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Message from the CEO

We hope you will take this opportunity to help shape our investment plans for the future.

Our business is simple. Our purpose is to make sure that the electricity network of poles, cables, wires and substations that we own deliver power in the areas we serve around the clock.

Our customers tell us we’re meeting their expectations, and they want the standard of our services to be at least maintained at current levels. They also expect us to operate a safe, secure and resilient network.

Looking to the future, our analysis shows that the condition of our network is declining and this decline is projected to accelerate as our assets age. Over time, the declining asset condition will drive poorer reliability outcomes for customers and reduce the resilience of our network to storms. More importantly, however, it will also expose our customers and staff to unacceptable safety risks. We cannot compromise on safety, and it remains our primary focus.

The amount of revenue we receive from our customers through network tariffs has remained broadly the same as historic levels as a result of the regulatory framework we operate within. However, while we have been working hard to manage the network efficiently within this allowance, there is a growing gap between our regulated revenue and the funding required to keep pace with electricity demand and our ageing assets.

We need to increase our investment in the network to deliver safe network services that meet customers’ expectations now and in the future. I firmly believe that if we delay taking action, the costs of addressing the growing safety and performance risks will be substantially higher later on. We must also make sure our network can meet our customers’ needs as they look to use new technology. The investments we make today must also continue to provide value to our customers in the future.

We are planning to invest close to $1.4 billion over the five-year period (2018-23), an increase of just under 50% compared to the previous five years. Good planning is essential. We know it is important to demonstrate that the money we spend on our network is prudent and efficient. The decisions we make on spending during the next few years will shape the capability and performance of our network in the coming decades.

Our investment plans will have an impact on the average prices customers pay for our services. Ultimately though, it is the Commerce Commission who will decide whether our proposed expenditure plans are appropriate.

How much your bill goes up will depend on how your retailer chooses to pass on the increased cost for our electricity distribution service and your particular characteristics. If our plan is approved, this would add approximately $1.00 to $1.50 per week to a typical household customer’s electricity bill.

We have written this consultation document to inform you of our plans and invite you to have your say. There are questions throughout to prompt feedback from you. This is an important part of our investment planning process. We are seeking your thoughts on particular aspects of our plan so we can focus our investment on delivering what customers value most highly.

This and other consultation material is available at www.yourenergyfuture.co.nz. Other information on the website provides more detail about our investment areas and the key parts of our plan.

Nigel Barbour (CEO)
1 Purpose of the document

We are currently developing a five-year investment plan or customised price-quality path (CPP) proposal for the period 1 April 2018 to 31 March 2023 (CPP Proposal). As part of this process, we are engaging with you - our customers and stakeholders - to explain:

− how our plan has been developed
− the challenges we’ve already applied to our thinking to ensure that our proposed expenditure is prudent and efficient
− where appropriate, to seek your views on priorities and preferences for this period and beyond

This consultation is a continuation of the engagement process that we started last year which sought your views on what you value most in your electricity supply, and what role you want us to play in meeting your future energy needs.

We want to ensure that our investment decisions deliver a network for you that is safe, secure and resilient and at the same time reflects your priorities and long-term interests.

This document provides an overview of our proposed expenditure plans. It reflects the priorities you have told us you want us to deliver. In particular, you do not want us to hold back on investment if it results in problems in years to come. In addition, you do not want to see a deterioration in the level of service we provide. However, we also recognise that some customers are especially concerned about electricity prices, which means that we must make every effort to ensure that our expenditure plans are prudent and efficient.

We have combined your feedback so far with our engineering and operational knowledge of the network to form an investment plan that we believe is necessary, prudent and efficient. Our investment plan is formed around three themes:

− Providing safe, secure¹ and resilient² networks. This requires us to focus on the underlying condition of our network (rather than focusing on short-term reliability alone) and maintain and replace equipment in a prudent and timely way.
− Investing for customer growth. This requires us to support and facilitate economic growth by ensuring network capacity meets our customers’ needs now and into the future.
− Enabling our customers’ energy choices. This requires us to learn about the technologies and new energy solutions through trials and pilot schemes to ensure our investments and approach are suitable for an evolving energy market and in the long term interests of customers.

We believe that our proposal strikes the right balance between keeping bills affordable and investing in our assets for the benefit of today’s customers and future generations. Our ability to maintain current service levels and to meet statutory safety obligations would be compromised if we don’t increase our levels of investment.

This consultation document informs you of our plans and invites you to have your say. There are questions throughout to prompt feedback from you. Further consultation material is available at www.yourenergyfuture.co.nz.

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¹ By “secure” we mean that the network has sufficient built-in redundancy to enable us to maintain electricity supply to our customers, or to restore it in a timely way following a single, reasonably foreseeable event such as the failure of a transformer.

² By “resilient” we mean that the network is designed, constructed and maintained so that it is able to absorb and recover from infrequent events such as severe storms or natural disasters.
Our consultation channels

Overview document
Summary of our investment proposal

Have your say document
Detail of our investment proposal including alternatives and considered options

Website and video
Provides access to all key documents and a link for providing feedback

Activities

One-on-one conversations

CEO letter

Advertising insert

Group forums

Question

We are seeking your feedback on the information presented in this chapter. While we welcome feedback on all aspects of the material, we are particularly interested in your views on the following.

Consultation and Engagement process

This consultation is a continuation of an engagement process that we started last year. This “have your say” document is part of a suite of consultation material (and digital content) we have developed to help explain our expenditure plans and the outputs we will deliver for this investment.

We are making this information available through different media channels including meeting with customers and stakeholders face to face.

1. Have we taken appropriate steps to make information available for you to “have your say”?
Powerco
background

Taranaki
Whanganui
Manawatu
Coromandel
Bay of Plenty
Wairarapa

Powerco network areas
2 Our role, customers and networks

Who we are
Powerco is New Zealand’s second largest electricity distribution company by customer numbers, providing an essential service to over 600,000 New Zealanders. We have the largest supply area and overall network length. Our networks stretch across the North Island from the Coromandel to the Wairarapa.

Our role
We own and maintain the poles and wires that distribute electricity from the high voltage transmission network to our customers’ premises. Our role in the electricity supply industry is shown in the figure below.

Figure 1: Our role in the electricity industry

Our customers
Our customer base includes:

- 15 electricity retailers who have contracts with us to operate on our network
- more than 330,000 homes and businesses comprising:
  - residential consumers and small businesses
  - medium sized commercial businesses
  - large commercial or industrial businesses
- 24 directly-contracted industrials, including large distributed generators
- 19 local territorial authorities and the NZTA.

Our residential and small business customers comprise more than 99 per cent of our customer base and approximately 66 per cent of electricity usage on our network. While small in terms of customer numbers, our commercial and industrial customers consume the remaining 34 per cent of the electricity we deliver.

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3 Distributed generation is a growing trend but still only a very small proportion of total generation.
Where we operate

We operate two separate networks, referred to as our eastern and western regions. Both networks contain a range of urban and rural areas, though both are predominantly rural. Geographic, population and load characteristics vary significantly across our supply area.

Figure 2: Our Eastern and Western Regions

Network charges

Our network charges make up approximately 30 per cent of a typical residential customers’ bill. The remaining 70 per cent comprises:

- approximately 10 per cent for the transmission network, which is owned and operated by Transpower
- approximately 60 per cent for generation (producing electricity) and retail (purchasing and selling electricity, metering and customer service)

We know that the pricing arrangements in the electricity industry are complex. Essentially, a customers’ electricity bill will include all of the elements in the supply chain from generation through to retail. In recent years, the price increases that our customers faced have not been caused by distribution charges. On average our charges have remained broadly flat in real terms since 2005.

Despite not having a direct contract with you, we consider all electricity users connected to our network to be our customers. We aim to meet our customers’ requirements, particularly in relation to reliability and customer service.
Customised price-quality path

Every five years the Commission determines maximum allowed price increases for non-exempt distribution business (17 in total across New Zealand), under what is called a Default Price Path (DPP) mechanism. This is designed to be a simple and low cost way of setting the revenue allowance for each network company. The DPP is based on a working assumption that the future will not be very different from the past in terms of what services customers want and what the companies need to invest in their networks and operations.

The industry regulation has been designed to encourage companies, like Powerco, to make a separate application for a CPP if the revenue allowance under the DPP is considered to be inadequate to meet their particular circumstances.

In our case, we are currently in a situation where the DPP does not meet our particular circumstances and later this year we will be asking the Commission to consider a proposal from us that we should be subject to a CPP which better reflects the investment needs of our network. In assessing our proposal and coming to its decision, the Commission will take a close look at our expenditure plan and test it to ensure that what we propose is prudent, efficient and in the long term interests of customers.

In developing our CPP Proposal we have considered the underlying health of our assets and how this has been trending over time. We have also reviewed our maintenance practices in light of industry best practice and our compliance obligations. Our plans are supported by quantitative analysis wherever data is available, and we are taking steps to improve our data on asset condition and performance as this information is key to ensuring effective investment decisions into the future.

Our proposed plan has been challenged by independent technical experts and the Powerco Board. Each has looked at whether we can reduce the impact on customers’ bills through a different mix of investment. Their thinking is aligned to ours - we must ensure our networks meet the needs of our customers, now and in the future while ensuring we are prudent with our investments. We believe that the plan strikes the right balance between keeping bills affordable and investing in our assets for the benefit of today’s customers and future generations.

We have identified additional investment opportunities which are not included in our proposed expenditure plans, but would benefit customers. We are seeking your feedback on whether we should undertake these additional investments and/or consider other investment opportunities beyond those set out in our current plan.

This consultation document plays an important role in encouraging customers and other stakeholders to be actively engaged in the regulatory process and in the finalisation of our expenditure plans.
3 Our asset management journey

Our stakeholders rightly expect us to be able to demonstrate that our network is optimally configured, our assets are appropriately utilised, and we operate the business efficiently.

This requires us to understand the health of our assets; how they are performing; where future network loadings are likely to arise; and the residual risk that it is appropriate for us to manage. Effectively utilising and adapting to technology change is also an important element of our asset management approach, and we put considerable focus on ensuring that the investments we make now are future proofed to the extent practicable.

Our asset strategy and planning capability is well respected within the distribution industry, and our annual Asset Management Plan has been consistently rated as a leading example in independent industry reviews. Our costs and performance compare well against the best utilities in New Zealand and Australia. We are proud of this and the way we manage our assets to provide a cost-effective service to our customers.

We also recognise, however, that asset management as a discipline continues to undergo progressive refinement internationally and the bar is continually rising. In terms of our journey, we are placing a strong focus on ensuring robust asset data and information on asset condition and real time performance to support our future decision making.

Reflecting this, in recent years we have taken a number of steps to improve our asset management capability:

- **Improved asset management framework.** We have taken steps to refine our objectives, policies, governance and planning frameworks. These are important changes that support prudent and efficient expenditure plans.

- **Enhanced models and processes.** We have been developing more robust models and processes to ensure we understand the current and expected future performance of our assets and the overall health of our network.

- **Increased network visibility.** We have started to invest in improved tools and technologies to increase our real-time network visibility. A particular focus is our low voltage network, which serves the majority of our customers. Investment in this area will eventually enable us to remotely reconfigure our networks in response to outages or demand peaks.

- **Improved analytical capability.** We are increasing our investment in analytical skills, key systems and data during the planning period.

Our target is to develop our asset management framework to be consistent with the internationally recognised standard ISO 55000 by 2022. This is used by many of the best asset managers in the world to guide their operations and achieving this will position us at the leading edge of our sector’s asset management practice.

While we continue to improve our asset management capability, the expenditure plans described in this consultation document provide our best view of the actions that should be taken to deliver the safe, secure and resilient network that our customers expect. In addition, we have tested the robustness of the plans by examining different expenditure options and outcomes. This analysis indicates that the proposed plans are prudent, efficient and in the long term interests of customers.

This document sets out the asset management analysis that underpins our proposal. Our process starts by considering the current and future needs of our customers, and then considers the options available to us to deliver this in the most efficient way possible. Our thinking is set out in the chapters that follow.
Consulting our customers
4 What you have told us so far

Our engagement approach

We engage regularly with our customers to help us understand the aspects of our service that are most important to them, and how we can improve. We receive customer feedback through a number of different channels including:

- Agricultural field days, expos and trade shows
- Regular commercial meetings
- Annual surveys
- Stakeholder meetings and focus groups
- Community-wide consultation on specific projects or topics
- Digital media (website and social media) and phone contact

To help inform our current investment planning round, in 2015/16 Colmar Brunton and PWC undertook a major survey of our residential and commercial customers. This provided us with some useful insights into what customers value from our services and their preferences for different service levels and costs. Some of the key findings from this exercise are summarised below.

Feedback on current performance and future direction

Households and small businesses are concerned about rising energy costs. Our customers on the whole believe that network companies like Powerco have a responsibility to manage long term costs to avoid the need for large, short-term price rises. Lower income residents and businesses are more price conscious and may accept a lower level of service to save money.

However, our research also clearly shows that customers don’t want us to store up problems for the future by cutting investment now at the expense of higher costs in the future. Customers also expect us to manage safety and performance of our networks efficiently and prudently. Survey results show that customers put reliability and safety above price considerations.

Three quarters of both commercial and residential respondents agreed that maintenance and investment in the network was either important or very important. Customers said that we should:

- Replace parts of the network before they break.
- Ensure that we use the most modern technology available.
- Prepare the network for new technologies such as electric vehicles and solar panels.
- Protect the network against damage from storms.
- Reduce both the number, and length, of power cuts.
- Inspect the network for potential problems.

We set out below some numbers and charts that summarise our customers’ view on our current performance and what they expect from us in the future.

More than 95% of our customers continue to be satisfied with our overall performance.
Percentage of customers believe their supply quality is satisfactory or better.

Note: the graph indicates our standard, not an industry-mandated figure.

The majority of our customers describe their current electricity supply as “reliable”.

How much do you agree/disagree with the following statement? % of responses

-25 0 25 50 75 100 0 25 50

My electricity supply is reliable.

Residential

Business

A similar percentage want the number and duration of outages to be reduced.

How important is this for you? % of responses

-25 0 25 50 75 100 0 25 50

Reducing the number of power cuts

Residential

Business

Reduction of length of power cuts

Residential

Business
Customers expect us to improve the way we provide information.

How important is this for you?

<table>
<thead>
<tr>
<th>% of responses</th>
<th>-25</th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
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</table>

Knowing about a power cut ahead of time if possible

Customers expect us to invest before network assets fail.

How much do you agree/disagree with the following statement?

<table>
<thead>
<tr>
<th>% of responses</th>
<th>-25</th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td></td>
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<td></td>
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<tr>
<td>Business</td>
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</table>

The lines company should replace parts of the network before they break.

Questions

We are seeking your feedback on the information presented in this chapter. While we welcome feedback on all aspects of the material, we are particularly interested in your views on the following.

Seeking further feedback on our priorities

We are seeking some specific feedback in a couple of areas to reconfirm our interpretation of what customers have already told us.

2. Would you, as a customer in our network area, prefer to accept some higher risk of power outages from faults, or high impact but infrequent events from storms or other natural events, if it meant delaying part of the proposed price increases? Or is it more important to address known and emerging issues on the network as quickly as possible?

3. Would you, as a customer in our network area, prefer that we leave older network assets in place, where safety is demonstrably not impacted, to minimise the price impact of spending to replace such assets, even if this means a higher level of risk of power outages from faults in the future, and higher costs to customers over the longer term?

4. We are planning to invest now to ensure we are able to maintain current levels of supply reliability into the future (i.e. maintain the current level of unplanned interruptions across our networks). As a result, the amount of work we will need to do on our networks will increase and the number of planned (pre-notified) supply interruptions will need to increase. Do you agree with this necessary trade-off?
5 How are we taking account of your feedback?

We value and recognise the importance of meaningful customer engagement. As such, we have developed plans that reflect the feedback received so far.

Our principal focus has been to ensure that our expenditure plans are efficient and prudent and in the long term interests of our customers. We call this meeting our “expenditure objective”. This has required us to make important choices on behalf of customers, so that we address emerging risks and ensure that we deliver value for money.

In developing our plans three themes emerged which describe what we intend to achieve:

- Providing safe, secure and resilient networks
- Investing for customer growth
- Enabling our customers’ energy choices

We think these themes capture what customers are telling us and what we must do as a prudent and efficient network company. The tables below summarise how these themes respond to the feedback we have received so far.

### Safe, secure and resilient

**During our preliminary consultation you said...**

- The safe operation of our network is more important than price.
- Our networks should be resilient enough to ride through storms.
- Replace parts of the network before they break.
- Current reliability should be maintained or improved.
- Price is important, and for some customers it may be more important than maintaining reliability.

**Our plans...**

- Ensure the safe operation of our network by addressing emerging risks.
- Improve network resilience so customers are less likely to be affected by storms.
- Provide for the replacement of those assets that are contributing to increasing failure rates.
- Address underlying concerns regarding asset condition so that reliability does not deteriorate.
- Adopt the expenditure option that delivers the best value, having regard to the long term interests of customers.

### Investing for customer growth

**During our preliminary consultation you said...**

- Our networks should support and enable economic growth in our regions.
- We should reduce the length and number of outages.
- We should provide reliable electricity into the future.

**Our plans...**

- Address areas where capacity and security fall below target for towns and cities.
- Utilise network automation and appropriate security measures to reduce the impact of unexpected equipment failure.
- Monitor and provide capacity for growth in local communities and businesses.

### Enabling our customers’ energy choices

**During our preliminary consultation you said...**

- Prepare the network for new technologies such as electric vehicles and solar panels.
- Ensure that we use the most modern technology available.

**Our plans...**

- Ensure our readiness for new technologies so that we can facilitate rather than impede customer choice.
- Enable us to trial new technologies and solutions.
Further opportunity for stakeholder feedback

Your feedback on this consultation document is important to us as we finalise our proposal.

In the following sections we explain what is driving the need for future investment and how we have prioritised and tested our plan. In the appendices to this document we have set out more detailed information on the alternative expenditure options we have considered.

Our plans are based on current information and incorporate detailed analysis of asset health, demand growth, and estimates of new technology uptake. We routinely update our thinking on assumptions, and are open to flexing our plans in response to feedback or if improved information becomes available and our current assumptions need to be refined. This is consistent with good asset management practice and the long term interests of our customers.

To assist customers in responding to this consultation paper, we have included a number of questions throughout.

After we submit our CPP application to the Commission you will have a further opportunity to comment on our proposals and provide input to the Commission’s assessment process.
Our proposed investment plan 2018-2023
6 Our CPP Proposal: At a glance

We plan to spend approximately $1.4 billion over the five year CPP regulatory period (FY 19-23), an increase of just under 50% compared to the previous five years (FY14-18).

How our proposed five-year investment compares to the previous five years

The chart below breaks down our expenditure by our three core investment themes. To help us deliver these plans, we also need supporting functions, represented by the supporting expenditure category below.

Figure 3: What makes up our expenditure

Our total planned expenditure over the CPP period is about $1.4 billion (or $280m per year). This compares to $940m (or about $188m per year) over the previous five years.

The mix of expenditure is broadly similar. Most of the expenditure increase is on network spend. Our supporting expenditure will also increase but by a lesser percentage as savings are made through economies of scale.

Quality outcomes

Our expenditure plan is focused on maintaining current levels of quality by proactively addressing underlying performance issues, such as asset health, before they cause a deterioration in asset performance. By “quality” we mean reliability, power quality/voltage and customer service, which includes our responsiveness to power cuts and service requests.

An unavoidable consequence of increasing our work programme is that the number of planned outages will have to increase - especially if we are required to de-energise parts of the network in order to gain safe access to our assets to undertake the necessary investment. Customers have told us that on the whole outages that are notified in advance (and are efficiently executed and kept to a minimum) are preferable to unplanned supply interruptions.

It is important to note that:

- A sustained increase in planned work on our network assets (and by association an increase in the level of planned supply interruptions) will need to continue beyond the CPP period – as illustrated in the figure below.
- While our investment plan will ensure the underlying risk of unplanned supply interruptions is stabilised at current levels (over the long term) – over the foreseeable future we will not see an overall improvement in average levels of network reliability performance.
The figure below shows our annual historical and projected interruption duration. Common with other distributors, we measure this using System Average Interruption Index (SAIDI), which represents the average annual interruption duration for an average consumer on our network. We distinguish between planned interruptions (e.g. pre-notified outages to allow us to safely access network assets) and unplanned interruptions (e.g. outages caused by storm damage).

Figure 4: Actual and forecast system average interruption duration per customer (SAIDI)

**Implications for our revenue requirement**

Our investment plans will impact the prices customers pay for our distribution services. The Commission will assess whether our proposed investment is prudent and efficient. It will then determine the amount of expenditure we are allowed to recover through revenue from electricity distribution charges.

If our plan is approved, our revenue requirement will need to increase by around 9 per cent.5

**How our proposed investment will affect your electricity bill**

After the Commission determines our ‘allowed revenue’ from distribution charges, how much your electricity bill goes up depends on how your retailer chooses to pass on the increased cost for our service.6

To help you work out the approximate impact on your electricity bill you need to know its composition. For example, the following figure shows the approximate split of the bill for a typical household consuming 8,000kWh per year.7

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5 For example, a SAIDI of 120 minutes means that the average customer on the network did not have supply for two hours during the year.
6 Relative to the revenue we expect to recover if we continue on a default price path.
7 For further information refer to the Electricity Authority’s website www.ea.govt.nz/consumers/my-electricity-bill/
8 Based on Ministry of Business, Innovation and Employment, Quarterly Survey of Domestic Electricity Prices
The following table illustrates how a household with an electricity bill of $2,500 per year would be impacted by a 9% increase in our revenue. Under the assumptions made, the increased revenue requirements translates into a 2.7% increase in total electricity cost.

<table>
<thead>
<tr>
<th>Description</th>
<th>$ per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual electricity bill today</td>
<td>2,500</td>
</tr>
<tr>
<td>Powerco portion of bill (total x 30%)</td>
<td>750</td>
</tr>
<tr>
<td>Increase due to CPP (Powerco portion x 9%)</td>
<td>68</td>
</tr>
<tr>
<td>Annual electricity bill after price increase</td>
<td>2,568</td>
</tr>
</tbody>
</table>

The typical household's bill in this worked example would increase by $68 per year or 2.7%. This increase corresponds to an average monthly increase of $5.70 and an average weekly increase of $1.30. As noted above, any actual increase will depend on how your retailer chooses to pass on the increased cost.
7 Our Plan will deliver a safe, secure and resilient network

Safety, security, resilience, and reliability are concepts that are tightly woven together and underpin good asset management. This requires a focus on ensuring all our assets are appropriately designed for the service they are intended to provide, are well maintained, and are renewed effectively at the right time.

Our networks are integrated into the very fabric of the communities we serve and so the implications of assets becoming unsafe are severe. Running poles and conductors beyond their safe service lives can result in broken structures, and lines falling to the ground - a situation that is not desirable or acceptable. Our plans are designed so that we act prudently to ensure the safety of the public and those who work on and around our networks.

The recent events in Christchurch and Kaikoura have also highlighted the public expectation that New Zealand’s core infrastructure should be built to a standard that ensures safety and resilience in the face of the challenging environmental conditions we sometimes experience in New Zealand. Our plans look to ensure that our assets are replaced and maintained in a way that ensures resilience given the specific environmental conditions experienced in our regions.

How our current reliability performance compares

If we compare our network reliability with those of other distributors (Figure 6 below) it shows we are already at the lower bound of acceptable performance. As indicated, we sit well above the line, and our performance is therefore not as good as our peers, taking our size and customer base into account. Our closest peers are shown as deep purple dots. As noted in earlier sections, our customers have expressed a view that allowing our reliability to decline is not desirable.

Figure 6: Comparing NZ distributors’ reliability performance

We have managed to maintain the current level of reliability experienced by our customers in recent years, even though the underlying health of our assets is declining. This is a good outcome, but it is not sustainable. It has been achieved by judiciously investing in automation and other operational improvements. However, there are now fewer opportunities for similar investments. More fundamentally, such approaches cannot overcome the need to replace end-of-life equipment so as to avoid safety risks.

As a consequence, we expect our reliability performance to track future changes in asset health even more closely than in the past. At current levels of expenditure, the expected decline in asset health is projected to accelerate as more assets reach end of life, which will impact reliability, and if not addressed judiciously, safety.
Our customers have indicated that they do not want the reliability of our service to deteriorate, nor safety to be compromised. Given the projected decline in asset health and our aging asset base, we need to take action to continue to deliver the safe, secure and resilient network our customers require. We also need to address gaps in our operational practices and vegetation management.

We have identified three initiatives that will enable us to meet customers’ expectations at the lowest sustainable cost:

- Address declining asset health by increasing asset replacement
- Enhance operational focus to reduce the number of asset defects
- Improve safety and resilience by addressing vegetation clearances across the network

Each of these actions is explained in turn. Our overall programme to ensure safe secure and resilient networks increases our revenue requirement by about 6.5 per cent.

### Providing safe, secure and resilient networks

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>From: $500m expenditure in FY14-18 ($100m five-year annual average)</th>
<th>To: $770m expenditure in FY19-23 ($154m five-year annual average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue impact</td>
<td>$270m additional expenditure</td>
<td>6.5% increase in our revenue requirement.</td>
</tr>
<tr>
<td>What this pays for</td>
<td>Asset renewals (in particular overhead structures and conductors), maintenance and vegetation management to keep our networks safe, secure, and resilient.</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Expenditure figures in real 2016 dollars. Final revenue increases to be determined by the Commission.

### We propose to increase the rate of asset replacement and renewal

During the next five-year period we are planning to increase the rate of renewal and replacement, particularly of overhead structures, which includes assets such as poles and crossarms, and conductors. The proposed increase will directly address the projected decline in asset health.

Safety is the ultimate driver for asset replacement and cannot be compromised. For example, failure of a pole or crossarm can expose the public to a fallen conductor or pole top equipment. The risk associated with working around end-of-life equipment is also a significant hazard to field staff. The age profiles of our assets indicate an increasing need for asset replacement in order to manage these risks. While safety sets the prime driver for asset renewal, effective renewal of assets also ensures stable network performance (reliability) and networks which are resilient to external impacts such as storms.

Our analysis shows that increased investment in the level of asset renewal is necessary to support our objective that the network should be safe, secure and resilient. Appendices 1 and 2 explain that there would be a significant impact on network safety and reliability performance if investment in this critical area is deferred. Aside from the increased safety and performance risk, deferral simply stores up higher costs for the future.

### We propose enhanced operational focus in response to the growth in asset defects

In reviewing our current performance, we see that there are clear gaps in our operational focus. These gaps are reflected in the level of component defects on our network. In practice there is a high operational
cost to replace assets when we let them fail in service, including interruptions to customers’ electricity supply. So taking a proactive approach to managing defects is important.

The number of component defects recorded on our networks has more than doubled over the past five years, and the higher the stock of these defects, the more likely that equipment will fail in service, resulting in electricity outages. We are also conscious that we anticipate an increasing number of defects to be found by our inspectors given that more asset components are approaching the end of their serviceable lives.

We have reviewed our operational practices to see how best we can address the increasing trend in defects. As explained in Appendix 3, enhancing our maintenance practices in a number of areas will reverse the trend in defects and help ensure we provide a safe, secure and resilient network. To ensure that we provide value for money, we are prioritising work to address those assets which present the greatest risk to network safety and resilience.

We have also considered different expenditure scenarios, including, for example, varying the rate of defect reductions. For reasons set out in Appendix 3 we believe our proposed increase in maintenance expenditure is prudent, efficient and in the long term interests of customers.

Vegetation management links closely to safe, secure and resilient outcomes

Trees near power lines are a hazard. They can cause fires and damage equipment in a way that impacts public safety, network reliability and resilience. We have the longest overhead network, which is most exposed to interference from vegetation.

Effective vegetation management is a key component of delivering our target outcome of a safe, secure and resilient network. In addition, our vegetation practices must comply with the latest industry guidelines, which now specify much clearer requirements. Our assessment is that we should:

- Change from a reactive approach to a full cyclical trimming programme that ensures vegetation is managed to effective risk-based principles across our entire network
- Implement a catch-up programme of work for sections of the network that have not been part of a cyclical programme to ensure we can meet the latest requirements

We provide further details of our analysis in Appendix 4. In particular, we explain why our proposed vegetation management expenditure is prudent, efficient and in the long term interests of customers.
8 Our plan will facilitate customer growth

Our networks support many key economic centres of New Zealand. For example, our networks provide distribution services to the horticultural, commercial and residential growth in the Bay of Plenty, strong dairy farming growth in the Waikato, the gas and oil industry in Taranaki and the rural headlands of Whanganui, Tararua, Rangitikei, Manawatu, and Wairarapa.

As an energy distribution company, we have a critical role to play in ensuring sustained economic growth in these regions is supported by a secure, economic and resilient link to energy sources. We are committed to meeting the capacity needs of our industrial and commercial customers, and the communities in which they operate.

Regional economic growth is supported by two main investment activities:

- **Growth in peak demand**: We continue to see steady electricity peak demand growth across sectors and specific locations. We need to invest to ensure the security of our networks caters for these increasing peak load requirements.
- **New connections**: We continue to see strong growth in customer numbers across our networks, in particular in the Tauranga region. We need to invest to provide the infrastructure to connect new customers, and allow for the additional electricity volumes they require.

Each of these investment drivers is discussed in turn below. The overall investment programme to meet customer growth increases our revenue requirement by about 0.9 per cent.

### Investing for customer growth

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>$130m additional expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>From:</td>
<td>$250m expenditure in FY14-18 ($50m five-year annual average)</td>
</tr>
<tr>
<td>To:</td>
<td>$380m expenditure in FY19-23 ($76m five-year annual average)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Revenue impact</th>
<th>0.9% increase in average distribution prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>This makes up 10% of the overall required revenue increase</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What this pays for</th>
</tr>
</thead>
<tbody>
<tr>
<td>New lines and capacity upgrades to existing lines to deliver additional volumes and ensure security for regional communities.</td>
</tr>
</tbody>
</table>

**Notes:** Expenditure figures in real 2016 dollars. Final revenue increases to be determined by the Commission.

### Growth in peak demand

In contrast to other areas in New Zealand, many of our networks continue to experience high demand growth, although the rate of growth varies regionally across the areas serviced by our networks. The key drivers in recent years have been:

- Steady residential subdivision activity, especially around Tauranga, but also in other key populations such as New Plymouth and Palmerston North.
- Significant changes in the demand from some larger industrial customers, especially from the dairy industry, and the oil and gas industry in Taranaki.
- Smaller but material contributions for particular locations from irrigation developments, cool stores and other agricultural loads.
The figure below shows how the system maximum demand across our network has continued to trend upwards. The increases we have experienced correlate well with general indicators of New Zealand economic activity such as GDP growth, and council housing consent patterns.

Figure 7: Historical system peak demand trend

It is critical that our planning processes effectively predict and cater for new load growth. Too little investment would compromise our ability to support new loads, too much investment would result in networks with levels of spare capacity and security not utilised by our customers.

To ensure prudent and efficient investment in support of growth on our networks, we have developed individual plans for each of our 13 planning regions. These plans:

- Identify existing and emerging network constraints, taking into account:
  - Our demand forecasts
  - Asset capacity ratings
  - Our network security standards
- Identify local needs and issues, including customer development plans
- Undertake risk based analysis of options to address constraints. We adopt the optimal solution, which may be a non-network option
- Subject proposed plans to a top down review, prioritisation and challenge process
- Optimise the growth plans by also considering planned asset replacement capital expenditure for the area

The security standards we operate to are based on internationally recognised frameworks, which match the level of security applied to the implications of a power outage. For example we apply a higher standard to loads in city CBDs compared to the loads in remote rural locations. We also work hard to find alternatives to reduce the cost of meeting these standards. For example, at times we will automate our networks to address the risk of outages, rather than build new lines. Our aim is to balance security with cost effective outcomes.

Our proposed investment for the five-year CPP period (FY 2019-2023) includes around 40 network development projects plus an allowance for routine growth projects and continued investment to progress automation, network evolution and communications. These programmes have been externally reviewed by industry experts to test their suitability and have been confirmed as appropriate.

In a number of cases, the investments we propose relate to a requirement to provide a ‘step change’ in capacity as a result of strong and sustained historical growth. For example, growth to the south-west of Tauranga City around Papamoa has triggered significant upgrades to our networks in this area. Growth in and around Palmerston North has necessitated investments to ensure capacity and security to the city’s CBD. Once complete, these investments will serve these communities for many decades to come.
We believe the investments we are proposing are prudent to ensure appropriate capacity and security to support the regions we serve – both for those that have experienced strong historical growth which we are moving to accommodate, and for those who continue to experience more modest but sustained growth.

Appendix 5 provides further information on the expenditure choices we have made in relation to growth and security capital expenditure. It also sets out the expenditure alternatives that we have considered prior to finalising our proposed plan and the reasons why we believe our proposal represents a balanced and prudent level of investment.

**Customer connections**

Every year several thousand homes and businesses connect to our electricity network. These new connections require investment in capital infrastructure. Residential connections range from a single new house to subdivisions with dozens of residential plots. Customer connections also include connecting new and growing businesses and infrastructure, from small connections such as water pumps and telecom cabinets, to large connections such as factories and supermarkets.

The majority of the cost associated with providing new connections or requested upgrades to existing assets is charged back to the individual customers who will benefit from the new assets. In most cases, however, new or upgraded assets will also result in expanded capacity and long-term benefits to other customers. Our customer contribution policy therefore specifies what proportion of new connection costs are recovered from individual customers and what proportion is paid for by us and socialised as part of wider distribution charges.

Our forecast of new customer connections is based on a combination of regional population growth forecasts, regional GDP growth forecasts and trending historical activity. We also communicate extensively with our customers and other stakeholders to ascertain their future energy needs – including planned developments. From this we forecast:

- Domestic connections
- Commercial connections
- Specific demand trends based on information such as changes in dairy milk cooling regulations, or specific indications of new large connections or upgrades from our larger customers

We are confident that our proposed expenditure to meet customer growth is prudent and efficient. As explained in Appendix 5, reducing expenditure - would expose our customers to unacceptable service outcomes.
9 Our plan will enable our customers’ energy choices

Although the electricity industry has developed new and better ways of doing things over the last 150 years since the invention of the lightbulb, there have never been as many new and exciting options available to our customers to take increasing control of how their electricity is made and how they use it.

From photovoltaic cells (PVs) generating power on the roof to electric vehicles (EVs) replacing petrol with renewable electricity, we expect to see new electricity opportunities becoming increasingly common in the years ahead, as will the number of people taking advantage of them.

There’s a lot we will be able to do to help our customers take advantage of these new opportunities. A key part of our strategy is to facilitate our customers’ future energy choices and making it easy for our customers to integrate new solutions to our networks. This is a key part of our focus and thinking.

We will continue to provide the traditional service of transporting power from the national grid to homes and businesses, and believe that central energy supply will remain a critical part of New Zealand’s energy supply arrangements in the longer term. However, technologies such as PVs, EVs and batteries will increasingly complement these arrangements – enabling customers to store and share energy and playing a critical part in New Zealand’s overall energy mix.

Accommodating this change will require the network of the future to be increasingly flexible and versatile. Technology solutions for our networks are becoming available such as batteries, network automation and improved network oversight to enhance our networks and enable new customer choices. The question is what technologies to deploy and how quickly to do this.

Before exploring this question below, we note that our total proposed expenditure to enable customers’ energy choices increases our revenue requirement by about 0.1 per cent.

<table>
<thead>
<tr>
<th>Enabling our customers’ future energy choices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expenditure</strong></td>
</tr>
<tr>
<td>$23m additional expenditure</td>
</tr>
<tr>
<td>From: $5m expenditure in FY14-18 ($1m five-year annual average)</td>
</tr>
<tr>
<td>To: $28m expenditure in FY19-23 ($5.6m five-year annual average)</td>
</tr>
<tr>
<td><strong>Revenue impact</strong></td>
</tr>
<tr>
<td>0.1% increase in average distribution prices</td>
</tr>
<tr>
<td>This makes up 1% of the overall required revenue increase</td>
</tr>
<tr>
<td><strong>What this pays for</strong></td>
</tr>
<tr>
<td>Technology to ensure our networks support customers where they seek to deploy emerging technologies such as photovoltaic systems and electric vehicles.</td>
</tr>
</tbody>
</table>

Notes: Expenditure figures in real 2016 dollars. Final revenue increases to be determined by the Commission.

Being flexible is key

We face a challenge because it is unclear how fast or where technical change will occur. Given the current uncertainties it is not prudent or efficient for us to undertake significant investment now and lock ourselves into a particular technology direction. Getting that type of decision wrong would mean unnecessary future costs for our customers by requiring a change of direction later.

What we are planning to do is to create options for the future and to identify ‘least-regret’ actions or investments that make it easier to integrate new technologies without costing any more than traditional engineering approaches. To do this we need to better understand what technology choices our customers
are making, and work with others in the energy sector to find the optimal solutions for our networks to enable these developments.

With these objectives in mind, we are currently planning to:

- Expand and develop our own capability for dealing with a changing future, including:
  - Expanding our programmes to understand technology trends
  - Increasing the amount of work we do with external parties, including universities, engineering companies and other lines businesses
  - Sharpening our forecasting and scenario analysis capability
  - Enhancing our understanding of what our customers are going to want to do and how that will change
- Develop our understanding of emerging technology – not only in theory, but practically in the field

**Keeping the total cost of integrating new technology as low as possible**

New Zealand is in a unique position. We know that new technologies will be central to the energy market of the future, however with a high proportion of our energy already delivered by renewable generation, means that we can let others test and prove technology, and then adopt it when it makes economic sense for New Zealanders to do so.  

As a company, we can also benefit from the research and modelling work done by others to ensure the investment decisions we make now are future-proofed and will support the way our customers are likely to use energy in the future. For example our approach to network technology utilises modelling completed by EA technology who have helped operators and regulators in the United Kingdom determine the optimal approach to accessing the benefits of new network technologies.

The expenditure we propose is focused on ensuring we stay on top of emerging technology trends, identify the best technology solutions now, and technologies which will support customers as new solutions emerge. By preparing ourselves now, we can respond to changes as they emerge, in a staged and progressive way that reflects the pace of change our customers require.

The level of investment we propose is modest compared with the longer term cost of failing to act. UK based studies suggest that careful network planning and technology selection has the potential to moderate the future costs of accommodating new customer solutions by as much as 50%. On top of that, customers will derive significant benefits if they are able to take up new technologies and solutions when the economics make sense for them to do so.

**Developing more cost reflective distribution charges**

The size and scale of assets required by electricity distribution networks like Powerco to deliver energy is set by the amount of electricity customers use when the network is at its highest loadings – so-called “peak demands”. At the moment our tariffs do not fully reflect how much “cost” each individual customer imposes on the system, because charges are not based on peak demand.

A more cost-reflective pricing structure will reward customers for smoothing their demand or delivering energy to the network at peak demand times. This charging arrangement will support the changes in the electricity market where customers will have more control over their energy usage decisions. Ultimately this will help moderate peak demand growth, and minimise the scale of the future investments we need to make.

To make sure customers are fully aware of these costs and benefits, during the course of the next five years (our CPP investment period) we plan to develop and introduce new cost-reflective pricing arrangements that should promote more efficient use of the network, provide customers with more choice and, in the longer term, contribute to lower network costs.

The new tariffs will inevitably rebalance charges across different customers – so that those customers that contribute more to peak demand (and the costs of the network) will pay a higher share of network costs in the future. However we believe that such a move is appropriate to ensure the very best outcomes for all customers and lower total network costs in the future.
10 Summary of our CPP proposal

We plan to spend approximately $1.4 billion over the five-year CPP period (FY19-23), an increase of just under 50% compared to the previous five years (FY14-18). This expenditure is summarised below.

Table 2: Summary of our CPP proposal

<table>
<thead>
<tr>
<th>CPP expenditure</th>
<th>Theme</th>
<th>Main Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>$770m</td>
<td>To ensure safe, secure and resilient networks</td>
<td>– prudent replacement of assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– improved operational management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– increased asset maintenance, rectifying faults, managing vegetation, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>other associated activities</td>
</tr>
<tr>
<td>$380m</td>
<td>To support customer growth</td>
<td>– to accommodate forecast load growth and address current security issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– to accommodate new customers and forecast customer load increases</td>
</tr>
<tr>
<td>$28m</td>
<td>To support our customers’ future energy choices</td>
<td>– to trial new technologies and systems that increase choice for our customers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– investigating innovative solutions that allow us to leverage benefits for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>current and future customers</td>
</tr>
<tr>
<td>$220m</td>
<td>To support network activities</td>
<td>– ensuring sufficient support, including the staff and facilities that</td>
</tr>
<tr>
<td></td>
<td></td>
<td>enable our operations</td>
</tr>
</tbody>
</table>

The figures below summarise our future expenditure requirements, including a comparison with our historical expenditure.

Figure 8: Historical and forecast total expenditure
Questions

We are seeking your feedback on the information presented in this chapter. While we welcome feedback on all aspects of the material, we are particularly interested in your views on the following.

Priority areas for investment

We have framed our planned investment around three priority themes which broadly reflect the preliminary feedback we have received from customers and our own assessment of the priorities for our network.

5. What are your overall views on our plans to lift investment in our networks to ensure ongoing safe, secure and resilient supplies?

6. What are your overall views on our plans to lift investment in our networks to support economic growth and increasing customer electricity demand in the regions we serve?

7. What are your overall views on our plans to increase our investment now so that we continue to support customers’ energy choices in a changing technology environment?

Testing our plan against the Commission’s expenditure objective

The Commission expects our expenditure plans to be consistent with the efficient costs that would be incurred by a prudent supplier facing our particular circumstances. It requires us to consider how we should weigh up the costs and benefits of different levels of expenditure.

Our proposal was developed to ensure prudent and efficient outcomes, delivering the optimal long-term benefit to consumers.

As discussed in Chapter 5, we have used customer feedback received to date to guide our evaluation of the available options. The plans we have selected are designed to ensure safe, secure and resilient networks, accommodate customer growth in our communities, and enable our customers’ future energy choices. In relation to network outcomes, we are seeking to maintain network reliability at current levels over the long term.

The appendices that follow set out our thinking, and the options that we have considered. We have considered four levels of expenditure and the impact of each option on customer outcomes. The scenario that best delivers the outcomes set out in our consultation to date is the scenario titled ‘Our CPP proposal’.

Option 1: DPP Allowance

<table>
<thead>
<tr>
<th>Scenario</th>
<th>DPP Allowance</th>
<th>Customer Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>In this scenario we set investments levels at the current regulatory allowance.</td>
<td>No change</td>
<td>Under this scenario minimum levels of safety cannot be maintained over the next five years. Risks to our staff and the public rise above the level allowed under industry safety regulations. The scenario is not considered viable or acceptable.</td>
</tr>
</tbody>
</table>

Note that the DPP allowance is lower than our current spend.
Option 2: Must Do

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Revenue increase</th>
<th>Customer Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>In this scenario we limit expenditure to safety critical items, and accept increasing numbers of assets failing in service.</td>
<td>5%</td>
<td>Under this scenario, immediate safety risks are managed over the next five years, however asset failure rates increase, and security margins erode below acceptable levels. Outages become noticeably more frequent for many, and replacement of assets is deferred or managed reactively. Current network architecture is maintained, and customers are restricted in their application of new energy solutions where these impact network outcomes. Customers are asked to fund the full cost of connection and connections of new load (e.g. business loads and EV loads) are restricted where capacity is not available. This scenario provides lower short term cost, but at the expense of resilience and security, and would require higher levels of investment (and prices) beyond the five year period.</td>
</tr>
</tbody>
</table>

Option 3: Our CPP Proposal

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Revenue increase</th>
<th>Customer Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>In our proposal we include investments that we believe will maintain safe, secure resilient networks, and minimise long term costs.</td>
<td>9%</td>
<td>Under this scenario, safety risks are managed for the longer term on a prudent basis to ensure the long term safety of our staff, service providers and the general public. Asset failure rates are stabilised, and network performance is maintained. Customer contributions are maintained at current levels, and new load is accommodated where it is economic to do so. New technology is evaluated and incorporated onto our networks to aid the connection of new energy solutions, and to moderate the long term cost of network operation. This scenario provides acceptable levels of resilience and security, and reduced long-term costs.</td>
</tr>
</tbody>
</table>

Option 4: Enhance security and resilience

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Revenue increase</th>
<th>Customer Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes all security investments currently considered ‘best practice’ and increased renewal programmes to minimise outages.</td>
<td>11%</td>
<td>We reposition our approach to reflect best practice in electricity distribution. Assets are replaced in a way that reduces unplanned outages to a minimum, security is lifted so that it is in accordance with internationally recognised standards, and new technologies are rolled out at scale to position our networks at the very forefront of technology development. This scenario provides the highest level of network security, resilience and flexibility, but is the highest cost.</td>
</tr>
</tbody>
</table>

As well as best reflecting the feedback we have received from customers, the scenario titled ‘Our CPP Proposal’ is also in the best long-term interests of customers taking into account both price and quality of service offered.

In the appendices, we provide more detailed analysis of these alternative investment options.

Are our plans affordable?

While we can’t influence all the costs that make up your electricity bill, we are committed to keeping the distribution network component as low as possible.

At the same time, it is important that we make the necessary investments in our networks so we can continue to provide a valued service to our customers into the future. Electricity is an essential enabler for homes and businesses, and the cost of power outages, including the disruption costs, is significant.

We think our proposal strikes the right balance for our customers between the upfront costs of ensuring a safe, secure, resilient supply of energy, and the potential safety and reliability downsides of lower levels of investment. We believe our regions deserve ongoing access to a distribution infrastructure that meets our customers’ needs and is sized to facilitate economic growth.
You may not see our network charges itemised on your electricity bill, as retailers typically incorporate our charges in their end prices, along with the other costs of supplying electricity. We charge all retailers the same amount for the services we provide on your behalf, so you should continue to shop around and choose whichever retailer offers the best deal for you.

Our increased revenue requirement can be recovered through different pricing profiles (which are cost neutral). For example, we could propose either:
- A single price increase at the beginning of the period, or
- A series of smaller annual price increases during the period

Questions
We are seeking your feedback on the information presented in this chapter. While we welcome feedback on all aspects of the material, we are particularly interested in your views on the following.

### Reducing the impact of necessary price increases

An increase in network investment is likely to result in the distribution network part of an "average" electricity bill increasing from the start of the CPP period (from 1 April 2018). As well as thoroughly testing our plans ourselves and subjecting them to independent review, we are also looking at ways to smooth any price increases over a five year period if that is what our customers want.

8. Would you, as our customer, prefer a larger initial increase in price or smaller ongoing annual price increases?
Investing beyond our proposed plan
11 Specific investment options, in addition to our CPP proposal

In this section, we ask whether you would value additional services that are not currently included in our CPP Proposal option. If you indicate support, we will include them in the final set of proposals that we will put to the Commission.

We have set out below the examples of worst served customers and our adoption of service lines. However, we are interested in feedback on any other initiatives that may enhance customer service. We look forward to receiving feedback from our customers on what additional initiatives, if any, should be included in our expenditure plans.

Any additional initiatives would not affect the investments that are already underway to enhance our customer service. For example, we are currently working to improve the level of information we provide on outages via our web page. We will also be releasing phone apps next year, which will provide real time updates on outage status.

Increased focus on worst served customers

We are conscious of the need to ensure that all our customers obtain a reasonable standard of service. Network reliability targets tend to operate at an aggregate level, which increases the focus on areas with more customers. Consequently, reliability performance in low-density areas is masked by measures that reflect average levels of reliability across the network, so the feeders that perform poorly in these areas may be given inadequate consideration.

To avoid this, we have developed separate performance targets for different feeder types on our network, based on the areas and customer numbers they serve. The targets are based on good New Zealand industry practice. However, even within these categories we find that the desired service level is not met for a significant number of feeders.

Major investment is required to address this problem. A narrow focused economic analysis would weigh the cost of that investment against the benefit of improved customer reliability, based on the estimated Value of Lost Load (which in turn is based on industry figures determined by the Electricity Authority). Under this approach, it is not possible to justify the investment from an economic perspective because the costs outweigh the benefits.

However, we also have to recognise that all of our customers expect a reasonable level of service. We therefore propose a phased investment programme spread over multiple regulatory periods which is focused on avoiding further material deterioration in service for those worst served customers.

We are also looking at non-network or off-grid options to improve services to our worst served customers, where these are more economic than conventional network investments.

The proposed phased investment plan to avoid further deterioration of service for our worst served customers would add around $25m to $30m capital expenditure over the five year CPP period.

Adoption of service lines

Customers typically own their service line, which is the line that crosses their property and links our network to their meter board. However, this position is not widely understood, which means that many service lines are not being managed or maintained appropriately. We believe that this is a potentially significant safety issue, which will become progressively worse if no action is taken.

We seek your views on whether service line ownership should be transferred to us. If ownership were transferred, we would be responsible for inspecting, maintaining and replacing service lines in accordance with industry standards. In addition, we expect that our costs of undertaking these activities would be lower than the costs to individual customers acting in isolation.

Transfer of ownership would be subject to customer-specific agreements. Assuming a gradual take-up, our analysis indicates that this new responsibility would add approximately $10 million to our annual
expenditure during the CPP period. This would cover maintenance and renewal expenditure.

Question
We are seeking your feedback on the information presented in this chapter. While we welcome feedback on all aspects of the material, we are particularly interested in your views on the following.

Investing beyond our proposed plan

In Section 11, we have highlighted a few areas where we could invest more over our five year planning period – as this investment would be of benefit customers.

9. What, if any, additional enhancements should be included in our plans?
10. Equally, are there any specific areas of our plan which you think we shouldn’t do?
11. Do you think we should further increase capital expenditure to address the reliability performance experienced by worst served customers?
12. What are your views on whether or not service line ownership should be transferred to Powerco to make the company responsible for inspecting, maintaining and replacing service lines in accordance with industry standards?
Appendices

Notifying customers of trade-off choices
Appendices Alternative investment scenarios and trade-offs

Appendices 1 to 5 explain the price and quality trade-offs we have made in developing our proposal and the other alternatives we considered. This is consistent with the Commission’s requirement that we consult with customers on these trade-offs.

The table below relates our CPP proposal themes to five key expenditure areas where we have considered trade-offs.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Supporting appendices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our plan will deliver a safe, secure and resilient network</td>
<td>Appendix 1 - Overhead structures renewal capital expenditure; Appendix 2 - Overhead conductors renewal expenditure; Appendix 3 - Network operational expenditure Appendix 4 - Vegetation operating expenditure.</td>
</tr>
<tr>
<td>Our plan will invest for customer growth</td>
<td>Appendix 5 – Network development expenditure</td>
</tr>
<tr>
<td>Our plan will enable customers’ energy choices</td>
<td>For the reasons set out in Chapter 10, we propose a modest level of expenditure in relation to new technology. No supporting appendix is therefore provided in relation to this theme.</td>
</tr>
</tbody>
</table>

Our detailed investment proposals include technical analysis for all of our asset fleets, to considerable detail. However, for the purposes of these appendices we have limited the discussion to those areas where significant increases in expenditure are proposed. We have also limited the technical detail to the level required to explain the proposed increase.

For each expenditure area, we discuss the outcomes against four investment scenarios:

1. **DPP expenditure**
2. **Must Do**: limiting expenditure to critical investments, i.e. reducing expenditure as far as possible in the short-term, accepting higher risk in the short term, and accepting higher costs longer-term.
3. **Our CPP proposal**: is the option we believe will deliver the best trade-off between network outcomes and long-term costs
4. **Enhance security and resilience**: investing to lift network security and resilience to leading industry practice.

In each case, we explain why we consider our CPP Proposal to be the most appropriate choice in terms of price-quality trade off. In particular, the analysis explains why the proposed expenditure satisfies the Commission’s expenditure objective. We believe that our proposed expenditure is efficient, prudent and in the long term interests of customers.

In general, we consider that option 4 – enhance security and resilience – would bring strong customer benefits through a shift to best-in-class secure and resilient networks over time. However, we are not recommending this level of investment because most of our customers have indicated they are generally comfortable with the level of service they are receiving, and would like us to moderate cost increases to the extent possible.

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Note that the DPP allowance is lower than current spend.
Question
We are seeking your feedback on the information presented in this chapter. While we welcome feedback on all aspects of the material, we are particularly interested in your views on the following.

### Alternative investment scenarios

In the Appendices to this document we summarise how our plan has been developed after considering different investment alternatives and the price / quality outcome / risk trade-off that results from each. We believe that our final plan strikes the right balance for both current and future customers and reflects the views of our customers.

13. We would welcome your comments and feedback on the price / quality / risk outcomes that our plan will deliver for customers?
Appendix 1 - Overhead structures renewals

This appendix discusses the price-quality trade-offs we have made, and the expenditure alternatives we have considered in relation to renewal of overhead structures. It supports our first theme, which is to provide a safe, secure and resilient network.

Our overhead structures portfolio consists of three major asset fleets:

- Wooden poles
- Concrete poles
- Overhead assemblies (crossarms, and associated components).

Poles and overhead assemblies are core components of our network. The performance of these assets is essential for delivering safe, secure and resilient networks. As the majority of our overhead network is accessible to the public, managing our overhead structure assets is also critical to ensuring public safety.

Poles and Overhead Assemblies – Current performance

We have approximately 39,000 wooden poles and 224,000 concrete poles on our network. Many of our wooden poles have exceeded or soon will exceed their standard expected lives (typically 45 years), as shown below. Our concrete pole fleet is more modern and the standard expected life is much higher (typically 60 years), so fewer poles will reach their end of life in the near future. The age profile of our concrete and wooden poles fleets are set out below.

We also manage 419,000 overhead assemblies. These are the crossarms and associated components at the head of poles, designed to support conductors and ensure sufficient isolation and separation. The age profile of our overhead assemblies is set out below, along with the standard expected life. Again it is evident that a large number of our overhead assemblies remain in service beyond their normal design lives, and that this is leading to an increasing rate of in-service failures.
Crossarm age profile

Crossarm equipment fault history

Note: FY17 data is based on a full-year projection of preliminary fault data, collected between 1 April and 19 December 2016.

Consistent with ageing assets, we are seeing definite signs that our assets are failing more often in service (see above fault history trend). Our performance is now poor compared with our peers, and is progressively deteriorating.

Figure 9: Distribution Overhead Line Performance - Benchmarking

Poles and Overhead Assemblies – Price / quality trade-off scenarios

As already noted, we have examined our expenditure options and outcomes against the four scenarios:

1. **DPP expenditure**: maintain expenditure in line with our current DPP allowance

2. **Must Do**: limit expenditure to critical investments now, and spend more in future

3. **Our CPP proposal**

4. **Enhance security and resilience**: investing more to replace assets in rural and remote rural areas that currently do not meet our target performance.

Our analysis considers the impact on asset health as this is a key determinant in delivering safe secure and resilient networks. Without increased investment in asset renewals, particularly for wooden poles and crossarms, we will see unacceptably large numbers end of life assets on our networks; high in-service failure rates; and unacceptable safety and network performance.

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10 Note that the DPP allowance is lower than current spend.
Asset Health Index for each scenario

Asset health reflects the expected remaining life of an asset and acts as a proxy for probability of failure. Asset Health Indices (AHI) have been prepared for a number of our asset fleets. Based on AHI forecasts we can estimate the required future volume of asset renewals and forecast the impact on our investment scenarios.

<table>
<thead>
<tr>
<th>AHI</th>
<th>ASSET DESCRIPTION</th>
<th>REPLACEMENT PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Asset has reached the end of its useful life</td>
<td>Within one year.</td>
</tr>
<tr>
<td>H2</td>
<td>Material failure-risk, short-term replacement</td>
<td>Within three years.</td>
</tr>
<tr>
<td>H3</td>
<td>Increasing failure-risk, medium-term replacement</td>
<td>Between 3-10 years</td>
</tr>
<tr>
<td>H4</td>
<td>Normal deterioration, regular monitoring</td>
<td>Between 10-20 years</td>
</tr>
<tr>
<td>H5</td>
<td>As new condition, insignificant failure risk</td>
<td>Over 20 years</td>
</tr>
</tbody>
</table>

Figure 10: Asset Health Indices

Our CPP proposal will increase asset renewal to ensure we manage asset condition and ensure the health of our assets remains stable, particularly for wooden poles and crossarms.

Overhead structures trade-offs

The overall implications of the various scenarios above are set out in Chapter 10. In the case of poles and overhead structures, our CPP proposal strike a balance between the high cost of adopting the ‘enhance security and resilience’ option (Scenario 4) and the unacceptable safety and performance issues associated with a low investment options (Scenarios 1 and 2)
Appendix 2 - Overhead conductors renewals

This appendix discusses the price-quality trade-offs we have made, and the expenditure alternatives we have considered in relation to overhead conductor renewals. It supports our first theme, which is to provide a safe, secure and resilient network.

Overhead conductors are a core component of our network that transport electricity from the transmission system to our customers. Our network is long, predominantly rural, and most circuits (78%) are overhead.

Our overhead conductors portfolio consists of three major asset fleets:
- Subtransmission conductors
- Distribution conductors
- Low voltage conductors

This appendix focuses on distribution conductors as this is where we are experiencing the worst implications for network performance.

Effective management of overhead conductors is essential for safety, as failures of conductors can lead to material public safety risks. While our protection systems are designed to isolate (turn the power off) to sections of conductor that have failed, no protection can assure this 100% of the time. So it is prudent to actively manage the condition of our conductor fleet to avoid potential harm to the public.

Distribution conductors – current performance

A significant proportion of our electricity network was constructed in the 1960s and 1970s. The average age of the distribution overhead conductor fleet is 37 years, and an increasing proportion of our conductor fleet is being run beyond the notional ‘design life’ of 60 years. The age profile is shown below.

The age profile shown above has clear implications. Conductors deteriorate as they age, leading to increased risk of failure. Some conductors derive their strength from a steel core which deteriorates and corrodes with age. Others can be impacted by ‘age hardening’ meaning that they can become more brittle with age. Proactive renewal of conductors is an important focus to ensure safe, secure, and resilient networks. We are seeing the impact of increasing volumes of older conductors on our networks in our fault rate trends. In addition, there are known issues with some conductor ‘types’ on our networks. As a result, we anticipate an accelerating deterioration of conductor condition if we do not replace old and poor performing conductors proactively.
Note: FY17 data is based on a full-year projection of preliminary fault data, collected between 1 April and 19 December 2016.

Due to the safety related risks involved, we do not consider it prudent to delay an investment response. We have sufficient evidence to confirm that we have an issue now, and a delayed response is likely to result in very high numbers of conductor failures with a high associated public safety risk.

**Distribution conductors trade-offs**

We have examined four expenditure scenarios, which reflect the scenarios set out in Chapter 10.

1. **DPP expenditure**: maintain expenditure in line with our current DPP allowance\(^\text{11}\)
2. **Must Do**: limit expenditure to critical investments now, and spend more in future and allow conductor fault rates to rise
3. **Our CPP proposal**
4. **Enhance security and resilience**: extending our conductor replacement programmes from those serving urban and rural areas, to include remote rural areas

**Asset Health Index for each scenario**

The following chart shows the asset health outcomes delivered under each scenario. Under the proposed CPP investment scenario, the conductors reaching end of life is effectively managed and reduced to a position we consider prudent.

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\(^{11}\) Note that the DPP allowance is lower than current spend.
Under the CPP and ‘enhance security and resilience’ scenarios, we see levels of end of life conductor managed to an acceptable range. Other scenarios hold end of life conductor levels at near current levels, and attempt to manage failures in a reactive way (jointing and repairing old conductor when it fails) noting that this in itself requires a material investment in conductor replacement.

Establishing a proactive approach to conductor replacement is an essential step in ensuring appropriate safety outcomes. Our current position results in conductor failure rates well above the industry average, representing a heightened public safety risk.

**Overhead conductors trade-offs for each scenario**

The overall implications of the various scenarios above are set out in Chapter 10. In the case of distribution conductors, we believe strongly that lifting investment in this area is the only appropriate course of action to ensure public safety and network reliability.
Appendix 3 – Network Operating Expenditure

This appendix discusses the price-quality trade-offs we have made, and the expenditure alternatives we have considered in relation to our network operating expenditure. It supports our first theme, which is to provide a safe, secure and resilient network.

The expenditure we set out in this chapter represents key proposed increases in network operating expenditure, excluding vegetation management which is discussed in Appendix 4.

We propose enhancing our approach in four key areas:

- Inspections
- Defect resolution
- Expanded maintenance practices
- Enhanced asset management capability

Lifting investment in defect resolution will help ensure safe, secure and resilient networks. Our investment in enhanced inspections, and expanded maintenance asset management capability will help ensure efficient expenditure programmes as we enter a phase of increased renewal expenditure.

Network Operating Expenditure – Current Performance

In reviewing our current performance, we see gaps in our operational performance arising from inadequate current investment.

A key indicator of this trend is the level of defects we have on our network. Defects related to minor components on our networks represent a high operational cost. The higher the stock of these defects, the more likely that equipment will fail in service, resulting in electricity outages.

The extent of defects on the network has grown considerably in recent years as shown below, reflecting lower than desirable levels of investment. Figure 14: Number of unresolved defect records
Asset management capability

Historically, our asset management capability expenditure and performance has been below ‘good practice’. We are therefore increasing our focus in this area, however there is considerably more to be done. This item is considered in detail in Chapter 23 of our 2016 AMP.

Our concerns are supported by a more detailed review of the practices used by other operators. We have found that we are lagging behind ‘good practice’ businesses in a number of aspects of our operations.

The diagram below is taken from our 2016 AMP and demonstrates the gains we have made over the past few years through increased investment in asset management capability, but also shows the further improvement still required to achieve best industry practice (“competent” maturity, or level 3).

Figure 15: Summary of Asset Maturity self-assessment scores by assessment area

As shown in the following figure, our current spend on asset management capability (System Operations and Network Support, SONS) is low in comparison with our peers. Increased expenditure in this areas will support our planned improvements.

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12 We chose as comparators the six distributors with the largest customer base.
An appropriate focus on asset management capability is increasingly important, as we seek to optimise our operations. This is particularly important in a period of increased capital expenditure and a changing energy environment.
Network operating expenditure trade-offs

As already noted, we have examined our expenditure options and outcomes against the following four scenarios:

1. **DPP expenditure**: maintain expenditure in line with our current DPP allowance
2. **Must Do**: complete only critical activities now, with more spend in the future
3. **Our CPP proposal**
4. **Enhance security and resilience**: we would expand our proactive maintenance processes; extend our asset management capabilities to ‘leading practice levels’; and increase the number of fault staff assigned to support rapid fault resolution.

Investing at a level consistent with scenarios 1 and 2 would see our current level of asset management capability broadly maintained, and defects held at unsustainable levels.

Investing in line with our CPP proposal (scenario 3) would see defects reduce to sustainable levels. Our asset management capability would progressively mature to achieve consistent ‘competent’ scoring, including certification to the internationally recognised ISO 55000 asset management standard. This would include the application of advanced analytical techniques to optimise our investments and the use of improved diagnostic testing to help better manage end of life assets.

Investing to ‘enhance security and resilience’ (scenario 4) would enable us to minimise defects on our networks, reduce unplanned outages, and achieve leading asset management capability.

The overall implications of the various scenarios above are set out in Chapter 10. Our CPP seeks to ensure we achieve sufficient asset management capability to enable the optimal operation of the network in the long term. We believe constraining investment in this area would be a poor choice as it would result in higher costs to customers in the longer term.
Appendix 4 - Vegetation management

This appendix discusses the price-quality trade-offs we have made, and the expenditure alternatives we have considered in relation to vegetation management. It supports our first theme, which is to provide a safe, secure and resilient network.

Trees near power lines are a hazard. They can cause fires, damage equipment in a way that impacts public safety, and impact network reliability and resilience.

Ensuring adequate expenditure on vegetation management is a key component of delivering our target outcome of safe, secure, resilient networks. This holds especially true for us, as we have the longest overhead network in New Zealand, and the most exposure to interference from vegetation.

Vegetation Management – Current Performance

In reviewing our current performance, we found that our vegetation faults are increasing, as shown below. It is important to note that vegetation related fault rates for FY16 were abnormally low due to benign weather patterns. Our faults this year are expected to continue the upward trend.

Figure 17: Trend in vegetation related interruptions

Note: FY17 data is based on a full-year projection of preliminary fault data, collected between 1 April and 19 December 2016.

Our current vegetation approach falls below the standard required to achieve good industry vegetation management practice in New Zealand. There has been considerable work done in this area in recent years, which defines good practice in vegetation management, and our plans are designed to reposition our approach to be consistent with this.

Our analysis shows that we spend less on vegetation management than comparable companies in the industry, and those whose practices are more closely aligned to the latest industry guidelines. Increasing our vegetation management work while improving our approach will support improved network performance.

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13 We identified comparators as distributors that have similar network characteristics to Powerco, i.e. predominantly overhead networks covering a mix of urban, rural and deep rural areas. Networks with short overhead line lengths or very different network characteristics are not considered relevant comparators for our network.
Vegetation Management trade-offs

The overall implications of the various scenarios above are set out in Chapter 10. The ‘DPP expenditure’ and ‘Must Do’ scenarios assume levels of expenditure on vegetation similar to current levels, and an acceptance that vegetation encroachment will occur, and continue to be managed on a reactive basis.

Our view is that a change our vegetation management approach is essential to enable us to move to good industry practice. Industry guidelines have established an approach for appropriate vegetation management, and our CPP proposal is designed to achieve this. The ‘enhance security and resilience’ scenario would allow increased levels of trimming and customer liaison in line with the very best operators in Australia and New Zealand, including negotiation of enhanced clearance corridors beyond legislative minimums.

We believe our CPP proposal reflects a prudent level of expenditure that meets good industry practice. This will support safe, secure and resilient outcomes, without the much higher levels of expenditure associated with a best practice position.
Appendix 5 - Network Development

This appendix discusses the price-quality trade-offs we have made, and the expenditure alternatives we have considered in relation to network development capital expenditure. Network development investments ensure we can meet growing electricity demand on our network, without compromising reliability. It supports our second theme, which is to invest for customer growth.

Some investments provide additional capacity, while others affect the degree of supply redundancy (also referred to as security). This portfolio also includes investments on new customer connections.

We classify growth and security investments into:

- **Major projects**: over $5 million, generally involving sub-transmission or grid exit point (bulk supply) works
- **Minor projects**: between $1m and $5m that typically involve zone substation works and smaller sub-transmission projects
- **Routine projects**: repetitive projects below $1m, including distribution capacity and voltage upgrades, smaller zone substation upgrades, transformer upgrades and low voltage reinforcement

**Network development – current performance**

In the past decade, at a national and local grid level, many areas of New Zealand have reported flat electricity demand. In contrast, our network has continued to exhibit steady and sustained growth. The chart below shows the historical demand trend for our network.

Our demand forecast, which considers both population related impacts (ie new housing) and GDP related growth (ie increased commercial activity), suggests we can expect demand to continue to grow in the medium to long term.

![Figure 19: Historical system peak demand growth](image)

As a result of the historical growth, and given current levels of investment, demand at many of our zone substations already exceeds firm capacity, and we are operating an increasing number of our assets beyond our targeted security levels. The chart below shows that compliance with our security standards at zone substations has fallen over the past five years.

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14 Firm capacity means the remaining capacity at a substation following an outage of a critical network component.

15 Security standards describe the required level of supply redundancy at our installations.
Network development – level of load at risk

The exposure of customers to key security issues can be evaluated reasonably easily, by viewing the scale of load at risk from a single asset failure at our substations. As a rule of thumb, loss of loads in excess of 5MVA due to a single asset failure are likely to expose local communities and businesses to unacceptable levels of economic loss and we have around 30 substations on our networks where this is the case. Longer outages (typically with a duration of 60 minutes or more) are also economically unacceptable, outside rural areas.16

Network development trade-offs

We have examined our options for network development expenditure in terms of the following four scenarios:

1. **DPP expenditure**: maintain expenditure in line with our current DPP allowance17
2. **Must Do**: limiting expenditure to critical investments, i.e. reducing expenditure as far as possible in the short-term, and accepting lower compliance with security standards further and higher costs later
3. **Our CPP proposal**
4. **Enhance security and resilience** in line with internationally accepted standards.

Security related trends associated with each scenario.

The following charts set out our future compliance position under the four scenarios when compared with our published security standards. Our proposals seek to arrest the recent decline and return it to a level approximating 50% compliance, which we have found to be a cost effective (albeit not ideal) position. Execution of the ‘enhance security and resilience’ scenario would take 10 to 15 years to execute, and so we have modelled a lift towards 60% compliance as an initial step in this direction.

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16 While these outages are inconvenient in rural areas as well, the cost of providing higher reliability levels generally prove prohibitive when compared with the economic benefit gained.

17 Note that the DPP allowance is lower than our current spend.
The impact of changes in security related investments can be very localised, and of extremely high significance to the local communities impacted. Care therefore needs to be taken in assuming a security scenario is appropriate ‘overall’ and our plans are designed to strike an appropriate balance between cost and impact to customers and communities through detailed review and over the longer term. Summaries of our specific planned network upgrades across our 13 planning areas are contained in Chapter 8 of our 2016 AMP.

**Network development – costs quality implications**

The overall implications of the various scenarios above are set out in Chapter 10. Our CPP proposal is structured to maintain current levels of network security, and address specific areas where security exposes our customers to unacceptable risk in the longer term.

In our view failing to stay on top of security related issues invariably results in prolonged outages which impact large numbers of customers in the longer term. These types of outcomes may not be readily apparent in average reliability statistics, but can have an extremely high cost at a local community level and so should be avoided.
How to provide feedback

You can provide feedback on any issues raised in this document by emailing us on yourview@powerco.co.nz or answering our feedback questions on our website yourenergyfuture.co.nz.