

Orion CPP Application: Submission on Professor Yarrow's Expert Advice

26 June 2013

1 Introduction and Summary

Professor George Yarrow was asked to provide advice to the Commerce Commission on aspects of the Commission's decision on a Customised Price-quality Path (CPP) application made by Orion.

Summary of Professor Yarrow's advice

Professor Yarrow's terms of reference focus on three main questions:

- In principle, would the costs and risks of a catastrophic event such as an earthquake be borne by businesses or by consumers in workably competitive markets characterised by the existence, on the supply side, of long-lived, specialised assets?
- Taking into account specific features of the New Zealand regulatory regime, should Orion be allowed to claw-back: (i) the costs associated with repairing and replacing assets that were damaged by the earthquakes; and (ii) foregone revenues resulting from decreased electricity consumption after the earthquakes?
- If it is concluded that at least some degree of claw-back should be applied, how should recovery of the costs of the earthquakes be allocated between consumers and Orion's shareholders?

Professor Yarrow's advice on these three areas, while qualified, is broadly that:

- The costs of events such as the Christchurch earthquake would not commonly be passed through entirely to customers in workably competitive markets—some of the costs would generally be borne by suppliers. However, he says this question should be answered empirically;
- Good regulatory practice tends to avoid claw-back, unless the avoidance of claw-back would itself cause significant harm. This conclusion is explicitly premised on the assumption that the regulatory framework allows for the recovery of expected efficient costs *ex ante*—including the costs of catastrophic events; and
- Professor Yarrow does not draw definitive conclusions on the allocation of the costs between consumers and Orion's shareholders. He does recognise that ultimately all costs will be borne by consumers because suppliers should be appropriately compensated (either *ex ante* or *ex post*) for the efficient costs of managing the risks allocated to them. In his view, provided that a regulator makes *ex ante* allowance for the recovery of the efficiently incurred expected costs of catastrophic events on a probability basis, then any deviations between

the expected and actual outcomes—favourable or unfavourable—should be borne by suppliers.

This report attempts to apply the principles set out by Professor Yarrow

Although Professor Yarrow’s advice usefully sets out some principles for thinking about the allocation of risk in regulated industries, he does not provide direct answers to the questions posed by the Commission. On the experience in workably competitive markets, Professor Yarrow calls for empirical evidence. On the question of treatment under New Zealand’s regulatory regime, Professor Yarrow refers to the principles of good practice regulation rather than the actual regulatory regime that applies in New Zealand.

In this report, we seek to apply the principles set out in Professor Yarrow’s advice by:

- Looking at whether the empirical evidence supports the view that workably competitive markets allocate the costs of catastrophic events such as earthquakes to suppliers. We do this by analysing an actual workably competitive market for long lived infrastructure—the market for public private partnerships (PPPs) under a variety of long-term contracts; and
- Examining the regulatory framework that applies to Orion to determine whether it supports the kind of risk allocation that is consistent with a workably competitive market for long lived infrastructure assets.

Applying Professor Yarrow’s reasoning supports Orion’s claw-back application

We find that the empirical evidence from the actual workably competitive markets for long lived infrastructure shows there is a high degree of explicit risk sharing between the public and private parties for catastrophic events. This suggests the empirical evidence is indeed contrary to Professor Yarrow’s initial views. Our review of the actual contracts in this market finds a weighting towards a greater proportion of risk of catastrophic events being met by consumers (through the public sector contracting agency). The evidence from PPP contracts also suggests the trend is to compensate firms for the costs and risks of catastrophic events is *ex post*—that is on an “as incurred basis”—but based on a clearly specified *ex ante* methodology.

We also observe that the current New Zealand regulatory framework is consistent with the *ex post* treatment observed in PPP contracts. While this differs from the approach advocated by Professor Yarrow, and may be an issue for the Commission to consider as part of a review of its Default Price Path (DPP)/Customised Price Path (CPP) and Input Methodology (IM) settings, it has little or no relevance to Orion’s CPP application. Instead, the Commission must consider Orion’s application within the context of the regulatory settings that existed at the time of the earthquakes, rather than against Yarrow’s preferred setting which incorporates an element of *ex ante* risk sharing. Based on our understanding of the current regulatory settings in New Zealand, there is little or no reason to expect regulated suppliers receive any *ex ante* compensation for such events.

In abstract, Professor Yarrow’s evidence appears to be indecisive about the extent of claw-back that should be permitted in this case. However, when read in the context of the empirical observations and New Zealand’s regulatory settings, we see Professor Yarrow’s advice as supporting Orion’s case for claw-back. This is for two reasons:

- Because the empirical evidence—from the related workably competitive market for infrastructure PPPs—shows that explicit *ex post* risk allocation to consumers is common; and

- Under the current regulatory framework regulated suppliers have not received *ex ante* compensation for the costs and risks of catastrophic events, as shown by the Commission’s statements that compensation for Type I risks are not included in the cost of capital.

This leaves claw-back as the only option available for regulated suppliers to recover their efficiently incurred costs when recovering from catastrophic events.

2 Workable Competitive Markets

Professor Yarrow states that he would not expect earthquake costs and risks to be passed through to consumers in workably competitive markets—so that in general, these costs should be borne by suppliers. However, he says he would look at empirical evidence—“an ounce of empirical evidence is worth a tonne of theory”.

In this section we accept Professor Yarrow’s challenge to find empirical evidence on how workably competitive markets for long lived infrastructure treat these events. We specifically look at the contracts entered into public sector agencies and private firms providing infrastructure—commonly known as PPPs. These contracts arise from competitive procurements, and have a long pedigree in dealing with all manner of risks (including the risks of catastrophes).

A workably competitive market for infrastructure

The Commission asked Professor Yarrow to specifically consider how workably competitive markets operate for “long lived infrastructure assets”. In PPPs, private sector firms compete in tendering processes for the right to construct infrastructure and provide services to the public for long periods—up to the economic life of the assets constructed. The rights and obligations of both the successful bidder and the public sector counterparty are specified in detailed and complex contracts.

Infrastructure PPPs and regulated networks therefore both involve long-term infrastructure provision with prices that are not set through regular market interactions. However, PPPs are not regulated due to the presence of “competition for the market”—firms competing for the award of a single contract. This means that successful bidders enter into contracts that reflect the risks and rewards inherent in providing the required infrastructure.

In our view, the Government also has similar objectives for PPPs and regulated industries—that suppliers have incentives to invest and innovate, to seek out efficiency gains and share them with customers (the public sector), and not to extract excessive profits. These objectives are clearly stated as part of the process of procuring a PPP contractor.¹ In effect, PPPs achieve these objectives through a regulatory regime that is locked in through the contract.

These characteristics make infrastructure PPPs an appropriate workably competitive market proxy for regulated suppliers such as Orion.

The way in which PPP contracts provide for *force majeure* events and specify the financial consequences of *force majeure* are particularly relevant to Orion’s CPP application. PPP contracts determine the financial flows between the parties, which mean even unforeseeable events such as the Christchurch earthquake need to be anticipated in the

¹ See for example NZTA’s announcements on the use of PPP procurement for the Transmission Gully highway project, which includes the core objectives of “value for money” and “innovation”. Available online at <http://www.nzta.govt.nz/projects/transmission-gully/docs/ppp-background.pdf>

contract and dealt with *ex ante*. At the start of the contract both parties should have a clear understanding of the risk allocation and financial consequences of these events.

The Canterbury earthquakes would meet the definition of *force majeure*

The European Court of Justice defines *force majeure* as:

*...the concept of force majeure, even though not limited to absolute impossibility, nevertheless implies that the non-performance of the act in question is due to abnormal and unforeseeable circumstances beyond the control of the person invoking force majeure whose consequences could not have been avoided in spite of the exercise of all due care.*²

The Christchurch earthquake clearly meets all three elements of this definition of *force majeure*:

- **“Abnormal and unforeseeable circumstances”**. While earthquake risks are known to be present in New Zealand, the nature and extent of the Christchurch earthquakes was not foreseeable. We note that earthquakes of this magnitude have been variously assessed as somewhere between a 1 in 120 year to 1 in 650 year event.³ *Force majeure* events are often referred to as “acts of God”, which are defined as:

*specifically storms, lightning, cyclones, earthquakes, natural disasters, actions of the elements, tidal waves, floods, droughts, landslides, mudslides and nuclear, chemical and biological contamination*⁴

- **“Consequences that could not have been avoided in spite of the exercise of all due care”**. It would appear that Orion took reasonable steps to avoid the physical and financial consequences of a major earthquake by operating a resilient network and taking out appropriate insurance. The reasonableness of Orion’s mitigating actions needs to be assessed against the remote probability of this risk event occurring (summarised under the bullet point above); and
- **“Non-performance”**. Orion could not meet its service obligations directly as a result of the earthquake.

While there are other definitions of *force majeure*, all concentrate on the magnitude and timing of the event, the unpredictability, and the degree of externality (beyond the control of either party to the contract).

Under these standard definitions of *force majeure*, if the Orion network was the subject of a PPP-style infrastructure concession contract, then the Canterbury earthquakes would have been declared as *force majeure* events. This makes the treatment of *force majeure* risk in the workably competitive market for PPPs the best empirical proxy for the current application to claw-back costs and foregone revenues.

Approach to surveying *force majeure* in PPP contracts

To provide a systematic review of the way infrastructure PPP contracts deal with the risk of *force majeure* events we have:

² Judgment of the Court of 7 May 1991; Organisationen Danske Slagterier agissant pour Jydske Andelsslakteriers Konservesfabrik AmbA (Jaka) v Landbrugsministeriet

³ Orion CPP submission, page 481

⁴ Partnerships Victoria, Risk Allocation and Contractual Issues, pp151

- Focused on *force majeure* events that are uninsurable, or uninsurable at an efficient premium. Insurance is the first source of funds for compensation in *force majeure* events, and PPP contracts typically require the private party to hold and maintain specified insurances. In some circumstances, when a risk becomes uninsurable that event in itself may allow the parties to claim *force majeure*; and
- Used model and template contracts, rather than specific examples. We draw on an extensive review of typical termination and *force majeure* provisions across 16 jurisdictions including the United Kingdom, Germany and France published by the European PPP Expertise Centre (EPEC).⁵ We then add the specific experience from a number of PPP model contracts, templates and guidelines outside of Europe, including from the New Zealand Government, Australian State Governments, and the World Bank. We believe that this approach is likely to be more representative of the general intent of PPP arrangements, and removes the risk that the evidence we rely on reflects specific contract negotiations or idiosyncratic risk allocations.

Our review focuses on the compensation payable on termination as a result of a *force majeure* event. This provides the best indicator of how the risk of *force majeure* events is shared between the public and private party to the contract. Where the public party is required to pay significant compensation, then the consumer under the contract is clearly bearing risk. In contrast, if the infrastructure provider is not compensated for the costs that it bears in *force majeure*, then suppliers are bearing risk.

Empirical evidence suggests that risks of *force majeure* events are largely borne by consumers

In general, we find that the compensation payable on termination as a result of *force majeure* shows a high degree of risk sharing between the public and private party, with the greatest risk and cost being taken by the public party. We also find that while all of these contracts clearly specify how such events are to be dealt with *ex ante*, the determination of compensation is invariably *ex post*. This is reasonable because *ex post* compensation is likely to be more efficient for highly unpredictable events. In other words, it is seldom deemed efficient to compensate suppliers *ex ante* on some actuarial basis because the risk event may or may not occur during the term of the contract.

This has important implications for operation of Part 4 of the Commerce Act. In theory, businesses are regulated in perpetuity and thus an actuarial determination of the costs of such events may well be appropriate. However, in a practical sense, given the time horizons that approximate the economic life of infrastructure assets, *ex post* compensation may be more efficient. At least, that is the revealed preference of parties to PPP and concession contracts.

Turning to some specific examples to illustrate these conclusions, EPEC's analysis of typical PPP contracts across 16 European jurisdictions found that nearly all jurisdictions provide for some type of compensation in the case of *force majeure* termination. This was because it was considered that since *force majeure* is the fault of neither party, the financial consequences should be shared. In regard to compensation, EPEC found that:

⁵ "Termination and Force Majeure Provisions in PPP Contracts", Allen & Overy for the European PPP Expertise Centre, March 2012

Compensation typically covers sums owed to the senior lenders (e.g. debt outstanding, unpaid interest, hedging breakage costs), the equity contributions paid in by investors as well as payments owed to the subcontractors; and

Compensation typically does not provide for any loss of future income. Monies owed to equity investors are net of distribution amounts already paid out (e.g. in Belgium, England, the Czech Republic and Germany).

The analysis also found that in regard to the related issue of insurance, if a risk became uninsurable, then the parties try to negotiate a mutually satisfactory solution. If that fails, then the public sector party has the option of accepting the risk itself or terminating the contract.

In the New Zealand National Infrastructure Unit “Draft PPP Standard Contract”, the compensation payable on termination as a result of a *force majeure* event is the greater of outstanding senior debt or the fair market value of the contract as determined by an independent expert. In other words—at the very least—the compensation payable and passed on to customers (or taxpayers) is the value of debt. Since PPPs are generally highly leveraged—perhaps 60 percent to 80 percent debt—then the bulk of the risk of a *force majeure* event is borne by the customers of the private infrastructure provider.

The Partnerships Victoria publication, “Risk Allocation and Contractual Issues” states that:

Taking into account both the nature and impacts of force majeure risk (including force majeure risks which are non-insurable, or insurable but at an unreasonable cost), optimal risk allocation principles may dictate that better value for money can be achieved by sharing a risk between government and the private party rather than allocating it to only one party

Partnerships Victoria also suggests that compensation payable on termination for *force majeure* events should be dealt with under a Material Adverse events mechanism:

The usual effect of a material adverse effect regime is to allocate risk (at least in part) to government or, in any event, away from the private party, through a process of mitigation which involves aspects of risk sharing. In general, the outcome specified is to afford redress to the private party in the event of a risk materialising, to the extent of protecting both its debt servicing ability and the project’s equity return to its investors.

Again under this mechanism, sufficient compensation is payable to return the private sector’s outstanding debt and equity—a considerable bias towards the costs being met by customers and tax payers.

The World Bank Institute PPP Reference Guide states that where termination occurs as a result of prolonged *force majeure* circumstances, compensation is typically between the extremes of:

- Payment of outstanding senior debt only (this is the usual position for private party default—that is protecting the lenders); and
- Payment of outstanding debt equity and forgone future profits (usual for public party default).

The World Bank states this is on the basis that neither party is at fault. Again even the lowest level of compensation would see customers and taxpayers assuming the bulk of the costs of termination. The World Bank Sample *force majeure* clause deals with the circumstance where the operator is entitled to be compensated for additional costs incurred (but no profits) if they continue to provide the service after a *force majeure* event:

If and to the extent that the Operator is prevented from executing the Services by the Event of Force Majeure, while the Operator is so prevented the Operator shall be relieved of its obligations to provide the Services but shall endeavour to continue to perform its obligations under the Contract so far as reasonably practicable [and in accordance with Good Operating Practices], [PROVIDED that if and to the extent that the Operator incurs additional Cost in so doing, the Operator shall be entitled to the amount of such Cost [COST BEING DEFINED AS HAVING NO PROFIT COMPONENT] (the Operator having taken reasonable steps to mitigate the Cost)].

This sample clause clearly requires the public sector party to compensate the operator for additional costs incurred as a result of the *force majeure* event.

Applying the evidence from PPP contracts to Orion’s claw-back application

These examples suggest the empirical evidence on how the risks of catastrophes are allocated and shared in PPP contracts differs from Professor Yarrow’s expectation that these risks would be borne by suppliers, rather than consumers.

We draw a number of conclusions from our review of PPP contract guidelines and model clauses:

- The Christchurch earthquake would qualify as a *force majeure* event under such contracts;
- In PPP contracts, the degree of risk sharing for such events is very largely determined *ex ante* through termination payments and is clear to both parties. Many of the clauses regarding payment on termination are formulaic—covering senior debt, for example—and to the extent that they are not determined *ex ante*—the contracts provide for *ex post* negotiation or determination by an independent expert; and
- The costs and risks are generally shared between the parties, with the public sector bearing the greater proportion because the private sector debt (usually a high proportion of total investment in highly leveraged infrastructure projects) is almost always guaranteed.

Given that PPP contracts are agreed in mature, competitive markets, this evidence suggests the risk allocation has evolved not from the theoretical construct proposed by Professor Yarrow, but because its more efficient. Parties clearly prefer to have a clear up-front allocation of risks, including through the codification of *ex post* payment of compensation, with most of the costs of *force majeure* borne by the consumer.

We conclude that if the Orion network was the subject of a PPP contract, then the only issue in regard to claw-back would be one of prudence—whether Orion has taken reasonable steps to mitigate costs.

3 New Zealand’s Regulatory Framework

Orion does not operate in a workably competitive market, but within a regulatory framework that aims to mimic the outcomes of a workably competitive market.

In the workably competitive market for PPP contracts:

- Firms earn returns that are commensurate with the risks that they bear—that is in the long run they earn appropriate returns
- There is *ex ante* clarity on the nature and extent of risk sharing and clear codification of the *ex post* compensation payable for *force majeure* events; and

- Compensation for *force majeure* events would be paid *ex post* on an “as incurred basis”.

In the remainder of this section, we consider whether the current New Zealand regulatory framework can be said to mimic the workably competitive market. In particular, we look at how much *ex ante* clarity is provided under the regulatory regime for *force majeure* events. If there is no clarity, then *ex post* claw-back is warranted to ensure that regulated suppliers earn returns that compensate them for the risks they bear.

3.1 Implications of the New Zealand Regulatory Regime

We begin by analysing the various statements and decisions made by the Commission in regard to the treatment of Type I risks and/or extreme events under the DPP process.

Evolution of the electricity regulatory regime

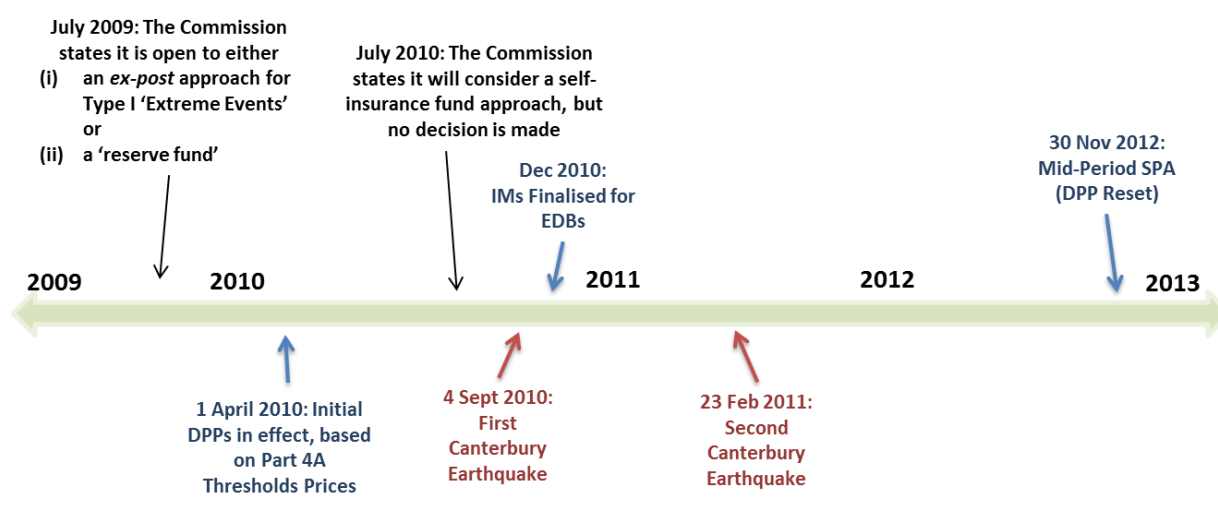
Prior to the current regulatory system, Electricity Distribution Businesses (EDBs) were subject to Part 4A of the Commerce Act, which enforced price and quality thresholds. These thresholds, introduced in 2001, required EDBs to recover revenues below a certain level determined by the Commission and ensure that their services met stated quality standards. If either threshold was broken, the Commission could impose price and/or quality control.

In 2008, Part 4 of the Commerce Act was amended, introducing the DPP) and CPP regime for EDBs. The Initial DPPs came into effect on 1 April 2010, and were based on prices under the Part 4A thresholds regime, adjusted for inflation. This gave time for the Commission to finalise IMs to guide the calculations of the next regulatory period’s DPPs. The prices currently charged by Orion were set under the Initial DPP.

The IMs were finalised in December 2010 and led the Commission to initiate a further reset of the DPPs on the basis that price paths resulting from the IMs would be materially different from those set in the initial DPP. However, by this time the first of the Canterbury earthquakes had already struck—just three months prior to the final IMs being published. As a result, Orion was not included in mid-period reset, which was completed in November 2012.

Figure 1 provides an overview of the evolution of the regulatory regime for EDBs and the timing of the Canterbury earthquakes. Figure 1 also lists two occasions (and there may have been more), when the Commission made statements about the treatment of Type I (catastrophic) risks.

Figure 1: Evolution of the Regulatory Regime and the Approach to Type I Risks



The Commission has provided mixed signals to respond to Type I risks

During the development of the IMs for the new Part 4, the Commission provided mixed signals on how EDBs should prepare for an extreme event. In the June 2009 IM Discussion Paper, the Commission discussed how regulated suppliers can face asymmetric risk.

- Type I risks were considered to be those that arise through infrequent, unexpected events, that the regulated supplier can typically not insure against, for example, earthquakes.
- Type II risks are more predictable, and may be such things as asset stranding, competitive entry, or demand shocks.

The Commission expressed the view that it would not be appropriate for EDBs to attempt to self-insure against Type I risks, as is usually done in workably competitive markets. This was because of the difficulty in quantifying the amount required to self-insure against a one-off, extreme event.⁶

Two options were initially suggested by the Commission to deal with Type I risks—establish a reserve fund, or through *ex-post* compensation. The reserve fund would be funded *ex-ante* and would be available to assist any EDBs that were affected from an extreme event.

A year later in the IMs draft decision paper (July 2010), the Commission described its view on self-insurance in the following terms:

The Commission's draft decision is that it will not adjust the cost of capital to allow for Type I risk. The Commission will consider an approach of allowing a supplier to set up a self-insurance fund further in the context of information disclosure requirements.⁷

⁶ See paragraphs 8.71 to 8.78 in <http://www.comcom.govt.nz/assets/Pan-Industry/Input-Methodologies/Input-Methodologies-Discussion-Paper-19-June-2009.pdf>

⁷ See paragraphs 3.6.28 and 3.6.29 in <http://www.comcom.govt.nz/assets/Pan-Industry/Input-Methodologies/Draft-Determinations-CC-Papers/Input-Methodologies-for-EDBs-and-GPBs-Companion-Paper-Draft-Determinations-and-CPP-Requirements-July-2010.pdf>

In the final IMs Reasons Paper published in December 2010, the Commission made a decision not to include an allowance for Type I risks in the WACC IM. The IMs did not otherwise address Type I risks.

What could suppliers expect from the regulatory regime?

Our conclusions from this analysis of the evolution of the current and previous regulatory frameworks are:

- Compensation for the costs and risks of catastrophic events is not part of the regulated returns allowed through the WACC. The Commission clearly decided that the cost of capital does not include compensation for Type I risks
- Self-insurance allowances and provisions do not appear to have been included as part of the operating expenses of EDBs under any of the previous frameworks (such as Part 4A), and are not found in the IMs—despite the Commission’s comments during the development of the IMs that it would consider self-insurance; and
- Insurance costs are a prudent and efficient operating cost incurred by EDBs.

In our view, these conclusions make it entirely reasonable for regulated suppliers to have interpreted the regulatory framework as allowing *ex post* recovery through clawback. Given the absence of *ex ante* compensation through an adjustment to the cost of capital or an explicit allowance for self-insurance, *ex post* compensation is the only remaining option to compensate regulated suppliers for efficient costs following a major adverse risk event.

We are surprised the Commission has not gone back to the decisions and supporting reasons it gave when implementing the new Part 4 regime. It is particularly concerning that the Commission did not acknowledge its position that the costs and risk of these events should be dealt with *ex post* in its Terms of Reference to Professor Yarrow. This omission renders Professor Yarrow’s advice much less valuable to considering Orion’s specific CPP application.

3.2 Orion’s Response

We now look at the actions Orion took under the framework before the earthquake event. As we understand the CPP application, Orion:

- Obtained appropriate and efficient insurance coverage for selected risks where—according to expert insurance advice—such insurance was commercially available. We note that the proceeds and estimated proceeds from insurance recoveries have been properly set off against the additional costs incurred as a result of the earthquake; and
- Improved the resilience of its physical network through a programme of capital expenditure that was based largely from lessons learnt from other earthquakes in New Zealand. Orion suggests these actions played a substantial role in mitigating the damage caused by the major earthquake.

The reasonableness of Orion’s action need to be considered in the context of:

- The probability of a severe earthquake was considered by various experts before the event as detailed in Orion’s submission to be somewhere between a 1 in 120 to 1 in 650 year event. Orion assumed a 1 in 450 year event. The last time Canterbury had a major earthquake was 1869;
- The lack of clarity in the regulatory framework as to the treatment of the costs of such an event; and

- The almost universal practice among Australasian EDBs of not insuring lines and cables because insurance is not commercially available. Both insurance expert reports (AON and Marsh) agree on this point.

On the question of prudent insurance cover, the two insurance experts (Marsh and AON) disagree on the issue of insurance for lines and cables—Marsh says it’s not available at a sensible price, AON says it can be obtained. The fact that they disagree and that no EDBs have insurance suggests it’s not readily commercially available. Further, the rates suggested by AON (\$3.75 million to \$5 million for \$50 million of cover) may not be efficient. On the basis of an earthquake being in the range of a 1 in 120 year to 1 in 650 year event the premium would range from 9 to 65 times the expected pay-out in the long run. Only an extremely risk averse firm would be prepared to pay a premium that implied such high levels of over-recovery by the insurer.

The role of insurance deductibles

We note Professor Yarrow discusses insurance deductibles and caps in terms of being part of a risk sharing mechanism between Orion and its customers. They are in fact a form of risk mitigation for insurance companies:

- Deductibles exist to align the incentives of the insurer and the insured—that is they ensure that making a claim has a cost for the insured thus avoid the moral hazard and perverse incentives inherent in insurance; and
- Caps exist because of imperfect information in that the insurer doesn’t have full knowledge of the possible frequency of the event and the possible magnitude of the claim so the cap limits their risk.

In other words, an infrastructure business that chooses self-insurance would be unlikely to allow deductibles and caps into a self-insurance arrangement. The issue of insurance deductibles and caps should not be confused with risk sharing between shareholders and customers.

3.3 Clarity on the Regulatory Regime would Change Outcomes

In reviewing the case for claw-back, the Commission should consider the financial impact on Orion and its customers if the regulatory framework had clear and explicit arrangements for the costs of catastrophic events.

Using the arrangements seen in PPP contracts, the regulatory regime would have provided:

1. *Ex ante* definition of the nature and quantum of the risks and costs of such events that are to be allocated to the firm—and appropriate compensation for those risks
2. *Ex ante* definition of the *ex post* methodology that would be used to calculate compensation for costs and risks that would be borne by customers; and
3. An operating cost allowance for appropriate and efficient insurance premiums—probably in the same order of magnitude as the actual insurance cost of Orion.

Alternatively, if the regulatory approach took an approach that involved more self-insurance, then the regulatory regime would have involved:

1. *Ex ante* definition of the nature and quantum of the risks and costs of such events that are to be allocated to the firm—and appropriate compensation for those risks;
2. An operating cost allowance for appropriate and efficient insurance premiums—probably in the same order of magnitude as the actual insurance cost of Orion

3. An actuarially determined self-insurance premium for the costs and risk of the event that are not allocated to the firm. This would be charged as an allowable operating cost and accumulated in a provision account. This would not be funded but would clearly show on the firm's balance sheet the obligations of its shareholders to meet costs up to the level of the provision. Such a provision would logically be capped at the expected cost of the event; and
4. An arrangement to claw-back the excess costs over the amount of the provision in the event of an earthquake, subject to a "light handed" *ex post* prudence test. This is essentially a "top up" arrangement which recognises that either the self-insurance premium was insufficient, the expected cost was greater, or that the arrangement had not been in place for sufficient time.

The critical point is that the financial impacts on the firm and its customers between these two alternative approaches is the same over the long run—that is, full *ex post* claw-back on an "as incurred" basis or a self-insurance provision and the "top up" mechanism should produce financially equivalent outcomes. This is because the "top up" mechanism ensures that the self-insurance premium is efficient by adjusting cash flows when an actual event occurs.

Thus if under both approaches all components and costs are assessed in real terms, then the resulting impact on the firm and the customers must be NPV neutral. In both cases, given the same risk allocation, the same costs would be recovered from the customers and met by the firm—at least in NPV terms—although there could be issues of intergenerational equity for customers and shareholders.

4 Conclusions

In his advice, Professor Yarrow suggests workably competitive markets would not be expected to pass the costs of catastrophic events such as earthquakes to consumers. However, Professor Yarrow also states that this should be tested with empirical evidence.

Our analysis of the empirical evidence from a related workably competitive market—the market for long term infrastructure PPPs and concession contracts—shows that contractual measures have been developed to pass the costs of catastrophic events to consumers. These contracts provide *ex ante* clarity on the nature and extent of risk sharing, and a clear codification of the *ex post* compensation payable for *force majeure* events. This enables firms to rationally enter these markets on the basis that over the long run they will receive appropriate rewards for the risks assumed under the contract. Our analysis also shows that the most common form of compensation for the costs and risks of *force majeure* events is *ex post* on the basis of efficient costs incurred. This solution overcomes the difficulty in assessing the probability and cost of these events, which makes conventional insurance or self-insurance generally less efficient.

The Commission's decision on Orion's CPP application needs to be based on the reality of New Zealand's regulatory regime. In our view, this requires the Commission to act consistently with the decisions and statements made under the New Zealand regulatory regime at the time the catastrophe(s) occurred, which regulated suppliers reasonably expect to apply. Since the current New Zealand regulatory framework does not provide for any *ex ante* compensation for such events, declining to allow claw-back would fail to compensate regulated suppliers for efficient costs.