSCP made two determinations of market rule breaches regarding non-compliance with gate closure, and resulting in financial penalties:

i. YTL PowerSeraya Pte Ltd failed to comply with gate closure rule on 26 November 2012. It was directed to pay a penalty of SGD10,000.[43]

ii. SembCorp Cogen Pte Ltd changed prices for its offer variations after gate closure on 16 February 2013. SembCorp Cogen was directed to pay a total financial penalty of SGD6,500.[44]

191. In 2012, the MSCP made a rule breach determination against YTL PowerSeraya Pte Ltd for its failure to submit offer variations to reflect its generation capability following simultaneous forced outages of four of its combined-cycle plants on 13 December 2011. The rule breach resulted in the artificial suppression of wholesale prices for several trading periods, significantly undermining competitive outcomes. The MSCP issued a stern warning to all market participants regarding the potential consequences of breaching Market Rules relating to offers and imposed a financial penalty of over SGD800,000 on YTL PowerSeraya Pte Ltd for this incident.[45]

192. In the course of monitoring and investigative activities carried out over the last five years, the MSCP and MAU did not make any report to the EMA regarding any complaints that may have been received or any material evidence that may have been uncovered that may indicate the possibility of anti-competitive agreements or the abuse of a dominant position contrary to Sections 50 or 51 of the *Electricity Act*.

4.3.3 The Electricity Act (2001)

4.3.3.1 Introduction

193. The *Electricity Act* is the principal legislation governing the electricity sector and the NEMS and has the purpose of creating a competitive market framework for the electricity industry.

194. Under the *Electricity Act* (Section 3), the EMA is charged with the general administration of the Act and with the function of, inter alia, creating an economic and regulatory framework for the electricity sector that promotes competitive, fair and efficient market conduct and prevents the misuse of monopoly or market power.

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43 MSCP (23 May 2013) *Determination of the MSCP* (https://www.emcsg.com/f224%2c80644/MSCP_Determination_2013D1_-_YTL_PowerSeraya_violation_of_gate_closure_on_26_Nov_2012.pdf).

44 MSCP (29 Aug 2013) *Determination of the MSCP* (https://www.emcsg.com/f224,82610/MSCP_2013-D2_Sembcorp_s_offer_price_changes_on_16_Feb_2013.pdf).

45 MSCP (17 Jul 2012) *Determination of the MSCP* (https://www.emcsg.com/f224,73348/MSCP_Determination_2012D3_-_PowerSeraya_failure_to_revise_offer_PUBLISHED_.pdf).

4.3.3.2 Relevant provisions

195. The *Electricity Act* (Section 50) prohibits any action which aims to or has the effect of preventing, restricting or distorting competition in any wholesale electricity market. Such actions include, inter alia, fixing prices or other trading conditions, and limiting or controlling electricity generation, any wholesale electricity market, or investment in the electricity industry.

196. The *Electricity Act* (Section 51) also prohibits any conduct which amounts to the abuse of a dominant position in any wholesale electricity market if it may affect trade within Singapore. Conduct constitutes abuse if, inter alia, it imposes unfair prices or other trading conditions or limits electricity generation or any wholesale electricity market to the prejudice of consumers.

4.3.3.3 The Energy Market Authority

197. The EMA, a statutory board under the Ministry of Trade and Industry, is the market regulator and competition authority of Singapore's electricity industry, and also serves as the PSO. It was established by the *Energy Market Authority of Singapore Act* (2001), which also provided for its functions and powers.

198. Under the *Electricity Act* (Section 3), the EMA is charged with, inter alia, creating an economic regulatory framework for the electricity market which promotes and safeguards competition and fair and efficient market conduct or, in the absence of a competitive market, prevents the misuse of monopoly or market power.

199. Under the *Electricity Act* (Section 54), the EMA can conduct investigations if there are reasonable grounds for suspecting that Sections 50 and 51 (see above) have been infringed. If the EMA reaches the decision that there has been an infringement, it can require the market participant to modify or cease the conduct in question and to pay a financial penalty in respect of the infringement of an amount not exceeding SGD1 million or 10% of the annual turnover of such person's business in Singapore (Section 59).

4.3.3.4 Market investigations

200. On the EMA's website, two investigations are reported. One investigation in March 2006 regarded a market participant's concerns over price spikes in wholesale electricity prices observed during the maintenance period of one of its units. The MSCP concluded that there was no evidence of inefficient or unfair behaviour or of manipulation by bigger players in the NEMS.

201. The second investigation in March 2007 looked into high regulation prices from October 2006 to January 2007. The regulation prices were either higher than or equal to SGD393.4/MWh for 30% of the time, which was substantially higher than the SGD29/MWh to SGD39/MWh registered between 2003 and September 2006. The

EMA directed the EMC to modify the Market Rules on 6 February 2009 to revise the regulation offer price cap and the regulation settlement price cap from SGD2,750/MWh to SGD300/MWh (or from 0.55 to 0.06 times the VoLL).

5 New Zealand

5.1 Introduction

202. The New Zealand electricity network extends over the two main islands, the North Island and the South Island. The electricity networks of both islands are linked by a DC interconnector under the Cook Strait with a capacity of approximately 1,200MW. The New Zealand market has a history of high levels of vertical integration, for example, in 2007, five firms that generate and retail electricity (gentailers) accounted for around 91% of generating capacity and 97% of total demand.[46]

203. The wholesale electricity market is operated by the government-owned corporation Transpower. Transpower is responsible for co-ordinating electricity supply and demand in real time, and ensuring that fluctuations and disruptions are avoided. To do this, Transpower determines the optimal combination of generators and reserve providers for each half-hour trading block, and then instruct the generators how much electricity to generate and when. Transpower is also responsible for planning ahead to ensure that supply can meet demand in the future, and that system security is maintained.[47]

204. The New Zealand Electricity Authority ("the Authority") develops policy, rules and systems for buying and selling wholesale electricity, and also for managing the security of supply. Rules for participants are governed by the *Electricity Industry Participation Code 2010* ("the Code").

5.2 Wholesale Market Design

5.2.1 Spot prices

205. The spot price is the half-hour price for wholesale market electricity. The spot price is used by Transpower to schedule available generation such that the lowest-cost generation is dispatched first. The offer price of the highest priced generator required to meet demand for a given half-hour trading block is the key determinant of the price for this half-hour trading block. This is known as marginal pricing.[48]

206. Spot prices are either forecast, provisional, interim or final. The forecast prices are available on the wholesale information and trading system (WITS), and have been

46 Hogan, S. & Meade, R. (2007) *Vertical Integration and Market Power in Electricity Markets*.

47 Electricity Authority (2014) *What the system operator does* (https://www.ea.govt.nz/operations/wholesale/system-operator/what-the-system-operator-does/).

48 Electricity Authority (2012) *Managing electricity price risk – A guide for consumers*, p. 4.

calculated taking into account the expected state of the electricity system, generators offers, purchaser bids (and sometimes demand) and dispatchable demand offers. Forecast prices provide an indication on when and how to best use electricity for industry participants.

207. The forecast prices are calculated for each half-hour trading block every two hours for every node (grid injection or exit point) across New Zealand. The forecast prices are available up to 36 hours ahead of time. Indicative prices – or "real-time" prices – are calculated for each node at the end of each five-minute period.

208. Provisional prices are calculated after electricity has been generated and consumed. They may be missing metering information but are the best available prices at the time they are published. The interim prices are published by the pricing manager the day after the generated electricity is consumed, once the data is complete. Final prices are calculated by the pricing manager and sent to the clearing manager who uses them to calculate invoices. All prices – forecast, provisional, interim and final – are available to industry participants on WITS.

5.2.1.1 Scarcity pricing

209. New Zealand does not have an explicit maximum price that can be set in the wholesale market. However, an effective maximum price has been established by a system of 'scarcity pricing' introduced by the Authority in October 2011, which came into force 1 June 2013.

210. This introduced arrangements to modify prices in the spot market when the system operator reduces demand through administrative action, with the aim of providing more certainty about spot prices during instances of widespread emergency load shedding. Scarcity pricing is required when forced power cuts are necessary because there isn't enough generation to meet electricity demand in one or both islands.

211. If scarcity pricing is triggered, the generation weighted average spot price (GWAP) will be calculated based on existing pricing processes. If the GWAP is lower than $10,000/MWh, all prices will be scaled up so that the GWAP reaches $10,000/MWh. If the GWAP is more than $20,000/MWh, then all prices will be scaled down so that the GWAP reaches $20,000/MWh.[49]

212. The Electricity Authority notes that[50]:

> *The price cap reflects an upper estimate of the value of forgone consumption during emergency load shedding. It has been adopted to address consumer*

[49] Electricity Authority (2014) *Scarcity Pricing* (https://www.ea.govt.nz/operations/wholesale/spot-pricing/scarcity-pricing/).

[50] Electricity Authority (2011) *Scarcity Pricing – Overview*, p. 2.

concerns that imposing a price floor for emergency load shedding situations may embolden providers of last-resort plant to charge prices above what would occur in a workably competitive market.

In combination, the floor and cap mechanism during scarcity will give improved revenue certainty for providers of last resort resources (generation and demand response), while also giving more assurance to wholesale purchasers that spot prices in emergency load shedding will not settle well above the level expected in a workably competitive market.

Furthermore, scarcity pricing will increase incentives for consumers and net-retailers to enter into hedge arrangements with providers of last resort resources, increasing competition in the provision of these resources.

5.2.2 Bids and offers

213. There is a general requirement for each generator to submit into the system operator offers for each half-hour trading period of the following trading day for each grid injection point at which it wishes to supply electricity. The offers must be received by the system operator by 1pm on the day prior to the trading day. Generating stations with capacity of less than 10MW are not required to make offers, and different rules also apply to wind generators (so called intermittent generators).

214. Generators (and purchasers) are able to revise or cancel offers (or bids) up to two hours prior to the beginning of the relevant half-hour trading period, by submitting a new bid or offer, or cancelling its initial bid or offer. Only embedded generators (those which are required to submit offers) may revise and cancel offered quantities, but not prices, up to 30 minutes prior to the beginning of the trading period.[51]

215. Offers and bids must be must be immediately revised prior to the beginning of the trading period if the quantity expected to be generated is expected to change by more than 10MW or 10% of the quantity scheduled (whichever is smaller). Provision is made to revise or cancel bids within the two hour window before the trading period starts if there is a genuine physical reason, or if the system operator has issued a formal notice of a grid emergency.[52]

216. In New Zealand, 5 minute prices are published for information purposes only, for example, to inform demand-side entities with real time capacity to shift load. Half-hour prices are used for settlement purposes.

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51 NZIER (2007) *The markets for electricity in New Zealand – Report to the Electricity Commission*, p. 7.

52 NZIER (2007) *The markets for electricity in New Zealand – Report to the Electricity Commission*, p. 6-8.

5.3 Wholesale Market Rules and Regulation

217. The Code sets out the duties and responsibilities that apply to industry participants and the Authority. The Authority is responsible for monitoring compliance with the Code (as well as Regulations and the Act). If any participant is alleged to have breached the Code, the Authority goes through a Code breach process.

5.3.1 Improving efficiency of prices in pivotal supplier situations

218. In 2012, the Authority investigated several "pivotal supplier situations". That is, situations where competition is weak enough to allow a generator to set the price. The Authority published a report which concluded that generators at Cobb and Tekapo were able to set prices which appeared to be inefficiently high during specific planned transmission outages. The Authority became concerned that this sort of behaviour may result in reduced retail competition and a lack of confidence in the wholesale market, which would be contrary to the long-term interest of consumers.[53]

219. The Authority asked the Wholesale Advisory Group ('the WAG') to investigate the problem and to identify possible solutions. This resulted in a discussion paper, released on 28 May 2013. Whilst the WAG did not identify any specific efficiency losses from either recent local or wider pivotal supplier situations, it noted that offer behaviour can change quickly and that history may not be the most reliable guide to the future. Therefore, the WAG considered the potential for efficiency losses to arise in the future. The WAG concluded that there is credible potential for material efficiency losses to arise in some scenarios, and that concerns about pivotal supplier situations were serious enough to warrant that the Code be amended. Specifically, the WAG suggested that a 'code of conduct' be introduced for trading by generators when they are pivotal.[54]

220. The WAG retained its support for the amendment also in its subsequent recommendations paper, after considering the submissions received on its discussion paper[55]. It recommended that the Authority introduce a tightly defined trading conduct provisions together with 'safe harbour' principles.

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53 New Zealand Electricity Authority (2013-2014). Improving the efficiency of prices in pivotal supplier situations - Outcome. Available at: http://www.ea.govt.nz/development/work-programme/wholesale/efficiency-of-prices-in-pivotal-supplier-situations/outcome/ . [Accessed 18 November 14].

54 Wholesale Advisory Group (2013). Pricing in Pivotal Supplier Situations, p. i-iii

55 New Zealand Electricity Authority (2013-2014). Improving the efficiency of prices in pivotal supplier situations - Outcome. Available at: http://www.ea.govt.nz/development/work-programme/wholesale/efficiency-of-prices-in-pivotal-supplier-situations/outcome/ . [Accessed 18 November 14].

221. In February 2014, the Authority released a consultation paper which proposed to amend the Electricity Industry Participation Code 2010 ('the Code') in a way which closely reflected the WAG's recommendation. Specifically, the Authority's proposal required generators and ancillary service agents to observe a high standard of trading conduct. The proposed Code amendment did not actually define the term 'high standard of trading conduct', but rather included a 'safe harbour' provision with three criteria. If all three criteria are met, then the participant will automatically be compliant with the requirement.[56]

222. The three requirements which must be satisfied for a participant's behaviour to meet the 'safe harbour' provision are summarised by the Authority in its decision paper from June 2014:

> *a. it offers all of its available capacity – energy and reserve – that is able to operate in a trading period*
>
> *b. when it decides to submit, revise, or withdrawn an energy or reserve offer in a timely manner after receiving the information that triggered this action*
>
> *c. when it is a pivotal supplier, either:*
>
> > *i. prices and quantities in its offers do not result in a material increase in the price in the region where it is pivotal. This is assessed by comparing prices in the immediately preceding trading period or another comparable trading period in which it was not pivotal*
> >
> > *ii. it offers when it is pivotal are generally consistent with its offers when it was not pivotal*
> >
> > *iii. it does not benefit financially from an increase in the price in the region where it is pivotal.*

223. In regards to criterion (a), the Authority notes in its June 2014 decision paper that, under the proposed wording *"suppliers must make and revise offers for plant in line with what they could be expected to physically provide in the trading period in question"*. It also notes that it *"expects suppliers to be able to meet a high standard of conduct even if it does not meet the first safe harbour criterion"*.

224. In regards to criterion (b), the Authority clarifies that the criterion does not mean that participants have to update their intentions in real time to comply, but rather that *"a participant should change its offer in a timely manner after receiving information that prompts this change (following a regular process)"*. Further, the Authority notes that the purpose of criterion (b) is to *"ensure the market is well informed and*

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56 New Zealand Electricity Authority (2014) *Improving the efficiency of prices in pivotal supplier situations,* p. C

should not be surprised by alterations to offers provided with late notice. It require[s] a participant to give as much notice as it is able to give of its intentions to submit, revise or withdraw the offer".

225. In regards to criterion (c), the Authority clarifies that the purpose is to *"reduce the scope for suppliers to modify their offers to increase prices to profit from periods where they are pivotal".*[57]

226. The Code was amended on the 17th July 2014 to reflect the Authority's proposals. The amendment to the Code involved inserting two new clauses (13.5A and 13.5B). These Clauses are reproduced at Box 1. The Authority concluded that if the outcomes achieved under the new provisions fall short of expectations the Authority will consider further action.[58]

Box 1: Insertion of Clauses 13.5A and 13.5B

13.5A Conduct in relation to generators' offers and ancillary service agents' reserve offers

*(1) Each **generator** and **ancillary service agent** must ensure that its conduct in relation to **offers** and **reserve offers** is consistent with a high standard of trading conduct.*
(2) Subclause (1) applies when –
*(a) a **generator** submits, revises, or cancels an offer; or*
*(b) an **ancillary service agent** submits, revises, or cancels a **reserve offer.***

13.5B Safe harbours for clause 13.5A

*(1) A **generator** complies with clause 13.5A if -*
*(a) the **generator** makes **offers** in respect of all its generating capacity that is able to operate in a **trading period**; and*
*(b) when the **generator** decides to submit, revise or cancel an offer, it does so as soon as it can; and*
*(c) in the case of a **generator** that is **pivotal**, -*
*(i) prices and quantities in the **generator's offers** do not result in a material increase in the **final price** at which **electricity** is supplied in a **trading period** at any **node** at which the **generator** is **pivotal**, compared with the **final price** at the **node** in an immediately*

57 New Zealand Electricity Authority (2014) *Improving the efficiency of prices in pivotal supplier situations – Decision Paper,* p. 2 - 9

58 New Zealand Electricity Authority (2013-2014). Improving the efficiency of prices in pivotal supplier situations - Outcome. Available at: http://www.ea.govt.nz/development/work-programme/wholesale/efficiency-of-prices-in-pivotal-supplier-situations/outcome/ . [Accessed 18 November 14].

*preceding **trading period** or other comparable trading period in which the **generator** is not **pivotal** at that **node**; or*
*(ii) the **generator's offers** are generally consistent with **offers** it has made when it has not been **pivotal**; or*
*(iii) the **generator** does not benefit financially from an increase in the **final price** at which **electricity** is supplied in a **trading period** at a node at which the **generator** is **pivotal**.*

*(2) A **generator** does not breach clause 13.5A only because the **generator** does not comply with subclause (1).*

*(3) An **ancillary service agent** complies with clause 13.5A if—*
*(a) the **ancillary service agent** makes **reserve offers** in respect of all of its capacity to provide **instantaneous reserve** that is able to operate in a **trading period**; and*
*(b) when the **ancillary service agent** decides to submit, revise, or cancel a **reserve offer**, it does so as soon as it can; and*
*(c) in the case of an **ancillary service agent** that is **pivotal** -*
*(i) prices and quantities in the **ancillary service agent's reserve offers** do not result in a material increase in the **final reserve price** in a **trading period** in an **island** in which the **ancillary service agent** is **pivotal**, compared with the **final reserve price** in the **island** in an immediately preceding **trading period** or other comparable **trading period** in which the **ancillary service agent** is not **pivotal**; or*
*(ii) the **ancillary service agent's reserve offers** are generally consistent with **reserve offers** it has made when it has not been **pivotal**; or*
*(iii) the **ancillary service agent** does not benefit financially from an increase in the **final reserve price** in a **trading period** in an **island** in which the **ancillary service agent** is **pivotal.***

*(4) An **ancillary service agent** does not breach clause 13.5A only because the **ancillary service agent** does not comply with subclause (3).*

5.3.2 Undesirable trading situation (UTS)

227. Part 5 of the Code sets out the regime for dealing with undesirable trading situations (UTSs).[59] In 2010, the Electricity Authority also published a set of guidelines for participants on UTSs.[60]

228. According to the guidelines, a UTS happens when there is a threat to orderly trading or settlement that cannot be resolved under the Electricity Industry Participation Code (2010). Clause 1.1(a) of the Code defines a UTS as:[61]

> *Undesirable trading situation means any situation –*
>
> *a) that threatens, or may threaten, confidence in, or the integrity of, the **wholesale market**; and*
>
> *b) that, in the reasonable opinion of the **Authority**, cannot satisfactorily be resolved by any other mechanism available under this Code (but for the purposes of this paragraph a proceeding for a breach of clause 13.5A is not to be regarded as another mechanism for satisfactory resolution of a situation).*

229. Clause 5.1(2) of the Code lists a non-exhaustive list of examples of what the Authority might consider to constitute an undesirable trading situation:[62]

> *(a) manipulative or attempted manipulative trading activity:*
>
> *(b) conduct in relation to trading that is misleading or deceptive, or is likely to mislead or deceive:*
>
> *(c) unwarranted speculation or an undesirable practice:*
>
> *(d) material breach of any law:*
>
> *(e) a situation that threatens orderly trading or proper settlement:*
>
> *(f) any exceptional or unforeseen circumstance that is contrary to the public interest.*

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59 Electricity Authority (2014) *Part 5 – Regime for dealing with undesirable trading situations* (https://www.ea.govt.nz/code-and-compliance/the-code/part-5-regime-for-dealing-with-undesirable-trading-situations/).

60 The Guidelines for participants on UTS are available here: https://www.ea.govt.nz/dmsdocument/8960.

61 Electricity Authority (2014) *Electricity Industry Participation Code 2010 Part 1 – Preliminary provisions*, p. 61.

62 Electricity Authority (2014) *Electricity Industry Participation Code 2010 Part 5 – Regime for dealing with undesirable trading situations*, p. 1.

230. Part 5 of the Code sets out the regime for dealing with a UTS. It allows the Authority to investigate the development, or possible development of a UTS, but it only commences an investigation within 10 business days after the possible UTS event. As noted in the Code definition of an "undesirable trading situation", a breach of Clause 13.5A (which requires conduct in relation to offers and reserve offers that is consistent with a high standard of trading conduct) is not to be regarded as another mechanism for satisfactory resolution of an undesirable trading situation.

231. If the Authority does find a UTS, it may take action to correct it. The powers of the Authority to correct UTSs set out in Part 5 of the Code are broad and include any one or more of the following. There is no mention of penalties:[63]

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

232. Further, the Code sets out the circumstances under which the Authority must consult with the system operator and participants. Finally, the Code requires that the Authority attempt to correct and restore normal operation as soon as possible.[64]

233. The Authority has published 14 UTS decisions since 2004. The latest decision was published on 8-12 March 2013, and the one before that on 26 March 2011. The 2013 decision related to the data and technical issues with the pricing process, however the UTS claims from Norske Skog Tasman Limited were withdrawn in April 2013 and the Authority took no further actions.[65]

234. The decision on 26 March 2011 relates to prices on the wholesale electricity spot market reaching levels of approximately $20,000/MWh over several hours in Hamilton and regions north of Hamilton when Transpower (the national transmission network operator) closed part of the grid to upgrade its lines into Auckland. A summary of this UTS decision is found in Box 1 below.

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63 Electricity Authority (2014) *Electricity Industry Participation Code 2010 Part 5 – Regime for dealing with undesirable trading situations*.

64 Electricity Authority (2014) *Electricity Industry Participation Code 2010 Part 5 – Regime for dealing with undesirable trading situations*, p. 1 – 3.

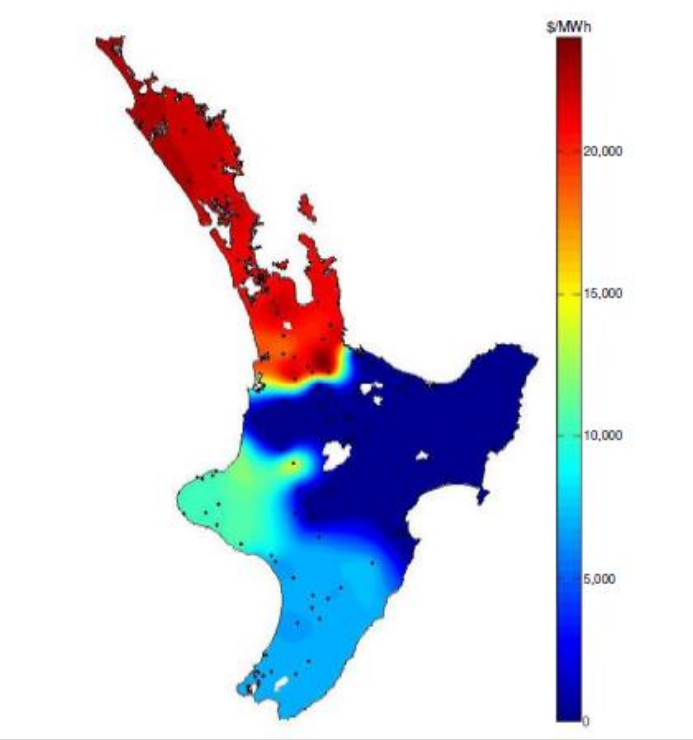
65 Electricity Authority (2014) *UTS decisions* (https://www.ea.govt.nz/code-and-compliance/uts/undesirable-trading-situations-decisions/).

Box 2: UTS decision of 26 March 2011

On Saturday 26 March 2011, the prices on the wholesale electricity spot market for Hamilton and regions north of Hamilton increased to approximately $20,000/MWh, and as high as several thousand dollars/MWh in other regions of the North Island. This occurred during planned transmission outages by Transpower to upgrade its lines into Auckland.

The outages were planned from 5am to 5pm on 26 March 2011, and in actuality went from 5am to 5:30pm. During this time generation from the Huntly power station was required to support demand from Hamilton and regions north of Hamilton. Genesis Energy revised its offers for the 26 March 2011 at 9:51am on 25 March, moving 320MW of offered generation for the Huntly power station from below $100/MWh to around $19,000/MWh. On March 26, a number of other plants moved offered generation into higher price bands.

The distribution of interim prices across the North Island for trading period 23 (11am – 11:30am) on 26 March 2011 are illustrated below. [66]



Source: Electricity Authority

[66] Electricity Authority (2014), 26 March 2011, (https://www.ea.govt.nz/code-and-compliance/uts/undesirable-trading-situations-decisions/uts-26-march-2011/).

The Authority received 35 UTS claims relating to the offer behaviour of Genesis Energy during the planned transmission outages on 26 March 2011. The basis of the claims is that the situation on 26 March 2011 constitutes:[67]

> *[…] a contingency or event that threatens, or may threaten, trading on the wholesale market for electricity that would, or would be likely to, preclude the maintenance of orderly trading or proper settlement of trades. The claims include that the conduct of Genesis Power Limited (Genesis Energy) constituted manipulative or attempted manipulative trading activity and conduct in relation to trading that was misleading or deceptive, and may have been unlawful and otherwise threatened orderly trading or the proper settlement of trades.*

The Authority concluded that a UTS did develop on 26 March 2011. In particular the Authority noted that the wholesale market for electricity was squeezed and that this resulted in an 'exceptional and unforeseen circumstance' which (may have) threatened both generally accepted principles of trading and the public interest.

However, it decided that the claims were not upheld, and that Genesis Energy's behaviour was not unlawful, did not amount to manipulative or attempted manipulative trading activity or trading that was misleading or deceptive. In particular the Authority noted that Genesis Energy's behaviour was 'consistent with managing its own risk position' and analysis did not support the view that it was engaged in manipulative or attempted manipulative trading activity. The Authority also noted that Genesis Energy has limited ability to forewarn participants, and it has made offers at $10,000/MWh over an extended period.

The Authority decided to let the interim prices for trading periods 1 to 21 and 36 to 48 on 26 March 2011 become the final prices, but to let the final prices for periods 22 to 35 be capped at $3,000/MWh at Huntly and to reset prices at other Genesis power stations to be based on the offer structure at the beginning of the day.

The Authority noted that the $3,000/MWh offer price cap removed the effect of the market squeeze component of the UTS whilst still maintaining incentives on participants in line with a workably competitive market.

The UTS Committee noted that its ex-post regulatory intervention in the wholesale market only occurred because a UTS had occurred and it was targeted specifically at correcting this UTS, and therefore it exercised regulatory discretion in a manner consistent with the Code and its interpretation of its statutory objective. It noted that allowing the interim prices for 26 March 2011 to become final prices would have increased uncertainty by allowing pivotal generators total discretion in setting prices.

67 Electricity Authority (2011) *Final Decision on the Undesirable Trading Situation of 26 March 2011, and Final decision on actions to correct the Undesirable Trading Situation of 26 March 2011*, p. 1.

6 France

6.1 Introduction

235. The electricity market in France was liberalised following the transposition of directives adopted by the European Commission into French law in 2000. The market was liberalised in order to promote an effective and efficient energy market open to competition. The French electricity market was further liberalised following the transposition of the directives in the European Commission's Third Energy Package into French law on 7 December 2010 (NOME Law). Nevertheless, Electricité de France (EDF), the pre-liberalisation state monopoly in the electricity market, still dominates the industry.

236. The French electricity market is physically interconnected with six European electricity markets, with electricity exports and imports in 2012 reaching 74TWh (approximately 15% of total consumption) and 29TWh (6%) respectively. In 2006, the Council of European Energy Regulators (CEER) launched "European Regional Initiatives"[68] to facilitate the integration of the regional electricity and gas markets. France lies within four of these regional initiatives and its day-ahead wholesale electricity market is coupled with several countries in Europe. When a day-ahead market is cleared, bids from countries within the regional initiative are simultaneously considered to see whether they can balance the market at a better price, taking into consideration limitations such as price bands on the relevant wholesale markets and network capacity.

237. In France, electricity can be traded on the over-the-counter (OTC) market or on the European Energy Exchange (EEX), which operates spot and derivative trading. EPEX Spot is a sub-market on which short-term trading in power (day-ahead and intraday spot products) for Germany, France, Austria and Switzerland takes place. EEX Power Derivatives (EPD or the derivatives market) provides a platform on which long-term trading of German and French power derivatives (future products) occurs. In 2012, the volume of intraday and day-ahead transactions on EEX France and OTC made up 10.8% and 3.8% of the total value of transactions made on the markets, respectively. Trading of futures contracts via OTC and on EEX France made up 82.8% and 2.6% of the total value of transactions made on the markets, respectively[69].

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68 See CRE website, *Regional Initiatives* (http://www.cre.fr/en/international/european-union/regional-initiatives); RTE website, *Regions as stages in the construction of a European electricity market* (http://clients.rte-france.com/lang/an/visiteurs/accueil/acteur_europeen_initiatives.jsp).

69 CRE (4 Dec 2013) *Rapport sur le fonctionnement des marches de gros de l'électricité, du CO2 et du gaz naturel en 2012-2013*.

238. Trading on EPEX Spot is regulated by the Exchange Rules and Codes of Conduct. The Exchange Rules set out the duties of the Market Surveillance Office (MSO), the independent body responsible for monitoring the EPEX Spot market and ensuring compliance with the rules and codes of conduct.

239. The electricity market is also regulated under the French Energy Code and the Code of Commerce. The Energy Code sets out the mission and authority of the Commission of Regulation of Energy (CRE), the independent authority responsible for regulating the energy sector in France. The Code of Commerce, which covers commercial laws, sets out the prohibitions regarding anticompetitive practices.

240. As France is part of the European Union (EU), electricity market surveillance falls under the European Regulation on Energy Market Integrity and Transparency (REMIT) of 25 October 2011. The Agency for the Cooperation of Energy Regulators (ACER) has been tasked under REMIT with the surveillance of wholesale energy markets at the EU level.

6.2 Wholesale Market Design

6.2.1 The day-ahead market

241. On EPEX Spot, transactions in the day-ahead market are effected by matching supply and demand orders by auction, after a period during which orders entered in the 'order book' by market participants are accumulated but not executed. The auction is blind such that the order book and transactions are anonymous.

6.2.1.1 Gate closure and rebidding

242. The order book opens 45 days before delivery and closes at noon the day before delivery. During this time, orders can be modified at will.

243. After gate closure, no more bids can be amended and the auction price for each hour of the next day will be calculated.

244. The intraday market allows trading closer to real-time, from 3pm the day before delivery up to 45 minutes before delivery. Transactions in the intraday market are effected by continuously matching supply and demand orders entered into the order book for immediate execution.

6.2.1.2 Price limits

245. The minimum and maximum price limits are set at -500€/MWh and 3,000€/MWh, respectively.

6.2.1.3 Published data

246. The preliminary results of the auction are published as soon as possible, from 12:42pm, and final results are published between 12:55pm and 13:50pm. Each market participant will receive a message containing the market price and volume and their individual executed volume per portfolio.

6.2.1.4 Second Auction

247. According to EPEX SPOT's Operational Rules, EPEX Spot may trigger a 'Second Auction' if the market is in curtailment (imbalance of purchases and sales leading to out-of-scale prices) or if the auction leads to a price that can be considered as abnormal given current market conditions (one or several hourly prices are significantly different from the other hours of the day or from the same hour(s) of a comparable day).

248. EPEX SPOT currently assesses whether a Second Auction will be triggered based on hourly prices hitting or exceeding the lower and upper price thresholds of -150€/MWh and 500€/MWh, respectively.

249. The aim of this Second Auction is to allow the members to improve the "tight situation" that has arisen in the market. EPEX Spot can decide to either allow for an extra sale/purchase of volume, manually adjust the price upwards or downwards, or re-open the order book to allow every market participant to adjust his bids. In the cases where the order book is re-opened, participants are only allowed to adjust their bids in order to improve the situation (supply more and buy less in a supply-tight market and supply less and buy more in a demand-tight market). If this Second Auction is not successful in leading to a market outcome, EPEX Spot may reject block offers that are worsening the situation at hand.[70]

6.2.2 Demand-side participation

250. On EPEX Spot, loads can make bids, with prices determined by the aggregate supply and demand of the exchange members.

6.2.3 Wholesale market efficiency

251. The General Economic and Financial Control (CGEFi) points out that EDF, the historical operator, is still the dominant producer of electricity in France with around

[70] Article 1.7. of the EPEX Spot Operational Rules.

85% of production capacity[71]. Nevertheless, in its market surveillance report for 2010-11, the CRE investigated the difference between spot prices and the marginal cost of EDF's production.[72] It concluded that the average mark-up of 3.2% estimated for 2010 did not correspond to an abuse of dominant position, with offers reflecting the system marginal costs in the EPEX Spot auction.

252. CRE's market surveillance report for 2012-13 also suggests that, except for price spikes on 9-10 February 2012, the average day-ahead and intraday prices fell between 2011 and 2012.[73] Furthermore, CRE's report states that spot prices are strongly and negatively correlated with the capacity margin (the difference between production capacity and demand), suggesting that these prices are largely determined by market fundamentals.

253. However, according to EPEX spot's chief operating officer, the volume of trade on the wholesale electricity market in France suffers from regulated tariffs such as the Regulated Access to Incumbent Nuclear Electricity (ARENH) introduced by the NOME law.[74] The ARENH, a right that entitles suppliers to purchase electricity from EDF at a regulated price (below the wholesale price and currently fixed at €42/MWh) and in volumes determined by the CRE, electricity which therefore does not go through the wholesale market. According to CRE's market surveillance report for 2012-13, volumes traded on the wholesale markets fell from 696TWh in 2011 to 578TWh in 2012, a loss of volume which corresponds to the volume of the ARENH (with a ceiling of 100TWh).[73] A government commission suggested that producers other than EDF could not compete with the regulated tariffs, which reflect the costs of production of the nuclear plants amortised by EDF to which they do not have access.[75]

254. According to the French competition authority (Autorité de la Concurrence), the absence of access to competitive base load electricity under the same conditions as

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71 CGEFi (30 Jan 2013) *Note - L'introduction de la concurrence dans le système électrique français: Etat de lieux et perspectives* (http://www.economie.gouv.fr/files/2013_01_30_Concurrence_et_marche_de_l_electricite.pdf).

72 CRE (2 Nov 2011) *Rapport sur le fonctionnement des marches de gros de l'électricité, du CO2 et du gaz naturel en 2010-2011* (http://www.cre.fr/documents/publications/rapports-thematiques/rapport-de-surveillance-des-marches-2010-2011/rapport-de-surveillance-des-marches-de-l-electricite-et-du-gaz-naturel-en-2010-2011).

73 CRE (4 Dec 2013) *Rapport sur le fonctionnement des marches de gros de l'électricité, du CO2 et du gaz naturel en 2012-2013* (http://www.cre.fr/documents/publications/rapports-thematiques/fonctionnement-marches-de-gros-electricite-co2-gaz-naturel-2012-2013/consulter-le-rapport).

74 Assemblée Nationale (16 Jan 2014) Compte Rendu n.5 (http://www.assemblee-nationale.fr/14/pdf/cr-cenucleaire/13-14/c1314005.pdf).

75 Commission (Apr 2009) *Rapport de la commission sur l'organisation du marché de l'électricité (*http://www.developpement-durable.gouv.fr/IMG/pdf/9-04-16_Rapport_Champsaur.pdf*)*.

EDF and the regulated sales tariffs (Tarifs Réglementés de Vente or TRV) are negatively impacting the incentive to invest in new production capacities by suppliers other than EDF.[76]

255. Given market coupling and interconnections with neighbouring countries, the French wholesale market is impacted by the other European electricity markets. A major problem with the European electricity market is low electricity prices on the wholesale markets, which has led major companies to close a total of 38GW of thermal capacity in Europe by 2015.[77] As a result of falling demand and further renewable capacity coming online, the electricity sector in Europe is currently experiencing a situation of excess capacity. The renewable plants have been weighing on the spot market, pushing EPEX spot prices down, and even leading to negative prices.[78] On the other hand, subsidies for these renewable plants are causing retail prices to increase.

256. According to the International Energy Agency (IEA), despite public and political concern over rising retail prices, wholesale prices in Europe are currently too low to stimulate the investment required to de-carbonise its electricity sector and replace its ageing energy infrastructure, despite current overcapacity in the market.[79]

6.3 Wholesale Market Rules and Regulation

6.3.1 Overview

257. Trading on EPEX Spot is regulated by the Exchange Rules and Code of Conduct. The Code of Conduct contains the rules of good conduct which must be followed by members of the exchange in order to guarantee fair and transparent market conditions. The Exchange Rules govern the organisation and operation of the exchange and sets out the duties of the Market Surveillance Office (MSO). The MSO

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76 Autorité de la Concurrence (12 Apr 2012) *Avis n° 12-A-09 du 12 avril 2012 concernant un projet de décret relatif à l'instauration d'un mécanisme de capacité dans le secteur de l'électricité* (http://www.autoritedelaconcurrence.fr/pdf/avis/12a09.pdf).

77 Commissariat Général à la stratégie et à la prospective (Jan 2014) La crise du système européen (http://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/archives/CGSP_Rapport_Systeme_electrique_europeen_28012014.pdf).

78 CRE (4 Dec 2013) *Rapport sur le fonctionnement des marches de gros de l'électricité, du CO2 et du gaz naturel en 2012-2013* (http://www.cre.fr/documents/publications/rapports-thematiques/fonctionnement-marches-de-gros-electricite-co2-gaz-naturel-2012-2013/consulter-le-rapport).

79 IEA (2014) *World Energy Investment Outlook 2014 – Executive Summary* (http://www.iea.org/publications/freepublications/publication/WEIO_2014_ES_English.pdf).

is the independent body responsible for monitoring the EPEX spot market and ensuring compliance with the rules and codes of conduct.

258. The electricity market is also regulated under the French Energy Code and the Code of Commerce. The Energy Code sets out the mission and authority of the Commission of Regulation of Energy (CRE), the independent authority responsible for regulating the energy sector in France. The Code of Commerce, which covers commercial laws, sets out the prohibitions regarding anticompetitive practices (Book IV). The French competition authority is responsible for ensuring free competition and assisting with the competitive functioning of markets at the European and international level.

259. As France is part of the EU, electricity market surveillance also falls under the European Regulation on Energy Market Integrity and Transparency of 25 October 2011 (REMIT), which is enforced by ACER.

6.3.2 Rules and Regulation

260. Exchange members must adhere to the Rules and Regulations of EPEX Spot, which consist of, inter alia, the Trading Agreement, the Market Coupling Facilitator Agreement, the Exchange Rules, the Code of Conduct, and the Operational Rules.

261. The Code of Conduct and the Exchange Rules are relevant to strategic bidding behaviour in each market. The Code of Conduct sets out the rules of conduct and market behaviour which must be respected at all times by the exchange members whilst the Exchange Rules set out the terms under which exchange members trade in the market.

6.3.2.1 Code of Conduct

262. In accordance with REMIT (see Section 6.3.5 below), the EPEX Spot Code of Conduct establishes rules prohibiting abusive practices affecting wholesale energy markets and aims to prevent and detect Exchange Members' misbehaviour in order to operate the market in a fair and transparent manner.

263. The Code of Conduct prohibits market manipulation, including false or misleading behaviour, collusion, and price positioning behaviour. It states that exchange members must commit to fairness towards EPEX Spot and the other exchange members.

264. The Code of Conduct states that all orders submitted on the exchange must have due economic justification for which EPEX Spot is entitled to look for by requesting explanations to such orders.

265. The Code of Conduct forbids exchange members from entering into any transaction or issuing any orders without a due economic justification, placing orders with no

intention of executing them, or giving false or misleading signals as to the supply of, demand for, or price of physical power contracts.

266. It also forbids exchange members from:

- securing the price of physical power contracts at an artificial level[80] (unless the person who entered into the transaction or issued the order to trade establishes a legitimate reason for doing so and that the transaction or order to trade conforms to accepted market practices on EPEX Spot markets);
- artificially causing prices to be at a level not justified by market forces of supply and demand, including actual availability of production, or transportation capacity, and demand; and
- conducting cross trades[81] with no real economic justification and/or with the purpose of influencing exchange prices.

267. The Code of Conduct stipulates that exchange members must inform the relevant authorities and EPEX Spot's MSO if they detect any suspicious behaviour. It sets out the penalties that can be enforced, which include suspension or expulsion from the EPEX Spot markets.

6.3.2.2 Exchange Rules

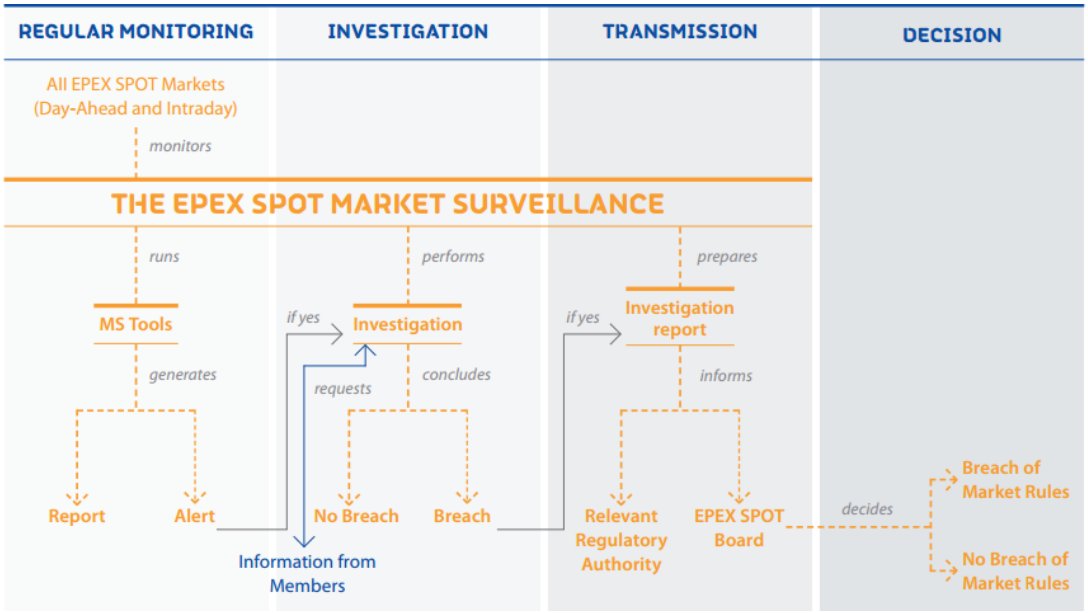
268. The Exchange Rules set out the duties of the MSO, an independent exchange body that directly reports to the EPEX Spot board. It continuously monitors the trading and settlement of transactions on the EPEX Spot markets and verifies that members comply with the EPEX Spot Rules and Code of Conduct.

269. The MSO must systematically record and evaluate data regarding trading and the settlement of exchange transactions, it must conduct any necessary investigations, and establish if transactions constitute exchange price manipulation. The MSO must inform the EPEX Spot if it suspects a rule breach. An overview of the MSO's market surveillance of EPEX Spot is shown in Figure 2 below.

80 That is, a level above the market outcome absent market manipulation.

81 A transaction where an exchange member is both on the buy and the sell side for the same product.

Figure 2 EPEX Spot Market Surveillance overview



Source: EPEX Spot (2011) Annual Report (http://static.epexspot.com/document/19478/RA%20EPEX%20SPOT_PDF%20BD.pdf)

270. The MSO has the authority to conduct special investigations but cannot enact sanctions. It must therefore inform the institutions responsible for sanctioning such as EPEX Spot, which can suspend or terminate the membership of an exchange member.

271. According to the Exchange Rules, EPEX Spot fully cooperates with the regulatory authorities of each of its market areas, with the aim of ensuring harmonised, efficient and regulated trading across Europe. The MSO therefore entertains relations with the national energy regulators of each country, including CRE in France, as well as other market surveillance departments, including the French financial intelligence unit (TRACFIN), ACER, and the European Commission.

272. The MSO may transmit transaction data to the authorities which are responsible for monitoring power trading, and may receive data from them to the extent that this is necessary to ensure the orderly conduct of trading and the settlement of exchange transactions.

6.3.3 Energy Code

273. The NOME Law on the organisation of the electricity market was enacted in December 2010 and codified in the French Energy Code in May 2011. The Energy Code (Title III, Book I) defines the missions and powers of the Commission of Regulation of Energy (CRE) and refers to the French Code of Commerce, the Code of the Environment and the Monetary and Financial Code.

6.3.3.1 *Commission of Regulation of Energy*

274. The CRE, established on 24 May 2000, is the independent administrative authority responsible for regulating the energy sector in France and ensuring the proper functioning of the electricity and gas markets to allow the development of competition to benefit consumers. Since the introduction of the Law n° 2006-1537 of 7 December 2006 relating to the energy sector[82] and under the Energy Code (Article L. 131-2), the CRE is responsible for monitoring transactions in the electricity market, including the consistency of offers made by market participants.

275. CRE's market surveillance mission now also falls within the context of the REMIT. The REMIT entrusts market monitoring, at the European level, to the Agency for the Cooperation of Energy Regulators (ACER) in cooperation with national regulatory authorities such as CRE in France. The Brottes law of 15 April 2013 expressly entrusted CRE with the mission of ensuring REMIT implementation and CoRDis jurisdiction to sanction any breaches of the regulation.

276. The aim of CRE's market surveillance is to detect any anti-competitive behaviour, verify that the market participants with market power do not abuse of it, and ensure that transactions in the market do not have the objective of altering the price formation mechanism to attain abnormal prices. CRE aims to ensure that wholesale market energy prices are consistent with the technical and economic fundamentals of the market. In this context, CRE systematically analyses any occurrence of price spikes in the electricity market.

277. Criminal activities, as defined by the CRE, include withholding of production capacity in the aim of driving prices up by creating an artificial shortfall, or sending offers or bids on trading platforms aimed at providing markets with erroneous information regarding the development of prices.

6.3.3.2 *CoRDis Committee*

278. The Energy Code (Article L-135-3) states that the CRE may proceed with any necessary investigation to fulfil its missions. These investigative powers are complemented by REMIT (Article 13). The Standing Committee for disputes and sanctions (CoRDis), an independent body of the CRE, executes CRE's competencies with regards to the sanctions defined in the Energy Code (Article 134-27). In case of non-compliance with its dispute settlement decisions, CoRDis can impose sanctions without prior notice. The sanctions available to CoRDis are a temporary ban from access to electricity networks for up to one year, or a financial penalty of not more

[82] République Française (7 Décembre 2006) LOI n° 2006-1537 du 7 décembre 2006 relative au secteur de l'énergie (http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000462914&dateTexte=&categorieLien=id).

than 8% of the offender's turnover. The sanctions can be appealed with the Council of State, which are the first and last resort.[83]

6.3.3.3 CRE and other market authorities

279. The Energy Code (Article 134-16) plans that the president of the CRE should refer to the national competition authority if any abuse of market power or anticompetitive practices occur in the electricity sector, particularly if these practices are prohibited under Articles L.420-1 and L.420-2 of the Code of Commerce.

280. In addition, the French Competition Authority ('the FCA') has the power to prevent and sanction anti-competitive practices in any economic sector, including electricity and gas. It must inform the CRE when referred to on any matter that would fall under the CRE's jurisdiction. The FCA must also notify the CRE of any abuse of a dominant position or any anti-competitive practice in the gas or electricity sector.

281. Finally, under the Energy Code (Article L.134-17) and the Monetary and Financial Code (Article L.621.21), the CRE and the Financial Markets Authority (AMF) cooperate in order to fulfil their respective missions. The CRE will refer to the AMF following breaches to regulations such as price manipulation. This cooperation is set forward in a Memorandum of Understanding signed in December 2010. Any information regarding possible breaches on the market for electricity and/or gas and its derivative markets shall be referred to the CRE.

6.3.3.4 CRE investigations

282. The CRE investigates any price spikes and reports on their findings. Furthermore, since 2007, the CRE publishes an annual market surveillance report analysing activity in the wholesale electricity market in France, including price spikes in the spot market.

283. In the 2012-2013 report on the functioning of the wholesale market, the CRE reports price spikes in February 2012 during which prices exceeded the 500€/MWh threshold, thereby triggering Second Auctions. The CRE concluded that the price spikes were linked to a tight demand and supply situation following unusually low temperatures and a sub-optimal use of the interconnections with Switzerland and Italy. The CRE also looked into the reasons why a Second Auction resulted in even higher prices. The CRE investigated changes in offers by three market participants during the Second Auction which could have led to higher equilibrium prices and therefore did not conform to the EPEX Spot rules[84]. CRE, investigating alongside

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83 http://www.cre.fr/en/presentation/powers#section4

84 The EPEX Spot rules state that, in the case of a Second Auction, only order modifications having the effect of reducing the disequilibrium between supply and demand are authorised.

ACER, concluded that there had been no breach of EPEX Spot rules or REMIT regulations but made recommendations to EPEX Spot regarding market transparency and improving the Second Auction procedure.

284. CRE's latest reports on the functioning of the wholesale market suggest that offers on the EPEX Spot auction for France were consistent with electricity market fundamentals and notably correlated with the margin of the electrical system.

6.3.4 French Competition Law

6.3.4.1 Code of Commerce

285. The French Code of Commerce (Book IV) sets out prohibitions regarding anticompetitive practices. The Code of Commerce prohibits any abuse of market power (Article L420-2) or action aiming to prevent or restrain competition, specifically when these create an obstacle to the determination of prices through competition in the market, inter alia (Article L420-1).

6.3.4.2 French competition authority

286. The French competition authority, empowered under the Code of Commerce and the *Treaty on the Functioning of the European Union* (2007), is the independent authority responsible for ensuring free competition and assisting with the competitive functioning of markets at the European and international level. It has been seized on several occasions by various entities, including competitors to EDF regarding abuse of dominance, none of which related to strategic behaviour in the wholesale market.[85]

6.3.5 Regulation on Wholesale Energy Markets Integrity and Transparency (REMIT)

287. The Regulation on Wholesale Energy Markets Integrity and Transparency (REMIT), dated 25 October 2011, is a European Union (EU) wide regulatory framework for the monitoring of wholesale energy markets specifically. REMIT prohibits insider trading and market manipulation in physical and over-the-counter financial transactions in the wholesale energy markets. REMIT covers the gap between the existing regulation of market conduct on the financial markets on the one hand and the regulation of the EU energy sector on the other hand. In essence, it applies many of the notions of market conduct already in place in regulation regarding the financial sector (MAD)

[85] See the following links for examples of decisions by the French competition authority relating to abuse of dominance in the electricity market: http://www.autoritedelaconcurrence.fr/pdf/avis/07d43.pdf; http://www.autoritedelaconcurrence.fr/pdf/avis/07mc04.pdf

and changes it so that it can now also apply to the trade of physical products (gas and electricity).

288. The REMIT:

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

ii. introduces the explicit prohibition of market manipulation, attempted market manipulation and insider trading in wholesale energy markets;

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

iv. provides the enforcement of the above prohibitions and the sanctioning of breaches of market abuse rules at the national level.

289. The types of market manipulations forbidden by the REMIT are extensive. The REMIT broadly sets out four types of market manipulation:

i. False/misleading transactions: trading, or placing orders to trade, which gives, or is likely to give, false or misleading signals as to the supply of, demand for, or price of wholesale energy products (Article 2(2)(a)(i) and (3)(a)(i) of REMIT). This includes wash trades, improper matched orders, and placing orders with no intention of executing them.

ii. Price positioning: trading which secures or attempts to secure the price of wholesale energy products at an artificial level (except under certain circumstances) (Article 2(2)(a)(ii) and (3)(a)(ii) of REMIT). This includes marking the close, abusive squeeze, market cornering, cross-market-manipulation, and physical withholding.

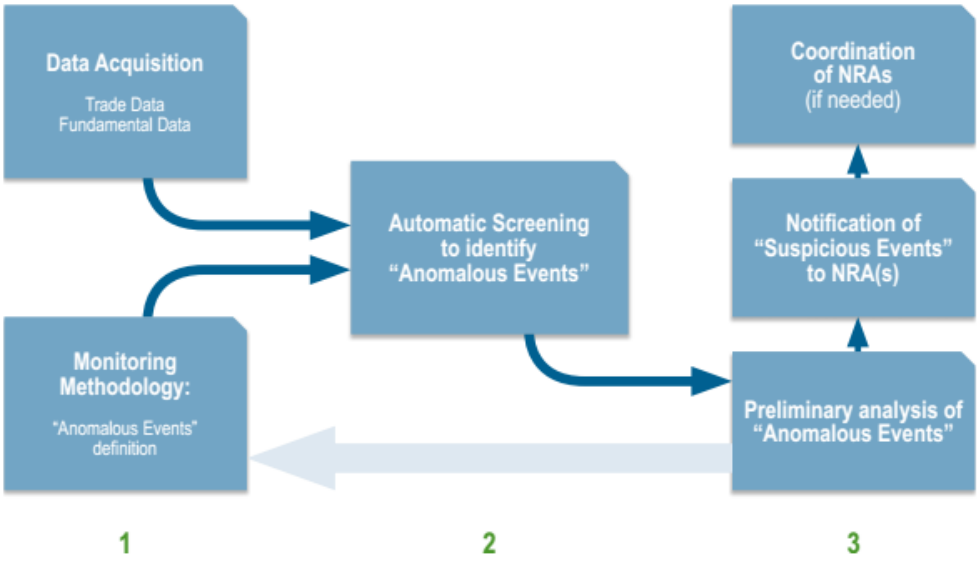
iii. Transactions involving fictitious devices/deception: (Article 2(2)(a)(iii) and (3)(a)(iii) of REMIT). This includes the dissemination of false or misleading market information, scalping, pump and dump, circular trading, and pre-arranged trading.

iv. Dissemination of false and misleading information: (Article 2(2)(b) and (3)(b) of REMIT).

6.3.5.1 Agency for the Cooperation of Energy Regulators (ACER)

290. REMIT tasks the Agency for the Cooperation of Energy Regulators (ACER), established by the *Regulation establishing an Agency for the Cooperation of Energy Regulators* on 13 July 2009, with the surveillance of wholesale energy markets at the European Union level. ACER's market monitoring approach is shown in Figure 3 below.

Figure 3 ACER's market monitoring approach



Source: ACER (2013) ACER's annual report on its activities under REMIT in 2012 (http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/REMIT%20Annual%20Report%202013.pdf).

291. ACER is responsible for collecting and analysing wholesale markets and other relevant data to identify possible instances of market abuse. REMIT requires energy market participants (primarily through brokers and exchanges) to submit detailed information on energy transactions to ACER. It also requires ACER to work closely with national energy regulators, such as CRE in France, and to exchange information with them.

292. ACER must notify the concerned national energy regulators after an initial assessment and when there is ground to believe that abusive behaviour has actually occurred. REMIT gives the national energy regulators the powers of investigation and enforcement, including the powers to impose dissuasive penalties to help stop and prevent market manipulation. The Brottes law of 15 April 2013 expressly entrusted CRE with the mission of ensuring REMIT implementation and CoRDis jurisdiction to sanction any breaches of the regulation.

293. As set out in sub-section 6.3.3.2, CoRDis can impose sanctions without prior notice in cases of non-compliance with its dispute settlement decisions. The sanctions available to CoRDis are a temporary ban from access to electricity networks for up to one year, or a financial penalty of not more than 8% of the offender's turnover. The sanctions can be appealed with the Council of State, which are the first and last resort.[86]

86 http://www.cre.fr/en/presentation/powers#section4

294. In 2012 and 2013, a total of 12 cases of potential breaches of the market manipulation prohibition (under Article 5) were reviewed by ACER in the electricity and gas markets in Europe. None of these regarded strategic bidding behaviour in the French wholesale market. ACER's activities consisted of coordination of the concerned National Regulatory Authorities (NRAs). In one of the cases, ACER observed a significant increase in electricity prices in the Baltic Elspot and therefore contacted the competent NRAs, the three Baltic NRAs. These then contacted the Nord Pool Spot's Market Surveillance, which then investigated whether there was any suspicion of breach of REMIT and found none.

6.3.6 European Competition Law

295. The EU competition law aims to ensure that competition is not distorted in the internal market. The EU competition law covers:

- horizontal and vertical agreements between undertakings which have the object or effect of preventing, restricting or distorting competition within the common market; and
- abuse of dominant position so that the maintenance of the degree of competition still in the market or the growth of that competition is hindered.

296. All companies within the EU, including those in the energy sector, have to adhere to these laws. In France, the execution of this law is overseen by the French competition authority.

297. One of the main roles of the European Commission (EC), the EU's executive body, is to enforce European Law. In the energy sector the EC required EDF to implement VPP auctions in 2001. Among many interventions in the French electricity sector, the EC began investigating EDF in 2009, following suspicions of price manipulation in the French wholesale market including, notably, strategic programming of the scheduled maintenance of its nuclear plants. However, in September 2012, the EC closed the case without further action.

7 ERCOT, United States

7.1 Introduction

298. The Electric Reliability Council of Texas (ERCOT) is the not-for-profit system operator for an electricity network that transports about 85% of the state's electricity requirements.

299. ERCOT is an 'electricity island' with only direct current interconnection to other electricity networks. It has two DC connections to the Southern Power Pool at Oklaunion and Monticello and three DC connections to the Comisión Federal de Electricidad at Eagle Pass, Railroad and Laredo. The total transmission capacity of these DC connections is approximately 1,106MW.

300. Because it is not synchronously connected to the rest of the United States, the transport of energy within ERCOT is unique amongst United States independent system operators in not being subject to the jurisdiction of the FERC. However, it remains subject to the reliability standards of the NERC.

301. The electricity market operated by ERCOT comprises of a day-ahead market and a real-time market. The key markets operated by ERCOT are energy markets. ERCOT does not operate an explicit auction or acquisition process for generation capacity. ERCOT also operates three procurement markets for ancillary services capacity products – the regulation service, the responsive reserve service and the non-spinning reserve service.

302. Participation in the day-ahead and real-time markets is voluntary, with specific exceptions for units specifically contracted by ERCOT to run. Generation and load entities can otherwise (and frequently do) contract directly with each other, through brokers or on the Intercontinental Exchange where various spot and futures markets operate for ERCOT prices. Possibly as a result, only a small percentage of total energy is transacted through ERCOT's energy markets – about 5% according to some sources.

303. The Public Utility Commission of Texas (PUCT) oversees the electricity market and monitors market activity to deal with market abuses and gaming.

7.2 Wholesale Market Design

7.2.1 Objectives

304. ERCOT's primary objective is the maintenance of a reliable electricity network, and to maintain a market design that promotes accurate prices signals that drives reliability.

7.2.2 Power pool design

305. ERCOT operates a day-ahead market and a real-time market for energy. The day-ahead market has hourly pricing and settlement, whereas calculation of the locational marginal price in the real-time market (also called the balancing market) is executed each five minutes to meet system demand and settlement occurs each 15 minutes. Settlement occurs based on the locational marginal prices from all the executions during the 15 minute settlement interval.

306. Participants can submit supply offers or energy bids into the day-ahead market. A supply offer consists of up to three parts, being:

- the Startup Offer, which includes all costs associated with starting a generator and connecting it to the synchronised network;
- the Minimum Energy Offer, which includes the costs incurred in producing energy at the minimum operating level; and
- the Energy Offer Curve, which indicates the resources willingness to sell its output between its minimum and maximum operating levels.

307. The Startup and Minimum Energy Offers are subject to generic caps in ERCOT's protocols depending upon the type of resource. The Energy Offer Curve may contain no more than 10 price-quantity pairs.

308. Offers and bids made in the day-ahead market that are accepted by ERCOT are financially binding on market participants but it does not confer a physical commitment on generation resources to be online in the operating hour. That is, generators may fulfil their commitments from the day-ahead market by contracting others to supply committed generation. The day-ahead market plays a number of roles in ERCOT:[87]

> *With the exception of the acquisition of ancillary service capacity, the day-ahead market is a financial market. Although all bids and offers are evaluated in the context of their ability to reliably flow on the transmission network, there are no operational obligations resulting from the day-ahead market clearing. These transactions are made for a variety of reasons, including satisfying the participant's own supply, managing risk by hedging the participant's exposure to the real-time market, or arbitraging with the real-time markets. For example, load serving entities can insure against volatility in the real-time market by purchasing in the day-ahead market. Finally, the day-ahead market plays a critical role in coordinating*

87 Potomac Economics (2012) *2012 State of the Market Report for the ERCOT Wholesale Electricity Markets*, p. 21.

generator commitments. For all of these reasons, the performance of the day-ahead market is essential.

309. The amount of energy that is directly traded in the day-ahead and real-time markets is relatively small, at about 5% of total electricity in the ERCOT region. However, this does not mean that the ERCOT price is unimportant or that strategic behaviour designed to influence that price could not be profitable. The prices determined by ERCOT are influential in setting the benchmarks that determine the value of spot, futures and derivative products traded bilaterally, though brokers and on the Intercontinental Exchange.

7.2.2.1 Gate closure

310. Although it is voluntary to participate in the day-ahead or real-time market, all scheduled entities must submit a current operating plan with ERCOT seven days in advance.

311. Bids and offers for the day-ahead market must be submitted prior to ERCOT executing the day-ahead market clearing process at 10am on the day prior to the operating day. Awards in the day-ahead market are announced by ERCOT at 1:30pm on the day prior.

312. From 2:30pm ERCOT runs its daily reliability unit commitment process, which studies all hours in the next operating day to ensure reliability.

313. Between 6pm of the day prior to the operating day and 60 minutes prior to the operating hour, an adjustment period applies. During this period, market participants may submit or revise energy offers and advise ERCOT of bilateral trades, self-schedules and changes to their current operating plans. These changes will take effect in the real-time market unless rejected by ERCOTs hourly resource unit commitment process that ensures system reliability.

314. After gate closure, there is no process to allow a generator to change its energy offer. However, it may communicate two technical changes to its ability to supply energy as follows:

- advising ERCOT of a forced outage of a resource; or
- updating ERCOT about the lower and upper sustained limits of a resource given operating conditions.

7.2.2.2 Price limits

315. Under the Scarcity Pricing Mechanism in Substantive Rule 25.505 the:

- high system wide offer cap is currently $7,000/MWh, rising to $9,000/MWh on 1 June 2015; and

- low system wide offer cap is $2,000/MWh or 50 times the Houston Ship Channel gas price.

316. There is also an energy offer and bid floor of -$250/MWh.

317. Starting from 1 June in each year, the system wide offer cap is set at the high system wide offer cap defined above. However, a balance is maintained called the peaker net margin (PNM) defined as the sum of differences over time between the real-time energy price and a proxy for peaking operating costs. If the PNM exceeds a pre-defined trigger during that year the system wide offer cap is reset to the low system wide offer cap.[88] The trigger point is set at approximately three times the annualised fixed costs of a new peaking plant and was applied in 2012 and 2013 as $300,000/MW.

318. The scarcity pricing mechanism attempts to balance two concerns. First, it is attempting to ensure that resource adequacy issues can be signalled in higher prices. The PUCT considers that higher price caps will increase the incentives for both new generation and for demand response. However, the PNM trigger mechanism is also designed to protect loads against very high prices during periods of low reserve margins. [89]

7.2.2.3 Offer mitigation and the competitive constraint test

319. Although it is an energy-only market and faces the potential problem of "missing money", ERCOT enforces mitigation of energy offers through a two-step process.

320. The mitigation process is intended to limit the ability of a generator to affect price when their output is required to manage congestion. To achieve this, transmission constraints are designated either as "competitive" or "non-competitive" through application of a competitive constraint test. The potential result of this assessment is signalled in advance but is conducted for each dispatch operating hour.

321. To be deemed "competitive" a constraint must meet certain conditions, including:

- that the Herfindahl–Hirschman Index (HHI) calculated on the import side of the constraint is less than 2000. This index is calculated the basis of the effective capacity; and
- that the capacity of any entity and its affiliates is not 'pivotal' in causing the constraint to bind. That is, the constraint would not bind even if this capacity

88 See Public Utility Commission of Texas Substantive Rule 25.505(g).

89 See Public Utility Commission of Texas, Order adopting amendment to §25.502, new §25.504 and new §25.505, Project No. 31972, approved at 10 August 2006 open meeting.

were not available – not including nuclear capacity and minimum energy capacity of coal power stations.

322. In the first step of the mitigation process ERCOT simulates dispatch observing the limits only from competitive constraints, i.e., ignoring the effect non-competitive constraints in generating market outcomes. A reference marginal price is determined through this process at each location.

323. In the second step, energy offers are mitigated such that offers are capped at the reference marginal price or a measure of variable cost, whichever is the greater. There is also an energy offer floor which applies unless the reference marginal price is lower than this.

324. The 2012 *State of the Energy Market* report shows that a very small percentage of dispatched capacity was mitigated on average. Even at times of high load the percentage of capacity mitigated was less than 0.5%.

7.2.3 Published data

325. Under Substantive Rule 25.505(f), ERCOT is required to publish on its website within two days after the information is accumulated:

- quantities and prices for energy and ancillary capacity services in the form of the market supply curve;
- quanta of self-supplied services;
- actual output and load for scheduled resources; and
- information on actual load against scheduled load.

326. Individual energy offers and bids are only disclosed by ERCOT 60 days after the information is accumulated.[90]

7.2.4 Demand-side participation

327. ERCOT's market design allows directly for demand response in the form of energy bids. Energy bids allow load serving entities to indicate their willingness to buy electricity at or below a certain price.

90 See Public Utility Commission of Texas Substantive Rule 25.505(f).

7.3 Wholesale Market Rules and Regulation

7.3.1 Overview

328. The Public Utility Commission of Texas (PUCT) oversees the electricity market and monitors market activity to deal with market abuses and gaming.

329. The PUCT also hires an Independent Market Monitor (IMM) to oversee and review the functioning of the wholesale market. Potomac Economics currently serves in this capacity and publishes annual "State of the Market" reports.

330. The rules enforced by the PUCT are codified in the Texas Administrative Code, Title 16, Part II. The Chapter 25 Substantive Rules applies to electric service providers with the objective to *"assure the availability of safe, reliable, high quality services that meet the needs of all Texans at just and reasonable rates."*

331. PUCT is also empowered under the *Public Utility Regulatory Act* to monitor and mitigate market power and to prevent market power abuses. The PUCT has the ability to apply administrative penalties. The Office of Administrative Hearings can review the decisions on their merits (by requesting a hearing).

7.3.2 Market conduct

332. Subchapter S of the Chapter 25 Substantive Rules relate specifically to wholesale market design.

333. Under Chapter 25.503(d) of the Substantive Rules directs the PUCT to consider whether the activity under review:

> *(1) adversely affected customers in a material way through the use of unfair, misleading, or deceptive practices;*
>
> *(2) materially reduced the competitiveness of the market, including whether the activity unfairly impacted other market participants in a way that restricts competition;*
>
> *(3) disregarded its effect on the reliability of the ERCOT electric system; or*
>
> *(4) interfered with the efficient operation of the market*

334. Chapter 25.503(e) also demands certain ethical standards of market participants. Beyond the requirement to comply with relevant rules, laws and protocols, the standards ask participants not to *"engage in activities and transactions that create artificial congestion or artificial supply shortages, artificially inflate revenues or volumes, or manipulate the market or market prices in any way."*

335. Finally, Chapter 25.503(g) lists activities that are prohibited. These include, but are not limited to, prohibitions against:

- creating artificial congestion;
- offer reliability products that cannot or will not be provided if selected, or conducting trades that misrepresent the financial position of a firm;
- engaging in fraudulent behaviour;
- engaging in collusive behaviour or in market power abuse – whether by physical or economic withholding of production.

336. In 2007, PUCT alleged that Luminant failed to comply with Chapter 25.503(g) under PURA section 39.157(a) (see section 7.3.4.1 below) and recommended an administrative penalty of $21 million and Luminant requested a hearing. In November 2008, PUCT and Luminant resolved the issue via an Agreement in order to avoid the expense and uncertainty of litigation. The Agreement settled on a payment by Luminant to PUCT of $15 million and specifies that this is not an admission of guilt by Luminant: [91]

> The Agreement provides that neither the payment of the penalty amount by Luminant nor anything in this Agreement shall be construed as an admission of liability by Luminant. Luminant expressly denies such liability.

337. However, under 25.504, an entity that controls less than 5% of the installed generation capacity in ERCOT is deemed not to have market power. This clause is known as "small fish swim free". With approximately 74,000MW of capacity expected to be available in ERCOT this year, 5% corresponds to control of 3,700MW of installed capacity.

338. Setting this limit at 5% is controversial. The independent market monitor, Potomac Economics, notes that:[92]

> *Currently the 5 percent "small fish" threshold is roughly 4,000 MW, as indicated by the red line in Figure 75. There were 450 hours over the past two years with less than 4,000 MW of surplus capacity. During these times a large "small fish" would be pivotal and able through their offers to increase the market clearing price, potentially as high as the system-wide offer cap.*

339. For example, a recent lawsuit against GDF Suez alleges that it was able to manipulate energy prices in the ERCOT market despite having a market share of marginally less

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91 Public Utility Commission of Texas – Notices of Violation by TXU Corp et al. of PURA § 39.157(1) and P.U.C. Subst. R. 25.503(g)(7), p. 7.

92 Potomac Economics (June 2013) 2012 *State of the Market Report for the ERCOT Wholesale Electricity Market*, p. 101.

than 5%. Specifically, the lawsuit accuses GDF Suez of economic and physical withholding to raise the price in ERCOT's real-time market.[93]

Box 3: Allegations of market manipulation made against TXU

In 2004 the Market Oversight Division (MOD) of the Public Utility Commission of Texas investigated allegations of market manipulation levied against TXU and other defendants by Texas Commercial Energy (TCE). TCE alleged that TXU engaged in both economic and physical withholding of electricity generation capacity in order to increase the price of energy in the balancing market.

MOD's investigation established that TXU was the largest generation business in ERCOT and was measurably dominant in the balancing market. MOD introduced a 'pivotal supplier test', which deems a supplier 'pivotal' if supply would not be sufficient to meet demand if it were removed from the market. Holding such a position allows a firm the ability to increase prices unilaterally. Analysis performed by MOD showed that TXU was pivotal across the ERCOT market 10% of the time, but was pivotal in the North Zone of ERCOT 72% of the time when there was zonal congestion, and 52% of the time in the West Zone when there was zonal congestion.

Econometric analysis suggested that prices were higher when TXU was pivotal and that changes to TXU's energy offers had effects on market prices. However, the MOD showed that increases to TXU's offer prices between 2002 and 2003 could be explained by increases in the price of fuel for its generation plant. Allegations that TXU physically withheld capacity were explained by its change in business strategy to replace high-cost power generated from more expensive generation units with power purchased on the market or through bilateral contracts, while offering the units to the market at a price intended to cover their operating costs under intermittent operation.

MOD investigated specific pricing events, including price spikes to $990/MWh on 24 February 2003 and on 6 March 2003. MOD observed that:

> *Anticompetitive behavior may manifest as various "hit-and-run" strategies that involve immediate and brief exploitation of real-time market events. This type of strategy might not involve any systematic change in market behavior and might not reveal itself in any time series analysis. For example, if the MCPE observed in real time were to increase $100 over what it was an hour ago, a pivotal supplier could respond with a last-minute offer change that could squeeze supply even more and keep the MCPE high – or drive it even higher.*

MOD therefore investigated whether TXU responded to increases in market prices with reductions in its energy offer quantities. It found that faced with price spikes, TXU did increase its quantity of energy offered. The fact that gate closure was one hour prior to the operating period in fact meant that it took some time for TXU's reaction to flow through to reductions in prices. There were other occasions where TXU reduced its

93 United States District Court Southern District of Texas Houston Division (2014) *Aspire Commodities L.P.'s and Raiden Commodities, L.P.'s Complaint for damages and injunctive and declaratory relief* (http://patelhammond.com/wordpress/wp-content/uploads/2014/04/2014-04-22-Plaintiffs-Original-Complaint.pdf).

quantity of energy offered but this was explained by changes due to operational factors that were not necessarily due to expectations of price spikes. Price spikes were in fact caused by 'hockey stick' offers provided by another operator. A hockey stick offer is when a generator offers its final increments of capacity at a price that is much higher than the price that it offers the majority of its capacity at and also higher than the marginal cost of producing that energy. The name derives from the shape of the offer curve created by this behaviour.

MOD found that while the data were factually consistent with some of TCE's allegations, they were also consistent with TXU's explanation that its actions were part of a reasonable business strategy. However, MOD considered that regardless of intent, TXU's actions may have had a greater probability of being profitable because of its size and influence on the market price in ERCOT.

Consequently, MOD suggested a number of potential remedies that could be used to mitigate market power being exercised by a pivotal supplier. These remedies included:

- a "Competitive Solution Method"; and
- a "pivotal supplier mitigation" method.

The "Competitive Solution Method" would allow an extra hour for offers in the day-ahead market when a supplier was pivotal or supply offers exceeded demand by less than 15%. If after the hour extension the situation was not resolved, the market price would be determined by excluding all pivotal suppliers from the offer stack, removing the 5% of most expensive offers and multiplying the remaining highest price by 1.5. The purpose of the solution is to address the problem of hockey stick bidding in situations where suppliers are pivotal or there is a shortage of supply.

The minimum requirement of 115% supply and removing 5% of the most expensive offers are designed to prevent hockey stick offers from setting the market clearing price:[94]

> *"The 115% minimum quantity requirement of the test is necessary to provide adequate competition in the supply of the service and to avoid having a hockey stick bid set the market clearing price."*
>
> *"Removing the highest prices 5% of the quantity needed from non-pivotal bidders is intended to prevent a hockey stick bid from setting the MCP."*

The multiplier to set the price from the remaining highest price was set at 1.5 because it is *"non-punitive and sufficiently high to send a strong price signal for additional supplies to come into the market in the future."*[95]
In the "pivotal supplier mitigation" method, each pivotal supplier's offer stack is reduced by proportionately setting aside its offers into a price-taking pool. The demand would also be mathematically reduced in this process such that the price would be set

94 Public Utility Commission of Texas – Report of the Electric Reliability Council of Texas (ERCOT) to the PUCT Regarding Implementation of the ERCOT Protocols, pp. 16 and 19.

95 Public Utility Commission of Texas – Report of the Electric Reliability Council of Texas (ERCOT) to the PUCT Regarding Implementation of the ERCOT Protocols, p. 18.

by the marginal cost of supplying mitigated demand with the mitigated offer stack. This solution addresses specifically the issue of pivotal supply but not the consequences of hockey stick bidding.

MOD also considered capping offers at variable cost plus 10%. However, it considered this problematic in the context of the (then) design of ERCOT in zones. Finally it also considered making no changes, noting that all potential remedies have costs which may not outweigh the benefits of taking action.

7.3.3 Wholesale market efficiency

340. Potomac Economics operates in the role of independent market monitor. It publishes an annual *State of the Market Report* on the ERCOT market. The most recent version of the report that is publicly available is for 2012.

341. The purpose of the *State of the Market Report* is to evaluate the outcomes of the wholesale electricity market. It assesses how the rules framework defines the incentives of participants and analyses their conduct.

342. In the 2012 *State of the Market Report*, Potomac Economics find that the ERCOT market performed competitively. However, it noted that real-time energy prices fell significantly between 2011 and 2012, down from an average of $53.23/MWh to $28.33/MWh. As a result, net revenues were insufficient to support investment in new generation even though reserve levels were close to the planning minimum targets.

7.3.4 Competition provisions

7.3.4.1 Energy specific law

343. Section 39.157(a) of *Public Utility Regulatory Act* confers on the PUCT the authority to address market power.

344. The clause permits the PUCT to require mitigation of the market power by, amongst other actions, ordering the disgorgement of excess revenues. Market power abuses are defined in the clause as practices:

- by persons possessing market power; and
- that are unreasonably discriminatory or tend to unreasonably restrict, impair or reduce the level of competition.

345. These specifically include predatory pricing, withholding of production, precluding entry and collusion.

7.3.4.2 General antitrust law

346. Federal and Texas state antitrust laws govern the participations of firms operating in ERCOT.

347. The federal *Sherman Act* and the *Texas Free Enterprise and Antitrust Act*, both prohibit conspiracies in restraint of trade. Violations can result in felony convictions and imprisonment of up to 3 years for individuals, fines to individuals of up to $350,000, and corporate fines of up to $10,000,000. Private citizens can sue under the antitrust laws and can be awarded three times the amount of damages proved. When a monetary gain or loss results from unlawful conduct, the fine can be increased to twice the gross gain to the defendant or twice the loss to the "victim."

8 PJM, United States

8.1 Introduction

348. The Pennsylvania New Jersey Maryland energy market (or PJM) operates a wholesale electricity market that supplies electricity to all or part of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia, an area with a population of around 61 million people.

349. As at 30 June 2014, had installed generating capacity of 184,007MW and almost 900 members including market buyers, sellers and traders of electricity. The PJM has historically been subject to substantial vertical integration. According to Bushnell (2008), the six largest retailers accounted for 70% of retail demand and 90% of generation capacity.[96]

350. PJM was established in 1927. In 1997, PJM was approved by the Federal Energy Regulatory Commission (FERC) as an independent system operator (ISO). In 2001, it formed a regional transmission organisation (RTO) which operates the transmission system in a multi-state area. Since then, a number of utility transmission systems have been integrated into PJM's operations.

351. PJM is regulated by FERC as a federal public utility. PJM is also committed to compliance with North American Electric Corporation and the North American Energy Standards Board business standards as well as ReliabilityFirst standards.

352. PJM comprises of:

- wholesale energy markets, including a day-ahead and a real-time market;
- a capacity market, known as the reliability pricing model (RPM);
- a financial transmission rights market; and
- ancillary services markets, including regulation and synchronised reserve markets.

353. Participation in the day-ahead and real-time energy markets are voluntary for generators that have not had capacity selected in the RPM. Both the day-ahead and real-time energy markets operate on the basis of least-cost security constrained dispatch and settle at locational marginal prices. The day-ahead and real-time energy markets settle separately. Generation and load may enter into bilateral contracts or

[96] Bushnell, James B., Erin T. Mansur, and Celeste Saravia. (2008) "Vertical Arrangements, Market Structure, and Competition: An Analysis of Restructured US Electricity Markets." *American Economic Review*, Volume 98(1), pages 237-266.

self-supply arrangements and purchase transmission from the PJM on the basis of differences in prices between source and withdrawal locations (i.e., transmission congestion costs).

8.2 Wholesale Market Design

8.2.1 Objectives

354. As an independent operator, the objective of the PJM is to provide electricity at the lowest cost whilst maintaining reliability in short-term grid operations (e.g. energy balance, resources, frequency response) and long-term capacity adequacy.

355. In order to do so, the PJM aims to provide incentives to generation resources to reveal their true cost of short-term and long-term operation through their offers. PJM seeks to provide incentives regarding new investment and retention or retirement of existing capacity.[97]

356. PJM organises continuous buying and selling of wholesale electricity which balances the needs of buyers and sellers. The objective of the day-ahead and real-time energy markets is to minimize the bid production cost of maintaining system energy balance while observing transmission limitations, maintaining reserves and regulation and ensuring individual generator constraints such as ramp rate or minimum run-times are not violated.

8.2.2 Auction design

357. The PJM energy market consists of two markets. They are the day-ahead market and a real-time balancing market. The day-ahead market is a forward market in which hourly clearing prices are calculated for each hour of the next operating day based on generation offers, demand bids, virtual supply offers, virtual demand bids and bilateral transaction schedules submitted into the day-ahead market.

358. The real-time balancing market is a spot market in which prices are calculated every five minutes based on actual market operating conditions and settled hourly based on deviations from day-ahead prices.

359. Both the day-ahead and real-time balancing market produce locational marginal prices. Locational marginal pricing reflects the value of the energy at the specific location and time it is delivered. This approach allows consistency between the energy price and the price for use of the transmission system. The energy price difference between the source point and the withdrawal point is equal to the transmission congestion cost (plus the cost of marginal losses). This allows

97 PJM (2009) *A Review of Generation Compensation and Cost Elements in the PJM Markets,* p. 6.

generators and load serving entities the option of participating in the energy market or entering bilateral contracts or self-supply arrangements.

360. The energy markets are a uniform price auction– all parties in the same location are paid or pay the same price.

361. The energy markets seek to ensure that a generator can recover at least its variable operating cost via energy market revenue and may recover a portion of their fixed costs if they have operating costs that are below marginal price. In practice, generators do not receive sufficient revenue to recover fixed costs through the energy markets alone.

362. Generators participating in the energy market must make market-based offers and cost-based offer. Market-based offers were introduced in 1999.

363. Market-based and cost-based offers consist of:

- Incremental offers of energy in $/MWh;
- Start-up offers in $/ start; and
- No-load cost in $/hour.

364. Schedules for incremental offers energy can be made in up to 10 segments.

365. The cost-based offer is used when a transmission constraint arises on the system, and the generator owner is determined to have a local market power according to the Three Pivotal Supplier (TPS) test. The TPS is a real-time automatic test of a generators market power over a constraint. The test calculates whether taking out the two largest generators and the tested generator will leave sufficient generation to relieve a constrained link.

366. It can be noted that the day-ahead market also includes incremental and decremental bids. These are essentially price sensitive bids that allow market participants to achieve greater price certainty for different market outcomes.

367. We understand that around 15% of energy is traded through the day-ahead market, 20% through the real-time energy market and around 65% is through bilateral contracts. The bilaterally contract amounts are schedule through the day-ahead market at binding congestion charges based on differences in locational marginal prices.

8.2.2.1 Gate closure

368. Generators participating in the day-ahead market must offer supply schedules by noon each day for the following day's trading. The orders are placed in merit order and the market solution (taking into account transmission constraints) is generated by 4pm each day. Any generator that is selected to run is locked into the offer they

had submitted and it may not be altered, subject to transmission security constraints, reserve requirements and generator unit availability.

369. Generators that are not selected in the day-ahead energy market solution at 4pm may revise their offer if they wish by 6pm in preparation for participation in the reliability scheduling and real-time energy market. However if the generator self-scheduled their unit in the day-ahead market, they cannot change the unit status to economic in the rebid period.

370. A generator offer that is accepted for the day-ahead market automatically carries over into the real-time balancing market. Real-time offers cannot be modified after the re-bidding period closes at 6pm.[98] In the real-time balancing market, PJM may perform additional resource commitment runs, as necessary, based on updated information. It sends out individual generation schedules updates to specific generation owners only, as required.

371. Locational marginal prices are calculated for the real-time balancing market at five-minute intervals based on actual operating conditions. Generators and load serving entities will receive/pay the higher real-time prices for any incremental energy provided relative to commitments in the day-ahead market (and conversely generators and load servicing entities will pay/receive the lower real-time prices for any decremented energy provided relative to commitments in the day-ahead market).

8.2.2.2 Capacity market

372. Capacity markets are a common feature of electricity markets in the United States. They were developed to deliver adequate generating resources are built to ensure reliable supply of energy to meet demand into the future (i.e., equal to demand plus a reserves). Capacity markets are an alternative to self-supply or long-term contracted supply.

373. In the PJM, the Reliability Pricing Model (RPM) was implemented in 2007 to provide a centralised market for procuring capacity on behalf of all load in the market.[99] Participation in the RPM by load serving entities is mandatory.[100] The RPM operates through roughly annual competitive auctions (known as base residual auctions) to procure capacity three years in advance of that capacity being supplied.[101] The cost

98 This is in contrast to some other markets, such as the Midwest ISO where, we understand, that real-time offers can be modified up to 30 minutes prior to dispatch.

99 The operation of the RPM is set out in Attachment DD of the Open Access Transmission Tariff (OATT) and PJM's Manual 18.

100 Except those with a fixed resource requirement option.

101 There are also incremental auctions that operate over a shorter period.

of capacity procured through the RPM is distributed to load serving entities in the period the energy is delivered into the market.

374. The capacity market is designed to compensate generators for their going-forward costs that are not covered in the energy market. It is designed to ensure participation by existing and new generating capacity as well as demand-side participants.

375. Any generator that is a capacity resource (clears in any RPM auctions or is a Fixed Resource Requirement (FRR)) is required to offer its energy into the day-ahead energy market. The FRR exists to deal with vertically integrated utilities that are subject to cost of service regulation, and therefore have that mechanism to recover the vertically integrated utilities' costs.

8.2.2.3 Price limits in the energy market

376. Cost-based price limited by guidelines in PJM Manual 15. Manual 15 sets out how generators are to develop their cost-based offers. This includes the use of fuel costs to determine start, no load and incremental costs (energy costs per segment of output range). Combined these form the basis of a generator's cost-based offer curves.

377. Cost-based offers have been historically calculated based on margins over fuel costs from 1997. Recent price spikes in fuel costs have led to price at $1000 cap. On January 21, 2014, approximately 5,000MW of Day-Ahead energy market offers were priced at $999/MWh. This indicates operating costs were above $1,000/MWh, but constrained by the offer cap.

378. According to Section 1.10.1A (d) of Schedule 1 of the PJM Operating Agreement, market-based offers in the energy market shall not exceed an energy offer price of $1,000/MWh. This is for segmented incremental energy offer (price & MW pairs) only and does not include start and no load cost.

379. Offer capping is relatively rare in the PJM. In the day-ahead market offer-capped unit hours were about 0.2% for the first six months of 2014 (and 0.7% in the real-time balancing market).

380. In 2012, PJM introduce a mechanism for shortage pricing. The purpose of the mechanism is to accurately price energy and reserves when reserves are short. This allows primary reserves to be activated in 10 minutes. In addition, a total price cap of $2,700/MWh for energy during reserve shortage is being phased in over four years (including a $1,700/MWh cap on reserves alone).

381. As PJM is not an energy-only market the purpose of the market price cap is to recognise the limitations in demand-side responses.

8.2.3 Published data

382. Locational marginal prices are calculated by PJM's computer systems and posted on www.pjm.com every five minutes.

383. The calculations used to determine locational marginal prices take into account electricity demand, generation costs and the use of and limits on the transmission system. The price tells PJM market participants the cost to serve the next megawatt of load at a specific location. The calculations factor in all the available generating sources to come up with the mix that creates the lowest production cost, while observing all limits on the transmission system.

8.2.4 Demand-side participation

384. In the PJM, demand-side participation occurs through market participants know as curtailment service providers (CSPs). CSPs act as agents for end-users to reduce their electricity use in response to high locational market prices.

385. CSPs compete on the same basis as generators in each of the PJM markets. CSPs may be local electricity utilities or specialist firms facilitating end-user response to electricity prices through smart metering and other equipment.

386. With exception of large wholesale customers in some areas, most end-users in PJM are not on retail rates that directly expose them to the wholesale price of energy or capacity.

8.3 Wholesale Market Rules and Regulation

387. PJM is regulated by FERC as a federal public under the Federal Power Act (2005).

388. PJM operates under a series of governing agreements that establish the functions and obligations of PJM and its members. The three primary agreements are the PJM Open Access Transmission Tariff (OATT), the Operating Agreement (OA) and the Reliability Assurance Agreement.

389. Each of these agreements must be accepted by the FERC. Sections 205 and 206 of the *Federal Power Act* (FPA) establish the standards for demonstrating why a proposed revision to a governing document should be approved by the FERC, which that the revisions are *just and reasonable*.

390. In 2005 Congress amended the *Federal Power Act* (FPA), specifying that it would be "unlawful for any entity … to use or employ, in connection with the purchase or sale of electric energy or the purchase or sale of transmission services subject to the jurisdiction of the Commission, any manipulative device or contrivance…".

391. In response to this new statute, FERC crafted its own Anti-Manipulation Rule, which essentially tracks the same language included in the statute, as well as the anti-manipulation provision relevant to securities law, Section 10(b) of the *Securities Exchange Act*.

8.3.1 Operating Agreement of PJM

392. The operating agreement (OA) governs how the PJM operates. To participate in the PJM, members must sign the OA. The OA is approved by FERC. The OA sets out the calculation of locational market prices in both the day-ahead and real-time balancing markets. The OA is supplemented by various manuals.

393. The OATT provides for the calculation of the total price of wholesale power in the PJM, including the major components of the price including the energy (locational marginal prices), capacity (RPM payments) and transmission service charges).

8.3.2 Market Monitoring Unit

394. FERC requires all RTOs to have a market monitoring unit (MMU). The FERC assigns three core functions to MMUs: reporting, monitoring and market design.

395. Open Access Transmission Tariff agreement (Attachment M) sets up the MMU. The objectives of this PJM Market Monitoring Plan are to maintain an independent MMU that will objectively monitor, investigate, evaluate and report on the PJM Markets, including, but not limited to, structural, design or operational flaws in the PJM Markets or the exercise of market power or manipulation in the PJM Markets.

396. The PJM Market Monitoring Plan establishes these functions, providing that the MMU is responsible for monitoring: compliance with the PJM Market Rules; actual or potential design flaws in the PJM Market Rules; structural problems in the PJM Markets that may inhibit a robust and competitive market; the actual or potential exercise of market power or violation of the market rules by a Market Participant; PJM's implementation of the PJM Market Rules or operation of the PJM Markets; and such matters as are necessary to prepare reports.

397. Monitoring Analytics is the MMU for the PJM. Monitoring Analytics performs its reporting function by producing State of the Market reports periodically. In its market design role, Monitoring Analytics initiates and proposes changes to the design of markets of the PJM market rules by conducting regulatory proceedings in consultations with stakeholders.

8.3.3 Wholesale market efficiency

398. Monitoring Analytics operates in the role of independent market monitor. It publishes an annual *State of the Market Report* on the PJM. The most recent version of the report that is publicly available is for 2014.

399. The purpose of the *State of the Market Report* is to evaluate the outcomes of the wholesale electricity market. It assesses how the rules framework defines the incentives of participants and analyses their conduct. In the 2014 *State of the Market Report*, Monitoring Analytics find that the PJM market performed competitively with the TPS test, cost-based offers and price caps in operation.

8.3.4 FERC

400. In late 2003 the Federal Energy Regulatory Commission (FERC) imposed six market behaviour rules for electricity market participants under its jurisdiction. This rules covered:[102]

    i. Unit operations – this rule required generators to operating and schedule their facilities, undertake maintenance and commit or other bid supply in a manner that is applicable with FERC rules. The rule does not require the generator to bid unless this is separately required;

    ii. Market manipulation – this (now rescinded) rule prohibited actions "without a legitimate business purpose" that intended or foreseeably could manipulation market prices or conditions. FERC said that if the conduct was "disciplined by the competitive forces of the market" it would find the conduct had a legitimate business purpose.

        This rule also contained rules against "wash trades", trades based on "false information", trades based on collusive arrangements and trades to "create artificial congestion" as these were deemed to be trades without legitimate business purpose;

    iii. Communication – a rule requiring generators to "provide accurate and factual information and not submit false or misleading information, or omit material information" to FERC, system operators or market monitoring units;

    iv. Reporting – a rule requiring reporting of consistent with the communication rule;

    v. Record retention – a rule requiring retention of information by generators of information supporting prices; and

[102] Market Behaviour Rules Order, 105 FERC.

vi. Related tariff measures – covers compliance with a generator's code of conduct.

401. Following passing of the *Energy Policy Act* of 2005, the Commission rescinded rules 2 and 6 (but replaced them with a new Anti-Manipulation Rule - see following section) and codified the substance of market behaviour rules 1, 3, 4, and 5 in the Commission's regulations under the *Federal Power Act* (FPA).

402. A breach of the market behaviour rules is effectively a tariff violation and the offending party will be subject to disgorgement of unjust profits.

8.3.5 Market manipulation

403. In 2005 Congress amended the *Federal Power Act* (FPA), specifying that it would be "unlawful for any entity . . . to use or employ, in connection with the purchase or sale of electric energy or the purchase or sale of transmission services subject to the jurisdiction of the Commission, any manipulative device or contrivance . . . ." Section 222, *Federal Power Act* (2005); 16 U.S.C. § 824v. FERC, pursuant to this statutory authority, craft

404. On October 20, 2005, FERC issued a Notice of Proposed Rulemaking (NOPR) to prohibit energy market manipulation. Pursuant to section 222 of the *Federal Power Act* (FPA), the FERC proposed Title 18 of the Code of Federal Regulations that it would be unlawful for any entity, directly or indirectly, in connection with the purchase or sale of electric energy or the purchase or sale of transmission or transportation services subject to FERC jurisdiction:

vii. to defraud using any device, scheme or artifice (i.e. intentional or reckless conduct);

viii. to make any untrue statement of material fact or omit a material fact; or

ix. to engage in any act, practice or course of business that operates or would operate as a fraud or deceit.

405. This broad rule that mirrors elements of United States securities law, for example, Section 10(b) of the *Securities Exchange Act*.[103]

406. Under the FPA, the FERC has power to impose penalties to disgorge unjust profits and to impose civil penalties for breach of the Anti-Manipulation rule. Section 316A(b) of the FPA allows civil penalties of no more than $1m for each day that such violation occurs. Section 316 of the FPA provides the FERC with statutory guidance to determine the level of the penalty within the cap (of $1m per day), including imposing penalties based on the seriousness of the violation and the efforts to remedy

[103] It can be noted that in rescinding the market behaviour rule relating to market manipulation it specifically dropped the "legitimate business purpose" test for market manipulation.

in a timely manner. The FERC has published Penalty Guidelines which establish a non-binding process of determining civil penalties based on the level of harm and other factors including culpability. The FERC has the power to impose penalties on generators and individuals.

407. Recently, FERC has undertaken a number of high-profile enforcement investigations for alleged breaches of its anti-manipulation rule. In mid-2013, FERC approved a form of settlement agreement with JP Morgan. FERC found that JP Morgan had engaged in fraudulent bidding behaviour that allowed it to achieve above market prices for supplying energy. FERC alleged that the bids were not "grounded in the normal forces of supply and demand" but were made on the basis of receiving "make whole" payments from the California Independent System Operator and the Midcontinent Independent System Operator.

408. The settlement had JP Morgan agreeing to a civil penalty of $285 million and a payment of $125 million relating to the disgorgement of "unjust profits", under Section 309 of the FPA.

Box 4: FERC Order and Penalties against Barclays

In July 2013, the FERC issued an order imposing penalties on Barclays for alleged market manipulation. The alleged market manipulation was said to have occurred between November 2006 and December 2008. The FERC imposed penalties on Barclays of US$34.9 million (plus interest) for the disgorgement of profit and a $435 million civil penalty. It also imposed civil penalties on individual traders, with three traders fined $1 million dollars and one trader fined $15 million for his central role in the alleged market manipulation.

FERC alleges that the market manipulation occurred in in a number of locations served by Barclay's Western power trading desk, including in Arizona, northern California and Southern California. Barclay's traded in these locations on the IntercontinentalExchange (ICE). Barclays had a total market concentration on ICE of between 10% and 58% of volumes[104] in the relevant period.

FERC alleged that Barclay's Western power trading desk "engaged in a coordinated scheme to trade next-day fixed-price physical power to move the ICE daily index settlement to benefit Barclay's fixed-for-floating financial swap positions that settled against those indices".

Barclays participated in both physical and financial trading of electricity in these locations on ICE. Barclays traded in the next-day or day-ahead fixed-price physical market in which physical electricity is bought and sold for delivery the following day at each location at cash prices. Day-ahead physical power is also traded at an ICE index price which is based on the volume weighted average of cash prices sold through ICE. As Barclays did not generate power it always had to exit its positions in the physical market.

104 For next-day fixed-price physical trades.

Barclays also traded financial products, most relevantly fixed-for-floating swaps at each location. These swaps involved the buyer paying a fixed price and the seller paying a floating price, where the floating price consisted of the ICE index price.

FERC alleged that Barclay's Western power trading desk commonly took 'opposite' positions in the physical and financial markets. That is, Barclays would take long (short) positions on financial swaps and short (long) positions in the physical market at the ICE index price. FERC then alleged that Barclays made physical cash trades to liquidate its position in the physical market against the ICE index that were intentionally unprofitable (from the perspective of the physical market). However, the effect of these cash trades was to move the ICE index in a manner that was profitable for the financial swaps entered into by Barclays, and nett profitable overall.

For example, FERC alleged that Barclays bought financial swaps at a fixed price such that (on nett) it would benefit from a higher ICE index price. This is a so-called long position. At the same time, it is alleged that Barclays took a short position in the physical market by selling more power than it had purchased. This means that as Barclay's liquidated its position in the physical market by buying electricity at that location, it raised the ICE index price to favour its financial swap position. FERC alleged that Barclay's physical trading position was intentionally unprofitable on its own and amounted to market manipulation.

FERC alleged that Barclays was "willing to accept losses in its next-day fixed-price physical trading to move the settlement of the daily indices in the direction that benefits its financial swaps".

We understand that Barclays and the individual traders are objecting to the order and penalties in the District Court.

8.3.6 General antitrust law

409. Federal antitrust laws govern the participations of firms operating in PJM.

410. The federal *Sherman Act* prohibits conspiracies in restraint of trade. Violations can result in felony convictions and imprisonment of up to three years for individuals, fines to individuals of up to $350,000, and corporate fines of up to $10,000,000. Private citizens can sue under the antitrust laws and can be awarded three times the amount of damages proved. When a monetary gain or loss results from unlawful conduct, the fine can be increased to twice the gross gain to the defendant or twice the loss to the "victim."

8.3.7 Reliability standards

411. Under the *Energy Policy Act* of 2005, the Federal Energy Regulatory Commission was required to designate an Electric Reliability Organization (ERO) to enforce

mandatory reliability standards for all participants in the North American bulk power system. The commission designated the NERC as the ERO in July 2006.

412. PJM Interconnection actively participates in the North American Electric Reliability Corp. (NERC), an organization whose mission is to ensure that the bulk electricity system in North America is reliable, adequate and secure.