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# Earthquake Readiness

## Customised Price - Quality Path Proposal

5 December 2017

## Executive Summary

Wellington Electricity is proposing new investment of \$31.24 million in earthquake readiness initiatives, including further critical spares for the electricity network in the Wellington region. This will significantly improve our response capabilities so that our community is better able to cope following a major earthquake.

Electricity is an essential service for our community; it is the lifeblood of society and essential for a thriving economy. Losing it for a prolonged period of time can have a devastating impact on people's quality of life. At a most basic level, access to fresh water, lighting, cooking, refrigeration, heating and communication would be seriously compromised without electricity.

Since the 2010-11 Canterbury earthquakes, we have been proactively assessing how we can reduce the impact on consumers resulting from damage to our network following a major earthquake in Wellington.

The Kaikoura earthquake in November 2016 sharpened everyone's awareness of Wellington's unique vulnerabilities. It heightened the need for a thorough examination of the region's preparedness to plan and respond appropriately to a disaster situation precipitated by a major earthquake.

As documented in our annual Asset Management Plans since 2011, we have evaluated a number of initiatives which include undertaking seismic strengthening of our key buildings to improve earthquake-prone building exposure, increasing our stock of critical spares, and improving our communication links and access to essential information systems. These investments which represent the first step in building network resilience will reduce the negative economic and societal impacts of a major earthquake by reducing the duration of electricity outages across the region.

Our proposal would lead to a modest price increase of \$1.50 to \$1.90 per month in lines charges for a typical residential customer. The customer benefit from the investment is substantial because it will reduce the impact of damage resulting from a major earthquake, and increase the speed with which power can be restored afterwards.

We provide a service that is critical to the wellbeing of both our business community and the people who have built their lives here in the Wellington region. As a trusted corporate citizen, our aim is to safely restore electricity to all our customers in the shortest practicable time subject to the other challenges a major earthquake event would bring.

This document sets out our proposal, for which we seek Commerce Commission ("the Commission") approval under a 'streamlined' customised price-quality path (SCPP) for the three years from 1 April 2018 to 31 March 2021.

### Wellington's unique vulnerabilities

One of the unique vulnerabilities of the region that is now better understood is the impact that a major earthquake could have on our region's transport links. These could be so badly damaged that the region could be effectively split into seven 'islands', five of which are within our distribution network.

If that were to happen, it would make restoration efforts extremely challenging as it would severely restrict the movement of people and equipment into, and throughout the region. An inability to easily leave the region makes the timely restoration of electricity supply especially important as communities would need to initially recover at home.

Our ability, as a key lifelines utility, to respond effectively and efficiently under a major earthquake scenario depends on having the right equipment stored in the right places within the region. Having such readiness spares would help to reduce electricity outages that would otherwise negatively impact our communities and businesses.

### Challenges with the region’s electricity network

The majority of our network is located underground. This provides great resilience against harsh Wellington weather, including intense storms and high winds which would otherwise cause frequent damage and disruption to an overhead network. However, the advantage of having cables underground is a significant weakness in the event of a major earthquake.

The risks associated with our cable network were evident in the Kaikoura earthquake in 2016. Areas of our network on reclaimed land at Centreport, had cables which pulled apart during the shaking and then came back together again. Unexpectedly some of these cables were able to continue supplying power, but subsequently failed.

It took ten months for Centreport to return to normal operations, and that was after an earthquake much less severe than the 7.5 magnitude event modelled in our major event impact analysis.

### Our proposed solutions

We have concluded that we should take a staged approach to the management of these risks by investing in some readiness solutions as soon as practical whilst requirements for additional resilience are developed over the medium and longer term.

#### First step- Improving Readiness

We are seeking approval to invest \$31.24 million (Opex and Capex) over the next three years to improve our readiness to respond to a major earthquake.

The proposed investments relate to ‘quick wins’ we can achieve in the short term. These are prudent, cost effective and sensible first steps. This will benefit of our communities and businesses by significantly reducing restoration times following a major earthquake.

A summary of our proposed readiness initiatives are shown in the table below.

Risk being addressed	Proposed initiatives	Capex (\$m)	Opex (\$m)	Total (\$m)
<b>33 kV cable faults</b>	Emergency hardware	4.74	0.67	5.41
<b>Loss of transformers and switchgear</b>	Mobile substations and switchboard	4.73	-	4.73
<b>11 kV cable and equipment faults</b>	Critical emergency spares	4.94	-	4.94
<b>Preventing damage to equipment in buildings</b>	Seismic reinforcement of significant buildings	10.40	-	10.40
<b>Maintaining data and communication links</b>	Communication systems	5.26	0.50	5.76
<b>TOTAL</b>		<b>30.07</b>	<b>1.17</b>	<b>31.24</b>

Table 1 – Proposed readiness initiatives

We intend making all spare equipment available to other Electricity Distribution Businesses (EDBs) in the event of disaster events that reduce their ability to restore power supply to their customers.

## Price Quality Regulation

Under Part 4 of the Commerce Act 1986, non-exempt EDBs such as Wellington Electricity are subject to either ‘default’ or ‘customised’ price-quality regulation. The purpose of this approach is to provide a relatively low-cost way of setting price-quality paths for suppliers, while allowing them to propose alternative price-quality paths when the default settings do not suit their individual circumstances.

Our application is for a ‘streamlined’ customised price-quality path (SCPP), which requires us to apply for several exemptions from, and modifications and variations to, the regulations set out in the Electricity Distribution Services Input Methodologies 2012 (IMs)<sup>1</sup>.

### Streamlined Customised Price-quality Path

Wellington has a stable network due to its steady growth. Our assets are quite mature and there is sufficient capacity headroom that we do not need to provide for extensive new capacity driven investments over the coming decade. We do have a planned programme of large asset replacement, but this will be gradually accommodated by spreading this across the current default price-quality allowances as anticipated within our current 10 year asset planning horizon.

We believe these readiness investments should be undertaken as a matter of urgency and should not be delayed to align with other large resilience underway that require joint planning with other utilities and the involvement of central Government. We therefore believe the best vehicle to implement this short-term solution is a SCPP.

If successful, the application will enable investment to strengthen additional key buildings, increase our stock of critical spares and improve our communication systems. These would improve the response and recovery effort following a major event.

In developing this SCPP, we have built an economically robust business case for investment to address the risk of a high impact low probability event. Our business case shows that there is a net benefit to consumers from the proposed readiness investments and is therefore in their long-term interests.

### Streamlined CPP Process

On 5 December 2017, we submitted this document with further supporting documentation, which together forms our application. The Commission will now review it and will need to be satisfied that the expenditure is prudent and efficient. We will work with the Commission to answer questions it or its advisors may have. The process will include opportunities for consultation.

We invite our customers and other stakeholders to participate in the Commission’s review process. Details on how to do so can be found at the Commission’s [website](#).

Following its assessment of our proposal and submissions from interested parties, we expect the Commission to make a determination by 31 March 2018. If approved, we plan to implement the proposal as soon as practicable.

## Summary

Our society has a reasonable expectation that there is a continuous supply of electricity. It is difficult to imagine life without it. While large disruptions can occur, our customers also reasonably expect to

<sup>1</sup> Part 5, Subpart 1, clause 5.1.7 of the IMs provides that a CPP applicant may request, and clause 5.1.6 provides that the Commission may approve, modifications or exemptions to these requirements prior to filing a CPP application.

have supply returned without undue delay. People's welfare and the region's economy will quickly suffer if the power stays off for extended periods.

We are committed to maintaining and operating our electricity network so we can continue to provide a high level of service to our residential and business customers in the manner which best meets their needs over the long term. This commitment includes ensuring we are prepared to respond quickly and effectively should a major earthquake affect the region.

We have identified a programme of immediate, affordable and pragmatic quick-wins to improve our earthquake readiness. We are seeking regulatory approval for this prudent expenditure. If our application is successful, we will be in a better position to start returning electricity supply to our communities and businesses in what could be an extremely stressful and traumatic time.

Improving our readiness, includes bringing emergency hardware, mobile substations and switchboards, critical spares and enhanced communications systems into the region, along with the seismic reinforcement of substations. These will enhance our earthquake response capabilities in the event that transport links are cut off for some time (estimated to be up to 12 weeks).

This proposal, if approved, would result in a lines price increase of around \$1.50 - \$1.90 per month for a typical residential customer.

We believe it is demonstratively better to take steps now to reduce the consequence of a major earthquake ahead of its occurrence. This will reduce the risk of prolonged disruption of our region's well-being and economic prosperity. This proposal is a positive step forward to improve our earthquake readiness, before we turn our attention to longer term resilience and further co-ordinated investment planning with central Government, city leaders and lifeline utilities.

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# 1 Introduction

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## 1.1 PURPOSE OF MAIN PROPOSAL

The purpose of this proposal is to seek regulatory approval for the additional funding required to implement a number of **readiness** initiatives, which will improve response and restoration times following a major earthquake.

We are seeking approval to invest \$31.24 million (Opex and Capex) over the next three years to improve our readiness to respond to a major earthquake. Approval of this proposal will allow us to implement relatively low cost **readiness** measures, which in the event of a major earthquake will result in Wellington communities and businesses avoiding significant social and economic welfare losses.

### Streamlined CPP Process

On 5 December we submitted this document together with supporting documentation, which together forms our SCPP application.

The Commission will review and consult with stakeholders on our proposal, and will need to be satisfied that the expenditure is prudent and efficient.

During its review, we will work with the Commission to answer questions they or their advisors may have. This process will include consultation with customers and stakeholders. Following the assessment of our proposal and submissions from interested parties, we expect the Commission to make a determination by 31 March 2018.

We are committed to engaging openly and constructively with our customers, stakeholders, the Commission and its advisors to ensure our proposal promotes our customers' long-term interests.

We invite our customers and other stakeholders to participate in the Commission's review process. Details on how to do so can be found at the Commission's [website](#).

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## 1.2 REGULATORY CONTEXT

Price-quality regulation is designed to ensure that we have similar incentives and pressures to suppliers operating in competitive markets to innovate, invest and improve their efficiency. It also aims to limit the ability of suppliers to earn excessive profits, while also ensuring that consumer demands on service quality are met.

Under Part 4 of the Commerce Act 1986 (the Act), non-exempt EDBs such as Wellington Electricity are subject to either 'default' or 'customised' price-quality regulation. The purpose of this approach is to provide a relatively low-cost way of setting price-quality paths for suppliers of such services, while allowing them to propose alternative price-quality paths when the default settings do not suit their individual circumstances.

Given the urgency and importance of the proposed expenditure as recognised by the Government Policy Statement (discussed in section 1.3), our application is for a SCPP. This requires us to apply for a number of modifications to, and exemptions from, the process and content requirements of

the Electricity Distribution Services Input Methodologies 2012 (IMs)<sup>2</sup>. In addition, in order to implement the price path approach, we propose a number of variations to the IMs pursuant to section 53V(2)(c) of the Act.

Wellington has a stable network due to its steady growth. Our assets are quite mature and there is sufficient capacity headroom that we do not need to provide for extensive new capacity driven investments over the coming decade. We do have a planned programme of large asset replacement, but this will be gradually accommodated by spreading this across the current default price-quality allowances as anticipated within our current 10 year asset planning horizon.

We believe these readiness investments should be undertaken as a matter of urgency and should not be delayed to align with larger resilience initiatives that require joint planning with other utilities and the involvement of central Government.

In developing this SCPP, we have built an economically robust business case for investment to address the risk of a high impact low probability event. Our business case shows that there is a net benefit to consumers from the proposed readiness investments and is therefore in their long-term interests.

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### 1.3 REASONS FOR OUR READINESS INVESTMENT PROPOSAL

Since the 2010-11 Canterbury earthquakes, we have been proactively assessing how we can reduce the impact on consumers from the damage to our network following a major earthquake in Wellington.

As documented in our annual Asset Management Plans since 2011, we have evaluated a number of initiatives. These included undertaking seismic strengthening of our key buildings to reduce earthquake-prone building exposure, increasing our stock of critical spares and improving our communication links and access to essential information systems. We have also been proactively investigating what else we could do to reduce the negative economic and social impacts of extended electricity outages across the region.

The Kaikoura earthquake in November 2016 sharpened everyone’s awareness of Wellington’s unique vulnerabilities and heightened the need for a thorough examination of the region’s preparedness to plan and respond appropriately to a disaster situation precipitated by a major earthquake.

The region is home to over 400,000 people and has thousands of small and medium businesses, as well as:

- the National Crisis Management Centre, underground at the Beehive;
- central Government and support agencies;
- several hospitals;
- all five interisland ferries – the critical sea link of State Highway One, carrying the bulk of freight that travels between the North and South Islands as well as significant passenger traffic;
- an international airport and a busy domestic one ; and
- other essential infrastructure including telecommunication exchanges, water pumping stations, fuel storage and supply hubs, and emergency services headquarters.

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<sup>2</sup> Part 5, Subpart 1, clause 5.1.7 of the IMs provides that a CPP applicant may request, and clause 5.1.6 provides that the Commission may approve, modifications or exemptions to these requirements prior to filing a CPP application.

This critical infrastructure relies on a continuous power supply and, whilst many have back up generation, there is a limit to how long that back up generation can support these critical services in the event of a major earthquake that disrupts transport and fuel supply links.

We are therefore seeking approval to invest \$31.24 million (Opex and Capex) over the next three years to improve our readiness to respond to a major earthquake for the benefit of our communities and businesses. The proposed investments relate to ‘quick wins’ we can achieve in the short term. These include increasing our stores of emergency spares and other key equipment across the region. We will also extend our seismic strengthening programme for all our key substation buildings to protect essential substation equipment necessary for return of supply and improve our communication systems. These are prudent, cost effective and sensible first steps.

### Reasons for seeking a Streamlined CPP

We are currently subject to a DPP which covers the regulatory period of April 2015 through March 2020.

Our current DPP does not provide for the additional funding required to implement the readiness initiatives without risking a significant reduction in the quality of service provided to our customers. Anything we spend out of our existing allowance will defer other planned expenditure. To date, we have spent almost \$2 million on readiness spares and our seismic strengthening programme. This has been funded out of our existing allowances. To fund any more would risk the quality of everyday service and the provision of a safe supply to our customers.

Following the Kaikoura earthquakes we have been in discussion with Government officials and the Commission regarding how the price-quality regime could best accommodate the additional expenditure required to improve our short term readiness capabilities. Having assessed different approaches, the Commission decided that the best available option to provide for this urgent readiness expenditure was to allow for a SCPP. This allows us a mechanism to recover the cost of funding these important readiness initiatives, thereby reducing the risk to Wellington consumers, as soon as possible.

We acknowledge the exceptional nature of a SCPP in as much as it recognises the national significance of Wellington’s disaster resilience as noted in “Resilience of Electricity Services in the Wellington Region” Government Policy Statement (GPS)<sup>3</sup>.

Importantly the GPS recognises our duties as a lifelines utility under the Civil Defence Emergency Management Act 2002 (CDEMA) which includes our response to any material change in hazard information to ensure we actively seek to reduce risks in light of that new information.

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## 1.4 OUR SCPP WILL IMPROVING EARTHQUAKE READINESS

Our growing body of knowledge has informed a number of potential risk reduction solutions. This is based on our improved understanding, and our own interpretation, of **readiness** and **resilience**.

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<sup>3</sup> <https://gazette.govt.nz/notice/id/2017-go4910>

**Readiness** is a subset of resilience and relates to what can be done to reduce the impact of an event before it has happened by being better prepared and equipped before we need respond and start the recovery process.

**Resilience** includes improving our ability to withstand an event by strengthening current assets and/or providing greater diversity to reduce the impact of damage when such an event occurs so that limited level of services can continue to be provided. Such improvements are very difficult to implement in isolation and almost always require extensive collaboration with other utility providers as well as local and central Government agencies.

Readiness solutions contribute to reducing the immediate impact of vulnerabilities and can build towards longer term resilience. Readiness can be implemented in the short term. Longer term resilience solutions require a co-ordinated planning and implementation approach.

The first step in this process is to seek regulatory approval for the additional readiness funding required in the short term to improve response and restoration times following a major earthquake.

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## 1.5 HOW THE PROPOSAL MEETS THE EXPENDITURE OBJECTIVE

The expenditure objective is defined in the IM:

**Expenditure objective:** *efficient costs that a prudent regulated Electricity Distribution Business (EDB) would require to: meet or manage the expected demand for electricity distribution services, at appropriate service standards during the CPP regulatory period and over the longer term; and comply with applicable regulatory obligations associated with those services.*

As described below, we are confident that our proposal meets this objective.

### **Efficient costs**

The cost estimates that support the proposal have been reviewed by an independent engineering consultant and deemed to be well supported and reasonable. For further detail refer *Jacobs Letter WE Earthquake Readiness Indep Review 27 Oct 2017.pdf* which is attached to this proposal.

We have been proactive in seeking cost efficiency in our seismic strengthening programme over the past two years by engaging directly with Orion's engineering consultants to find out what worked in their programme and where we could reduce cost. This has already delivered cost efficiencies.

### **Prudence**

By using a rigorous selection process, we are confident that we have chosen the right readiness initiatives to meet the need. Our approach aligns with that of a prudent EDB.

The proposed readiness initiatives were chosen from a number of options on the basis of economic merit – i.e. the option that returned the highest positive net benefit compared to other options.

We are confident that we should be investing in these readiness initiatives as soon as practical as the annual foregone benefit from delay is higher than the savings from deferring the expenditure.

***Demand for our services***

Access to a safe supply of electricity will be essential to critical emergency services in the immediate aftermath of a major earthquake. Our proposed investment will improve our readiness to restore supply to critical services and infrastructure after a major earthquake.

The limited access into the region, and restrictions on movement within the region, after a major earthquake will prevent people being able to easily move away from their homes. In this situation, recovery at home will be required, making prompt return of electricity and other services very important for our residents and businesses.

The Government has clearly signalled its expectations, through the issue of the GPS, for Wellington's lifeline utilities to maintain and restore core services in Wellington during and following a major event.

***Appropriate Service Standard***

We believe it is appropriate to apply for a continuation of our current quality path, as described in our 2017 Asset Management Plan (AMP) and in section 6.5. The proposed investments will not impact our service standard until the point at which they are required, such as after a major earthquake. At that point in time, they will significantly improve service against current state by improving the restoration of power supply.

***Compliance with Applicable Regulatory Obligations***

We have responsibilities as a lifelines utility under the CDEMA, including responding to any material change in hazard information, to ensure we actively seek to reduce risks in light of that new information. This proposal is part of our response to a material change in our assessment of service supply risk (including the interdependencies on transport links) posed by a major earthquake in Wellington.

## 1.6 APPLICATION STRUCTURE

The table below shows how this main proposal document fits into the wider application structure.

<b>Main Proposal</b> and the following supporting documents
Earthquake readiness business case
Independent engineering review letter
Stakeholder engagement
2017 Asset Management Plan
Further stakeholder engagement - addendum
<b>Regulatory Compliance Schedules</b> (this document) and the following supporting documents
Commission letter confirming IM modifications and exemptions
Directors certification
Audit terms of engagement
Audit opinion
Audit invoice
<b>Financial Models</b> and the following supporting documents
CPP forecast expenditure
2017 AMP forecast expenditure
CPI projections for EDBs
Disposals and other regulated income for EDBs

**Table 2 - Application Structure**

## 2 Impacts of a Major Earthquake

### 2.1 EARTHQUAKE RISK

Wellington’s unique vulnerability to a major local earthquake is well known. However the extent of the impact that such an earthquake would have on the region is only starting to be well understood. This is largely due to the work and studies carried out following the Christchurch earthquake series in 2010/11 and the effects of the 14th November 2016 Kaikoura earthquake.

In 2012, a Wellington Lifeline Group’s report estimated that power supply to some consumers could be lost for between 20 and 95 days under the scenario of a direct magnitude 7.5 (Richter) rupture on the Wellington Fault. This outage period was further supported in a report by Opus<sup>4</sup> which concluded that the region could be split into seven ‘Islands’. These islands will have no road access between them for an extended period (months rather than weeks), with some roads into the region being closed for up to four months.

Five of these ‘islands’ are within our area of supply as shown in Figure 1 below.

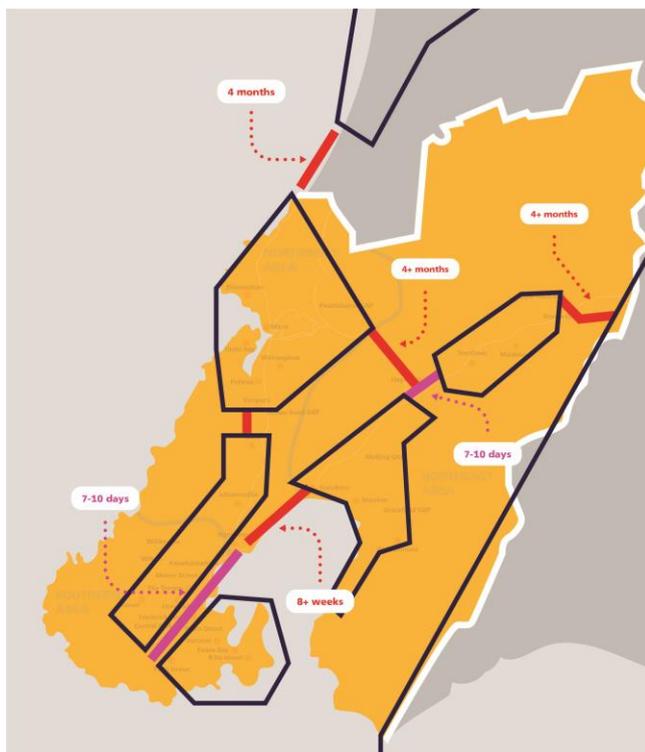


Figure 1 - Affected Transport Links

We have estimated that a major earthquake would result in an immediate loss of up to 60% of the region’s electricity supply which is similar to what happened in Christchurch in the 22 February 2011 earthquake. Some of this can be restored relatively quickly if we can communicate effectively with patrolling field crews, safely access our buildings, and reliably use our data systems to control our equipment.

After the initial restoration of power, we expect that up to 35% of power could be lost from a few days up to three months and over 100,000 customers could be severely impacted by damage to our network.

While much of this loss can be attributed to asset damage, the duration of outage is increased by Wellington being cut off from the rest of the country by severed transport links. This would make restoration efforts very difficult and exacerbate what would

already be a desperate situation for many of the most vulnerable members of our society.

#### 2.1.1 Impact on the people in our communities

Electricity is an essential service, the lifeblood of society and fuel for our economic prosperity. Losing it for an extended period of time has a devastating impact on people’s ability to function and

<sup>4</sup> Restoring Wellington’s transport links after a major earthquake, Wellington Lifelines Group, March 2013

lead normal lives. At a most basic level, access to what we deem as essentials such as fresh water, lighting, cooking refrigeration, heating and communication is compromised often with no viable alternatives.

This is further compounded if the outage extends into weeks and possibly months. Businesses that cannot function productively may relocate, taking the people that work there with them. However, in many areas, people will be unable to move due to severed transport links and this makes it even more of an imperative that we are well equipped to return electricity services as quickly as possible so they can recover in their own homes.

In Wellington’s case, Government personnel may be required to move away, even temporarily, and there is a possibility that parliament would relocate to another city to ensure continuity of Government.

Add this to the general trauma and distress that a major earthquake would cause and it is not hard to imagine the vast social and wider economic impact. Without a prompt return of utility services, the social fabric may unravel as the ability for people to relocate, or to receive alternative help will be limited.

Those without financial resources will find it even more difficult to meet daily needs. Those with mobility or financial constraints – the elderly, disadvantaged families, families with disabled members – may find it difficult to find temporary assistance as organisational and social support may be absent for an extended period after an earthquake.

As noted by Fran Wilde in the November 2012 Lifelines report:

*“There is so much at stake. Not only does the region comprise 11 per cent of the country’s population, but it also generates 15 per cent of its GDP. Wellington is the seat of government and the transport hub between the North and South islands. Many organisations have their national headquarters in the capital’s CBD so that a severe earthquake would affect operations far beyond the city.”*

### **2.1.2 Wider economic impacts**

The impact of a major earthquake on the city’s infrastructure and the wider economic and social impacts have been well documented and discussed over the past few years, with heightened awareness following the Christchurch and Kaikoura earthquakes.

In 2015, Wellington Lifelines commissioned a report by BERL<sup>5</sup> which concluded that there is:

*“A potential permanent economic loss to New Zealand with a present value of \$30-\$40 billion of New Zealand’s GDP from emigration of highest level business services firm. The investment in buildings and infrastructure needed to increase Wellington’s resilience to mitigate this loss is of the order of \$3-\$4 billion”*

The duration of electricity outages following an earthquake is directly relevant to the potential emigration of businesses and this is on top of the direct impact that can be represented by a value of unserved energy.

<sup>5</sup> “Wellington – essential to NZ’s Top Tier. Its resilience is a national issue.” -BERL, December 2015.

The health of New Zealand's relatively small economy and its limited capacity to withstand high impact events in a low resilience environment is also front of mind for industry leaders, utility providers and central and local Government through the Built Environment Leaders Forum<sup>6</sup>.

While these investments are justified assuming a value representing the direct impact of supply interruptions, the wider impact of long duration interruptions cannot be easily captured by a single figure and therefore we consider our estimates of benefits to be conservative.

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<sup>6</sup> <http://www.mbie.govt.nz/info-services/building-construction/safety-quality/built-environment-leaders-forum>

### 3 Proposed Expenditure on Earthquake Readiness

In developing our proposal, we have built an economically robust business case for investment in readiness initiatives to reduce the impact of an earthquake (which is essentially a high impact low probability event). Economic justification for such events can be difficult given the lack of certainty and accurate information supporting the probability of when an earthquake will happen. That said, our business case shows that there is a net benefit to consumers from the proposed investments and it is therefore in the long-term interests of consumers that these investments occur as soon as possible.

The full business case is attached to this proposal – refer *Earthquake Readiness Business Case - December 2017.pdf*.

#### 3.1 BUSINESS CASE DEVELOPMENT

To ensure we are investing for the long-term benefit of our consumers, we have assessed the risk of earthquake damage to our network and developed appropriate short term readiness solutions to start reducing that risk.

We have ensured these are prudent and sensible investments that are economically robust using conservative assumptions about the quantum of potential benefit.

Our approach to the development of this business case has been to:

- define the need by identifying the network areas susceptible to failure, building vulnerabilities, and risks of limited access to our communications and data systems;
- identifying the readiness options that enable us to promptly start restoration efforts following an event;
- estimating the costs and benefits of each option; and
- selecting preferred options based on their effectiveness, technical feasibility, and their expected benefits.

#### 3.2 EARTHQUAKE READINESS BUSINESS CASE OVERVIEW

A summary of our proposed initiatives is shown in the table below.

Risk being addressed	Proposed initiatives	Capex (\$m)	Opex (\$m)	Total (\$m)
<b>33 kV cable faults</b>	Emergency hardware	4.74	0.67	5.41
<b>Loss of transformers and switchgear</b>	Mobile substations and switchboard	4.73	-	4.73
<b>11 kV cable and equipment faults</b>	Critical emergency spares	4.94	-	4.94
<b>Preventing damage to equipment in buildings</b>	Seismic reinforcement of significant buildings	10.40	-	10.40
<b>Maintaining data and communication links</b>	Communication Systems	5.26	0.50	5.76
<b>TOTAL</b>		<b>30.07</b>	<b>1.17</b>	<b>31.24</b>

Table 3 – Summary of proposed initiatives

All figures in this section are expressed in 2017 real dollars.

The first three initiatives were chosen based on the net benefit (benefit minus cost) they provided relative to other options which totalled \$28 million. The benefit is the improvement in restoration times that each option offers against the current state. These improvements are a combination of the repair time and the time it would take to transport equipment into the region under our current state – i.e. if we don't have adequate spare equipment in the right location.

The majority of benefits from the spare overhead line and cable equipment arise from a reduction in the time it would take to transport spare equipment to where it is required. However, there are also significant benefits from reducing the repair time from utilising mobile and portable substation options.

The proposal to seismically strengthen our substation buildings is primarily driven by an impending change to our seismic building standard to bring all zone substation and important buildings up to 67% of NBS. This standard is consistent with peer utilities.

The proposal to add three data centres and improve our communications systems is driven by the recognition that restoration efforts can only begin if we have adequate communication links and access to critical systems and tools. A delay in the restoration of the initial 60% of electricity without supply is valued at around \$110 million a day. Add to this the compounding effect of our communities and businesses being without power for days on end, and one can see there is significant value that could be lost from not addressing this relatively simple problem.

All spare equipment will also be made available to other distribution companies in the event of large scale natural disasters that cause damage to their networks thus enabling a broader reduction in risk than just the Wellington region.

### *Proposed short-term initiatives*

The proposed short term initiatives are detailed below.

#### **Emergency hardware (\$5.41M) includes:**

- equipment required to construct around 19 km of emergency overhead power lines in the event of part of our 91km of 33kV fluid filled cables being damaged. It will improve electricity restoration times by between 2 and 12 weeks;
- 33 kV XLPE (plastic) cable spares which will be stored in the CBD and has the potential to save two weeks in equipment transport time compared to our current state.

#### **Mobile Substations and Switchboard (\$4.73M) includes:**

- two mobile 10 MVA substations which will be held ready for deployment. One will be located in the Wellington CBD and the other in the Hutt Valley region;
- one 11kV mobile switchboard which will enable the restoration of the electrical load at substations damaged by liquefaction and/or ground shaking.

When deployed with the emergency overhead lines, these assets have the potential to reduce power restoration time in the Hutt Valley from 16 weeks down to 4, and from 14 weeks down to 8 in the Wellington CBD.

**Critical emergency spares (\$4.94M)** includes:

- three sets of cable fault location equipment, over 1,000 cable joint repair kits and over 4,000m of 11kV cable for repairs;
- critical distribution switchgear and transformers including 12 transformers and 30 units of switchgear to replicate damaged or inaccessible supply points.

By storing the above equipment in various locations across the region, we are confident that we can reduce the significant outage impacts from 11kV cable failure. This investment is especially important for our ability to quickly restore critical loads across the region.

**Seismic reinforcement of significant<sup>7</sup> buildings (\$10.40M)** includes:

- strengthening over 90 substation buildings to at least 67% of the New Building Standard (NBS).

Learning from Orion’s experience after the 2010/2011 earthquake sequence led us to consider a further increase in strengthening standards for earthquake-risk buildings to 67% of the NBS. Our current programme addresses “earthquake prone” buildings (ie <34% NBS), and we plan to extend that programme to strengthen all significant substation buildings.

The strengthening of our substation buildings to this standard will help ensure equipment contained within them is available for service after an event. Major substation equipment is difficult to move within the region and has long (6-12 month) replacement lead times. Stronger buildings will also make access far easier (and safer) which will, in turn, expedite the restoration of power.

Assuming a similar ratio of avoided asset replacement costs as Orion<sup>8</sup>, this \$10 million strengthening work would avoid an equipment replacement cost of between \$50-\$80 million on our network after a major earthquake. It would also reduce the additional cost of delays arising from procuring equipment from overseas suppliers.

**Communications systems (\$5.76M)** include:

- installing three data hubs to ensure that the critical network systems we need for restoration information are accessible should telecommunications links fail between islanded regions after an earthquake;
- improving voice radio communications systems for maintaining operational control.

Housing data hubs in a simple shipping container that can be located at three separate sites provides both diversity and redundancy. It also reduces personnel and public safety risks – avoiding entry into damaged buildings to access emergency systems and data.

Communication with field workers and restoration crews is vital for safety (for crews, public and property). It also allows the control room to build a picture of both damage and network availability ahead of restoration processes. An independent radio network allows us to respond without reliance on public communications system, which may be compromised for long periods.

<sup>7</sup> Significance is based on criteria including public and worker safety, network criticality and the type of connected load.

<sup>8</sup> \$5-6m of reinforcement spending protected \$50-60m of substation equipment (Resilience Lessons: Orion’s 2010 and 2011 Earthquake Experience report by the Kestrel Group, September 2011).

The communications systems investment is a key enabler because it allows us to safely start the restoration process by:

- undertaking public safety patrols and action isolation requests;
- communicating earthquake damage assessments;
- planning the prioritisation of recovery options;
- resource planning; and
- commencing the planned sequence of restoration activities.

This initiative is seen as an enabler of the other initiatives in that it allows us to effectively assess earthquake damage, prioritise options for recovery and start planning our response.

### 3.3 PLANNED CAPEX AND OPEX OVER THE SCPP PERIOD

Figure 2 below shows the total proposed Capex and Opex for the SCPP period including the DPP forecast Capex and Opex as detailed in our 2017 AMP.

The majority of planned readiness spend will occur in the 2021 regulatory year (RY: year ending March) as progress is made on the acquisition of bespoke spare equipment such as the mobile substations and the data centres. The emergency hardware will be fully acquired by the end of the 2021 regulatory year as will the majority of 11 kV critical emergency spares.

In addition to our previously approved<sup>9</sup> allowance for RY 19 and RY20 we have included the forecast expenditure for RY21 set out in our 2017 AMP. As indicated, we plan to spend a total of \$31.24 million over this period to support our earthquake readiness capability. We are not proposing any material change to the BAU forecasts for the RY21 contained in the 2017 AMP.

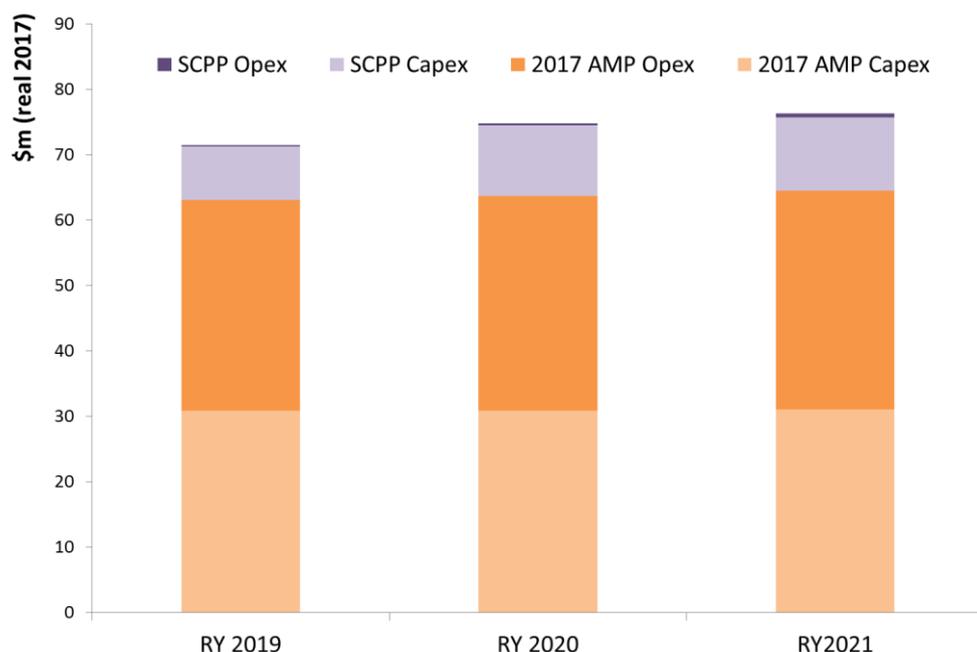


Figure 2 – Forecast Capex and Opex

<sup>9</sup> Under Part 4 of the Commerce Act the Commission set a DPP for us and 15 other electricity distribution businesses (EDBs). The current DPP runs from 1 April 2015 until 30 March 2020. DPPs take a one-size-fits-all approach to setting allowable revenues with limited tailoring for individual EDBs.

The additional readiness spend does not have any strong interdependencies with other expenditure categories or our quality standards which is why we are not proposing a change to the latter – refer section 6.5.

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### 3.4 DELIVERABILITY

We do not foresee any significant deliverability risks for the spare equipment, such as poles, wires, cables and radio systems, as it is relatively straightforward to acquire this in a timely manner. The mobile substations, whilst requiring design and construction are not unique so we anticipate these to be delivered to schedule.

There are delivery risks in the seismic strengthening programme as completing the required work on 91 buildings over a three year period is a significant step up in delivery.

We are preparing for this change by:

- ensuring we have design and construction capacity available ahead of approval;
- grouping buildings into similar construction and age categories so that we can develop standard designs for the strengthening work; and
- working with all councils to streamline the consenting process.

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### 3.5 FORECASTING APPROACH

We have forecast the costs of this SCPP by scoping the Capex and Opex requirements using bottom-up estimates. Cost estimates were based on a combination of historical spend and supplier quotes.

The cost estimates associated with the seismic strengthening programme are based on a combination of information from detailed seismic assessments, historical costs and experience. The forecast of expenditure was based on our assessment of delivery resource capacity and availability over the next three years.

The costs were reviewed by an independent reviewer, the detail of which can be found in the attachment - refer *Jacobs Letter WE Earthquake Readiness Indep Review 27 Oct 2017.pdf*.

## 4 Independent Review of Business Case

### 4.1 THE ROLE OF THE INDEPENDENT REVIEWER

We have sought an exemption to the requirement to obtain “verification” under Part 5 (5.1.3) of the Input Methodologies in favour of providing evidence of an independent engineering review of our earthquake readiness business case.

We engaged Jacobs engineering consultants to undertake an independent review of our readiness business case. Jacobs is a global provider of technical, professional, and scientific services, including engineering, architecture, construction, operations and maintenance.

The scope of the review included:

- reviewing the engineering option analysis and selection process;
- reviewing the description of the preferred options;
- reviewing the preferred options costings; and
- reviewing our approach and the costs associated with an intensified seismic reinforcement programme.

### 4.2 REVIEW PROCESS

The review process is shown in Figure 3 below.

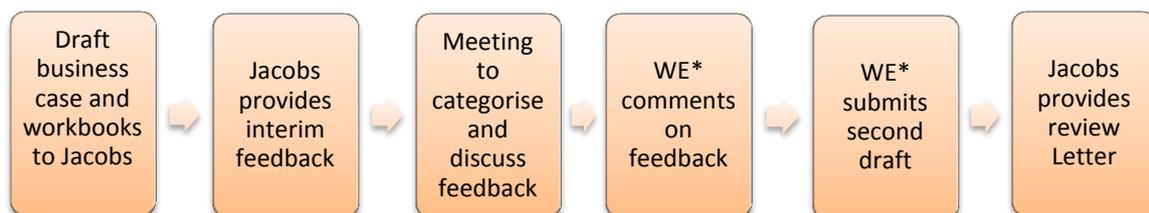


Figure 3 – Independent Review Process<sup>10</sup>

Jacobs provided comprehensive feedback which was classified as follows:

- **clarifications** - where descriptions and explanations were not as clear as they could be;
- **inconsistencies** – where there was inconsistency between numbers in the document and those in the spreadsheets;
- **drafting issues** – typographical errors and mismatches between the same data within the document; and
- **recommendations** – specific recommendations for consideration.

<sup>10</sup>

WE\* is Wellington Electricity

We prepared responses to each item and provided details of actions that would be taken to address the item if required. A revised business case document (showing all mark ups) and associated attachments were then sent back to Jacobs along with the completed feedback form.

Jacobs then provided a letter summarising the review and this is attached to our proposal - refer *Jacobs Letter WE Earthquake Readiness Indep Review 27 Oct 2017.pdf*.

### 4.3 KEY FINDINGS OF INDEPENDENT REVIEW

The key findings and recommendations from the review are set out below.

Risk Area	Jacobs' Key Findings
<b>33 kV cable damage</b>	The options chosen by WELL build off the learnings from Orion's temporary overhead lines built after the Christchurch earthquake.
	The cost estimates are well supported by preliminary designs and supplier quotes.
	However, the pole/line foundation costs are a significant component of the overall cost and subject to final pricing. See comments in Section 4.4.
	The CBA approach has correctly excluded the cost / benefits of lines that are included in the substation options below.
	Jacobs found some errors in the initial CBA which WELL has resolved. The changes did not change WELL's preferred options.
	The preferred options chosen would provide a significant economic and social benefit by reducing the length of outages from 33kV cable faults by several weeks compared to the status quo (do nothing) option
<b>Zone substation damage</b>	The cost estimates are supported by supplier quotes or from publicly available information.
	The CBAs were robust; however, the net benefits were not as significant as the line options above.
	The CBAs may improve if the line/pole foundation costs are reduced (as noted above).
	The capex can potentially be reduced by \$136k by using the same design for both mobile substations. See comments in Section 4.4.
	The flexible use of mobile substations for "business as usual" strengthens the economics associated with mobile Substations. However, their movement should be carefully considered (i.e. to low seismic risk locations)
<b>11kV Cable and Distribution Equipment Damage</b>	Jacobs agree with the concept of storing spare 11kV cable joints to reduce joint supply delays.
	Jacobs questioned whether it would possible to transport (relatively small / light) joints via helicopter or boat to the Hutt within 5-6 weeks thus reducing the spares by 40-50% (\$1-1.3m). WELL indicated that there is doubt that this would be possible and is having ongoing discussions with Wellington Lifelines. See comments in Section 4.4.
	Overall the cost estimates associated with the option are robust and the CBA is likely to be conservative.
<b>Buildings</b>	Jacobs recommended reviewing Transpower's seismic policy and design standard for relevance. WELL has confirmed that it has done this and no action was taken.

Risk Area	Jacobs' Key Findings
	<p>Jacobs are not in a position to judge the criticality of the structures chosen for seismic strengthening. However, WELL's approach appears to be a pragmatic estimate of the risks and consequences of potential earthquake damage to high risk substation buildings and the high level cost estimates required to strengthen them.</p> <hr/> <p>Jacobs recommended including a provisional sum for strengthening foundations to mitigate ground failure risks under new regulations. WELL increased its capex estimates to include Detailed Seismic Assessments (DSA) of its buildings – however did not add funding for additional strengthening.</p> <hr/> <p>In Jacobs view, Transpower's policy addresses geotechnical hazards including liquefaction and provides specific performance criteria. If WELL intend to adopt Transpower's policies and/or achieve the appropriate Importance Level standards and Building Consent for the strengthening works, there is a risk there will be insufficient funding to meet the full strengthening aspirations in the Business Case. See comments in Section 4.4.</p> <hr/> <p>While no CBA has been undertaken, the ratio of avoided repair costs by upfront strengthening of buildings based on Orion's experience is in the order of 5 to 8 times</p> <hr/> <p>Additionally, this will ensure that workers can safely access equipment to expedite the restoration of power, resulting in reduced restoration times.</p>
<p><b>Communication Links</b></p>	<p>Jacobs questioned WELL on the necessity of having three standalone control room / data centres. See comments in Section 4.4.</p> <hr/> <p>Jacobs understands that the magnitude 7.5 earthquake scenario would likely result in the physical isolation of three key areas of WELL's network and the loss of communication between them.</p> <hr/> <p>Therefore, in order to maximise its ability to safely restore load in all three areas, Jacobs is satisfied that three centres would reduce restoration times.</p> <hr/> <p>A review of WELL's initial costs found potential savings of around \$500k capex and phasing of costs has reduced total opex in the first 3 years by \$550k.</p> <hr/> <p>Jacobs is comfortable that the cost breakdown for each of the communication components is robust but is not in a position to comment on whether all the equipment is required. However, we note that the specifications have been determined by independent specialist providers.</p> <hr/> <p>While no CBA has been undertaken Jacobs agree that a functional communications and network information control/data centre is a key enabler that is necessary to achieve the benefits of the restoration options discussed above</p>
<p><b>General Findings and Recommendations</b></p>	
<p>WELL's risk assessment is based on a magnitude 7.5 event on the Wellington Fault. Given the existence of numerous other fault lines this approach has some limitations, but Jacobs is of the view that the methodology used is pragmatic</p>	
<p>WELL has used, in its analysis, a 300 year return period for a magnitude 7.5 event. The return period is based on the cumulative probability of occurrence of the five regional fault lines. Jacobs is of the view that the assumption is reasonable and we note that that WELL has also used sensitivity analyses to test the viability of the options against different return periods.</p>	
<p>Given the timeframes associated with design and procurement of some of its preferred options (i.e. mobile substations, data centres etc.), and based on discussions with Jacobs, WELL updated its Business Case to phase capital expenditure over FY18 to FY21. This change also impacted on the operating expenditure of the Business Case</p>	

**Table 4 – Jacobs Key Findings and Recommendations**

The impact of these findings and other comments noted in the detailed feedback are discussed below.

## 4.4 IMPACT ON PROPOSAL

There are a few areas which are worth comment as indicated in Table 4 above.

### *33 kV cable damage*

Jacobs' observed that the pole/ line foundation for the temporary overhead lines is a significant component of the overall cost.

We have recently conducted a field trial of the foundations and this has led to some minor design changes and we will not have final cost estimates for this until mid-December. Any material changes which could impact on this proposal will be shared with the Commission at the earliest opportunity.

### *Zone substation damage*

Jacobs observed that it may be possible to reduce the Capex of one of the mobile substations by \$136K if we use the same design for both.

Given we are only at concept stage for these mobile substations, the exact design requirements are unclear and have been estimated based on a standard percentage of total cost. We are not yet at the stage where we can confidently reduce this cost element. We will reconsider this view as the design work is progressed.

### *11 kV cable and distribution equipment damage.*

Jacobs questions whether it would be possible to rely on flying in spare 11 kV cable joints after an earthquake and thus reducing the required amount of spares.

Our view is that given the uncertainty about other forms of access into the Hutt Valley region, we should prepare as well as we can in the event that the region is cut off for 12 weeks. Civil Defence would have control of all air space and sea transport which will be prioritised on the basis of need with medical and emergency response being prioritised above everything else.

In civil defence terms, for air access into the region, we are likely to rank as priority 4 behind airborne firefighting, urban search and rescue, casualty evacuations and emergency supplies. This would leave sea barges as an alternative means of access. However, we do not know for certain if we would be able to land a barge with equipment and/or people into the Hutt Valley. The Seaview marina is the only likely landing spot, but discussions with the Lifeline project team indicate that there could be potential issues with this approach, and work continues to scope out suitable landing areas.

### *Buildings*

Jacobs raised concerns that we have not allowed sufficient funding to meet the full strengthening plan the business case. This relates to our decision to not make allowance for any strengthening works in terms of ground strengthening.

We have taken this approach for the following reasons:

- raising buildings to 67% NBS will not guarantee a building will remain undamaged following an earthquake but it will increase the probability that the building will survive or remain

sufficiently intact such that the equipment inside will still be operable or at least in a state to be recovered and redeployed. Our current understanding of the additional cost for ground strengthening is such that it will likely be more cost effective to invest in spare equipment and to strengthen a wider number of buildings to achieve the same benefits. This is due to the flexibility of the solutions that is provided by holding spare equipment. The ultimate decision on what to strengthen at each building will be made on a case by case basis following detailed site analysis and considering the risk/ cost trade off. This will be a conscious risk based decision.

- our current understanding of the complexity of ground strengthening requirements means that we could not achieve it within the three year timeframe for all the sites that are at risk.

### *Communication Links*

Jacobs' questioned the need for three data centres.

We are of the view that we need three data centres to provide the required diversity as there is a real risk that we could lose both transport and communication links between Haywards, Porirua/Tawa and the Wellington CBD/ Western Wellington regions. Should we lose communication links, it is essential that we can operate these three islands separately.

### *General Issues*

Other key areas of feedback from Jacobs that impacted the proposal were:

- re- phasing of expenditure – which pushed out the Opex component and resulted in a reduction in total Opex;
- seismic strengthening costs increased by \$140K as we added costs to cover increased requirements for more detailed seismic assessments (at Jacobs suggestion);
- adjusting the restoration improvement times for options 5 and 6 of the zone substation options, meant that option 5, a spare zone transformer returned a marginally higher (\$0.08 million) net benefit to the preferred option. However, Jacobs had noted that we had not taken into account the “business as usual” (BAU) benefits associated with the flexibility of mobile substations. Given the net benefit differential between options was so small, less than 4% of the total cost, we deem them to be even and the mobile substation option is preferred on the basis of flexibility and wider BAU benefits;
- Jacobs noted that the original analysis only included one switchboard in options 2 and 4 of the zone substation options (these were not preferred options). This was corrected to two switchboards but did not change the outcome of the analysis;
- data centre costs were reduced by taking out unnecessary uninterruptible power supply units; and
- modifications were made to the document and the Excel workbooks to assist with clarity and transparency.

Revisions to the proposal changed the total proposed expenditure from \$32.04 million to \$31.24 million. The options remained the same.

## 5 Stakeholder and Customer Engagement

### 5.1 STAKEHOLDER ENGAGEMENT

We have been engaging with stakeholders for a number of years on matters of earthquake readiness and resilience. This has principally been through our membership of the Wellington Lifelines Group and the Wellington Regional Resilience Group as well as involvement in the Built Environment Leaders forum.

Wellington Lifelines Group Membership	Regional Resilience Group Membership	Built Environment Leaders Forum
Wellington City Council	Wellington City Council	New Zealand Lifelines Council
Porirua City Council	Porirua City Council	Earthquake Commission
Lower Hutt City Council	Lower Hutt City Council	Building Research Association of New Zealand
Upper Hutt City Council	Upper Hutt City Council	Building System performance, MBIE
Greater Wellington Regional Council	Greater Wellington Regional Council	Science, Skills and Innovation, MBIE
Wellington Water	Wellington Water	Local Government New Zealand
Transpower NZ Limited	Transpower NZ Limited	Ministry of Civil Defence and Emergency Management
The New Zealand Transport Agency	The New Zealand Transport Agency	Ministry for the Environment
Centreport Limited	New Zealand Fire Service	Department of the Prime Minister and Cabinet
GNS Science	Wellington Region Emergency Management Office	New Zealand treasury
Kapiti Coast District Council	Wellington Lifelines Group	Christchurch City Council
Kiwirail	Wellington Electricity Limited	Wellington City Council
Nova energy		GNS Science
Powerco		Resilience to Nature's Challenges Science Challenge
Wellington International Airport		University of Canterbury
Wellington Electricity Limited		University of Auckland
		Kestrel Group

**Table 5 – Forum membership details**

We have been active contributors to these, and other forums and shared the results of our investigations to inform the readiness and resiliency discussion in Wellington. Other organisation's findings have, in turn, informed our own investigations, not least the "Transport Access" report by Opus which was issued by the Wellington Lifelines Group in March 2013<sup>11</sup>.

We have had regular discussions with Orion and are also involved in the Built Environment Leaders Forum which is a joint initiative between Ministry of Business, Innovation and Employment, Building Research Association of New Zealand (BRANZ and the Earthquake Commission (EQC)<sup>12</sup>.

In late 2016, following the Kaikoura earthquake, Government asked key infrastructure providers what could be done to improve the region's readiness to respond to a second significant earthquake based on the earthquake series experienced in Christchurch (2010-11).

At that time, correspondence from MBIE<sup>13</sup> included the following commentary:

<sup>11</sup> <http://www.gw.govt.nz/assets/Emergencies--Hazards/Lifelines/13-03-23-Transport-Access-full-project-report-FINAL-corrected.pdf>

<sup>12</sup> [www.mbie.govt.nz/info-services/building-construction/safety-quality/built-environment-leaders-forum](http://www.mbie.govt.nz/info-services/building-construction/safety-quality/built-environment-leaders-forum)

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*“Wellington faces an elevated risk of an aftershock that may damage energy and transport infrastructure, leaving the region cut off from other regions and with fragmented internal road links. MBIE and other agencies, is looking for assurance that Wellington is prepared for a significant aftershock (e.g. 7.5 on the Richter scale).”*

Following this correspondence, the urgency of our own readiness and resilience studies increased and precipitated increased and more focussed engagement with the Commerce Commission, MBIE and Government ministers.

On completion of our readiness business case, we started, and continue to engage with key stakeholders, providing specific briefings on our proposed expenditure. This engagement included an overview letter (included in the *Stakeholder Engagement – December 2017.pdf* attachment to this proposal) providing a summary of the business case and proposed pricing impacts. This was followed, where possible, by face to face meetings between our CEO and the stakeholder’s counterpart.

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<sup>13</sup> Email from MBIE to Wellington Electricity and Transpower dated 22 November 2016.

Stakeholder	Formal Feedback Received (to date)	Letter
<b>Wellington City Council</b>	They accepted the price-quality trade-off is appropriate. Mayor Lester quoted in a media article <sup>14</sup> : “The city needs this.”	Attached
<b>Porirua City Council</b>	Mayor Tana expressed his support for the proposal indicating that more needed to be done to prepare for a big earthquake.	
<b>Upper Hutt City Council</b>	Mayor Guppie indicated strong support for the proposed expenditure	Attached
<b>Greater Wellington Regional Council</b>	Chair Chris Laidlaw expressed full support for the proposal.	Attached
<b>Wellington Water</b>	CE Colin Crampton recognised the risk to transport links and noted that we need to be able to respond to customers within each island to deliver an appropriate level of post event service.	Attached
<b>Wellington Lifelines Group</b>	Chair Fran Wilde was broadly supportive but did question the level of price increase	
<b>Built Environment Leaders Steering Committee</b>	Supportive of the proposal as it aligns with the forum’s priority of identifying and improving the resilience of NZ’s most critical infrastructure components and systems.	
<b>Energy Retailers Association of New Zealand</b>	Trustpower raised concern that this must have been a known risk for years so why wasn’t it included in the DPP allowance. Other members wanted to see more detail before commenting further. Nova expressed broad support given the community welfare benefits.	
<b>Genesis Energy</b>	Raised concerns with the precedent of allowing streamlined CPPs. Indicated broad support for the community welfare aspects of the proposed expenditure as well. They also supported the risk reduction afforded to other EDBs by making the spares available for use in the event of natural disasters elsewhere in the country.	
<b>BusinessNZ</b>	Supportive of measures, such as those proposed in your business case that seeks to improve our current position, so long as they are cost effective and appropriately balance the additional costs to consumers with the benefit received.	
<b>Nova Energy</b>	Nova indicated that it recognises the value of being ready to respond quickly and effectively to restore power supplies in the event of a major earthquake; thereby ensuring communities can start the recovery process without undue delay.	
<b>Wellington Chamber of Commerce</b>	CE John Milford acknowledged that the proposed investment is about providing contingency in the case of earthquakes. They support approval of the application recognising the marginal increase in cost and acknowledge this is a key step in the right direction to improving our electricity readiness.	Attached

**Table 6 – Readiness Business Case Stakeholder Engagement Summary**

The five councils which represent our communities were overwhelmingly in favour of our proposed expenditure as they see the need to improve the readiness capability of our region as a whole. Similarly, Wellington Water and the Wellington Chamber of Commerce were also supportive. This is reflected in their letters of support that are attached to this Proposal.

There were some concerns raised by ERANZ members principally around the pricing impact and the potential for this to set a precedent for other EDBs to pursue “streamlined CPPs”.

We do not believe that there is a precedent set by this proposal in as much as it was specifically precipitated by a Government Policy Statement targeting improved resiliency in the Wellington region.

<sup>14</sup> <http://www.stuff.co.nz/business/98537226/wellington-electricity-planning-to-spend-more-than-30m-improving-electricity-resilience>

Further feedback can be found in *Further Stakeholder Engagement Addendum - December 2017.pdf* and the stakeholder letters can be found in the attachment, *Stakeholder Engagement - December 2017.pdf*. Both are attached to this proposal.

## 6 Revenue Requirement and Pricing Implications

### 6.1 DURATION OF REGULATORY PERIOD

We propose that this streamlined CPP covers the period 1 April 2018 – 31 March 2021.

### 6.2 MODIFICATIONS, EXEMPTIONS AND VARIATIONS TO IMs

The streamlined nature of this CPP is driven by exceptional circumstances. To enable a streamlined process requires us to make change to certain provisions in Parts 1, 4 and 5 (and related schedules) of the Electricity Distribution Services Input methodologies 2012<sup>15</sup> (IMs).

We have therefore requested and the Commission approved a number of modifications to, and exemptions from, the process and content requirements of the EDB IMs. In addition, in order to implement the price path approach, WELL proposes a number of variations to the IMs pursuant to section 53V(2)(c) of the Act.

Full details can be found in the Regulatory Compliance Schedules document.

### 6.3 DETERMINING OUR REVENUE REQUIREMENT

The revenue requirement is derived by applying the relevant IMs for building block allowable revenues (BBAR) and maximum allowable revenues (MAR). The building block components are smoothed over the 3 year CPP period using the method set out in the CPP input methodologies.

The approach combines the DPP BBAR method for business as usual expenditure with CPP BBAR method for incremental earthquake readiness expenditure.

For the first two years of the CPP (RY19 and RY20) the building block costs used to derive the revenue requirement comprise:

- the maximum allowable revenue approved under the current DPP determination (DPP MAR), plus
- the building block costs of the earthquake readiness expenditure (CPP BBAR).

For the final year of the CPP (RY21) the building block costs used to derive the revenue requirement comprise:

- a roll forward of the DPP BBAR using RY21 business as usual capital and operating expenditure derived from the 2017 AMP (DPP BBAR rolled forward), plus
- the building block costs of the earthquake readiness expenditure (CPP BBAR).

Consistent with the input methodologies, the form of control relevant to the revenue requirement is a revenue cap.

This is illustrated in the figure below.

<sup>15</sup> Part 5, Subpart 1, clause 5.1.7 of the IMs provides that a CPP applicant may request, and clause 5.1.6 provides that the Commission may approve, modifications or exemptions to these requirements prior to filing a CPP application.

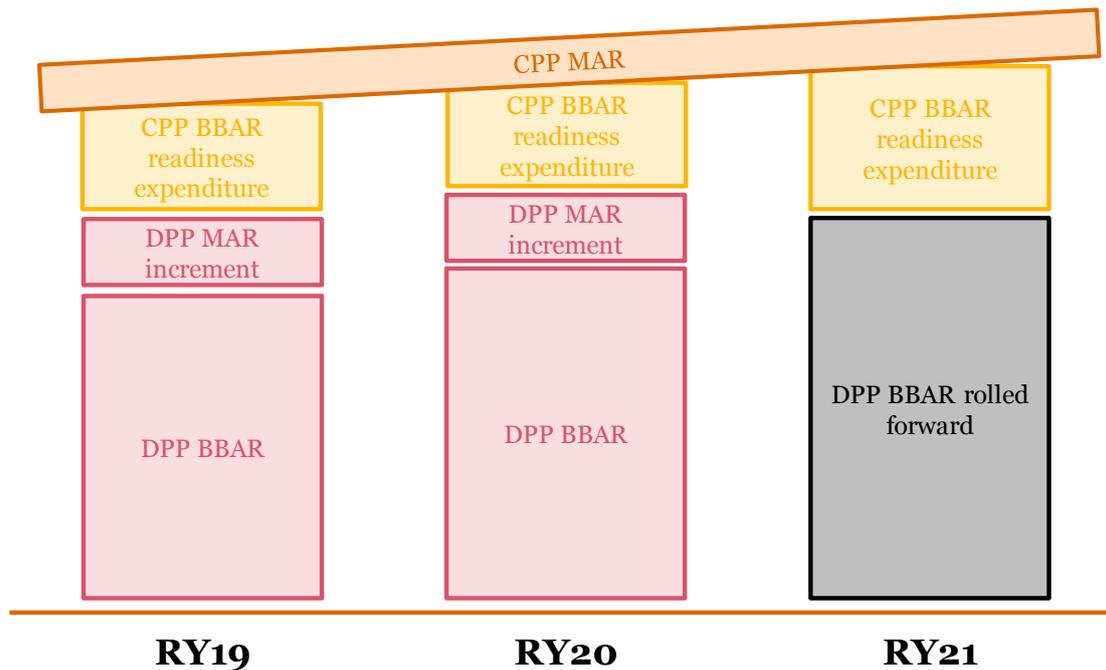


Figure 4 - Approach to calculating CPP maximum allowable revenue (MAR)

The 67<sup>th</sup> percentile estimate of WACC used is 7.19%. This is the 67th percentile estimate applicable to the 2015-2020 DPP.

For the term credit spread differential allowance, the values proposed for RY19 and RY20 are those which were specified in the 2015 DPP financial model. The value proposed for RY21 utilises the method from the 2015 DPP financial model, rolled forward with the forecast RAB value. No additional allowance is proposed to reflect the earthquake readiness expenditure.

## 6.4 EXPECTED PRICING IMPACT

The proposed investment would lead to a modest price increase of \$1.50 to \$1.90 per month in lines charges for a typical residential customer on our network over that time. We are of the view that this relatively modest price increase will provide substantial long term benefits to the consumers of Wellington which far outweigh the cost of the readiness investments.

The benefit of that investment is substantial because it will reduce the impact of damage to the electricity network within reinforced substations from a major earthquake, and increase the speed with which power can be restored afterwards through improved critical spares availability.

## 6.5 PROPOSED QUALITY STANDARD

We are not proposing a change to our quality standard as part of this proposal. That is because the additional readiness expenditure is unlikely to have strong interdependencies with our quality performance.

We therefore propose rolling over our current DPP quality standard (see Table 7 below) into the RY21 year. In other words, we propose that our current quality standard apply for the duration of the SSCP period<sup>16</sup>.

	Target	Cap <sup>17</sup>
<b>SAIDI<sup>18</sup></b>	35.44	40.63
<b>SAIFI<sup>19</sup></b>	0.547	0.625

**Table 7 - Proposed Targets 2019 to 2021**

These are the same targets and caps as set by the Commission’s determination for the 2015 to 2020 DPP period

<sup>16</sup> It should be noted that in the event of a major earthquake, our expectation is that we would breach these standards as we are reducing the impact, not eliminating it.

<sup>17</sup> Level where the Commerce Commission may initiate a quality review

<sup>18</sup> System Average Interruption Duration Index

<sup>19</sup> System Average Interruption Frequency Index