

Liability Arrangements in the Electricity Industry

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1 Executive summary

This report considers, from a first principles basis, the liability arrangements for electricity industry participants that will best assist with achieving the Electricity Authority's statutory objective.

This report focuses on the liabilities arising in the event of breaches by market participants of the Electricity Industry Participation Code 2010 ("the Code") as specified in the Electricity Industry (Enforcement) Regulations 2010 ("the Regulations"). The market participants considered in our report are the market operation service providers, ancillary service agents, asset owners, and providers of metering services.

This report draws on the economic theory of liability to consider the most appropriate arrangements for the electricity market. We consider:

- the optimal approach to structuring the liability limits;
- the appropriate level of the liability limit for each of the identified market participants; and
- the appropriate place for the liability limits to be set out (i.e., in the Regulations, the Code or in contract).

The aims in designing liability arrangements are to create incentives in the electricity industry that best promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers. We seek to take into account throughout our analysis the trade-off between competition, supply security and efficiency in the short run and the long run.

On the one hand, we want to provide adequate incentives for providers to comply with their performance obligations and to avoid reckless behaviour while, on the other hand, avoiding the risk that participants choose not to enter the market or take overly conservative approaches that would lead to an overall reduction in competition and increase in costs for consumers.

It is difficult for a third party to design optimal liability arrangements with any great precision. Normally such arrangements are a matter of commercial negotiation and optimal arrangements will tend to emerge and evolve over time. Ultimately arrangements will tend to evolve that result in risks residing with the party that is best placed to manage them.

It should also be noted that the liability arrangements in the Regulations are only one component of the overall incentive and risk management regime in the electricity industry. In particular, market participants are likely to be more concerned about the consequences

of any mistakes or poor performance for their reputation than they are about any risk of financial penalties or compensation being imposed by the Rulings Panel.

Nevertheless it is apparent from our investigations that the current liability arrangements in the electricity market are rather ad hoc and lack consistent rigorous underpinnings. In several cases the current liability limits are so low as to potentially provide inadequate incentives for service providers to manage their risks prudently and insufficient incentive for aggrieved parties to incur the litigation and other costs when they consider a breach has arisen. We note that just as important, if not more important, as the limits that are established are the practices that are adopted in enforcing the liabilities regime.

Our methodology for assessing, from a first principles basis the appropriate structure and level of the limits is to first assess, for each market service under review, the value at risk (in qualitative terms) for the industry. We then determine a range for the appropriate relationship between the liability limit and the revenue earned for the relevant service provider(s). Based on these inputs we derive an indicative per event and annual liability cap for each service. Finally we assess these derived results, on a service-by-service basis, in the light of the unique characteristics of each service.

In preparing this report we consulted with a number of market participants (refer Appendix 1). Those participants have not however had the opportunity to review this report. We also had regard to historical developments in the level and structure of the limits in the electricity industry (as summarised in Appendix 2), the international liability arrangements in Australia and Singapore (as summarised in Appendix 3) and to the limits pertaining to the gas industry and the finance sector (as summarised in Appendices 4 and 5 respectively).

Overall, we conclude there are net benefits from having limits on the liabilities various participants in the electricity industry face in relation to breaches of the Code. Limiting liability increases competitiveness in the market by reducing the barriers to entry, while still providing a good balance between the incentive for providers to secure electricity supply and the freedom to take on risks that promote the long term efficiency of the industry. Our specific recommendations for the structure, level and location of the limits are provided in the following section of this report.

In summary we conclude:

- the appropriate structure of the limits depends on the nature of the service. In general we favour the structure that is most common already in the Regulations of a combination of per event and per year limits;
- the appropriate level of the limits depends primarily on the likely size of damages in the event of poor behaviour by the provider and the size of contract with the provider. As with the structure, the appropriate levels of the limits need to be

considered on a service-by-service basis. There are some limits (e.g., for the system operator and ancillary service providers) that we conclude are too low while others (e.g., for the pricing manager) are too high; and

- current legislation requires that the liability limits are in the Regulations and although there are other possibilities we do not find a compelling argument for this to change.

We consider that the levels of the liability limits should either be reviewed every three to five years or indexed annually to the growth in the revenue of the relevant service provider.

2 Recommendations

We recommend that the EA:

- a. **considers** the following liability limits for participants in the electricity market:
 - for the system operator, limits in the range of \$2m to \$5m per event and \$10m to \$20m per annum;
 - for the WITS provider, liability limits be included in the Regulations in the range of \$0.7m to \$1m per event and \$1.4m to \$2m per annum;
 - for the pricing manager, limits in the range of \$250,000 to \$400,000 per event and \$500,000 to \$750,000 per annum;
 - for the reconciliation manager, limits in the range of \$500,000 to \$800,000 per event and \$1m to \$1.6m per annum;
 - for the clearing manager, limits in the range of \$1.5m to \$2m per event and \$3m to \$4m per annum;
 - for the FTR manager, limits in the range of \$250,000 to \$350,000 per event and \$1.3 to \$1.7m per annum;
 - for the registry manager, limits in the range of \$50,000 to \$100,000 per event and \$230,000 to \$450,000 per annum;
 - for the market administrator, limits in the range of \$100,000 to \$230,000 per event and \$230,000 to \$450,000 per annum;
 - for asset owners, limits in the range of \$1.5m to \$2m per event and \$3m to \$4m per annum;
 - in respect to metering standards, limits in the range of \$130,000 to \$200,000 per event and \$1m to \$1.5m per annum;

- for frequency keeping, limits in the range of 50% to 75% of annual revenue per event and 100% to 150% of annual revenue per annum, with the absolute dollar limits removed; and
 - for all other ancillary services, limits in the range of 75% to 100% of annual revenue per event and 150% to 200% of annual revenue per annum, with the absolute dollar limits removed;
- b. **notes that** we recommend percentage-of-annual-revenue liability limits (per event and annual) for the ancillary services;
 - c. **notes that** we recommend a combination of absolute dollar per event and annual liability limits for all other services in the industry;
 - d. **considers** linking the penalty limit to the total liability limits for each service or removing the penalty limit entirely and allowing the Rulings Panel to use its discretion on a case-by-case basis;
 - e. **considers** reviewing the liability limits every three to five years or adjusting annually the limits to the growth in the revenue of the relevant service provider;
 - f. **notes that** we recommend the liability limits remain set out in the Regulations; and
 - g. **notes that** the liability limits themselves are but one of a number of incentives impacting the behaviour of market participants and should be considered in this wider context.

3 Introduction

The Electricity Authority (EA) has engaged TDB Advisory Ltd (TDB) to prepare a report on the liability arrangements in the electricity industry. In particular, the EA is seeking a first-principles approach in addressing the following question:

“What are the most appropriate liability arrangements for market operation service providers, ancillary service agents, asset owners, and in respect of (electricity) metering standards and metering information, to assist with achieving the Electricity Authority’s statutory objective?”

The EA has a single statutory objective as described in Section 15 of the Electricity Industry Act 2010:

“to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers”.

This report draws on the economic theory of liability to address whether having liability limits in place for each of the service providers is the most appropriate arrangement for the electricity industry. We consider:

- the optimal approach to structuring the liability limits;
- the appropriate place for the liability limits to be set out (i.e., in regulation or in contract); and
- the appropriate liability limit for each service provider.

Section 4 of this report provides a theoretical framework by drawing on the economics of liability. Section 5 describes the current service providers in the electricity industry and the liability arrangements they face. We undertake an analysis of the appropriate structure, levels and place for the liability limits in Sections 6, 7 and 8 respectively. In section 9 we consider the broader context of incentives facing market participants in the electricity industry before providing our conclusions in Section 10. Our recommendations for the appropriate arrangements for each service provider are presented in section 2 above.

A list of people and organisations we met with in the course of this review is provided in Appendix 1.

In Appendix 2 we present the historical record of the electricity service provider liability limits.

In Appendix 3 we present details about the liability arrangements in the electricity sectors in Australia and Singapore.

Appendices 4 and 5 consider the liability arrangements in the New Zealand gas industry and the New Zealand financial markets respectively.

4 Conceptual framework

The electricity industry is an integral part of the New Zealand economy. The EA is tasked with the objective of promoting competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers. The economy faces significant potential costs if the industry was to operate inefficiently and, in the worst case scenario, errors or abuse by industry participants could have a crippling effect on the nation. It is therefore important that market participants have the right incentives that encourage the appropriate level of risk to be taken at a reasonable cost.

This section of the report provides a general overview of legal liability and the considerations relevant to the New Zealand electricity industry.

Liability can arise under law and under contract. Statutory liability is a liability that arises because a law that is not open to interpretation dictates that parties are held responsible for certain actions or omissions. Contractual liability arises because a party has entered a contract in which they are liable for damages if they fail to perform in accordance with the terms of the contract. Legal liability cannot be avoided or contracted out of; contractual liability on the other hand is up for negotiation between the contracting parties.

Parties can be liable under law and under contracts to indemnify victims for poor performance, negligence or causing harm in order to give a provider an incentive to exercise due care in providing a good or service. Such a liability can be unbounded but this is unlikely to lead to an efficient outcome. Therefore, limits on the liabilities that providers are exposed to are established to encourage an efficient allocation of risk between the contracting parties.

Typically, the provider is unable to reasonably manage all possible risks associated with the good or service it provides. Although a private agreement cannot allow a party to contract out of legal liability, contracts with insurers allow insurance arrangements to be put in place to deal with the financial consequences of legal liabilities for such things as common law actions for negligence. Indemnities can also be set up under contracts to cover legal liabilities. Yet without limits on the provider's exposure we may never see a market develop as you cannot fully insure against unlimited liability: providers may not be willing to enter the market as the cost imposed by the liability risk outweighs the potential profit and the purchaser may not be able to obtain a particular good or service they are seeking.

A provider may be able to limit its exposure by purchasing insurance to cover its liability. However, such insurance is typically not open-ended; that is, the insurance cover is typically capped at a limit by the insurer. The insurance provider must ensure it also establishes the right incentives as an insurance cap limits the insurer's exposure and allows the issue of moral hazard to be managed – i.e., the risk that the insured party will alter its behaviour and not take due care once it has purchased insurance. If cover was uncapped, the insured party would have less incentive to exercise due care and to manage the risks it faces.

It is generally considered that the idea of legal liability concerns three main objectives:¹

- compensating victims;
- deterring injurers; and
- spreading risk.

¹ Cooter, R., *Economic Theories of Legal Liability*, 1991.

Compensatory damages are payments made to an injured party to indemnify that party for a particular loss suffered because of the actions of another. Compensatory damages are limited to the amount required to cover what was lost or to fully reimburse the injured party. In order to be awarded compensatory damages, recognisable harm must have been inflicted. Compensatory damages act as a deterrent against poor performance or unlawful behaviour by imposing a cost on the party inflicting the harm.

However, there are a number of reasons why an injurer may not have to face compensatory damages that fully reimburse the injured party for its losses so the expected compensatory cost of poor performance will likely be less than the full reimbursement cost: sometimes unlawful actions or breaches of contract are not identified or only partial compensation can be recovered in court or there is some contractual or legal limit to the compensation payable for a particular injury. Even in cases where a court or ruling body awards a compensatory payment the private benefit received by the injurer may outweigh the compensatory damages.

In order to further deter poor performance courts may impose further penalties to punish the injurer and to encourage socially efficient behaviour. Monetary payments that go beyond that which is necessary to reimburse an injured party for its losses are deemed punitive damages. Punitive damages are a further punishment to the injurer; the threat of such payments increases the cost of wrongdoing and is intended to align private costs with social costs to encourage socially efficient behaviour.

Liability limits are put in place to spread risks between contracting parties according to who is best placed to bear the risk. In the New Zealand electricity industry, liability limits, if determined correctly, should lead to service providers taking on an optimal level of risk for the most efficient operation of the industry. When the required compensation is too low or too high then incentives will be distorted and lead to an inefficient outcome. A number of other factors beyond the liability limits incentivise the behaviour of service providers: reputational concerns, market culture, internal company culture, the EA's compliance process and a variety of other factors all impact how market participants behave. Below we consider how the liability limits affect incentives in isolation.

4.1 Liability limits too high

If liability limits are too high then providers of the good or service are too strongly deterred from taking on risk. Too great an exposure to potential liability may price many participants out of a market. For example, the US has experienced a decline in a number of domestic industries due, at least in part, to the huge increase in liability costs over the past two decades. The asbestos industry has disappeared altogether. US plane manufacturers have largely been driven out of the market while ten of the thirteen companies manufacturing

vaccines for the five serious childhood diseases exited the market because of rising liability costs.²

These changes have occurred over a period of time where the quality and safety of these products have improved considerably. That is to say, liability costs and risks have trended in opposite directions.

All else being equal, a higher liability limit will increase the incentive for injured parties to pursue legal cases. If liability limits become too high then the incentive for injured or supposedly injured parties can reach a point where an inefficient amount of litigation occurs. As the potential reward for bringing legal action increases an ever more litigious environment is created.

It is important, therefore, when setting liability limits in the electricity industry that the service providers in the industry are exposed to an appropriate level of liability so the market is incentivised to behave in a way most likely to benefit consumers in the long run. Too great of an exposure to liability costs would increase insurance costs and/or the risks facing the providers and ultimately increase costs for the industry as a whole through 'gold-plated' services. These costs must in turn be absorbed, mitigated or passed on to consumers. Further, when liability costs become too high service providers are priced out of the market as the high liability limit acts as a barrier to entry that discourages potential service providers from tendering for particular roles. Having fewer service providers limits competition in the market and, in the extreme, there will be no competition at all within certain price ranges.

When liability limits expose service providers to an undue level of risk then dynamic efficiency is compromised. In the short term, innovation and competition will be stifled by overly risk-averse behaviour. In the longer run, dynamic efficiency will suffer due to a lack of investment and an over-priced cost of provision.

4.2 Liability limits too low

On the other hand, if liability limits are too low then providers would be incentivised to engage in 'reckless' behaviour. A provider faces a set of private costs and benefits that are directly incurred or received by the provider. However, any decision a provider takes will have a net social cost which includes the direct costs and benefits to the provider and the indirect costs and benefits to wider society. One of the private costs a provider must consider is its exposure to liability in the case of poor performance: when a very low liability limit is put in place the total net cost to society does not change when a bad outcome

² W. Kip Viscusi, Liability, The Concise Encyclopaedia of Economics.

occurs but the private cost faced by the provider would be very small. Such a liability arrangement can encourage a provider to engage in 'reckless' and socially inefficient behaviour.

A well-structured liability arrangement is one that aligns private costs and benefits with social costs and benefits.

An appropriate level of liability will take into account the cost of potential damage that may occur. The more costly the potential damage, the higher the liability limits should be, all other things equal. We should be most concerned about avoiding outcomes that are the most harmful to society: a higher liability limit is one way of discouraging providers from taking certain risks.

A change in liability limits impacts the cost to a provider of operating in the market. This cost is explicitly realised in changing insurance premiums but more generally impacts the risks facing a provider. All else being equal, for any given level of damage that may occur, the lower the level of potential compensation payments a provider faces in the case of injury, the riskier the provider's behaviour is likely to be.

Taking on some risk is necessary and often beneficial. However, where victims have no means of receiving compensation in the face of injury then potential providers are free to enjoy the upside of risky behaviour while avoiding the downside risks.

The issue becomes further compounded when we consider the incentives for the victim to pursue a case in court. When liability limits are very low if a service provider is ordered to pay a fine or compensation this will be restricted to the low liability limit: the lower the liability limit the less compensation a victim can be awarded. In addition, when liability limits are too low, the time, effort and money required to pursue a case will rarely be incurred by victims and the threat of liability becomes an empty one. This is because the legal process can be long and expensive, with no certainty that the outcome will be successful or that even if it is successful that the legal cost incurred will be able to be recovered.

When liability limits are very low, not only is an injurer's liability limited to a small sum, the smaller this cap is the less likely the injurer will have to pay anything at all: victims have no incentive to pursue a case if the compensation is minimal and in some cases may not even cover their legal costs.

Reckless behaviour needs to be adequately deterred by an appropriate exposure of providers to liability for their actions. Liability limits that are too low are likely to generate a level of disruption, uncertainty and overly-risky behaviour that could prove costly and

inefficient. In the case of the electricity industry it is particularly important to encourage low-risk behaviour where supply security is considered particularly important given the high costs to the economy of unexpected outages.

4.3 Structure

Uncapped liability poses a significant risk and is very difficult to fully insure against. Hence the attraction of forming limited liability companies when going into business to protect personal assets. In a commercial environment, liability limits are often negotiated to limit the risk a person or organisation faces in providing a good or service.

Annual/Contractual limits

One way in which liability can be limited is to place a cap on the liability a party faces over a given period of time, most commonly annually or over the life of a contract. Such a limit provides the affected parties with a degree of certainty and a quantifiable risk that can be insured against. As with any cap, it limits liability to a specified amount which will ideally spread risk in such a way as to produce the most efficient outcome.

A cap that covers a specified period of time can however lead to perverse incentives once the limit is reached. The incentives to discourage poor performance created by liability arrangements disappear once a party reaches its liability limit for the time period. After that, there will be a period of time during which there will be no direct financial repercussions for poor performance. It can be expected, all else being equal, that poor performance is more likely to occur once the limit has been reached. The desire for the party to procure further work beyond the time period affecting the liability limit and reputational concerns will be considerations, but these incentives are always in place.

Liability caps that cover a specific time period have the effect of arbitrarily awarding compensation to victims in the early part of the period before the limit has been reached. After the limit has been reached, victims are unable to receive any form of compensation. Such a liability arrangement arbitrarily creates winners and losers depending on the point at which damage is inflicted in the period covered by the liability limitations.

Event limits

Liability limits can be set on a per event basis so that the liability faced by a provider for any given occurrence of poor performance is restricted to the cap. Per event liability limits create more consistent incentives for providers and more consistent compensation for victims. Once an event has occurred, whether or not the liability limit was reached, the incentives facing a provider going forward remain unchanged. This is not the case once an annual or contractual liability limit has been reached.

Potential victims may be concerned about financial risks they may face in the event of poor performance by a provider. In the case of a per event limit they have some certainty around the maximum amount of compensation they are likely to receive regardless of when the poor performance may occur. If an annual or contractual limit is in place potential victims face the additional uncertainty of not knowing whether they will receive compensation at all if the poor performance happens to occur after a provider has reached the annual or contractual liability limit.

Absolute dollar limits

Absolute dollar liability limits impose a strict dollar cap on the liability faced by a provider. Such limits can take account of the risks and likely scale of damage that could result from poor performance. Industry-wide regulation that limits liability for all providers to an absolute dollar limit can create very different incentives for providers depending on the scale of the business.

Ideally, liability limits are set at a level that creates the right incentives for market participants to act in the most efficient manner. Absolute liability limits, unless tailored on a company-by-company basis, cannot provide the same incentives for different sized companies or for different scales of service. For a given liability limit a very small company may consider the liability risk too high to even enter the market while a very large company may consider the risk inconsequential and may engage in overly risky behaviour.

Absolute dollar limits require reviewing as the industry, providers and services change over time. To provide some form of automatic adjustment these dollar limits may be indexed to inflation.

Percentage of annual revenue limits

Liability limits can be capped at a percentage of the annual or contractual revenue generated by a provider. Such a liability arrangement is better able to provide similar incentives to providers of a different scale and for different levels of service provision. Tailoring liability limits to revenue automatically allows adjustments to be made for different companies that provide a different scale of service and for the same companies over time as revenue changes.

One issue with liability limits that are linked to revenue is that they may be out of touch with the risks involved in the provision of particular services. Sometimes a relatively low paying contract or a provider that provides a service on a very small scale can still have the potential to cause significant harm. In these cases a liability limit restricted to a percentage of revenue may be too low given the risks involved and the scale of impact that may result from poor performance.

4.4 Spreading risk

So how do we find the right balance? In theory, the party best placed to manage the risk should take on the risk. Often the availability of a number of third-party insurers simplifies this issue but the allocation of rights may still impact who bears the cost of the risks.

Placing a cap on liability spreads the risk between the injurer and the victim. In the case of the electricity industry the parties likely to cause harm are often best equipped to monitor and deal with the risks involved. Changing these limits affects who bears the risks. A lower limit means the potential victim of a future error will receive less compensation for damages they incur. A higher limit should result in fewer damages but this increased safety is likely to come ultimately on the back of increased prices.

In principle, we must consider the probability of an error occurring and its likely impact and weigh this up against the effective cost of prevention resulting from the liability limits that are put in place. The appropriate solutions to this issue for the New Zealand electricity industry are explored further in Section 6 through 8 below and our conclusions are provided in section 9.

Firstly though we summarise and assess the current liability arrangements in the electricity industry in section 5 below.

5 Current market arrangements

The Regulations (Part 2, Subpart 2) set out liability arrangements for:

- market operation service providers;
- assets owners;
- ancillary service agents; and
- electricity metering standards and information.

Market participants interact and contract with a variety of parties. For example, a generator/retailer may be an ancillary service agent, contract out for a variety of operational services and engage with numerous suppliers, customers and other market participants such as distribution companies and Transpower. Many of these interactions will be formalised through private contracts which will often include specific liability arrangements of their own. These liability arrangements are separate and incurred in addition to any regulatory liability meted out by the Rulings Panel.

The liability limits in the Regulations apply only to breaches of the Code. A private contract may be breached while the Code is not and vice versa: in the first case privately contracted liability limits may come into play and the EA has no reason to investigate the action.

The liability limits of each market participant under the Regulations are detailed in subsections 5.1 to 5.4 below.

In the event of a Code breach a market participant may be liable to pay a penalty to the Crown as well as compensation to injured third parties.

Under the Electricity Industry Act 2010, the maximum pecuniary penalty that the Rulings Panel can order a market participant to pay the Crown for breaching the Code is \$200,000. The maximum total liability a market participant faces for breaches of the Code, including compensation payable to injured third parties, pecuniary penalties paid to the Crown and legal fees, varies depending on the type of service, as detailed below.

5.1 Market operation service providers

There are eight distinct market operation services the EA provides or contracts from external providers. These are services related to the:

- system operator;
- wholesale information trading system (WITS) provider;
- pricing manager;
- reconciliation manager;
- clearing manager;
- FTR manager;
- registry manager; and
- market administrator.

System operator

Transpower is contracted as the system operator and conducts the day-to-day operation of the physical electricity system. Transpower is required to perform this role and as a statutory monopoly the EA has no alternatives when it comes to contracting a system operator.

The system operator schedules and dispatches electricity supply with the objectives of avoiding supply disruptions and maintaining frequency and voltage within approved

tolerances. The system operator service provider role was established at the start of 2004 when the Electricity Governance Regulations 2003 came into effect.³ Prior to this, dating back to 1996 to coincide with the establishment of the wholesale electricity spot market, most of the system operator role was split into the roles of scheduler, dispatcher and common quality coordinator.⁴

Under the Regulations:

The system operator is not liable for a sum in excess of—

(a) \$200,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$2 million in respect of all events occurring in any financial year.

Section 55(3) of the Act provides Transpower (in its role as system operator) and all other market operation service providers with immunity from tort claims by industry participants. However, section 55(3) states that this immunity does not apply in cases of negligence with fraud.

Providers may also be liable for negligence without fraud in tort claims brought by persons other than market participants.

Wholesale information trading system provider

A number of different parties in the electricity industry including energy sector participants, market operation service providers and the EA require information to be transferred between them. The wholesale information trading system (WITS) provider delivers a central facility that allows for the receipt and publication of information pertaining to the wholesale trading of electricity and reserves. Most importantly, the bids and offers from purchasers and generators are sent through the WITS provider and on to the system operator. NZX Ltd currently provides the WITS service.

The Regulations do not prescribe a liability limit for the WITS provider as they do for the other market operation service providers. However, the service provider agreement between NZX and the EA stipulates an annual liability limit of \$500,000 (with the exception of wilful breaches or fraud on the part of the WITS provider in which case there is no limit).

³ These regulations commenced on 15 January 2004.

⁴ The term 'common quality coordinator' was not in use in 1996, but became part of industry lexicon when the New Zealand electricity industry's self-governance arrangement for common quality across the power system was developed between 1997 and 1999. This arrangement was known as the Multilateral Agreement on Common Quality Standards (MACQS).

FTR manager

The FTR manager is responsible for regularly running auctions for financial transmission rights (FTRs). FTRs allow electricity market participants to manage locational price risk on the transmission network and are a type of financial hedge. The FTR manager role is currently performed by Energy Market Services (EMS), a division of Transpower.

Under the Regulations:

The FTR manager is not liable for a sum in excess of—

(a) \$500,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$2 million in respect of all events occurring in any financial year.

Pricing manager

The pricing manager calculates and publishes prices for electricity and reserves. Data is sent to the system operator and used by the clearing manager in the settlement process. The pricing manager role was also established in 1996 to coincide with the establishment of the wholesale electricity spot market. NZX Ltd currently performs the role of pricing manager.

Under the Regulations:

The pricing manager is not liable for a sum in excess of—

(a) \$200,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$5 million in respect of all events occurring in any financial year.

Reconciliation manager

The reconciliation manager reconciles information on electricity volumes at different points on the grid and publishes the information for the clearing manager. The electricity volumes consumed must balance with the electricity taken from the grid. The role was established in 1994 when the monopoly franchises on the supply of electricity to consumers were removed. NZX Ltd currently performs the role of reconciliation manager.

Under the Regulations:

The reconciliation manager is not liable for a sum in excess of—

(a) \$500,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$2 million in respect of all events occurring in any financial year.

Clearing manager

The clearing manager primarily settles the sales and purchases of electricity in New Zealand including settling FTR transactions. The role was established in 1996 when the wholesale electricity spot market was established. NZX Ltd currently performs the role of clearing manager.

Under the Regulations:

The clearing manager is not liable for a sum in excess of—

(a) \$5 million in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$10 million in respect of all events occurring in any financial year.

The Regulations further stipulate that:

The clearing manager must, at all times, maintain any fidelity insurance cover that is required by the Authority, on terms and in respect of risks approved by the Authority, with an insurer approved by the Authority, in relation to any direct financial loss the clearing manager may sustain from any acts of fraud or dishonesty committed by it in its capacity as clearing manager or by any of its employees, contractors, or agents.

The clearing manager is required to take all reasonable steps to recover the full amount insured but its liability is limited to the amount actually recovered.

Registry manager

The registry manager must maintain the national registry which is a database containing a record of all connections to the national electricity network. The information must be kept up to date and is the primary mechanism for customers switching between electricity retailers. The role was established in 1999 when full retail competition was introduced. Jade Direct NZ Ltd currently performs this role.

Under the Regulations:

The registry manager is not liable for a sum in excess of—

(a) \$50,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$1 million in respect of all events occurring in any financial year.

Market administrator

As the name suggests, the market administrator role encompasses a range of administrative-type functions in the wholesale and retail electricity markets. Originally the role was performed by an external provider. In 2004 the Electricity Commission (now the EA) began performing these duties, as the market administrator role is closely aligned with the EA's role of electricity market oversight and coordination.

Under the Regulations:

The market administrator is not liable for a sum in excess of—

(a) \$50,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$500,000 in respect of all events occurring in any financial year.

Table 1 below provides a summary of the liability arrangements for the market operation service providers.

Table 1: Liability arrangements for market operation service providers

Service	Provider	Annual Revenue (\$m)	Liability limits	Limits established	Contract between
System operator	Transpower*	36.5	up to \$200,000 per event up to \$2m per year	2003	EA and Transpower*
Wholesale information trading system provider	NZX Energy	1.4	no specific mention of WITS provider's liability	2007	EA and NZX
Pricing manager	NZX Energy	1.6	up to \$200,000 per event up to \$5m per year	1996	EA and NZX
Reconciliation manager	NZX Energy	1.1	up to \$500,000 per event up to \$2m per year	1996	EA and NZX
Clearing manager	NZX Energy	2	up to \$5m per event up to \$10m per year	1996	EA and NZX
FTR manager	EMS (Transpower)	0.85	up to \$500,000 per event up to \$2m per year	2011	EA and EMS
Registry manager	Jade Direct NZ	0.45	up to \$50,000 per event up to \$1m per year	1999	EA and Jade
Market administrator	Electricity Authority	in house	up to \$50,000 per event up to \$500,000 per year	2003	EA - in house

*Electricity Industry Act 2010 requires Transpower to perform this role.

Figure 1 below presents the liability limits from the Regulations as a percentage of the annual revenue generated by each market operation service provider.

Figure 1: Liability caps as a percentage of annual revenue for service providers

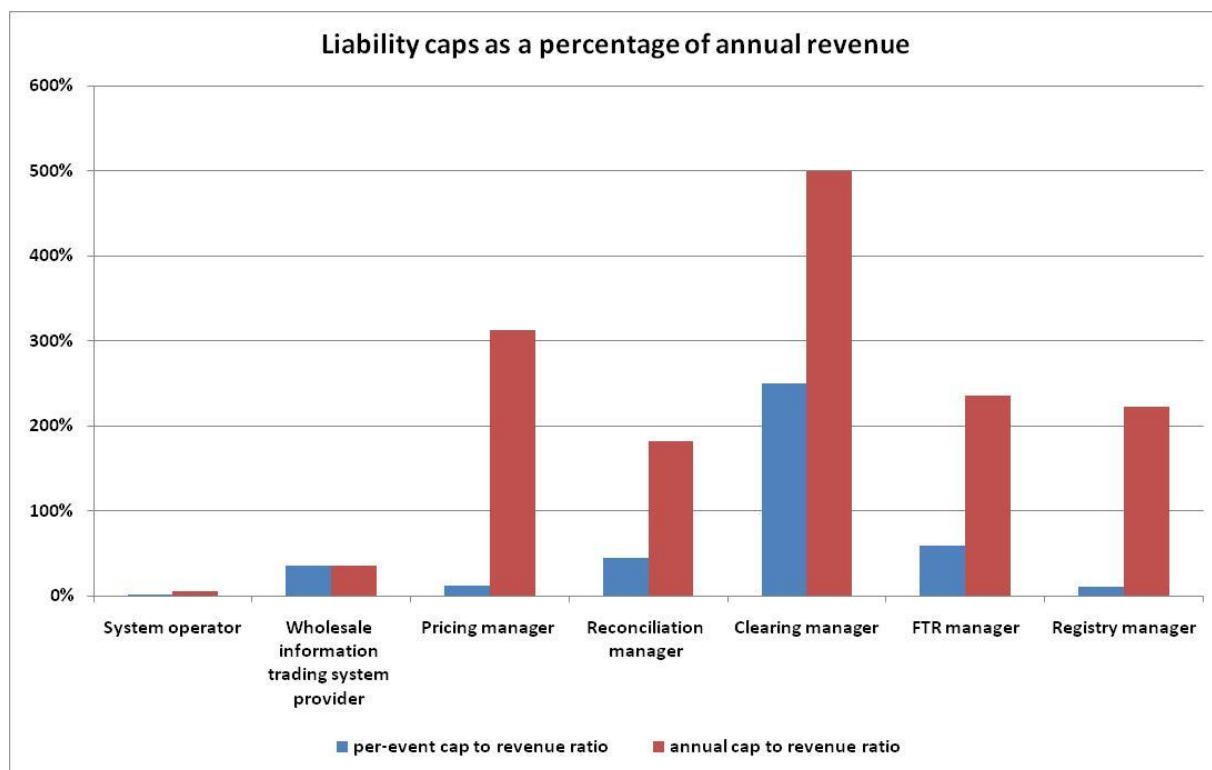


Figure 1 above provides some insights into areas of potential inconsistency in the current liability arrangements. In particular, based on the ratio of the liability cap to revenue:

- the system operator’s liability limits seem particularly low;
- the clearing manager’s liability limits seem particularly high; and
- the pricing manager’s annual liability cap seems relatively high compared with its per event cap.

It should be noted, however, that the above analysis is only a partial analysis: in particular an analysis based solely on the liability cap/revenue ratios does not account for the differing consequences of failure across the different services. A broader analysis is provided in section 6 below.

5.2 Asset owners

The term ‘asset owners’, as it relates to the Code and the liability arrangements in the Regulations, include any participant in the electricity industry that owns or operates an asset used for the generation or conveyance of electricity. Asset owners include:

- generators;
- direct consumers – there are seven large consumers in New Zealand with direct connection to the national grid;
- distributors – there are 29 local distribution companies that deliver electricity from the national grid to consumers; and
- Transpower – the national grid owner.

Under the Regulations:

An asset owner is not liable in respect of any breach of any provision of Part 8 of the Code (which relates to common quality), or any related provision of Part 17 of the Code, for a sum in excess of—

(a) \$2 million in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$6 million in respect of all events occurring in any financial year.

The liability limits faced by asset owners for breaches of the Code were established in 2003.

5.3 Ancillary services

In addition to the market operation service providers the industry also requires a number of ancillary service agents. In order to meet its obligations the system operator contracts with a number of ancillary service agents for the following ancillary services:

- frequency keeping – to balance any inequalities such that the grid frequency remains at around 50 Hertz;
- instantaneous reserve – to assist in recovery to normal operating conditions after a drop in frequency;
- over-frequency reserve – to assist in recovery to normal operating conditions after a spike in frequency;
- voltage support – provision of additional power resources; and
- black start – provision of equipment that allows for electricity supply to resume after a blackout.

Under the Regulations:

An ancillary service agent is not liable for a sum in excess of,—

(a) in respect of any one event or series of closely related events arising from the same cause or circumstance, the lesser of \$100,000 or 5% of the expected annual fees for the relevant type of ancillary service; and

(b) in respect of all events occurring in the period of 12 months ending with the breach, the lesser of \$300,000 or 20% of the expected annual fees for the relevant type of ancillary service.

Unlike the liability limits on the market operation service providers, the liability limits for ancillary service providers take into account the annual fees providers expect to receive for the provision of the given service. The revenues associated with the five ancillary services differ considerably. Table 2 below details the annual service fees for each ancillary service over the past three years:

Table 2: Annual fees for ancillary services, 2010/11 – 2012/13

	2012/13	2011/12	2010/11
<i>Frequency keeping</i>	\$44,750,775	\$55,940,913	\$49,685,826
<i>Instantaneous reserves</i>	\$37,466,459	\$38,766,777	\$24,910,335
<i>Voltage support</i>	\$6,925,320	\$7,976,683	\$8,020,527
<i>Over frequency reserve</i>	\$1,235,498	\$1,219,470	\$1,089,020
<i>Black start</i>	\$577,636	\$555,029	\$537,412
<i>Total</i>	\$90,955,688	\$104,458,872	\$84,243,120

Table 2 indicates that there are significant differences in the annual revenue generated by each ancillary service. However it should be noted that the revenue figures above are for the total revenue for each service and the number of providers of each service varies. In the case of the market operation services there is a single provider of each service. However, in the ancillary services market there are often a number of providers of a given service at different points around the country; as such, each ancillary service agent is only receiving a portion of the revenue indicated in Table 2 above.

Table 3 below details the ancillary service agents operating in the New Zealand electricity market in 2013.

Table 3: Ancillary service providers in 2013

	Frequency Keeping	Instantaneous Reserve	Over Frequency Reserve	Black Start	Voltage Support
Contact Energy	✓	✓	✓	✓	✓
Counties Power		✓			
EnerNOC		✓			
Genesis Energy	✓	✓		✓	
KCE Mangahao and Todd Mangahao		✓	✓		
Meridian Energy	✓	✓	✓	✓	
Mighty River Power	✓	✓	✓	✓	
NZ Aluminium Smelters		✓			
NZ Steel		✓			
Nga Awa Purua			✓		
Northpower		✓			
Norske Skog		✓			
Pan Pac		✓			
Powerco		✓			
TrustPower	✓	✓			
Tuaropaki (Mokai)			✓		
Vector		✓			
WEL Networks		✓			
Wellington Electricity Networks		✓			
Winstone Pulp International		✓			

Note: Contact Energy no longer provides voltage support

5.4 Metering

Participants have a number of obligations under the Code in relation to metering standards, including obligations around metering installations, testing, compliance and accuracy. They also have obligations in relation to gathering and storing metering information and then providing it to the reconciliation manager.

Under the Regulations in the case of metering:

No industry participant is liable for a sum in excess of \$200,000 in respect of any one event or series of closely related events arising from the same cause or circumstance.

A number of parties have obligations under the Code in respect of metering. The liability limit of \$200,000 for Code breaches was established in 1994.

There is no annual limit on liabilities for metering services.

5.5 Problems with the current arrangements

The current liability arrangements have generally been in place for many years. They have typically been carried over from previous regimes during industry changes or restructures.

The following two examples highlight that there are clear indications that some of the current limits provide poor incentives and lack rigorous underpinnings.

Firstly, the liability limits for asset owners that are in place are materially different to those initially recommended by the Grid Security Committee (GSC). In a 2002 paper for the Electricity Governance Establishment Committee (EGEC), the GSC recommended a liability cap for asset owners that balanced the incentives to comply with performance obligations but did not discourage participants from entering the market or taking overly conservative approaches that would lead to an overall increase in common quality costs.

“The GSC considered a cap per event of \$5m with an annual limit of \$15 million would meet these objectives. The Governance Working Group notes that given the range and diversity of factors involved any cap is clearly a difficult exercise.”⁵

In response the minutes of an EGEC meeting, largely comprised of parties directly affected by the liability limits, indicates the following discussion occurred:

“There appeared to be some support for the view that the proposed caps of \$5m for an event and \$15m per annum might be too high and might discourage some parties from joining. A variety of cap levels, such as \$2m/\$6m and \$3m/\$8m, were raised as alternatives, however it was agreed that the GSC was the more appropriate forum for reconsidering the cap level.”⁶

Although the recommendation is a circumspect one, ultimately the \$2m/\$6m liability limits were approved and remain the limits written into regulation.

Secondly, a similar ad hoc approach was taken in determining the liability limits for the newly established role of the FTR manager. The new role provided an opportunity for a review of the liability arrangements. The EA’s consultation paper at the time even suggested that “it would be possible to build a model of the costs to the FTR manager (and its insurer), and the costs to vulnerable parties of monitoring and managing risks....The model would suggest an optimal level for the liability limit, where the combined costs are minimised.”⁷

⁵ Paper for Electricity Governance Establishment Committee, Liability for Asset Owners.

⁶ Minutes of EGEC meeting, 26 Feb 2002.

⁷ EA’s Consultation Paper, Regulations to implement the FTR market.

We note that such a model would prove difficult to create and would need to adopt many simplifying assumptions.

However, the approach that was taken for the FTR manager simply involved selecting the current market operation service that had the most parallels and applying the same liability limits. In the case of the FTR manager it was decided that the reconciliation manager was the most similar service.

Through these two examples we recognise that determining a precise optimal liability limit is a difficult process. However, it is also evident that there is little rigour or consistency underlying some of the current arrangements and that the current limits in several instances can be improved upon.

5.6 Trade-offs

This section explores the trade-offs that must be considered when determining the most appropriate structures and levels for the liability limits for the electricity industry.

Transparency

Public liability limits as expressed in regulation provide a great deal of transparency and certainty for market participants. Privately contracted agreements are subject to negotiation and are far less transparent to the industry.

Imbalance of negotiating power

There are situations where negotiating power may be very much imbalanced between contracting parties, which favours having liability limits in regulation.

Cost

The higher liability limits are, the greater the risk for industry participants and the greater the cost of insurance. Ultimately, these costs will be borne by the end consumer. In considering a change in the liability limits we must weigh up the cost of having a liability limit in place compared with the importance of compensating an injured party in the case of an error.

Supply security

The higher the liability limits the more conservative, risk-averse behaviour that will be encouraged. Risk aversion will maximise supply security in the short run so it should reduce the chance of an error occurring. However, it may not be the most cost-effective approach nor be in the best interest of consumers in the long run.

Innovation, competition and dynamic efficiency

If the liability limits are set too high there is the chance that markets become uncompetitive as current participants and potential participants are unwilling to participate in the market. There is also the risk of stifled innovation and a negative impact on dynamic efficiency if participants are overly risk averse.

Overall, we recognise that the liability limits themselves are only one of many factors driving the behaviour of market participants. Any material change in liability limits should be grounded in good reasoning as the disruption caused to most market participants seems an unnecessary cost to impose on the industry without a clearly identified benefit motivating change.

5.7 The current process

In the case of a Code breach the Rulings Panel⁸ takes into account the following considerations:

- *severity of the breach;*
- *the impact of the breach on other industry participants;*
- *the extent to which the breach was inadvertent, negligent, deliberate or otherwise;*
- *the circumstances in which the breach occurred;*
- *any previous breaches;*
- *whether the participant disclosed the matter to the EA;*
- *the length of time the breach remained unsolved;*
- *the participant's actions when it learned of the breach; and*
- *any benefit the participant obtained.*

The Rulings Panel deals with Code breaches in a detailed and systematic manner. However, ten years of historical breaches provides us with a telling story about the practical relevance of the current liability limits. Table 4 below details the breach notifications received over the past ten years, the numbers that were investigated and of these the number that went to the Rulings Panel (“complaints”) and the penalties imposed by the Panel.

⁸ Allegations of breaches of the Code are considered by a committee of the Board of the Electricity Authority, with more serious breach allegations referred to an independent Rulings Panel. The members of the Rulings Panel are appointed by the Governor General on the recommendation of the Minister of Energy.

Table 4: Breaches of the Code, 2004-2013

Year ending June	Breach notifications received	Notifications closed with no investigation	Investigations commenced	Investigations settled	Investigations closed without settlement	Complaints	Penalties	Total Closed
2004 four months	98	20	6	0	0	0		20
2005	209	193	18	7	8	2	\$1K & 2.5K	210
2006	215	208	17	10	3	0		221
2007	160	147	7	6	6	1	\$8K	160
2008	210	202	11	7	2	0		211
2009	285	258	14	7	3	0		268
2010	200	197	10	2	4	1	\$17.5K	204
2011	147	161	14	3	9	0		173
2012	134	142	4	5	12	1	\$15K	160
2013	211	182	2	2	1	0		185
2014 six months	67	119	3	0	1			120
Totals	1936	1827	106	49	49	5	\$44k	1932
% of total notifications	100%	94.4%	5.5%			0.3%		
% of investigations			1	47.2%	46.2%	5.7%		

Source: EA

Almost 2,000 breaches occurred over the ten year period but the majority of these breaches were considered insignificant by the EA. 106 breaches were considered significant enough to warrant further investigation by the EA but of these only 6 made it as far as the Rulings Panel. The penalties imposed by the Rulings Panel ranged from \$1,000 to \$17,500 (of a maximum permitted amount of \$20,000). The sum total of penalties handed out over the ten year period equates to a mere \$43,000. Hopefully this is some indication of a well-performing industry. However, based on the analysis above, there seems little question that the EA takes an educative and fairly light-handed approach in dealing with breaches of the Code.

It is important to note that the 'penalties' only include the fines issued by the Rulings Panel. It does not include further payments of compensation that providers may have been liable for as a result of the breach.

In and of itself however, the light-handed approach adopted by the EA has the potential to impact market participants in two key ways:

- 1) there appears to be little real threat in practice of a significant financial cost being imposed on market participants; and
- 2) as such, the liability limits as they stand and any proposed changes to them may be unlikely to motivate or alter the behaviour of market participants in a material way.

We must also take into account the entirety of the EA's approach to compliance in the industry and the variety of other incentives motivating the behaviour of market participants, but the two points above are important to note.

6 Analysis of the structure

This section assesses the most appropriate structure for the liability limits in the electricity industry. In terms of structuring the liability limits the limits could be:

- per event;
- annually and/or over the term of the contract.

These limits could be in the form of:

- an absolute dollar cap;
- a percentage of annual revenue.

Any combination of the above options is available for each of the industry roles under consideration.

The industry typically and historically has had both annual and per event caps on liability for most service providers. In practice, with very few instances of penalties and compensation being ruled on it is very improbable that an annual liability cap is ever reached. However, we do suggest maintaining both per event and annual caps for service providers.

Per event caps provide certainty and consistent incentives for the parties subject to the liability limit, and give a clear indication to other parties of the extent of the compensation they may be able to receive if harmed. Due to the fact the annual threshold is rarely going to be reached the per-event cap will provide consistent incentives going forward even after a breach has occurred. The annual cap provides a clear and quantifiable risk over a common time frame that can be insured against.

Alternatively, there could be no annual caps in place and service providers could insure up to what they consider an appropriate amount. The issue with self-selected levels of insurance is that they provide a very different form of certainty than an annual cap: insurance up to a particular level covers all liabilities for a provider up to the insured level. However, the insurance is of no help in preventing the worst case scenario in which liability exceeds the level of insurance. Annual caps in regulation provide the certainty of protecting against a worst-case scenario. This is particularly useful in levelling the field between incumbents and potential new market entrants: incumbents are likely to have better information about the risks involved. Potential new players in the market may underestimate or overestimate the risks involved and an annual cap provides a clear indication of an appropriate level of required insurance cover.

Annual caps are preferred to liability limits spanning the term of the contracts as they allow for a consistent approach to be used across the industry. The service providers have different length contracts, beginning and ending at different times and in some cases, such as for asset owners, there is not even a contract in place.

There are in principle a variety of forms a liability cap covering a fixed term (e.g., “the twelve month period”) could take: the “twelve month period” could begin at the start of the contract; the start of the calendar year; the start of the financial year; or from the time of the first event. In our experience the most commonly observed arrangement is for the term (“the twelve months”) to commence at the start of the contract and rollover on an annual basis thereon if/when the contract is renewed. This arrangement is probably the simplest from an administrative perspective for both parties.

Having established that we will consistently apply a per-event and annual liability limit across all services it is important to consider whether these limits will be absolute dollar caps or a percentage of annual revenue.

Absolute dollar cap

For the market administrator, asset owners and with respect to metering it makes no sense for the limits to be linked to revenue: such a wide variety of participants are exposed to these limits and it is too difficult to accurately attribute revenue to a particular asset or metering-related service. We therefore recommend the limits for these participants remain as absolute dollar caps.

In the case of the market operation service providers there is only a single provider of each service so it is not particularly important whether limits are a percentage of revenue or absolute dollar figures. Both forms of the liability limit could have some link to revenue but the form in which the limit itself is set out is of little consequence given there is only a single provider of each service.

Over time, revenues for most market operation service providers have remained fairly stable. Notably, there has been some significant change in the system operator’s revenue. However, fluctuations in the system operator’s revenue can be driven by changes in capital expenditure, and are not necessarily an indication of material changes in the scope of the role. In addition, the system operator’s limits are well below the rest of the market in terms of the liability limit to revenue ratio.

In order to be consistent with current practices and for the limits to be immediately obvious we recommend maintaining absolute dollar limits for all industry participants other than ancillary service agents. As noted above, the liability limits should be reviewed regularly to take into account changes in the service provider roles and/or the market.

Percentage of revenue cap

Currently, under the Regulations:

An ancillary service agent is not liable for a sum in excess of,—

(a) in respect of any one event or series of closely related events arising from the same cause or circumstance, the lesser of \$100,000 or 5% of the expected annual fees for the relevant type of ancillary service; and

(b) in respect of all events occurring in the period of 12 months ending with the breach, the lesser of \$300,000 or 20% of the expected annual fees for the relevant type of ancillary service.

Unlike the market operation service providers there is often more than one ancillary service agent providing the same ancillary service. For this reason, it makes much more sense for ancillary services to have a liability limit linked to revenue. A revenue based liability limit more consistently incentivises providers of different services and of different scales. We recommend per-event and annual liability limits for ancillary service agents that are a percentage of annual revenue. For particularly large providers it may be reasonable to include an absolute dollar ceiling in conjunction with this.

These limits should be reviewed every few years; there is the option of linking the absolute dollar caps to inflation or revenue to allow for an automatic adjustment to changes in market conditions.

7 Analysis of the levels

In this section we provide a first-principles assessment of the appropriate liability levels for the electricity market participants on a service-by-service basis. We discuss our methodology and work through the findings of our analysis and test these findings against the current arrangements and the historical record.

7.1 Methodology

There are a variety of market participants affected by the liability arrangements currently in the Regulations. These service providers repeatedly interact in a complex marketplace and each takes on risks of a very different nature and scale. It is therefore important that we consider the appropriate liability limits on a service-by-service basis.

The methodology we adopt in arriving at proposed liability limits is as follows:

- 1) value at risk assessment;
- 2) cap-to-revenue ratios assessment;
- 3) derive indicative annual liability limits;
- 4) per event to annual cap ratios assessment;
- 5) derive indicative per event liability limits;
- 6) comparison with current arrangements;
- 7) service-specific assessment to arrive at proposed liability limits.

Firstly we undertake a qualitative, high-level risk assessment of each service in order to arrive at an estimated value at risk for each service.

As an initial input into our assessment we ask two simple, high-level questions of each service:

- what is the likely frequency with which a provider is expected to materially adversely affect industry participants? and
- what is the likely per event impact per participant (worst-case scenario)?

These considerations allow us to arrive at a qualitative value at risk for each service categorised as high, medium, low, or very low.

We consider the link between revenue and the liability limits to be an important one. The greater the value at risk, all else being equal, the greater the proportion of a service provider's contracted revenue that should be at risk if a material error occurs. Similarly, a lower liability limit-to-revenue ratio is appropriate for a low risk, low impact service.

We take the current annual revenue generated by each service and derive indicative annual liability cap ranges for each provider by imposing cap-to-revenue ratios that increase as the value at risk increases.

We then return to the first of our initial high-level questions: “what is the likely frequency with which a provider is expected to materially adversely affect industry participants?”. We consider it appropriate that different relationships between per event and annual liability limits should exist for providers that are expected to materially adversely impact other market participants at different frequencies.

We derive indicative per event liability limit ranges from our indicative annual liability caps and the expected frequency of harm.

This methodology is consistently applied across the market services. However, it is important to test the appropriateness of these conclusions: we conclude our analysis on levels by considering the indicative liability limit ranges derived from steps 1 to 5 above in the context of the current and historical liability arrangements and service-specific factors to arrive at recommended liability limit ranges for each service.

7.2 Assessment of the liability limit levels

Our approach to determining the appropriate level of each liability limit is to assess the service-specific factors in the context of value at risk, cap to revenue ratios, per event to annual cap ratios and the current and historical liability arrangements.

1) Qualitative value at risk assessment

Our assessment of the risks associated with each service involves consideration of two high level points:

- the likely frequency of a market participant causing material harm to others; and
- the likely scale of impact (worst-case scenario).

Both of these questions are measured on a four-point scale as per Table 5 below.

Table 5: Service provider categorisations

Likely frequency categorisation		Impact categorisation	
Very low	< 1 instance every 5 years	Low impact	<\$50K
Low	1-2 instances every 5 years	Medium impact	\$50K - <\$100K
Medium	1-2 instances every 3 years	High impact	\$100K - <\$1M
High	1-2 instances per annum	Very high impact	\$1M and above

Combining the above two considerations, with slightly more weight placed on the scale of impact, we arrive at a qualitative value at risk assessment. Table 6 summarises these assessments on a service-by-service basis.

Table 6: Risk assessment

Service provider	Likely instances of materially adversely affecting industry participant(s)	Per event impact per participant (worst case scenario)	Value at risk
System operator	low - medium	very high	high
WITS provider	very low	high	low
Pricing manager	very low	high	low
Reconciliation manager	very low	high	low
Clearing manager	very low	very high	medium
FTR manager	low	very high	medium
Registry manager	low	low	very low
Market administrator	very low	low	very low
Asset owners	very low	very high	medium
Metering	medium - high	medium	low
Frequency keeping	very low	high	low
Instantaneous reserve	very low	very high	medium
Over frequency reserve	very low	very high	medium
Voltage support	very low	very high	medium
Black start	very low	very high	medium

Table 6 indicates that the electricity industry is largely secure and the risk of any service provider causing a material error is relatively low. However, the New Zealand electricity industry is one in which supply security is of high value. In a number of instances the potential impact resulting from poor performance is significant. It is therefore important that appropriate liability limits are set so as to encourage a suitable level of precaution in the industry.

2) Cap-to-revenue ratios

Next we consider the ratio of the liability limit to the annual revenue (the “cap to revenue” ratio) for each service. Table 7 below presents the current liability limits as a percentage of the 2013 financial year revenue on a per-event and annual basis.

Table 7: Current cap-to-revenue ratios

Service	Per event cap to revenue ratio	Annual cap to revenue ratio
System operator	1%	5%
Wholesale information trading system provider	36%	36%
Pricing manager	13%	313%
Reconciliation manager	45%	182%
Clearing manager	250%	500%
FTR manager	59%	235%
Registry manager	11%	222%
Ancillary services	≤5%	≤20%

There are fairly large differences in the liability limit to revenue ratios for different services. Asset owners, metering and the market administrator have been excluded from the table as there is no clear manner in which revenue can be apportioned to these particular aspects of a company’s operations. All the ancillary services are covered by the same liability limit. According to current regulation, ancillary service agents are liable for the lesser of 5% of revenue and \$100,000 per event and the lesser of 20% of revenue and \$300,000 per year. Therefore, at most, ancillary service agents are going to be liable for 5% of revenue per event and 20% of revenue annually, or considerably less if revenue is high enough.

It is appropriate to have varying liability limit to revenue (or profit) ratios for different services. However, these differences should be strongly linked to value at risk.

Commercial practice for the effective liability limit to revenue ratio varies, depending on factors such as the nature of the service and the relative bargaining powers of the parties. In principle, the terms should allocate risk to the party best placed to manage it and over time we expect, at least in competitive sectors, the terms of contracts to evolve towards such an outcome. In practice, at least in the short to medium term, there is inevitably a degree of “horse trading” around the terms and the liability limits often are one of the last aspects of a contract to be finalised.

Industry practice in comparable sectors in New Zealand varies widely but in our experience the effective cap to revenue ratios is typically in the range of 50% to 300% or higher. For example:

- in the professional services sector (e.g., engineering services, accounting services and legal services) there are no hard and fast rules but liability limits that at least cover the revenue from the contract and that range up to five times the revenue or higher are not uncommon;
- a leading supplier of online business to business services typically limits its exposure to the value of the contract;
- a major supplier to the telecommunications, ports and other infrastructure industries requires limits of no more than three to five times revenue or else it will decline the contract, even though it has insurance in place to cover capped liabilities;
- in a network industry the contract between the network owner and a provider of network maintenance service has a limit that is 10 to 15 times the annual revenue;
- the NZX Settlement and Depository System earns around \$3.7m a year and is liable for the uncapped full cost of direct losses in the case of settlement failure and direct fraud with a \$5m cap per event for indirect fraud; and
- NZClear, a securities settlement system and central depository operated by the Reserve Bank of New Zealand earns around \$4.5m per annum and is liable for direct losses up to \$5m per event.

There are statutory limits on the penalties that can be imposed by the Courts under the Commerce Act and the Telecommunications Act:

- under the Commerce Act, 1986 there are maximum per event penalties for contravening the information disclosure requirements for price/quality regulations for regulated goods and services. These penalty limits range from \$100,000 to \$500,000 (for an individual) and from \$1m to \$5m (for a corporate) (refer s86 and s87); and
- under the Telecommunications Act, 2011 (s156L) maximum per breach penalties range up to \$10m, depending on the nature of the breach, with additional penalties able to be imposed for continuing breaches (s156M).

There are no statutory limits on compensation that can be paid.

We adopt a conservative approach and consider a reasonable range for the annual liability cap to revenue ratios is between 50% and 300%. If the ratio is much lower than this range the liability limit’s practical effect in incentivising prudent behaviour tends to be undermined. If the ratio is much higher it can become a deterrent, especially for small participants, entering the sector.

Table 8 below details the proposed relationship between value at risk and the annual liability limit (as a percentage of annual revenue).

Table 8: Proposed cap-to-revenue ratios based on value at risk

VAR	Annual limit range	
	Low	High
very low	50%	100%
low	100%	150%
medium	150%	200%
high	200%	300%

The total proposed range of cap-to-revenue ratios is from 50% to 300% with the proposed cap to revenue ratio increasing as value at risk increases.

3) Indicative annual liability limits

Indicative annual liability limits are derived from the annual revenue generated by a service and the value at risk for that service. Table 9 below presents our indicative annual liability limits by service.

Table 9: Indicative annual liability limits

Service	VAR	Revenue (\$m)	Annual cap (\$m)	
			low	high
System operator	high	\$36.5	\$73.0	\$109.5
WITS provider	low	\$1.4	\$1.4	\$2.1
Pricing manager	low	\$0.5	\$0.5	\$0.8
Reconciliation manager	low	\$1.1	\$1.1	\$1.7
Clearing manager	medium	\$2.0	\$3.0	\$4.0
FTR manager	medium	\$0.9	\$1.3	\$1.7
Registry manager	very low	\$0.5	\$0.2	\$0.5
Market administrator*	very low	N/A	\$0.2	\$0.5
Asset owners**	medium	N/A	\$3.0	\$4.0
Metering***	low	N/A	\$1.0	\$1.5
Ancillary services †				
Frequency keeping	low	\$9.0	\$9.0	\$13.4
Instantaneous reserve	medium	\$2.1	\$3.1	\$4.2
Over-frequency reserve	medium	\$0.2	\$0.3	\$0.4
Voltage support	medium			
Black start	medium	\$0.1	\$0.2	\$0.3

Note: the roles with no directly attributable revenue have liability limits linked to the service(s) with the most similar risk profile:

* Market administrator's annual limit comes from the registry manager

** Asset owners' annual limit comes from the clearing manager

*** Metering annual limits comes from an average of the pricing manager, WITS provider and reconciliation manager

† Ancillary services have multiple providers. These limits are expected average absolute dollar limits

4) Per event to annual cap ratios

Next we consider the appropriate relationship between the annual limits and the per event limits. Of most importance here is the frequency with which a service provider is expected to materially impact other participants.

For example, two hypothetical market participants, A and B, with the same contracted annual revenue and which are expected to cause the same level of harm can be impacted very differently by the same liability limits. Assume \$1m of damage is caused in one twelve month period by both parties but participant A does so in a single large event while participant B does so across ten \$100,000 events. If the liability arrangements are a \$500,000 annual liability limit and a \$50,000 per event liability limit for both participants then even though both participants cause the same damage (\$1m) in a year:

- participant A would be liable for only \$50,000; while
- participant B would be liable for \$500,000.

We therefore suggest that the expected frequency with which harm is expected to be caused should determine the appropriate relationship between the per-event liability limit and the annual liability limit. That is, the more frequently an adverse event is expected to occur, the lower the per-event cap should be relative to the annual cap.

Our proposed per event to annual cap ratios are presented in Table 10 below:

Table 10: Proposed per event to annual cap ratios

Frequency	Ratio
Very low	100%
Low	50%
Medium	20%
High	10%

5) Indicative per event liability limits

Indicative per event liability limits are derived from the indicative annual liability limits and the expected frequency with which a service is expected to cause harm. Table 11 below presents our indicative per event liability limits by service.

Table 11: Indicative per event liability limits

Service	Frequency	Per event (\$m)	
		low	high
System operator	low-medium	\$11.0	\$16.4
WITS provider	very low	\$0.7	\$1.1
Pricing manager	very low	\$0.3	\$0.4
Reconciliation manager	very low	\$0.6	\$0.8
Clearing manager	very low	\$1.5	\$2.0
FTR manager	low	\$0.26	\$0.34
Registry manager	low	\$0.05	\$0.09
Market administrator*	very low	\$0.11	\$0.23
Asset owners**	very low	\$1.5	\$2.0
Metering***	medium-high	\$0.13	\$0.19
Ancillary services †			
Frequency keeping	very low	\$4.5	\$6.7
Instantaneous reserve	very low	\$1.6	\$2.1
Over-frequency reserve	very low	\$0.2	\$0.2
Voltage support	very low		
Black start	very low	\$0.1	\$0.1

Note: the roles with no directly attributable revenue have liability limits linked to the service(s) with the most similar risk profile:

** Market administrator's annual limit comes from the registry manager*

*** Asset owners' annual limit comes from the clearing manager*

**** Metering annual limits comes from an average of the pricing manager, WITS provider and reconciliation manager*

† Ancillary services have multiple providers. These limits are expected average absolute dollar limits

6) Comparison with current arrangements

Table 12 compares the indicative ranges for the per-event and annual limits resulting from the analysis above with the current levels for the limits.

Table 12: Comparison between indicative and current limits

Service	Per event limits (\$m)			Annual limits (\$m)		
	Indicative		Current	Indicative		Current
	low	high	current	low	high	current
System operator	\$10.95	\$16.43	\$0.20	\$73.00	\$109.50	\$2.00
WITS provider	\$0.70	\$1.05	uncapped	\$1.40	\$2.10	uncapped
Pricing manager	\$0.25	\$0.38	\$0.20	\$0.50	\$0.75	\$5.00
Reconciliation manager	\$0.55	\$0.83	\$0.50	\$1.10	\$1.65	\$2.00
Clearing manager	\$1.50	\$2.00	\$5.00	\$3.00	\$4.00	\$10.00
FTR manager	\$0.26	\$0.34	\$0.50	\$1.28	\$1.70	\$2.00
Registry manager	\$0.05	\$0.09	\$0.05	\$0.23	\$0.45	\$1.00
Market administrator	\$0.11	\$0.23	\$0.05	\$0.23	\$0.45	\$0.50
Asset owners	\$1.50	\$2.00	\$2.00	\$3.00	\$4.00	\$6.00
Metering	\$0.13	\$0.19	\$0.20	\$1.00	\$1.50	uncapped
Ancillary services †						
<i>Frequency keeping</i>	\$4.48	\$6.71	\$0.10	\$8.95	\$13.43	\$0.30
<i>Instantaneous reserve</i>	\$1.56	\$2.08	\$0.10	\$3.12	\$4.16	\$0.30
<i>Over-frequency reserve</i>	\$0.16	\$0.21	\$0.10	\$0.31	\$0.41	\$0.30
<i>Voltage support</i>			\$0.10			\$0.30
<i>Black start</i>	\$0.11	\$0.15	\$0.10	\$0.22	\$0.29	\$0.30

† Ancillary services have multiple providers. The indicative limits are expected average absolute dollar limits

The comparisons in Table 12 above indicate that most service limits are reasonably close or within the proposed indicative ranges. There are however some significant outliers: most noticeably the limits for the system operator, registry manager, providers of frequency keeping and instantaneous reserves, which currently have limits much lower than the indicative ranges; and the clearing manager which currently has limits significantly higher than the indicative range. In addition the wholesale information trading system (WITS) provider currently has no limits specified in the Regulations.

Before drawing any conclusions about the appropriate levels for the limits though we assess the limits on a service-by-service level below.

7) Service-specific assessment

Having arrived at the indicative liability limits presented above we consider these limits in the context of service-specific factors. The general framework above is a guide but we must consider each limit on a service by service basis. We also consider the historical record of liability limits by means of comparison.

System operator

The system operator is a service vital to the everyday functioning of the industry. This role involves the real time scheduling and dispatch of electricity with the objective of no disruption of supply. The importance and scale of the role is reflected in the size of the contract; the system operator generates significantly more revenue than all the other market operation service providers combined.

Transpower provides the service and has a strong focus on supply security. The expected frequency with which harm is likely to be caused by the system operator is the highest of any major market participant due to the sheer scale and complexity of the job. Due to the nature of the role, real time scheduling and dispatch errors have the potential to cause significant harm.

As a percentage of the annual revenue generated from the role, the current caps are very low. No matter the extent of the damage caused by a single event the system operator's liability is capped at \$200,000, i.e., less than one percent of annual revenue. The annual cap of \$2m is somewhat higher but still only represents around 5% of annual revenue and would require ten separate significant events in a single year in order to be reached. Such a series of errors seems very unlikely to occur.

The current liability limits for the role have been carried over from the NZEM service provider agreements as they applied to the dispatcher and scheduler. There are a number of reasons why those limits may be somewhat low for the current system operator role. The per-event and annual liability limits of \$200,000 and \$2m respectively applied to each of the roles separately. In theory, if the dispatcher and scheduler had each been separately involved in a number of damaging events, then they would each have been liable for up to \$2m annually. The system operator is a combination of those providers, the common quality coordinator role defined under MACQS, and the security of supply obligations placed on the system operator under the Electricity Industry Act. Therefore the system operator has a bigger role to play than did the scheduler and dispatcher under the NZEM. The electricity market has also grown considerably over the time period. However, no matter the extent of the damage caused by the system operator it remains liable for only up to \$200,000 per event and up to \$2m annually.

In addition, the NZEM rules stipulated liability limits for the scheduler, dispatcher and grid operator: separately, these liability limits were up to \$1m per event and up to \$5m in any 12 month period. Although the limits set out in the service provider agreements took precedence over these rules, it is an indication that some industry participants felt higher liability limits were reasonable for these roles.

A further point to note is that the system operator is a statutory monopoly and so there is no competition for the role. As a statutory monopoly the system operator's incentive is to seek to pass all cost increases from a higher liability limit on to the industry via its service provider fees, assuming the system operator increases its external insurance to cover the increased limits rather than self-insuring. Although the system operator is well placed to manage the risks associated with its role, some of this burden will also probably best fall on the industry. Some level of commercial risk is likely to be acceptable for the industry and the industry will have internal policies, risk mitigation procedures and insurance to help minimise the risks it faces.

It is important to incentivise all the service providers to manage risk efficiently and we consider the current per event liability limit of less than 1% of revenue for the system operator to be inadequate in this respect. On the other hand, we consider the indicative liability limits for the system operator resulting from our analysis to be too high.

Overall, given the scale and importance of the system operator role we would expect significantly higher liability limits than is currently the case. We recommend liability limits in the range of \$2m to \$5m per event and \$10m to \$20m annually.

A case study: The Carter Holt Harvey - system operator dispute

A Code breach allegation between Carter Holt Harvey (CHH) and the system operator was brought to the Rulings Panel concerning an unplanned outage on October 27, 2010.⁹ The outage lasted some 30 minutes but Carter Holt Harvey assessed its Kinleith pulp and paper mill lost a day's production as a result.

The main reason for the outage was data wrongly entered in the grid management system by the system operator some five years earlier which was not picked up until after the outage. The system operator self-reported the rule breach in March 2011.

Following investigations and hearings, the system operator was found by the Rulings Panel to have had "deficient" processes causing an incident of "moderate to high severity" involving a "systemic" error.

The Rulings Panel imposed a fine of \$15,000 on the system operator (the maximum fine at the time was \$20,000). The Rulings Panel prohibited the publication of the amount of compensation it ruled be paid to CHH but the amount sought was reported in the press to be just short of \$500,000.¹⁰

The maximum amount the system operator was liable for under the Regulations was \$200,000 per event. CHH therefore could not have received compensation of more than \$185,000.

CHH advise that the compensation it received covered little more than the legal and related costs it incurred in pursuing the case and that it received little or no recompense for the damages it incurred.

The maximum per event fine for the system operator now is \$200,000. If that fine had been imposed on the system operator for this breach, given the maximum per event liability the system operator faces of \$200,000, CHH would have received no compensation to cover either its litigation costs or the damages it incurred. The potential for such an outcome would appear to reduce the incentive for parties to bring cases against the system operator.

⁹ The Rulings Panels decision can be found at <http://www.ea.govt.nz/act-code-regs/rulings-panel/%23decisions#decisions>. Decision of 27 September 2013.

¹⁰ <http://www.nbr.co.nz/article/national-grid-operator-pinged-over-kinleith-shutdown-bd-147269>

Wholesale information trading system provider

The WITS provider is an important source of information and means of information transfer for market participants. Many parties upload and make use of information on the system. The contract generates around \$1.4m annually and the role is largely automated.

NZX Energy provides the service and it has run very smoothly since its inception. The probability of harm being caused appears very low but if it were to occur it could be of reasonable significance.

Currently there are no liability limits for the WITS provider written into regulation. The service provider agreement attempts to limit liability to \$500,000 per event and annually. In the event that multiple errors causing damage occur in one year the contract allows payments above the \$500,000 threshold to be offset by payments made in prior events. In practice this only provides a partial limitation on liability and in the case of one event in a 12 month period, no limitation at all. As the liability arrangement currently stands, the service provider agreement does not in any way limit the compensation payment the Rulings Panel may order the WITS provider to pay in damages.

The \$500,000 liability cap to annual revenue ratio is around 36% for the WITS provider but as described above there is actually no limit on the liability.

There is no historical record of liability limits applying to the WITS provider other than the current limits written into the service provider agreement.

The nature of the liability arrangements for the WITS provider is inconsistent with the rest of the industry. It seems appropriate that, as is the case with the other service providers, the WITS provider has liability limits written into the Regulations. Given the improbability of an error occurring it may not be necessary to include an annual liability limit. The fact that there has not been any issue raised to date despite the fact that technically the WITS provider has unlimited liability may suggest that there is no great perceived risk of material damage occurring. Nevertheless, we recommend liability limits in the range of \$0.7m to \$1m per event and \$1.4m to \$2m per annum.

Pricing manager

The pricing manager calculates and publishes prices for the industry. The role is performed by NZX Energy and generates around \$1.6m a year in revenue. A large portion of this contract contributes to the licensing of software owned and maintained by the system operator.

The process is largely automated but does draw on large databases of information. Therefore there is some chance of errors occurring in published prices although this is

minimised as prices are reviewed and can be adjusted if errors are found. However, if harm is caused, it has the potential to be material.

The current per event and annual liability limits of \$200,000 and \$5m represent 13% and 313% of annual revenue respectively. Given the expectation that material harm will be caused with a very low frequency it seems unreasonable that the annual limit is several times greater than the per event limit. \$5m as an annual limit also seems particularly high. This limit seems all the higher when we consider that of the \$1.6m in revenue earned \$1.1m of this goes directly towards licensing the software.

There were no liability limits written into the NZEM rules to offer a historical comparison. However a per event limit currently on par with the system operator and an even higher annual cap seems unwarranted in this case. We recommend liability limits for the pricing manager in the range of \$250,000 to \$400,000 per event and \$500,000 to \$750,000 per annum.

Reconciliation manager

The reconciliation manager reconciles electricity supply and consumption volumes across the grid. The role generates around \$1.1m annually and is performed by NZX Energy.

The act of trying to reconcile supply and demand figures provides an inbuilt check of sorts allowing the reconciliation manager to identify discrepancies before supplying its final data to other parties. This makes the likelihood of error occurring very low. However, the reconciliation manager's reports are used by all market participants and the EA, so mistakes have the potential to cause material harm to the industry.

The per-event limit of \$500,000 and the annual limit of \$2m represent cap-to-revenue ratios of 45% and 182% respectively. As the current liability limits stand these ratios fall within the middle of the indicative range. The current liability limits in regulation are in line with the MARIA rules and EGEC draft service provider agreement limits. Interestingly, the NZEM rules, the EGEC rules and the first draft of the 2003 Electricity Governance Regulations all had much higher liability limits for the reconciliation manager: up to \$5m per event and up to \$10m annually. This indicates the perceived importance and risk associated with the role of reconciliation manager.

The importance of the role and risks involved do warrant reasonable liability limits being put in place but up to \$10m seems extreme in relation to the rest of the industry considering the contract only earns the provider \$1.1m a year in revenue. We recommend liability limits in the range of \$500,000 to \$800,000 per event and \$1m to \$1.6m per annum.

Clearing manager

The clearing manager settles all purchases and sales of electricity in the industry. The clearing manager invoices market participants for electricity trades and a variety of other services and fees in the industry. The role generates around \$2m annually and is currently performed by NZX Energy.

The credit risk in the industry lies with other market participants and in the case of a significant error the clearing manager could send companies bankrupt and erode confidence in the market. It is important therefore that there are strong incentives in place to avoid such errors and there is an arrangement in place to allow injured parties to receive significant compensation.

The current liability limits are the highest in the industry at \$5m per event and \$10m annually. These limits are in line with historical limits in the NZEM rules, the EGEC draft service provider agreements and the EGEC rules. As a percentage of annual revenue these limits equate to 250% and 500%, both of which are the highest ratios in the industry.

Given the importance of the role and the scale of potential impact it is important that the liability limits remain at the top end of the industry, however the likelihood of materially impacting the industry is very low. We recommend liability limits in the range of \$1.5m to \$2m per event and \$3m to \$4m per annum.

FTR manager

The FTR manager runs regular auctions of FTRs, providing market participants with a means to hedge against locational price risk. Currently the role is performed by Energy Market Services (EMS), a subsidiary of Transpower and generates around \$850,000 a year in revenue.

The risk of an error occurring is relatively low. However, if the FTR manager were to adversely affect market participants it is likely that this impact would be very high.

Currently the liability limits stand at \$500,000 per event and \$2m annually. These limits equate to 59% and 235% of annual revenue. The role is relatively new and so there is no historical record of liability limits to consider. The current limits coincide with those of the reconciliation manager as this service was deemed the most comparable and therefore the same liability limits were considered the most appropriate.

Arguably the limits of the FTR manager could be somewhat lower as there is only one market operation service provider with a contract smaller than that of the FTR manager. We recommend liability limits in the range of \$250,000 to \$350,000 per event and \$1.3 to \$1.7m per annum.

Registry manager

The registry manager keeps up to date the national database of connections or installation control points (ICPs). This role is performed by Jade Direct NZ and is the smallest market operation service provider contract at \$450,000 per annum.

There is a large amount of data for the registry manager to keep current and so there is a relatively high chance of error of some description occurring. However, most of these errors are going to have little impact on industry participants.

The current liability limits are set at \$50,000 per event and up to \$1m per year. These limits in absolute terms are appropriately at the bottom end of the liability limits in the industry. The per event cap-to-revenue ratio of 11% is also relatively low; however the annual cap-to-revenue ratio of 222% seems quite high. The EGEC draft service provider agreement included a considerably higher liability arrangement: up to \$1.25m per event and up to \$5m per year. The MARIA registry service provider deed and the NZEM registry service provider deed contained per-event caps of \$1.25m with uncapped annual liability.

Technological progress may have simplified and automated the role somewhat but these historical limits certainly seem very high relative to other liability limits in the industry. The transition to the current, much lower limits seems appropriate. Given the low risk associated with the role and the relatively small contract, the registry manager should remain with liability limits at the bottom end of the industry limits.

We recommend liability limits in the range of \$50,000 to \$100,000 per event and \$230,000 to \$450,000 per annum.

Market administrator

The market administrator is an in-house role performed by the EA. It is a relatively low level role that deals with the coordination and oversight of the industry.

Although the role encompasses a range of tasks, on the whole it is generally a low risk, low impact service.

The current liability limits for the market administrator are \$50,000 per event and \$500,000 per year. These limits at an absolute level are the lowest of all the market operation service providers. Relative to other cap-to-revenue ratios it is difficult to determine how this compares as there is no clear revenue attributable to the EA's role as market administrator.

The role was previously performed by an external provider and in the EGEC draft service provider agreements liability limits of \$200,000 per event and \$2.5m within a 12 month period were set out. However, it needs to be noted that the WITS provider role was incorporated in the market administrator role at the time.

Perhaps slightly higher limits are reasonable if the role is contracted externally but given current arrangements it seems appropriate for the liability limits to remain at the bottom end of the industry.

We recommend liability limits in the range of \$100,000 to \$230,000 per event and \$230,000 to \$450,000 per annum.

Asset owners

An asset owner is any market participant that owns or operates an asset used for the generation or conveyance of electricity. These participants include generators, distributors, direct connect consumers and Transpower as grid owner.

Generally asset owners are likely to have very strong incentives to avoid errors, so the likelihood of material harm being caused to other participants is very low. However, in the worst case scenario for large asset owners the potential impact on the industry of poor performance could be very severe.

The liability arrangements for asset owners affect a wide range of companies of varying sizes and a large range of assets of varying scale and importance. These differences lend themselves to a liability limit linked to revenue rather than an absolute cap. However, although company-wide revenue is relatively easy to identify it becomes a complicated and unnecessary issue to attempt to apportion revenue to particular assets that are owned or operated by a company. As such an industry-wide absolute liability limit as is currently in place is appropriate.

The current liability limits stand at \$2m per event and \$6m annually. These align with the limits set out in the EGEC rules. However, the Grid Security Committee initially proposed much higher limits of \$5m and \$15m. The limits that were finally settled on were the lowest of those proposed and discussed. This indicates that there was at one point some appetite for limits higher than they are today.

Given that the probability of a large-scale error occurring is so low, a relatively large liability limit need not translate into a large expected insurance cost. It seems appropriate that a relatively high limit is in place in order to deter poor performance and ensure grid security.

We recommend liability limits in the range of \$1.5m to \$2m per event and \$3m to \$4m per annum.

Metering

The Code requires industry participants to meet certain obligations in relation to metering standards, including in relation to metering installations, testing, compliance, and inaccuracies. The Code also places obligations on industry participants in relation to

gathering and storing metering information and then providing it to the reconciliation manager.

The probability of an error occurring with respect to metering standards or metering information in the industry is actually relatively high. However, most of these cases will be insignificant and correctable. It is relatively rare that material harm is expected to be caused through metering errors.

The metering obligations affect a large number of market participants but, as with asset owners, there is no clear manner in which to attribute revenue to a particular aspect of a company's metering obligations. As such an absolute dollar limit is the most appropriate form liability limits should take. The liability limit is currently set at \$200,000 per event with no annual cap on liability.

In the electricity industry it is very unlikely that any annual liability limit that is several times greater than the per-event limit is ever going to come into effect. Nevertheless, it seems appropriate that metering standards and information should, just like all the service providers, have an annual liability limit put in place.

We recommend liability limits in the range of \$130,000 to \$200,000 per event and \$1m to \$1.5m per annum.

Ancillary services

The system operator contracts out for four different ancillary services in order to meet its performance obligations:¹¹

- frequency keeping;
- instantaneous reserve;
- over frequency reserve; and
- black start.

Each of these services provides additional support in order to secure the supply of electricity in New Zealand. There is a fairly low risk that significant harm is caused to other market participants by these ancillary service agents. However, in the worst case the threat of cascade failure could prove disastrous to the industry and the national economy.

Unlike the market operation services a number of different agents provide the same ancillary services. Revenues therefore differ across ancillary services and within ancillary services by company. As such, this is the least appropriate service to set out an absolute

¹¹ Voltage support is no longer contracted for.

dollar liability limit as it will affect the incentives of market participants to very different degrees.

Currently there are combined absolute dollar and revenue-linked limits for ancillary service agents: the lesser of \$100,000 and 5% of annual revenue per event and the lesser of \$300,000 and 20% of annual revenue annually. At most these translate into cap-to-revenue ratios of 5% and 20% respectively but in some cases considerably less.

While an error occurring is very rare it can pose an enormous threat so a relatively high limit is appropriate. The real concern is a single disastrous event, not a frequent number of cumulative errors. It therefore seems appropriate to have a per event limit very close to the annual limit or to do away with the annual limits entirely. In this case the absolute levels seem unnecessary and extremely low while the percent-of-revenue limits also appear far too low.

We suggest having separate and slightly lower liability limits for the frequency keeping ancillary service: the expected risks associated with this service are considered to be lower than the other ancillary services. We therefore recommend liability limits in the range of 50% to 75% of annual revenue per event and 100% to 150% of annual revenue per annum for frequency keeping. For all other ancillary services we recommend liability limits in the range of 75% to 100% of annual revenue per event and 150% to 200% of annual revenue per annum.

Penalty limits

The current legislation on penalty payments sets out that the maximum penalty that can be issued to any market participant for a breach of the Code is \$200,000. This is a blanket rule that applies to all market participants. Under a liability regime that tailors its total liability limits on a service-by-service basis this approach of a limit that is the same across the different services seems crude and inconsistent. With significant variation in total liability limits across services a single penalty cap may not be appropriate in all cases. We suggest linking the penalty limit to the total liability limits for each service. Alternatively, removing the penalty limit entirely and allowing the Rulings Panel to use its discretion on a case-by-case basis could also be effective.

8 Analysis of where to place the liability limits

The third question we were asked to consider was where the best place would be for the liability limits to be set out. Do the liability limits need to be prescribed in the Regulations? The current arrangement includes a prescribed liability limit set out in the Regulations for each service other than the WITS provider. Under the Electricity Industry Act, any liability limit set out for breaches of the Code should be set out in regulation. However, the

legislation could be altered to allow liability limits as they pertain to breaches of the Code to be removed from the Regulations and set out in the Code.

A third option would be to negotiate the limits through private contract. While there is a legislated Code of behaviour for market participants it would not be possible to privately contract liability limits for Code breaches. As discussed above regarding the WITS provider, such an arrangement does not offer protection against Code breaches. In principle, the legislative basis for the Code could be removed and the industry could return to a form of self-governance. This would allow privately negotiated rules and liability limits to be contracted by industry participants. We propose this as a hypothetical possibility but do not explore it further.

Liability limits set out in the Code would allow the EA to determine and alter the limits. This would provide a little more flexibility as the process required for regulation change could be avoided. However, market participants may feel there was a little less certainty if the limits appeared more flexible. A shift into the Code and under the EA's jurisdiction would remove the issue somewhat from the political sphere. However, for this to happen a law change would have to occur which would come with its own costs and transition process. It would also raise the issue of who determines the liability arrangements for the market administrator role undertaken by the EA.

In practice, there is very little difference between liability limits set out in the Regulations and the Code. This being the case, the simplest approach is for the limits to remain set out in the Regulations.

9 Other considerations

The liability arrangements are one of a number of incentives acting on market participants. This section discusses other incentives impacting the behaviour of market participants. Market participants in the New Zealand electricity industry are largely influenced by a set of incentives outside the liability limits. In order to better understand the impact of the liability arrangements we need to consider the wider context and full set of incentives that the liability limits regime falls within.

The EA's compliance process

As noted in section 5.7 above, the EA currently takes a light-handed and educative approach to compliance. However, because the EA is not repeatedly sending participants to the Rulings Panel and coming down hard on breaches does not mean its approach is ineffective. It is difficult to assess how differently the market would operate in an alternative environment but many participants seem to respond well to the current approach:

warnings, information, education, encouragement and a constant striving towards continual improvement have a significant positive impact on behaviour.

Rulings Panel's history

As noted above, few incidents reach the Rulings Panel and the penalties imposed on participants have been so insignificant that the purely financial impact would have been scarcely given a second thought by market participants. It is important to note that the current legislation has increased the maximum allowable penalty from \$20,000 to \$200,000. This is a significant change, however, since its introduction the Rulings Panel has yet to make a ruling. Such a track record is likely to indicate to participants that pecuniary penalties in and of themselves are no great cause for concern.

Although a given liability limit may seem reasonably high, the expected cost this imposes on a market participant may be relatively insignificant given the infrequency of cases taken to the Rulings Panel. It is important to note, however, that a number of cases are settled prior to being sent to the Rulings Panel and some form of compensation may be included in these settlements. This represents somewhat more of a financial risk to market participants than the possibility of a case being taken to the Rulings Panel.

Service provider agreements

The liability limits in the Regulations relate only to a market participant's liability as determined by the Rulings Panel as a result of a breach of the Code. Market participants have a variety of other liabilities and performance incentives in their service provider agreements, their private contracts with suppliers and customers and their other business relationships. There is a small risk that some kind of financial punishment may be imposed by the Rulings Panel but there is also a much broader and more significant driver of market participant behaviour: the need and desire to meet the obligations of all business relationships.

The official liability limits written into the Regulations do become more important however, insofar as they impact the liability arrangements written into private agreements such as the service provider agreements. It is difficult to determine the extent to which these two liability limits would coincide if a significant change was to occur in the regulated liability limits.

Liability limits for breaching a contract can and are included in the current service provider agreements. However, the benefit of external liability limits written into regulation is to provide some certainty to market participants about their liability exposure in the event they harm a third party. For example, NZX and the EA can formalise a service provider

agreement but the liability limits in regulation provide a cap on NZX's liability if it breaches the Code and causes harm to a market participant other than the EA.

Reputational concerns

The risk of losing a good reputation can act as a powerful incentive to market participants. The financial risk arising from the regulation-based liability limits are probably far less of a concern to market participants than the risk of public awareness of performance that fails to meet industry standards.

The electricity industry involves a number of large, long-term players and many of the service provider agreements are long term contracts. Such an environment results in repeat interactions over the course of a long term relationship. If the market were to lose confidence in a particular participant the financial repercussions could be significant.

Inherent risk aversion

It appears that market participants in the New Zealand electricity industry generally take a very conservative, risk-averse approach. This market culture is a significant driver of behaviour. For example, Transpower, despite the seemingly low liability limits for the system operator, seems to have cultivated an internal culture that places the utmost importance on supply security.

Disruption

Change brings with it disruption and the resulting uncertainty comes with a cost. A change in the Regulations could lead to market participants having to rewrite internal policies, amend various legal documents, renegotiate contracts (in particular insurance policies) in addition to the process of changing the Regulations (although presumably changes to the limits would be undertaken at the same time as other changes to the Regulations). These costs should only be incurred if there is good reason to believe a greater benefit can be achieved in doing so.

In summary, the liability limits are just a part (and arguably a very small part) of the incentives driving the behaviour of market participants. There have been a large number of breaches, with a small percentage of these investigated by the EA and only six (in the last ten years) referred on to the Rulings Panel to make a decision on. The liability limits have only once come into effect, i.e. only once has the Rulings Panel imposed a penalty large enough to require the liability cap to be enforced. Therefore, a variety of other incentives are driving the behaviour of market participants in the electricity industry.

10 Conclusions

This report considers, from a first principles basis, the liability arrangements for electricity industry participants that will best assist with achieving the EA's statutory objective. We sought to address the following question:

“What are the most appropriate liability arrangements for market operation service providers, ancillary service agents, asset owners, and in respect of (electricity) metering standards and metering information, to assist with achieving the EA's statutory objective?”

That is to say, what liability arrangements best promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers?

This report draws on the economic theory of liability to consider the most appropriate arrangements for the electricity industry. We considered:

- the optimal approach to structuring the liability limits;
- the appropriate level of the liability limit for each of the identified market participants; and
- the appropriate place for the liability limits to be set out (i.e., in regulation or in contract).

It should also be noted that the liability arrangements as they pertain to Code breaches are only one factor among many influencing the behaviour of market participants in the electricity industry. In particular, market participants are likely to be more concerned about the consequences of any mistakes or poor performance for their reputation than they are about any financial costs imposed by the Rulings Panel.

The aims in designing liability arrangements are, on the one hand, to provide adequate incentives for providers to comply with their performance obligations while, on the other hand, avoiding the risk that participants choose not to enter the market or take overly conservative approaches that could lead to an overall increase in costs for consumers.

Nevertheless it is apparent from our investigations that the current liability arrangements in the electricity market are rather ad hoc and lack consistent rigorous underpinnings. In several cases the current arrangements are so low as to potentially provide inadequate incentives for service providers to manage their risks prudently and insufficient incentive for the aggrieved parties to incur the litigation and other costs when they consider a breach has arisen.

Overall we conclude:

- the appropriate structure of the limits depends on the nature of the service. In general we favour the structure that is most common already in the Regulations of a combination of per event and per year limits;
- the appropriate level of the limits depends primarily on the likely size of damages in the event of poor behaviour by the provider and the size of the contract with the provider; and
- current legislation requires that the liability limits are in the Regulations and although there are other possibilities we do not find a compelling argument for this to change.

Bibliography

Contact Energy (2014), *Liabilities Review*, Letter to TDB Advisory, February.

Cooter, R. (1991), *Economic Theories of Legal Liability*, from the Selected Works of Robert Cooter, Journal of Economic Perspectives, Volume 5 (3), University of California, Berkeley, June.

Cooter, R., and Ulen, T. (2007), *Law and Economics*, 5th edition, Pearson/Addison Wesley, University of California, Berkeley.

Damodaran, A., *Value at Risk (VAR)*, Stern School of Business, New York University, <http://people.stern.nyu.edu/adamodar/pdfiles/papers/VAR.pdf>

Electricity Authority, *Compliance, Philosophy, Policies and Guidelines*, Establishment Board Briefing Paper for the Electricity Authority Board.

Electricity Authority (2011), *Regulations to implement the FTR market*, Consultation Paper, October.

Electricity Authority (2011), *Consultation on Regulations to implement the FTR market*, Summary of submissions and the Authority's response, November.

Electricity Authority (2012), *Review of the force majeure provisions in the Code*, Consultation Paper, June.

Electricity Authority (2012a), *Review of the force majeure provisions in the Code*, Summary of submissions, Information paper, October.

Electricity Commission (2004), *Recommended Approach and Regulation/Rule Amendments for Limitation of Liability and Force Majeure for Ancillary Service Agents under the EGRs*, Consultation Paper, August.

Electricity Commission (2004a), *Regulation Amendment Proposal: Limitation of Liability and Force Majeure for Ancillary Service Agents under the EGRs*, Consultation Paper, December.

Electricity Commission (2006), *Benchmark agreement consultation paper and draft benchmark agreement*, for the purposes of consultation under section II of part F of the Electricity Governance Rules 2003, May.

Electricity Governance Amendment Regulations, 2005.

Electricity Governance Establishment Committee (2002), *EGEC minutes 26 February 2002*, February.

Electricity Governance Establishment Committee (2002), *Limitation of Part C Liability for Assets Owners*, Paper for Electricity Governance Establishment Committee, February.

Electricity Industry Act, 2010.

Electricity Industry (Enforcement) Regulations, 2010.

Miceli, T. J., (2009), *The economic approach to law*, 2nd edition, Stanford Economics and Finance.

Rossato, A., (1994), *An Economic Analysis of Liability Rules*,
<http://www.jus.unitn.it/cardozo/review/Students/neq.html>

Shavall, S., *Economic Analysis of Alternative Standards of Liability in Accident Law*, Harvard University, <http://cyber.law.harvard.edu/bridge/LawEconomics/neg-liab.htm>

Shavall, S. (2004), *Foundations of economic analysis of law*, Belknap Press of Harvard University Press.

The Electricity Rulings Panel (2013), *Decision of the Electricity Rulings Panel Dated 27 September 2013*, September.

Transpower New Zealand Ltd, *System Operator Annual Review, 2005/06 to 2012/13*.

Viscusi, W. K., *Liability*, Vanderbilt University, The Concise Encyclopaedia of Economics, <http://www.econlib.org/library/Enc/Liability.html>.

Appendix 1: List of meetings held

In the course of preparing this report we met or held discussions with representatives of:

- Advanced Metering Services
- Business NZ
- Carter Holt Harvey
- Contact Energy
- Electricity Authority
- Electricity Networks Association
- Genesis Energy Ltd
- Jade
- Major Energy Users Group
- Meridian Energy Ltd
- Norske Skog
- NZX Energy
- Transpower (including its wholly-owned subsidiary Energy Market Services (EMS))

Appendix 2: Electricity industry service provider liability limits

Service	NZEM rules (2005) liability limits*	NZEM service provider agreement liability limits**	MARIA rules (2005) liability limits*	EGEC service provider agreement liability limits	EGEC rules liability limits
Scheduler	up to \$1m per event up to \$5m in any 12 months	up to \$200,000 per event up to \$2m in any 12 months	N/A	See 'System operator'	See 'System operator'
Dispatcher	up to \$1m per event up to \$5m in any 12 months	up to \$200,000 per event up to \$2m in any 12 months	N/A	See 'System operator'	See 'System operator'
Grid operator	up to \$1m per event up to \$5m in any 12 months	up to \$200,000 per event up to \$2m in any 12 months	N/A	N/A	See 'Asset owners'
System operator	N/A	N/A	N/A	up to \$200,000 per event up to \$600,000 in any 12 months	Liability limit not referred to in the EGEC rules
Wholesale information trading system provider***	See 'Market administrator'	See 'Market administrator'	N/A	See 'Market administrator'	See 'Market administrator'
Pricing manager****	No liability limit referred to in the NZEM rules (2005)	up to \$200,000 per event up to \$2m in any 12 months	N/A	up to \$200,000 per event up to \$5m in any 12 months	Liability limit not referred to in the EGEC rules
Reconciliation manager*****	up to \$5m per event up to \$10m in any 12 months	up to \$500,000 per event up to \$2m in any 12 months	up to \$500,000 per event up to \$2m in any 12 months	up to \$500,000 per event up to \$2m in any 12 months	up to \$5m per event up to \$10m in any 12 months
Clearing manager*****	up to \$5m per event up to \$10m in any 12 months	up to \$5m per event up to \$10m in any 12 months	N/A	up to \$5m per event up to \$10m in any 12 months	up to \$5m per event up to \$10m in any 12 months
FTR manager	N/A	N/A	N/A	N/A	N/A
Registry manager*****	No liability limit referred to in the NZEM rules (2005)	up to \$1.25m per event No annual limit	No liability limit referred to in the MARIA rules (2005)	up to \$1.25m per event up to \$5m in any 12 months	Liability limit not referred to in the EGEC rules
Market administrator	No liability for any action taken/not taken in good faith under NZEM	No liability for any action taken/not taken in good faith under NZEM	No liability limit referred to in the MARIA rules (2005)	up to \$200,000 per event up to \$2.5m in any 12 months	Liability limit not referred to in the EGEC rules
Asset owners	N/A	N/A	N/A	N/A	up to \$2m per event up to \$6m in any 12 months
Metering	N/A	N/A	up to \$200,000 per event No annual limit	N/A	up to \$200,000 per event No annual limit
Security and Quality Adviser	N/A	N/A	N/A	Up to the cost of performing the Services to the date of the claim (up to a maximum of the annual cost of providing the	N/A
Transport Adviser	N/A	N/A	N/A	Up to the amount paid to the Provider for Services under the Service Provider Agreement within the Year	N/A

Service	<i>Draft Electricity Governance Regulations 2003 liability</i>	<i>Initial (i.e. as at 15/01/2004) Electricity Governance Regulations 2003 liability</i>	<i>Final (i.e. as at 31/10/2010) Electricity Governance Regulations 2003 liability</i>	Enforcement Regulations 2010 liability limits
Scheduler	See 'System operator'	See 'System operator'	See 'System operator'	See 'System operator'
Dispatcher	See 'System operator'	See 'System operator'	See 'System operator'	See 'System operator'
Grid operator	See 'Asset owners'	See 'Asset owners'	See 'Asset owners'	See 'Asset owners'
System operator	up to \$200,000 per event up to \$2m in any 12 months	up to \$200,000 per event up to \$2m per financial year	up to \$200,000 per event up to \$2m per financial year	up to \$200,000 per event up to \$2m per financial year
Wholesale information trading system provider***	See 'Market administrator'	See 'Market administrator'	Liability limit not referred to in the final version of the EGRs 2003	Liability limit not referred to in Enforcement Regulations
Pricing manager****	Liability limit not referred to in the first draft of the EGRs	up to \$200,000 per event up to \$5m per financial year	up to \$200,000 per event up to \$5m per financial year	up to \$200,000 per event up to \$5m per financial year
Reconciliation manager*****	up to \$5m per event up to \$10m in any 12 months	up to \$500,000 per event up to \$2m per financial year	up to \$500,000 per event up to \$2m per financial year	up to \$500,000 per event up to \$2m per financial year
Clearing manager*****	up to \$5m per event up to \$10m in any 12 months	up to \$5m per event up to \$10m per financial year	up to \$5m per event up to \$10m per financial year	up to \$5m per event up to \$10m per financial year
FTR manager	N/A	N/A	N/A	up to \$500,000 per event up to \$2m per financial year
Registry manager*****	Liability limit not referred to in the first draft of the EGRs	up to \$50,000 per event up to \$1m per financial year	up to \$50,000 per event up to \$1m per financial year	up to \$50,000 per event up to \$1m per financial year
Market administrator	Liability limit not referred to in the first draft of the EGRs	up to \$50,000 per event up to \$500,000 per financial year	up to \$50,000 per event up to \$500,000 per financial year	up to \$50,000 per event up to \$500,000 per financial year
Asset owners	up to \$2m per event up to \$6m in any 12 months	up to \$2m per event up to \$6m per financial year	up to \$2m per event up to \$6m per financial year	up to \$2m per event up to \$6m per financial year
Metering	up to \$200,000 per event No annual limit	up to \$200,000 per event No annual limit	up to \$200,000 per event No annual limit	up to \$200,000 per event No annual limit
Security and Quality Adviser	N/A	N/A	N/A	N/A
Transport Adviser	N/A	N/A	N/A	N/A

* Each MARIA and NZEM service provider deed took precedence over the MARIA and NZEM rules (respectively) in the event of conflict between the rules and the deed.

** In September 1996 the contract agent negotiating the scheduler, dispatcher, grid operator and reconciliation manager deeds with Transpower noted that the negotiated liability limits represented a balance between the cost of obtaining insurance versus the level of cover appropriate to the service provider function.

*** Until 30 June 2007, the WITS service provider role was subsumed within the market administrator service provider role.

**** At the commencement of the NZEM on 1 October 1996 the pricing manager's liability was limited to \$1m per event and up to \$5m in any 12 months. The liability limit of \$200,000 per event and up to \$2m in any 12 months came into effect when the pricing manager provider was reappointed for the period 1 October 1999 to 30 September 2002.

***** In respect of the reconciliation manager's liability, the MARIA rules stated that a participant who claimed financial loss under the rules of NZEM could not claim for any financial loss under the MARIA rules.

***** Both the clearing manager and pricing manager NZEM service provider deeds in place at the time the Electricity Governance Regulations 2003 came into effect specifically limited each provider's per event liability for penalties to:

- i) 5% of 12 times the fees for the month in which the breach occurred (if the breach was admitted)
- ii) 5% of 12 times the fees for the month in which the breach occurred plus any costs awarded against the service provider (if the breach was not admitted).

***** The liability limit in the NZEM registry service provider deed for compensation and costs was \$1.25m per event, with no annual liability limit, and no fines could be imposed on the registry provider.

Meanwhile, the liability limit in the MARIA registry service provider deed for compensation and costs was \$1.25m per event, with no annual liability limit, while there was a \$5,000 per event cap on fines and a \$30,000 annual cap on fines.

Hence, for a rule breach adversely impacting NZEM and MARIA, the registry service provider's maximum liability was:

- i) per event: \$2.5m for compensation and costs, and \$5,000 for fines
- ii) annually: \$30,000 for fines, else uncapped.

Source: EA

Appendix 3: International liability arrangements

This appendix provides an overview of the liability arrangements in the Australian and Singaporean electricity markets.

The interactions between market participants within each of these electricity markets are governed by a complex set of rules, contracts and legislation. This appendix offers a brief overview of the liability arrangements in each market. For a complete understanding of the specific liability arrangements in each market we suggest a more thorough investigation.

10.1 Australia

The wholesale electricity market in Australia, National Electricity Market (NEM), has been operational since the end of 1998, and since 2005 has provided electricity to Queensland, New South Wales, Victoria, South Australia and Tasmania. Each year over AUD\$11 billion of electricity is traded on the market and consumed by almost 19 million end users.

A spot market facilitates trading between electricity generators and consumers while a financial trading market allows for electricity futures to be bought and sold. The Australian Energy Market Operator (AEMO), established in 2009, performs two core operational roles: power system operator and market operator. These roles include implementing, administering and operating the wholesale exchange and managing the security of the power system. The Australian Energy Market Commission (AEMC) acts as the rule maker and developer for Australian energy markets.

The National Electricity Objective, as stated in the National Electricity Law is:

“to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to –

- a. price, quality, safety, reliability, and security of supply of electricity; and*
- b. the reliability, safety and security of the national electricity system.”*

Market participants must comply with a variety of rules and standards in a complex and regulated industry. Market participants can adversely impact other players in a number of ways and there are fairly strict procedures and formulas to follow in calculating and paying compensation.

Compensation by AEMO for scheduling errors

In order to simplify the compensation process the AEMO is required to maintain a “participant compensation fund”. It is required that up to \$1m be contributed to the fund each year.

Establishment of Participant compensation fund

(a) AEMO must continue to maintain, in the books of the corporation, a fund called the Participant compensation fund for the purpose of paying compensation to Scheduled Generators, Semi-Scheduled Generators and Scheduled Network Service Providers as determined by the dispute resolution panel for scheduling errors under this Chapter 3.

The funding requirement for the Participant compensation fund for each financial year is the lesser of:

- (1) \$1,000,000; and*
- (2) \$5,000,000 minus the amount which AEMO reasonably estimates will be the balance of the Participant compensation fund at the end of the relevant financial year”.¹²*

This fund acts as a cap on the maximum liability faced by the AEMO in respect of scheduling errors. There is also a Dispute Resolution Panel in place to act as an independent ruling body in the case of disagreements between market participants.

“(a)Where a scheduling error occurs, a Market Participant may apply to the dispute resolution panel for a determination as to compensation under this clause 3.16.2.

(b) Where a scheduling error occurs, the dispute resolution panel may determine that compensation is payable to Market Participants and the amount of any such compensation payable from the Participant compensation fund”.¹³

“In determining the level of compensation to which Market Participants are entitled in relation to a scheduling error, the dispute resolution panel must:

- (5) Recognise that the aggregate liability in any year in respect of scheduling errors cannot exceed the balance of the Participant compensation fund that would have been available at the end of that year if no compensation payments for scheduling errors had been made during that year.”¹⁴*

Compensation by generators to network service providers

Also, if generation does not meet performance standards then the Network Service Provider is entitled to indemnification which may take the form of financial compensation.

“If the generating system is not capable of the level of performance established under paragraph (c)(1) the Generator, depending on what is reasonable in the circumstances, must:

¹² National Electricity Rules, Section 3.16.1

¹³ National Electricity Rules, Section 3.16.2

¹⁴ National Electricity Rules, Section 3.16.2(h)

(1) pay compensation to the Network Service Provider for the provision of the deficit of reactive power (supply and absorption) from within the network”¹⁵

Civil liability faced by AEMO and network service providers

The National Electricity (South Australia) Regulations set out the maximum civil liabilities faced by the AEMO and network service providers. The AEMO and network service providers have a liability limit of \$2m per event unless that event causes death or bodily injury, in which case there is no limit on civil liability.

“Maximum civil liabilities of AEMO or network service providers

(1) For the purposes of section 77A(4)(c) of the old National Electricity Law and section 119(3) of the new National Electricity Law, maximum amounts are prescribed as follows:

(a) the maximum amount of AEMO's civil monetary liability to each person who suffers loss as a result of a relevant event is, in respect of that event \$2 million;

(c) the maximum amount of each network service provider's civil monetary liability to each person who suffers loss as a result of a relevant event is, in respect of that event, \$2 million;

(e) paragraphs (a), (b), (c) and (d) do not apply in relation to civil monetary liability for death or bodily injury;”¹⁶

Indemnifying the AER, AEMC and AEMO

Market participants are required to indemnify the Australian Energy Regulator (AER), the Australian Energy Market Commission (AEMC) and the AEMO for any harm caused as a result of a rules breach. There is no limit on this compensation payment.

“Indemnity to AER, AEMC and AEMO

Each Registered Participant must indemnify the AER, the AEMC and AEMO against any claim, action, damage, loss, liability, expense or outgoing which the AER, the AEMC or AEMO pays, suffers, incurs or is liable for in respect of any breach by that Registered Participant or any officer, agent or employee of that Registered Participant of this rule 8.6.”¹⁷

¹⁵ National Electricity Rules, Section 5.2.5..1(d)

¹⁶ National Electricity (South Australia) Regulations, Section 14.1

¹⁷ National Electricity Rules, Section 8.6.5

10.2 Singapore

The Singapore electricity market is regulated by the Electricity Market Authority (EMA). The EMA also has the role of Power System Operator and has as one of its core functions industry development. The EMA was established in 2001 in an attempt to open up the Singapore electricity market.

An EMA paper, 'Introduction to the National Electricity Market of Singapore' gives a brief overview of the contractual arrangements in the Singaporean market:

"The wholesale market rules have the effect of a contract between each market participant and the EMC. This ensures that market participants have the recourse to take legal action against the EMC for damages sustained as a result of the non-observance of the market rules by the EMC and vice versa.¹⁸ But the rules also contain dispute resolution procedures to be used in the first instance. Similarly, as a condition of registration as a market participant, each applicant will be required to enter into a contract with the PSO. This has the same objective and effect as the contract that is deemed to exist between the EMC and each market participant.

The objectives of the market rules are:

- *To establish and govern efficient, competitive and reliable markets for the wholesale selling and buying of electricity and ancillary services in Singapore;*
- *To provide market participants and MSSL22 with non-discriminatory access to the transmission system;*
- *To facilitate competition in the generation of electricity; and*
- *To protect the interests of consumers with respect to prices, and the reliability and quality of electricity service."¹⁹*

Section 13 in Chapter 1 of the Singapore Electricity Market Rules describes the rules around liability and indemnification in the market.

The Energy Market Company (EMC) operates Singapore's wholesale electricity market and must indemnify market participants for any harm caused as a result of the EMC breaching the market rules.

¹⁸ The market rules do, however, contain provisions that limit liability and that address "force majeure" situations.

¹⁹ 'Introduction to the National Electricity Market of Singapore', Section 5.1.2

13.1 LIABILITY OF EMC

Subject to section 13.1.4, the EMC shall indemnify and hold harmless a market participant and the market participant's directors, officers and employees from any and all claims, losses, liabilities, obligations, actions, judgements, suits, costs, expenses, disbursements and damages incurred, suffered, sustained or required to be paid, directly or indirectly, by, or sought to be imposed upon, the market participant, its directors, officers or employees from or in respect of any matter with respect to which liability may be imposed on the EMC pursuant to section 13.1.1.²⁰

Section 13.1.1 of the rules exempts the EMC from any other liability except for that set out in the market rules.

The Power System Operator (PSO) which is responsible for the secure supply of electricity to consumers and operation of the transmission system must indemnify market participants for any harm caused as a result of the PSO breaching the market rules.

13.2 LIABILITY OF PSO

Subject to section 13.2.4, the PSO shall indemnify and hold harmless a market participant and the market participant's directors, officers and employees from any and all claims, losses, liabilities, obligations, actions, judgements, suits, costs, expenses, disbursements and damages incurred, suffered, sustained or required to be paid, directly or indirectly, by, or sought to be imposed upon, the market participant, its directors, officers or employees from or in respect of any matter with respect to which liability may be imposed on the PSO pursuant to section 13.2.1.²¹

Section 13.2.1 of the rules exempts the PSO from any other liability except for that provided in the market rules.

Both the PSO and EMC are exempt from liability in the case of a force majeure event:

13.4 FORCE MAJEURE

13.4.1 Subject to section 13.4.14, neither the EMC nor the PSO shall be liable to any market participant for any failure or delay in the performance of any of their respective obligations under these market rules, any market manual or the system operation manual, other than the obligation to make payments of money, to the extent that such failure or delay is due to a force majeure event.²²

²⁰ Singapore Electricity Market Rules, Chapter 1, Section 13.1.2

²¹ Singapore Electricity Market Rules, Chapter 1, Section 13.2.2

²² Singapore Electricity Market Rules, Chapter 1, Section 13.4.1

Market participants in the Singaporean electricity industry must indemnify the EMC and the PSO for any harm caused as a result of the participant breaching the market rules.

13.3 LIABILITY OF MARKET PARTICIPANTS

13.3.2 Subject to section 13.3.4, a market participant shall indemnify and hold harmless the EMC, the PSO or both, as the case may be, their respective directors, officers or employees and any member of a panel from any and all claims, losses, liabilities, obligations, actions, judgements, suits, costs, expenses, disbursements and damages incurred, suffered, sustained or required to be paid, directly or indirectly, by, or sought to be imposed upon, the EMC, the PSO or both, as the case may be, their respective directors, officers or employees and any member of a panel from or in respect of any matter with respect to which liability may be imposed on the market participant pursuant to section 13.3.1.²³

Section 13.2.1 of the rules exempts market participants from any other liability except for that provided in the market rules.

Section 13.5 of the Rules sets out that in the case of an inconsistency between contractual agreements and the market rules then the market rules will take precedence. It appears there is no limit on the compensation payments that market participants can be liable to pay in the event of a rules breach. However, there are strict rules around what exactly parties are liable for which in effect limits the liability of market participants. An arbitration tribunal assesses the damages against a party in light of the market rules and contractual agreements in place.

²³ Singapore Electricity Market Rules, Chapter 1, Section 13.3.2

Appendix 4: New Zealand gas industry

This appendix briefly overviews the structure and liability arrangements in the New Zealand gas industry. It is important to note that the gas industry's liability arrangements very much resemble the electricity industry's arrangements because they were modelled on them. The similarity should not be considered a precedent and therefore a justification for the current electricity arrangements.

The gas industry has its own set of enforcement regulations: the Gas Governance (Compliance) Regulations 2008. These regulations prescribe a code of rules for market participants. Under the regulations a market administrator, investigator and Rulings Panel are appointed and the process in the case of an alleged breach is very similar to that followed by the EA and the electricity industry Rulings Panel:

- *the **Market Administrator** receives breach allegations, refers allegations that it determines raises material issues to the Investigator and where appropriate, attempts to achieve a resolution on allegations it determines not to have raised material issues. The Market Administrator function is currently being undertaken by Gas Industry Co.;*
- *the **Investigator** investigates allegations of alleged breaches that have been determined to raise material issues (and unresolved breaches referred by parties) and attempts to settle them. Jacquie Kean (Barrister) and Jason McHerron (Barrister) have been appointed as Investigators.*
- *the **Rulings Panel** has jurisdiction to approve or reject settlements and determine breach allegations. The Minister of Energy and Resources has appointed Hon Sir John Hansen KNZM as the Rulings Panel.²⁴*

The Rulings Panel may order the payment of a civil pecuniary penalty up to \$20,000 in any case where a market participant has breached the governance regulations. This penalty is in line with the previous maximum penalty the Rulings Panel in the electricity industry was able to order upon breach of the Code.

The Gas Governance (Compliance) Regulations include very similar, although generally lower, limits on the liability market participants face in the gas industry as compared to the liability limits faced by electricity industry participants. For example, Sections 57 and 58 of the regulations stipulate the following liability limits:

The registry operator is not liable under these regulations for a sum in excess of—

²⁴ <http://gasindustry.co.nz/work-programme/compliance>.

(a) \$20,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$100,000 in respect of all events occurring in any financial year.

The allocation agent is not liable under these regulations for a sum in excess of—

(a) \$50,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or

(b) \$250,000 in respect of all events occurring in any financial year.

It is interesting to note that Section 58A of the regulations allow the liability limits to be determined solely by the privately contracted service provider agreement for the critical contingency operator:

The critical contingency operator is not liable under these regulations for a sum in excess of the annual fee stipulated in the critical contingency operator service provider agreement in respect of all events occurring in any financial year.

Appendix 5: New Zealand financial markets

This appendix is a brief overview of the liability arrangements in New Zealand's financial markets. In particular, we have looked at the liability arrangements of New Zealand Clearing Limited (NZCL) and New Zealand Depository Limited (NZDL), together forming part of the NZX settlement and depository system; NZClear, a securities settlement system and central depository operated by the Reserve Bank of New Zealand (RBNZ); and the Exchange Settlement Account System (ESAS), a real time gross settlement system operated by the RBNZ. Table 13 below provides a summary of our findings:

Table 13: Summary of financial market liability limits

Service	Provider	Annual Revenue	Liability Limits	Contract Between
NZX Settlement and Depository System	NZCDC (NZX)	NZCDC: \$3.7m (NZX: \$56m)	Settlement failure: compensation of direct losses (no cap). Direct fraud: compensation of direct losses (no cap). Indirect fraud (general principles of law): compensation of direct losses up to \$5m per event.	NZCDC and Financial Institutions
NZClear	RBNZ	Revenue (Jun 2013): \$4.5m	Limited to direct losses. Total aggregate limit per event of \$5m	RBNZ and Financial Institutions
Exchange Settlement Account System	RBNZ		No liability unless gross negligence (limited to direct funds lost in account unrecoverable by accountholder)	RBNZ and Financial Institutions (accountholders)

NZX settlement and depository system

Both NZCL and NZDL are wholly owned subsidiaries of New Zealand Clearing and Depository Corporation Limited (NZCDC) which is a wholly owned subsidiary of NZX Limited. NZCL offers clearing and risk management services for NZX's markets, covering cash equity and debt products as well as derivatives. NZDL provides securities safe keeping services, stock lending and borrowing, and settlement of transactions between participants.

NZCDC Group earned around \$3.7 million in revenue for the 12 months to 31 December 2012. NZX Limited earned around \$56 million in revenue over the same period.

NZX rules require all equity trades that occur on the NZX market to be settled on the NZCDC settlement system. The NZCDC settlement system is a designated settlement system under part 5c of the Reserve Bank of New Zealand Act 1989 and is regulated jointly by the Reserve Bank of New Zealand (RBNZ) and the Financial Markets Authority (FMA).

A designated settlement system is required to have, amongst other things, rules that govern the operation of the system, and those persons that interact with the system. NZCDC publishes two sets of rules, one for NZCL and one for NZDL. Both rules are of a similar

nature and we have below highlighted some of the key sections in regards to compensation and liability limits within the NZCL clearing and settlement rules.

NZCL – Clearing and Settlement Rules

Section 4.4: Compensation for Settlement Failure

- 4.4.1 *If CHO (NZCL) fails to deliver any or all of the required quantity of an Approved Product... or CHO (NZCL) fails to pay all or any part of the amount required to be paid... affected Clearing Participants and Lending Clearing Participants may seek compensation from CHO (NZCL)... for direct losses resulting from that failed delivery or payment, which CHO (NZCL) will be entitled to recover from any Clearing Participant or Lending Clearing Participant responsible for the failure.*
- 4.4.4 *...CHO (NZCL) must determine in good faith the amount of compensation which reflects the direct losses...*
- 4.4.5 *If CHO (NZCL) determines to pay less than the amount of compensation claimed, it will... provide reasons for its determination and a calculation showing how the amount of compensation paid (if any) was calculated.*
- 4.4.8 *CHO (NZCL) will not be liable to pay compensation in respect of any settlement failure if such failure arises out of causes beyond the reasonable control of CHO (NZCL) or NZCDC.*

Section 8.1: Liability of Affected Persons

- 8.1.1 *CHO (NZCL) and each Clearing Participant and each Lending Clearing Participant agree and acknowledge that:*
- (a) the sole and exclusive remedy for settlement failure by CHO (NZCL) is payment of compensation under, and subject to the terms of, Rule 4.4; and*
- (b) in order to balance the importance of appropriate compensation being paid... in the event of settlement failure, with the desirability of maintaining the stability (of the system)... the liability of each Affected Person (NZCL, NZCDC, NZX) in respect of any other breaches, acts or omissions by each Affected Person shall be limited or excluded on the basis set out in this Rule 8.1.*
- 8.1.2 *Each Affected Person's liability to any Person for any breach, act or omission whatsoever... is limited to:*

a) Losses resulting from fraud that is directly attributable to that Affected Person or Losses resulting from fraud that is indirectly attributable to that Affected Person through general principles of law... provided that notwithstanding any fraud, no Affected Person will be liable for any indirect or consequential damages, nor any loss of profits, goodwill, reputation or opportunity, whether direct or indirect...

b) in respect only of CHO (NZCL), compensation payable to Clearing Participants or Lending Clearing Participants under, and subject to the terms of, Rule 4.4 in relation to a settlement failure.

8.1.3 *The total aggregate limit of an Affected Person's liability in respect of or arising out of or in connection with any one event for which that Affected Person is liable under Rule 8.1.2 shall be as follows:*

(a) in the case of Losses resulting from fraud that is directly attributable to an Affected Person... liability shall not be subject to a monetary cap.

(b) in the case of Losses resulting from fraud that is indirectly attributable to an Affected Person through general principles of law... the total aggregate liability of that Affected Person and all other Affected Persons for those Losses shall not exceed NZ\$5 million.

(c) in the case of compensation payable by CHO (NZCL) to a Clearing Participant or Lending Clearing Participant under Rule 4.4, the compensation payable by CHO (NZCL) shall be subject to such limitations, conditions and exclusions as set out in Rule 4.4.

8.1.4 *Except as expressly set out in Rule 8.1.2, no Affected Person will have any obligation or liability to any Person, whether a claim is made in contract, tort (including negligence), equity or otherwise, and whether under statute, warranty, indemnity, or any other obligation to pay...*

8.1.5 *If for any reason any Affected Person is liable to any one or more Persons under or in connection with these Rules, all Affected Persons' total aggregate liability in respect of all those Persons together, and all Affected Persons' breaches, acts and omissions combined, will not in any circumstances exceed an aggregate total of \$100 (or if this amount is not enforceable at law, then the minimum amount that is enforceable at law), provided that this limitation will not apply to liability permitted under Rule 8.1.2.*

In summary, the rules stipulate that:

- in the occurrence of settlement failure, compensation of direct losses is the exclusive remedy and the amount of compensation of direct losses is established by NZCDC in good faith (there does not appear to be a cap on how much NZCDC will pay in direct losses);
- in the occurrence of fraud directly attributable to NZCDC, compensation of direct losses is not subject to a monetary cap;
- in the occurrence of fraud indirectly attributable to NZCDC through general principles of law, the total aggregate liability for those direct losses shall not exceed NZ\$5 million; and
- notwithstanding any fraud, NZCDC is not liable for any indirect or consequential damages, nor any loss of profits, goodwill, reputation or opportunity, whether direct or indirect.

NZClear

NZClear is primarily a securities settlement (fixed interest and equities) system and central depository, operated by the Reserve Bank of New Zealand (RBNZ). Non-broker to broker wholesale transactions by New Zealand and offshore parties (i.e. trades not done on the NZX) are generally matched and settled on the NZClear system.

The rights and obligations of members to each other and the rights and obligations of the RBNZ as operator of the system are governed by a mutual contract entered into by all members. This contract is known as the NZClear Rules.

21.4 Limitation of liability

21.4.1 Where the System Operator... is liable to any other person in respect of any matter arising out of or in connection with the System, that liability shall be limited to direct losses. The System Operator shall not be liable in respect of any act or omission, including any wilful default or act done or omitted other than in good faith, for:

(a) indirect losses of any kind, including loss of profits, or damage to reputation; or

(b) losses which exceed the maximum liability set out in Rule 21.4.2.

21.4.2 The total aggregate limit of the System Operator's liability under these Rules or otherwise in respect of all claims made by Members or Participating EAHs in respect of or arising out of any one event will not exceed five (5) million dollars. For the purpose of this Rule 21.4, all inter-related events which give rise to the System Operator's liability under these Rules or otherwise will be treated as one event. In the event of any two or more Members or Participating EAHs suffering losses which exceed the total aggregate limit of \$5 million, the liability of the System Operator to

each of those Members or Participating EAHs in accordance with this Rule 21.4 will be proportional to the total loss suffered by each of those Members or Participating EAHs respectively.

In summary, the rules stipulate that:

- the system operator's (RBNZ's) liability is limited to direct losses; and
- the total aggregate limit of the liability arising from one event will not exceed \$5 million.

Exchange Settlement Account System

ESAS is the RBNZ's system that allows individual transactions to be settled electronically between financial institutions as they happen. ESAS is New Zealand's principal high-value payments system which is used to settle payment instructions between accountholders (largely comprising financial institutions). The RBNZ publish the terms and conditions underpinning the agreement between provider (RBNZ) and accountholder (financial institutions).

17. Limitation of Liability

17.1 The Accountholder acknowledges and agrees that:

(a) the Transaction Fees have been or will be set by the Reserve Bank... having regard only to recovering the cost to the Reserve Bank of providing, managing and operating the System and administering the Settlement Accounts;

(b) the potential damage or loss that might be suffered by the Accountholder by reason of the failure of the Reserve Bank to observe or perform any of its obligations... or to take or omit to take any action, is wholly disproportionate to the fees that the Reserve Bank expects to receive...

(c) ... the Reserve Bank will not be liable for any act or failure to act in the performance of its obligations... nor for the consequences of such acts or omissions and will therefore not be liable to the Accountholder for any loss, costs, claims, demands or other damages suffered or incurred by the Accountholder... unless such liability arises from the proven gross negligence, wilful default, fraud or theft of the Reserve Bank... (in which case the Reserve Bank will be liable only for the amount of any funds lost from the Accountholder's Settlement Account as a direct result of such proven gross negligence, wilful default, fraud or theft which is not reasonably able to be recovered by the Accountholder (taking reasonable steps to do so without delay) and provided that the immediate cause of any such loss from the Accountholder's

Settlement Account is not due to any act or omission on the part of the Accountholder).

- 17.2 *For the avoidance of doubt, it is expressly agreed that in no event will the Reserve Bank be liable to the Accountholder for any indirect, special, incidental or consequential loss or damages of any kind and however arising (including loss of revenues or profits, lost data, business interruptions, or loss arising from errors, or breaches of security, in the Accountholder's own systems, including the Accountholders Submitting System) even if advised of the possibility of such loss.*

18. Accountholder Remedies

- 18.1 *The Reserve Bank acknowledges that failure on its part to perform the obligations it has agreed to perform... could result in significant losses being incurred and/or irreparable harm being suffered by the Accountholder that are not or that is not, by these Terms and Conditions compensatable or fully compensatable in damages recoverable from the Reserve Bank as a result of its contractual breach. The Reserve Bank therefore further acknowledges that the Accountholder has (in addition to any other remedy available to it at law, in equity or otherwise) the right to apply for urgent interlocutory relief and substantive relief (by whatever court ordered remedy sought by the Accountholder and available to it from the courts) to stop the Reserve Bank from acting in default of, or requiring the Reserve Bank to act in accordance with these Terms and Conditions and/or the Business Continuity Plan in the performance of those obligations.*

In summary, the terms and conditions stipulate that:

- the RBNZ and account-holders (financial institutions) note that the potential damage or loss that might be suffered by the account-holders of a system failure are wholly disproportionate to the fees collected by the RBNZ;
- the RBNZ will not be liable for any act or failure to act in the performance of its obligation nor for the consequences of such acts or omissions and will therefore not be liable to the account-holders for any loss, costs, claims, demands or other damages suffered or incurred by the accountholders;
- the RBNZ will be liable for any funds lost in the account-holders' settlement accounts (if the accountholders cannot recover in full) if the liability arises from the proven gross negligence, wilful default, fraud or theft of the RBNZ;
- the RBNZ is not liable to the accountholders for any indirect, special, incidental or consequential loss or damages of any kind and however arising; and
- the RBNZ acknowledges that the accountholders have (in addition to any other remedy available to it at law, in equity or otherwise) the right to apply for urgent

interlocutory relief and substantive relief to stop the RBNZ from acting in default of, or requiring the RBNZ to act in accordance with the Terms and Conditions and/or the Business Continuity Plan in the performance of those obligations.