Technical Advisor Report

on the

Orion New Zealand Ltd

CPP Proposal

Report to

The Commerce Commission

Strata Energy Consulting Limited

2 August 2013

This report has been prepared to assist the New Zealand Commerce Commission (the Commission) with its determination of a customised price-quality path (CPP) for Orion New Zealand Limited (Orion).

This report relies on information provided to Strata by the Commission and Orion. Strata disclaims liability for any errors or omissions arising from information provided to Strata by other parties, for the validity of information provided to Strata by other parties, for the use of any information in this report by any party other than the Commission and for the use of this report for any purpose other than the intended purpose.

In particular, this report is not intended to be used to support business cases or business investment decisions nor is this report intended to be read as an interpretation of the application of the Commerce Act or other legal instruments.

Strata Energy Consulting
PO Box 12332,
Thorndon,
Wellington
New Zealand

Phone: **+64 4 471-0312**
Email: **bill.heaps@strataenergy.co.nz**
Web: **http://www.strataenergy.co.nz**

About Strata

Strata Energy Consulting Limited specialises in providing services relating to the energy industry and energy utilisation. The Company, which was established in 2003, provides advice to clients through its own resources and through a network of Associate organisations. Strata Energy Consulting has completed work on a wide range of topics for clients in the energy sector both in New Zealand and overseas.

Authorship

Prepared by:	Bill Heaps and Clive Bull
Quality approved by:	Bill Heaps
Date:	02/08/2013
Version:	Client V2.0
Acknowledgements:	

Table of Contents

1 Introduction

1.1 Purpose of this report

1 The purpose of this report is to provide advice to the Commerce Commission (Commission) on various technical aspects of Orion NZ Limited's (Orion) Customised Price-quality Path (CPP) application. This report provides a summary of Strata Energy Consulting's (Strata's) findings and advice on adjustments to Orion's proposed expenditures.

2 This report is structured in the form of headlines, key focus areas and a summary of proposed expenditure adjustments. The contents of this report have been developed based on our professional opinion from information provided by the Commission and Orion throughout the course of this review. We have also relied on the Commission's analysis and modelling in forming our views.

1.2 Context

3 Orion has experienced a significant event due to earthquake damage to the network and the impact on the Christchurch community. The Orion Board, management and staff have responded admirably to the challenges of managing electricity supply delivery through an incredibly turbulent period. In responding to the safety and supply restoration priorities following the significant events, the network appears to have performed soundly, having met the immediate priorities of the community.

4 It is important to note that the CPP application covers expenditure that is expected to be incurred during a period that is 3 to 8 years after the most damaging earthquake. The expenditure forecasts under consideration therefore fall beyond the post event reactive period and into a more 'business as usual' operation.

5 In the last two years, Orion has had to be responsive to events and has operated in a more reactive mode than is normal for an electricity distribution business (EDB). With the focus of activity in Christchurch now shifting to the rebuild, Orion's mode of operation will need to transition to a renewed focus on the long-term management of the network.

6 The Orion management team is aware of the need to transition to a more normal pace of operation and is taking steps towards achieving this. However, our review has identified that when developing the CPP, Orion has missed some opportunities to improve workload management and, through this, assist in the transition process.

7 Delivering electricity network services efficiently to consumers requires the use of sound asset management practices. Good asset management practice requires combined economic and technical evaluation of options

to manage risk, cost and performance. For example, the deferment of capital expenditure for as long as possible may have economic benefits for consumers, provided that network performance and risk of failure can be managed within acceptable standards. Well performing electricity network businesses utilise a range of asset management and network design approaches to avoid the need to spend money to replace assets unnecessarily.

8 Consistent with the above, Strata's approach to Orion's CPP proposal was based on a top-down approach that applied a critical review of the process through which Orion developed the capex and opex forecasts and tested the validity and sensitivity of critical input assumptions. The approach can be considered to be similar to a governance level review rather than a bottom-up replication of the network planning process.

9 During the review, Strata considered the Verifier's report and attended a workshop at which the Verifier presented and discussed its findings. In addition, two workshops were held with Orion in Christchurch. Subsequent additional requests for information were made to Orion and the information received was reviewed and taken into consideration along with the CPP application material and the Verifier's report.

10 On a number of occasions, Strata and Orion management have discussed specific topics in order to gain a clear understanding of the review process. Strata ensured that reasons were provided to Orion when additional information requests were made. Orion has, at all times in the review, acted professionally and provided responses within expected timeframes.

11 The Commerce Commission management and staff provided modelling and analysis of data which Strata has relied on when making assessment of appropriate expenditure levels.

12 In this report, unless stated otherwise, currency values are expressed as constant 2013 dollars.

2 Headlines

13 Orion's CPP proposal envisages significant step changes over and above historical levels in all network related expenditure. A proportion of the step changes relate to earthquake issues and Orion's purchase and management of transmission spur assets. After taking these components into account, a significant step change in expenditure is being sought by Orion.

14 In our view, Orion's proposed step changes in all major expenditure areas are not fully justified and should be adjusted to reflect:

(a) the level of expenditure that is justified and reasonably expected to be spent during the CPP period;

(b) the level of network development capital required to be spent to meet the needs of consumers whilst managing uncertainty and risk;

(c) that replacement capex is larger than would be expected given the:

(i) age and condition of the assets; and

(ii) impact of the network development programme;

(d) the need to manage workload through the rebuild period; and

(e) opportunities to better manage workload across the organisation rather than increasing staffing levels.

15 Our views on the adjustments that are appropriate to make to the CPP proposed expenditure are:

(a) Development capex –

(i) CPP 1 - a downwards adjustment in the CPP period of $21.6m to reflect the managed deferral[1] of sections of the proposed 66 kV sub-transmission ring development;

(ii) CPP 2 – is a committed project, no adjustment to be made; and

[1] Strata use "deferral" in this report in the context of postponing expenditure into a future period, usually outside the CPP period.

(iii) CPP 3 to 20 - downwards adjustment in the CPP period of $39.6m[2] to reflect the managed deferral, scope and cost allocation changes.

(b) Replacement capex –

(i) a reduction of 20% of proposed expenditure to account for a revised asset replacement programme based on reasonable asset condition ratings and average asset age; and

(ii) a further reduction of 10% to account for cost estimation accuracy and prudent decision making that would lead to the deferral of some replacements. For example, the impact of the major projects capex will remove from service some assets that are scheduled for replacement.

(c) Network opex –

(i) the removal of the unjustified contingency sum of $7.5m;

(ii) a further $9m reduction in emergency maintenance opex to take into account a reasonable expectation of future cable fault rates; and

(iii) a further reduction of 5% to scheduled maintenance and unscheduled maintenance to reflect the expected gains from improved asset knowledge and management, and prudent decision making.

16 Our estimate is that the above network opex adjustments will result in an overall downwards adjustment in the order of 16% ($21.3m) to network opex.

17 Proposed increased staffing levels in network management and operations should be limited to 50% (a reduction of 10 FTE's). This adjustment is to take into account the potential for optimisation across the organisation and improved workload management.

18 The remainder of this report provides the rationale for these headline findings.

[2] 2013 constant prices.

3 Major capex projects

3.1 Context

19 This section presents Strata's views on the major capex projects included in Orion's CPP proposal. It is presented in two parts:

(a) CPP1 and CPP2, which are the two major projects for rebuild and reinforcement of the 66 kV network across northern Christchurch; and

(b) CPP3 – CPP20, representing a number of urban and rural projects, which account for the balance of the major capex in the CPP proposal.

20 Orion has undertaken work over several years to establish a long-term strategic development plan for its network. Since the earthquakes, Orion has reviewed its sub-transmission (66 and 33 kV) and distribution (11 kV) network architectures. These reviews have broadly supported retention of Orion's pre-earthquake approaches to planning standards and network architecture, with additional elements to provide resilience to high impact, low probability (HILP) events.

21 Orion's long-term vision is for a network capable of supplying a peak demand of 800 MW,[3] reaching this level of demand over several decades.

22 Orion's CPP proposal includes significant amounts of capex to progress the development of its sub-transmission and distribution networks in both urban and rural areas. Orion has also commenced a programme of Transpower spur asset acquisitions on the basis that it can manage these assets more efficiently than Transpower.

23 We provide our views on each of these aspects in this section.

3.2 Findings on network development capex: CPP1 and CPP2

3.2.1 Introduction

24 Project CPP1, titled Urban Major North, represents around $60m of committed and proposed capex and is thus a significant component in the context of the overall expenditure proposal. CPP1 provides for significant

[3] See Orion's Network Architecture Review document

rebuild and strengthening of the 66 kV network between Islington and Bromley GXPs across the northern suburbs of the city.

25 Project CPP2 represents around $20m of committed capex to rebuild and expand Dallington zone substation.

26 This section presents Strata's views on the scope and timing of the network development components of Orion's CPP proposal. Our conclusions require initial consideration of Orion's planning standards and the preferred network architecture that Orion has developed from these standards.

3.2.2 Planning standards

27 Orion has developed its planning standards hierarchically, by considering the investments that are necessary to provide (in priority order) sufficient:

(a) capacity – so as to provide network capacity that should meet the expected peak demand without overloading;

(b) security – so as to provide capacity plus additional network assets so that supply can be maintained without customer interruption, or quickly restored, following one or more faults to network assets; and

(c) resilience – so as to provide capacity and security plus additional network assets to afford flexibility of response to high impact, low probability (HILP) events, enabling supply to most customers to be restored within reasonable timeframes.

28 We consider that Orion's planning standards reflect the upper end of planning practice for a network of its size, supplying the types of load present and expected in Christchurch and the Canterbury region.

29 We have compared Orion's planning standards against those adopted by Wellington Electricity, Aurora (Dunedin) and Vector (Auckland).[4] In summary, Orion's network planning standards generally exceed the standards adopted by Wellington Electricity and Aurora but are similar to those used by Vector.

30 Orion's planning standards can also be considered to exceed those that apply to the transmission network that connects Orion's network with

[4] While no two cities are exactly the same and cases can be advanced at a detailed level that seek to establish a city's unique consumer needs, Wellington, Dunedin and Auckland represent appropriate benchmarks at a high level, since they are New Zealand's three other main cities serving diverse consumer bases in an urban environment. Dunedin also represents a colder climate South Island city. Each of these cities has unique consumer needs that can be credibly argued as justifying higher levels of security and resilience.

electricity suppliers. The Grid Reliability Standards that require the power system to *remain in a satisfactory state during and following a single credible contingency event occurring on the core grid.*[5]

31 It is important to note that planning standards are used by EDBs as planning guidelines. They do not represent absolute minimum standards to be implemented and maintained in all situations at all times and should not, on their own, justify any particular network reinforcement project without a comprehensive, standalone business case.

32 EDBs face many practical and economic realities that explain why their as-built networks fall short of those that would, on paper, result from the strict application of their planning standards. In Orion's case, for the duration of the post-earthquake recovery period, which will be many years, we would expect that the network would not meet planning standards to a material degree. This reflects a situation in which Orion operates within a state of significant uncertainty and that a rebuild of considerable magnitude will require a sustained investment of resources over many years.

33 We will discuss the subject of relaxed planning standards in a later section.

3.2.3 Network architecture

34 As mentioned above, Orion has undertaken architecture reviews of both its sub-transmission and distribution networks. We have noted three significant changes resulting from these reviews, discussed in the following sections.

Sub-transmission transferred to 66 kV

35 Of note is that Orion is seeking within its CPP proposal to strengthen its 66 kV network to provide a sub-transmission backbone that replaces:

(a) suburban transfer capacity[6] that has historically been provided at 11 kV; and

(b) suburban and rural transfer capacity that has historically been provided at 33 kV.

36 A strategic change of this significance requires that gradual development is carried out in a staged manner over many years. As the 66 kV network is developed over time, the change will enable significant simplification of the 11 kV network so that it increasingly provides only local distribution service. It will also enable decommissioning of some superseded 33 kV assets.

[5] Electricity Industry Participants Code schedule 12.2 Grid Reliability Standards.

[6] Transfer capacity is capacity provided by the network to transport bulk supplies over distances of several kilometers between suburbs or rural districts.

37 By staging the reconfiguration over many years (in fact, decades), the timing of specific reconfiguration and development projects can frequently be made to efficiently coincide with equipment (particularly switchgear) end-of-life replacements.

Radial architecture converted to meshed network

38 A second area where Orion has modified its network architecture relates to the 66 kV circuit configuration used to supply urban zone substations.

39 In urban settings, Orion has historically provided one or two[7] 'transformer-ended' 66 kV feeder cables per zone substation, with cables buried in the same trench where two are provided.

40 With its experience of earthquake damage, Orion now considers that greater security can be provided with a meshed network layout that avoids co-locating circuits in single cable trenches. Since it provides route diversity, this arrangement is more likely to avoid (though is not completely immune from) simultaneous faults to two or more cables supplying a single zone substation.

41 A typical arrangement using Orion's revised approach results in single circuits that form closed rings, supplying a number of zone substations in 'daisy chain' style, starting and ending at a grid exit point (GXP). Within this architecture, individual circuits are provided with sufficient capacity so that supply is maintained to all zone substations in the ring, without interruption, following the loss of any single circuit.[8]

42 If two circuits develop faults simultaneously and interrupt all supplies to a zone substation supplied only by those two circuits, a second level of supply security is available via the 11 kV network. By switching the network to transfer the load that was supplied from the 'dead' zone substation to adjacent zone substations, supply can be restored to most or all of the affected consumers within an hour or so.[9]

43 We have no particular view as to whether radial or meshed network architectures provide superior performance. We accept that Orion has decided to transform its radially configured legacy sub-transmission network and expect that this will take a significant period of time to fully implement. In practice, Christchurch urban sub-transmission will remain a hybrid of two approaches for the foreseeable future.

[7] The number depends on the zone substation maximum demand.

[8] This is referred to as providing "n-1" security.

[9] This is referred to as providing "n-2 following switching" security.

Network resilience

44 Orion's network development plans seek to provide network resilience to HILP events by developing network architectures that can provide the flexibility to fairly rapidly restore supplies following events that cause extreme network damage. Orion has focused this part of its development plan by considering, as an extreme HILP event, the loss of all supplies from either one of the two major urban GXPs (i.e. either Islington or Bromley).

45 In normal operation, Orion's individual urban zone substations are supplied from either Islington or Bromley, with a roughly east – west geographical split between the two GXPs. By providing sufficient east – west interconnection capacity at 66 kV, Orion aims to eventually develop its 66 kV network so that it can supply all of its urban zone substations from either Islington or Bromley alone, following an extreme contingency in which all supply from one or other GXP is interrupted.

46 Among competing priorities for scarce resources (i.e. those that provide network capacity and security), particularly within the next few years, we consider that new investments in network resilience should be afforded the lowest level of priority for development. This view results from a simple trade-off of expected costs and benefits and from rigorous prioritisation between competing alternative investments.

47 We note that business cases for resilience investments that require significant levels of capex are, in general, very difficult for infrastructure providers to justify, as critical input assumptions are based on extremely long return periods and highly speculative risk consequences.

3.2.4 CPP1 and CPP2 scope and timing

48 Having reviewed the specific projects included in the CPP1 and CPP2 programmes, we have observed that, as the city rebuild is at a very early stage, a significant level of planning uncertainty exists in the current environment. This uncertainty increases the risk to consumers that capital investments made now may become significantly suboptimal or stranded as patterns of electricity demand develop over a period of many years.

49 In its CPP1 and CPP2 proposals, Orion is seeking to restore sections of the network damaged by the earthquakes and to generally accelerate the development of its 66 kV cable network as an urban sub-transmission backbone (as we discussed in section 3.2.3). Orion's short-term priorities within the CPP period are:

(a) repair of key sub-transmission assets in east Christchurch (i.e. supplies to the (recently new) Rawhiti and (existing) Dallington zone substations, so as to replace temporary overhead circuits);

(b) providing n-1 security to Dallington and Rawhiti by installing new 66 kV circuits to McFaddens and Marshlands / Waimakariri / Hawthornden respectively;

(c) providing for anticipated residential demand growth in north Christchurch, and partially offloading heavily loaded zone substations at Papanui and McFaddens, by developing new zone substations at Marshlands (urban north-east) and Waimakariri (urban north-west); and

(d) providing the capability to transfer load from Islington to Bromley, so as to more evenly balance the respective demands on these two GXPs.

50 Orion's preferred development plan also provides resilience to a HILP event involving one of the two urban GXPs by establishing two new east – west GXP ties to the north of the city (one through Papanui – McFaddens – Dallington and one through Waimakariri – Marshlands - Rawhiti).

51 We have reviewed the network architecture analysis undertaken by Partna Consulting.[10] The Partna report demonstrates the feasibility of an alternative architecture that could provide adequate sub-transmission capacity and security across the northern suburbs of the city within the CPP period.

52 We note that the Partna alternative sub-transmission development plan is prioritised so that it delivers:

(a) capacity to relieve imminently overloaded sections of the network within the CPP period;

(b) security to an 'n-1 following switching' level within the CPP period (we'll refer to this level as a 'basic security' level);

(c) 'enhanced security' to an 'n-2 following switching' level in the medium term (i.e. in the years following the CPP period); and

(d) resilience elements in the longer-term, possibly many years into the future.

53 Partna recommends that the enhanced security and resilience investments (i.e. items (c) and (d) respectively) are removed from the CPP capex plan and undertaken in future time periods.

54 Strata agrees with Partna's recommendation, which we note is based on temporarily relaxing compliance with planning standards. While we consider it likely that consumers would understand and be comfortable with the implicit trade-off between price and service quality, we feel that this is a trade-off that Orion should have, but Strata understands did not, explicitly test with consumers.

[10] See separate report by Partna: *Findings on the Orion CPP Proposal – Major Urban Capital works and Architecture review*, June 2013.

55 We also note that the resilience elements of Orion's development plans represent an improvement on pre-earthquake network capability. Pre-earthquake, Orion had developed plans to increase network resilience but had not yet fully implemented them.

56 We consider that slowing down the commitment to some of the major capex plan items would provide significant benefits. It would:

(a) provide more time for demand growth patterns to more clearly emerge, allowing greater visibility of the benefits of alternative options to Orion's proposed development plan;

(b) free up resources to deliver higher priority projects within the expenditure plan;

(c) obtain the time value of money benefits derived from deferring expenditure;

(d) avoid the need to increase project management and project delivery resources;

(e) allow expenditure to be moved outside the period when contracting labour costs will be particularly high; and

(f) lessen the likelihood of mistakes from rushed design, construction and commissioning activity.

57 The counter-argument is that a slower rate of build will prolong the period within which targeted security and resilience objectives are not met and increase the likelihood of service interruptions. In respect of this, we consider that:

(a) this dilemma is representative of the trade-offs that resource-constrained asset managers routinely make – appropriately, it requires that managers prioritise resources to the highest value alternatives; and

(b) even if Orion's rate of build was slower, Orion's consumers would still receive a safe and reliable supply of electricity and Orion would have the capacity to meet the demand for new load and connections over the CPP period and beyond. Orion's consumers would not receive a supply of electricity less reliable than that of other typical New Zealand EDBs and it would improve more gradually over time.

58 Thus, we consider that during post-earthquake reconstruction, the highest priority expenditures should proceed, but it is to the benefit of consumers if expenditure that can reasonably be deferred, is deferred. This would realise the benefits noted in paragraph 55, whilst minimising the extent of price increases on consumers.

3.2.5 Conclusions on network development capex

59 Strata considers that Orion's approach regarding planning standards and network architecture creates a broadly appropriate roadmap to guide longer-term development options.

60 However, delivering a network to achieve the ultimate level of performance, particularly in respect of providing enhanced levels of security and resilience to HILP events should be considered a long-term goal that might be justified as and when costs and benefits are isolated and evaluated against consumer needs within comprehensive business plans.

61 The level of business planning seen in this regard has been limited to broad network architecture-level justifications based on "greenfield" input assumptions. Notwithstanding our comments in paragraph 47, we have not seen the level of cost benefit and consumer-need analysis on a project-by-project basis that we would expect to see in support of expenditures of the size included in Orion's major capex plan.

62 Within the CPP period, we would expect Orion to focus on critically prioritising its capex spend, providing for immediate capacity to relieve imminent constraints where necessary and reinstating basic security levels to the sub-transmission and distribution networks. Relatively low cost investments that secure future development options (such as the acquisition of strategic land parcels) would also be appropriate for inclusion within the CPP period.

3.3 Integration of Transpower spur assets

63 Orion has commenced a significant programme of spur asset purchases from Transpower. In the urban area, the programme would effectively bring all urban 66 kV network assets, and their associated 11 kV supplies, between Islington and Bromley into Orion ownership and control.

64 Orion has justified the asset purchases on the grounds that it can more efficiently manage these assets than Transpower, including cost-effectively integrating them into its sub-transmission and distribution networks.

65 Orion's acquisition of the spur assets is an integral part of the network architecture it has proposed. Acquisition enables planning and development of the urban sub-transmission network to be undertaken holistically.

66 Strata considers that conceptually, from an asset management perspective, the acquisition of transmission spur assets appears technically sound and practically achievable.

67 From an economic perspective, Strata would expect that each acquisition would be subject to a comprehensive business case that sets out the benefits and risks of the investment against other feasible options. At this stage, we have not seen such a business case.

3.4 Findings on major project capex: CPP3 – CPP20

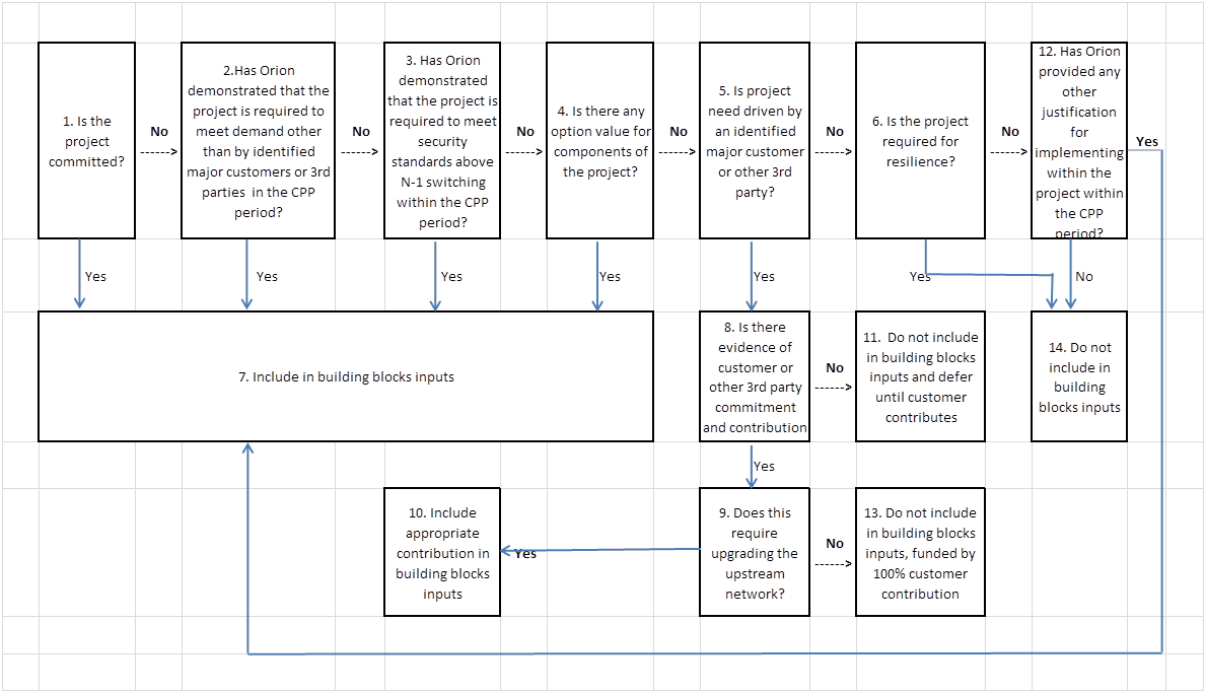
3.4.1 Introduction

68 The balance of Orion's major project capex proposal comprises projects CPP3 – CPP20. The Commission has undertaken a review of the expenditures proposed within these projects and has asked Strata to provide a peer review of its findings.

3.4.2 Assessment methodology

69 The Commission's view on what expenditure should be included is broadly consistent with the conclusions we reached in section 3.2. The Commission has set out its views in an expenditure hierarchy in the following figure.

Figure 1: Major capex decision hierarchy



70 The Commission considers that expenditure within the CPP period is appropriate if:

(a) the expenditure is already committed, in which case it is separately considered in the claw back proposal – Strata considers that this is appropriate;

(b) it is demonstrated that the expenditure is necessary to provide network capacity to meet demand within the CPP period – Strata considers that this category should apply to investments that are not customer-specific but that are necessary to meet

demonstrated capacity needs and therefore appropriate for inclusion within the CPP period;

(c) it is demonstrated that the expenditure is necessary to meet security standards at the current levels – we consider that this refers to meeting *basic security* levels, but not any *enhanced security* levels (using the terms we set out in section 3.2.4), within the CPP period;

(d) there is any option value that might reasonably be expected from components of the project – we consider that this category should refer to relatively low cost strategic investments, such as land acquisitions that provide future development options and is therefore appropriate for inclusion within the CPP period;

(e) the expenditure is to provide customer-specific connection requirements, in which case an appropriate level of customer commitment and contribution is required (which would offset any amount that might have been included as a CPP period expenditure). We consider that customer-specific investments should be recovered from the party that benefits from the investment and that economically efficient pricing signals for such investments are an important factor in investment decision making. If a connection investment requires a component of investment in the upstream network that benefits a wider customer base, an allowance reflecting this value is appropriate for inclusion within the CPP allowed expenditure; or

(f) there are other reasons, not captured in any of the above categories, for the expenditure – Strata considers that any such reasons should be fully explained and justified with an appropriate business case.

71 Expenditure that is required to provide network resilience is not appropriate in the CPP period, unless justification is provided within a demonstrated business case. Strata agrees with this conclusion (this was discussed in section 3.2).

72 Strata recognises that the decision-making framework shown diagrammatically in Figure 1 provides a summary of the actual decision-making process adopted and recommend that the Commission considers the clarifications provided in paragraph 70 above.

3.4.3 The Commission's findings

73 The Commission has provided the results of its assessment as summarised in its expenditure hierarchy outlined above – see Figure 2.

Figure 2: Analysis of major capex for CPP3 – CPP19

Orion code	Major Projects (by Project)	Cost $(000)	Decision Framework references	Draft Decision	Allowance in CPP	2015	2016	2017	2018	2019
CPP1	Urban Major North	$ 46,190		Some projects	$ 26,174	$ 12,806	$ 1,285	-	$ 12,083	-
CPP2	Dallington substation	$ 19,628	1	Pre CPP	-	-	-	-	-	-
CPP3	Urban major west	$ 6,684	1, 2, 3, 4, 5, 6, 12, 7	Land purchase and upgrade incomer cables at Moffett.	$ 329	-	-	-	-	-
CPP4	Urban major southeast	$ 8,773	1, 2, 3, 4, 5, 6, 12, 7	Land purchase	$ 700	-	-	-	-	-
CPP5	Urban South - new 66 kV at Awatea supplied from Halswell-Islington lines. Buy land	$ 250	1	Committed	-	-	-	-	-	-
CPP6	Urban Major CBD - landscaping existing substation along the Avon River green zone	$ 500	1, 2, 3, 4, 5, 8, 11	Ok	-	-	-	-	-	-
CPP7	Rural Major	$ 13,558	1, 2, 3, 4,5, 6,12, 14.	Defer all non committed beyond CPP	-	-	-	-	-	-
CPP8	Rural Major Hororata/Creyke 66kV	$ 5,857	1, 2, 3, 7 - for some components.	Allow 66 kV bay and TF. Ripple control at Annat and Bankside.	$ 2,520	$ 1,800	-	-	-	$ 720
CPP9	Major Rural Central Plains - for pumping water. 66kV plus 11 kV reinforcement and connection to hydro generation. Central Plains in 2014, outside of CPP.	$ 3,723	1, 2,3, 4, 5, 8. Allow 0.25% for uncertainty	Allow 50% of Orion's share, assuming that some uncertain projects may proceed.	$ 931	-	-	-	$ 931	-
CPP10	Rural Major Springston	$ 1,144	1,2,3,4,5,6,12,7 for switchroom.	11 kV SG replacement	$ 466	$ 466	-	-	-	-
CPP11	Rural Major Norwood	$ 5,784	1, 2, 3, 4, 5, 8, 11	Defer beyond CPP	$ 250	-	-	-	-	-
CPP12	Rural Major Power Factor	$ 720	1, 2, 3, 4, 5, 6, 12, 7	Ok, 54Q	$ 600	$ 120	$ 120	$ 120	$ 120	$ 120
CPP13	Rural Major Annat - 33/11 kV TF upgrade to supply Central Plains Water scheme	$ 393	1, 2,3, 4, 5, 8. Allow 0.25% for uncertainty	Defer until customer commitment	$ 197	-	-	-	$ 197	-
CPP14	Rural Banks Peninsula - Transformer upgrade	$ 1,150	1, 2, 7	Ok	$ 773	$ 773	-	-	-	-
CPP15	Rural Major Southbridge	$ 4,385	1, 2, 3, 4, 5, 6, 12, 14	Allow land purchase	$ 100	-	-	$ 100	-	-
CPP16	Rural Major Dunsandel	$ 2,415	1, 2, 7	Allow due to high dairy growth	$ 2,415	-	-	-	$ 2,415	-
CPP17	Rural Major Porter Heights	$ 4,137	1, 2, 3, 4, 7	Porter Heights development is committed. Allow Orion's share	$ 2,069	$ 2,069	-	-	-	-
CPP18	Rural Major Kimberley	$ 2,645	1	Pre CPP	-	-	-	-	-	-
CPP19	Rural Major Alpine (Castle Hill and Arthurs Pass)	$ 249	1, 2, 3, 7	Ok	$ 249	-	$ 249	-	-	-

3.4.4 Strata review of the Commission's findings

74 Strata's assessment of the Commission's review of CPP3 – CPP20 is summarised in Table 1. Strata has reviewed the decision-making process discussed in section 3.4.2 and provided an indication of its agreement with the Commission's assessment or recommend that the Commission considers an alternative position.

Table 1 Summary of assessment for CPP3 – CPP20

Project code	Strata's assessment of Commission assessment	Comments
CPP3	Agree	Provides for land acquisition and cable upgrade only. Shands 66 kV conversion is an enhanced security and resilience investment.
CPP4	Agree	Provides for land acquisition only. The Milton – Lancaster link is primarily a resilience investment that can be delayed until after the CPP period.
CPP5	-	Expenditure pre-dates the CPP period.
CPP6	Agree	Council requirement with community beneficiaries. Electricity consumers should not be required to fund.
CPP7	Agree	Some parts of this programme predate the CPP period. The parts proposed for delay until after the CPP period have alternatives or contain significant levels of uncertainty.
CPP8	Agree	Other feasible options may be less expensive but have not been considered. Orion's proposal appears to be an expensive option to resolve the 33 kV load limit at Hororata. Retaining 33 kV for part of the network in this area and new 66/11 kV at Hororata should be considered as an option. Hence, the draft decision to allow a 66 kV bay and transformer at Hororata is a reasonable alternative.
CPP9	Agree	Customer-specific investments (which should be largely customer funded) but the draft decision provides an allowance for upstream network components. Also, the generation scheme is speculative at this stage. It is not clear that the scheme has received planning consents.
CPP10	Agree	Allow switchgear upgrade but disallow undergrounding unless community funded.
CPP11	Agree	Timing is speculative based on not-yet-committed large consumer load growth. Timing is for 2019, which is right

Project code	Strata's assessment of Commission assessment	Comments
		at the end of the CPP period, therefore defer until after the CPP period.
CPP12	Recommend further review	While this is not a large expenditure, the proposal indicates that more thought has yet to be put into this strategy. Relevant quotes: "The policies and planning standards for PFC solutions are still under development. The costs are based on recent investigations and installations." "The economics of reactive assets depend on the regulatory regime, which has not yet been settled." We recommend delaying this project until policy development is more advanced and a better justification provided.
CPP13	Agree	Speculative demand based on possible irrigator needs. Customer-specific expenditure, so if the project proceeds within the CPP period, it can be consumer funded. Allowance has been made for a small upstream network contribution to the project.
CPP14	Agree	Relatively low cost transformer swap within the CPP period appears to be justified. Part of this programme predates the CPP period.
CPP15	Agree	The demand forecasts are not compelling. They show a 2.5 MW increase for the combined maximum demands of Hills, Killinchy and Brookside over the CPP period. This is a marginal increase. The existing substations have adequate N capacity and the $4.4m new Southbrook substation would only provide contingency transfer of the load from adjacent substations if the fault coincided with peak demand. The proposal also mentions 11 kV constraints but other options to relieve those in the short term (e.g. line regulators and/or PFC) are not considered. Allowing the land acquisition component is appropriate.
CPP16	Recommend further review	Provides additional customer capacity and should be mostly customer funded.
CPP17	Agree	Provides for alpine facilities. Partially customer funded with allowance made for upstream network contribution.
CPP18	-	Project committed. Predates the CPP period.
CPP19	Agree	Low level of expenditure. Provides a cost-effective security upgrade.

Project code	Strata's assessment of Commission assessment	Comments
CPP20	-	Expenditure pre-dates the CPP period.

75 Having considered CPP3 – CPP20 from a "bottom-up" perspective, we have, as a final check, looked at the resulting allowed expenditure "top-down". Strata notes that Orion's proposed expenditure across these projects is significantly in excess of the proposed allowance following the Commission's project-by-project draft decisions.

76 The Commission's assessment, along with our recommendations as summarised in Table 1, result in the removal of three rural zone substations from the CPP period major capex projects. In Strata's view, taking into account the planning uncertainty that exists in 2013 for expenditures considered necessary in the period 2015 – 2019, it would not be unreasonable to expect that one of the three rural zone substations might be justified in updated planning inputs.

77 Accordingly, the Commission may consider that allowing one of the three rural zone substations would represent a reasonable expectation, when viewed from a top-down perspective. Strata recommends that the Commission considers this view and/or invites Orion to address this possibility in its submission in response to the Commission's draft decision.

4 Replacement capex

4.1 Specific context on replacement capex

78 Replacement capex expenditure is required to maintain the asset fleet in reasonable condition and age. The replacement capex forecast is not required to address expected faults resulting from earthquake damage.

79 Orion is proposing to spend $124.4m (Real 2013) on network asset replacement over the five year CPP period. The replacement capex for the previous five years was $56.3m (Real 2013); however, this period includes the impact of the earthquake on the replacement programme in financial year (FY) 2011 and FY2012. A comparison between the pre and post-earthquake replacement capex can be made using the annual averages for the 2008 to 2010 years and the CPP period.

80 The pre earthquake annual average replacement capex was $11.1m (Real 2013) and the annual average for the CPP is $24.4m (Real 2013). Figure 3 shows that a significant step change from previous levels is proposed for the CPP period.

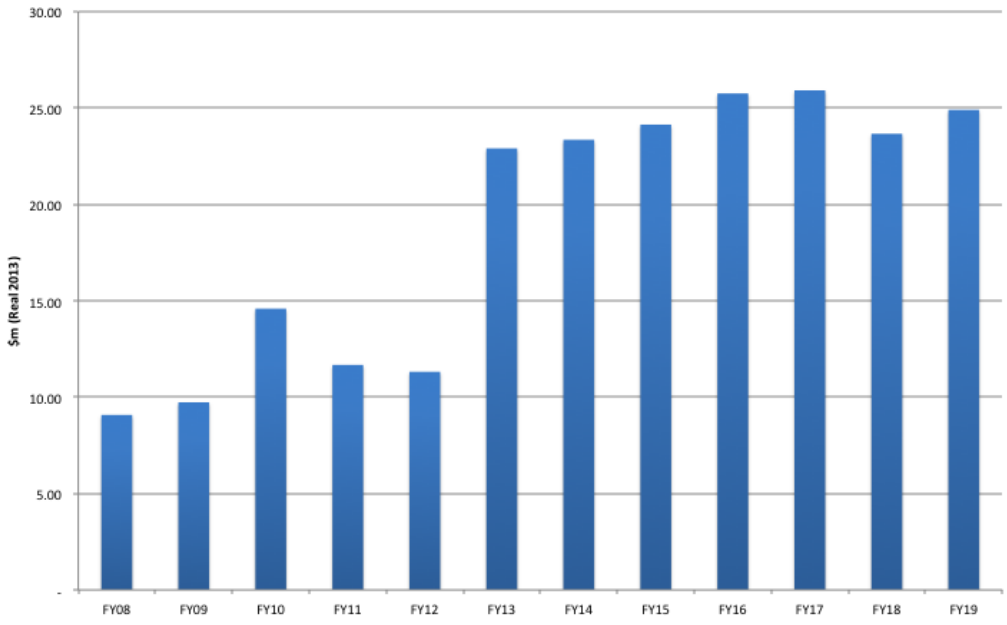


Figure 3: Actual and forecast replacement capex (Real 2013)

81 Figure 4 provides a comparison of the contribution to replacement capex made by individual asset categories.

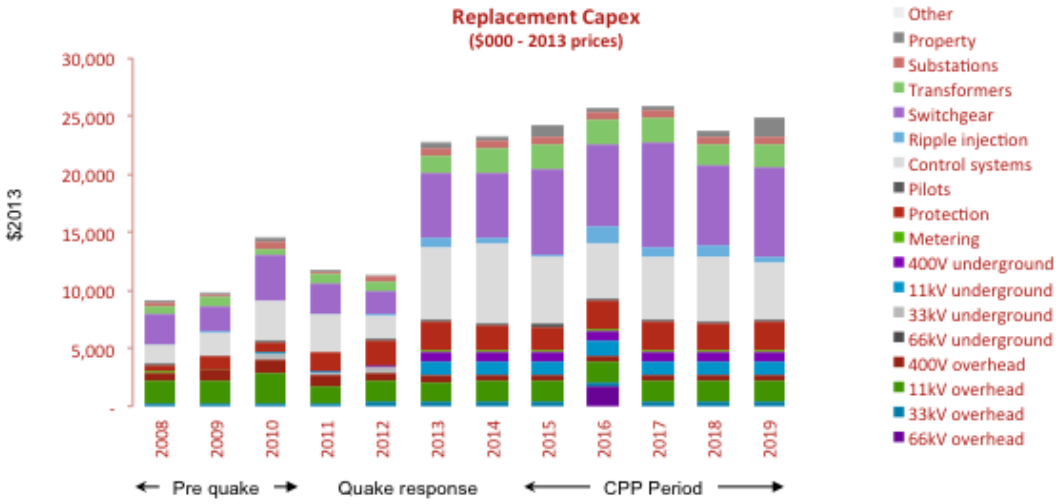


Figure 4: Replacement capex by asset category (source: Commerce Commission)

82 A major contributor to the step change in replacement capex during the CPP period can be seen to be a significant increase in proposed expenditure on switchgear (see Figure 5).

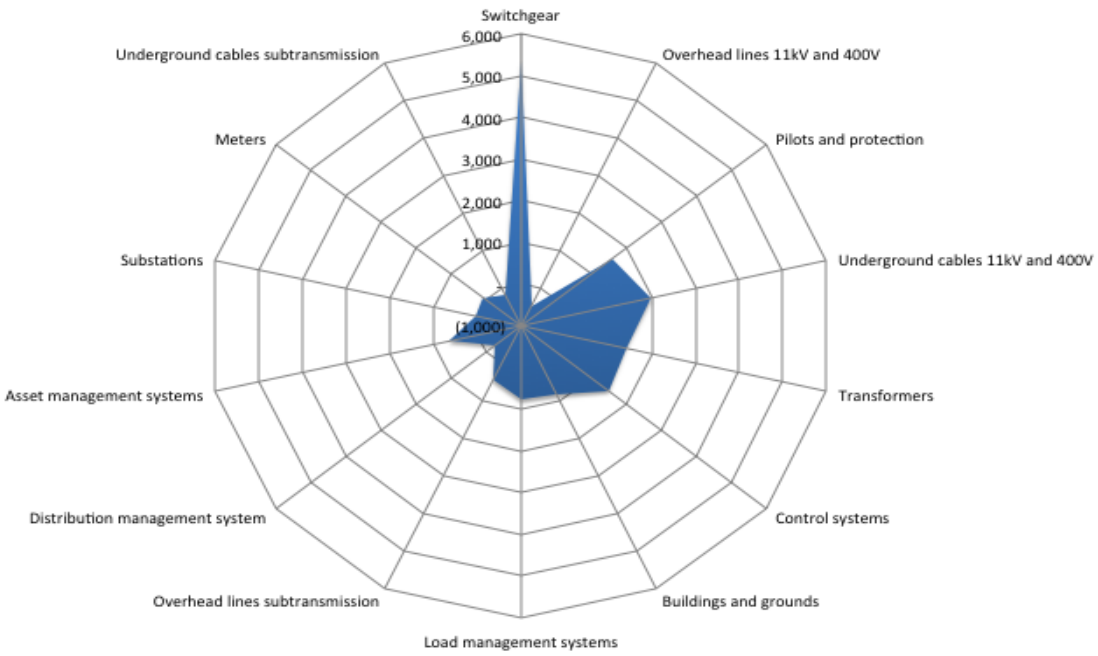


Figure 5: Step changes in replacement capex components

83 Figure 5 shows the difference between annual average replacement capex for 2008 to 2010 and that proposed for the CPP for network asset categories. The variations are shown in thousands of dollars (real 2013). It is clear that the largest driver of the step change is switchgear, with an annual average step change of nearly $5.3m or 125%.

84 Switchgear replacement is the most significant contributor to replacement capex and, as noted above, to the increase over pre-earthquake

expenditure. Importantly, this asset category has been subject to detailed condition assessment through Orion's introduction of a Condition Based Risk Model (CBRM) for asset management.

85 In its report, the CPP Verifier considered that switchgear replacement had been *developed in a comprehensive manner and appears to be well planned.*[11] The Verifier based its conclusion that the accelerated level of expenditure was *probably justified*, on the understanding that the need had been established to *maintain the current health index and address safety and reliability issues with certain switchgear types*[12].

86 Strata has undertaken an assessment of the methodology through which Orion has developed its replacement capex proposal and, in particular, the switchgear component.

4.2 Orion's methodology for establishing replacement capex

87 Orion's replacement capex is built on a bottom up basis. Identification of assets and prioritisation of projects/programmes takes into account asset age, performance and condition. These asset parameters are combined to provide asset health ratings and/or Orion condition rankings.

88 Orion has been developing its methodology over a number of years and is introducing an EA Technology CBRM. The constraint on resources due to Orion's response to the earthquakes has understandably stalled the implementation. Consequently, the asset replacement programme has been developed through the use of a combination of methodologies using CBRM health ratings, Orion condition rankings and asset age. The Verifier found that for some asset categories, where reliable condition data was not available, replacement priority defaulted to asset age.

89 Strata found that for switchgear and protection relays both health ratings and Orion rankings had been established. These asset condition indicators are used as the primary determinants for establishing a replacement priority. This also takes into account the age of the asset. Orion also applies a risk assessment, which gives higher priority to those assets that are considered by Orion to have higher consequences arising from failure than others (e.g. assets adjacent to schools).

90 Strata understands that Orion has not applied a specific top down review process to the replacement expenditure forecasts. An example of top down analysis is where a constraint on one or more input assumptions (such as

[11] Geoff Brown & Associates, Verifiers Report page 36 (CPP paginated page100198)

[12] Geoff Brown & Associates, Verifiers Report page 35 (CPP paginated page 100197)

available budget or available staff and contractor capacity) is applied and the resulting changes in asset health, average age profiles and risk of failure can be seen and assessed. Using this approach, senior management and the Board can test the appropriateness of forecast expenditure on a more objective basis than they otherwise could. From discussions with Orion, Strata understands that the ability to consider the sensitivity of the resulting risk across a range of expenditure levels would be possible with full implementation of CBRM.

4.3 Assessment of replacement capex

91 Given Orion's proposed step change increases in network development capex and opex it is important to, wherever possible, create downward movement in other workloads. This is particularly important for an organisation that has been under considerable stress or where significant increases in the workforce would be required.

92 One area that has the potential for Orion to reduce workload by delaying non-essential activity is replacement capex.

93 Inevitably a bottom up expenditure forecast developed on an item-by-item, line-by-line basis will produce a result that is in excess of what the business will reasonably spend. This effect happens because, in practice, the business will respond to improved information, constraints in resources, changed priorities etc. allowing deferment of proposed expenditure or changes in the scope of planned work.

94 Based on our review team's experience and assessments of other electricity network businesses, Strata is not satisfied that sufficient top down assessment and sensitivity analysis has been applied when establishing the proposed replacement capex.

95 Given that switchgear and protection systems represent 49% of the replacement capex budget, Strata has undertaken an assessment of Orion's asset data to quantify the potential for delaying this work.

96 Given the level of asset age and condition information that is available for switchgear and protection relays, Strata considers that it is possible to undertake a form of top down sensitivity assessment of the proposed expenditure. Accordingly, the Commission and Strata have undertaken sensitivity analysis on these asset categories.

97 From the results obtained for switchgear and protection relays, an assessment has been made on the reasonableness of applying the results of the assessment to the total proposed replacement capex.

4.3.1 Methodology

98 Subsequent to onsite workshops, Orion provided asset databases for switchgear and protection relays. Amongst other things, the data fields included:

(a) asset age;

(b) health rating;

(c) Orion condition ranking;

(d) replacement cost estimate; and

(e) year of replacement.

99 Asset age was identified from the date of manufacture of the asset.

100 The asset health rating applied by Orion is based on the CBRM system and has a range of 1 to 10 (1 rating representing the best health and 10 being the worst. Orion generally indicates a 4 and under rating as 'green' and a 5 to 6 rating as amber. 7, 8, 9 and 10 ratings are indicated red. In the database, there are a small number of exceptions to this colour coding rationale.)

101 Orion's 2013 Asset Management Plan provides the following table showing the method used to convert our CBRM scores to those required by the Commerce Commission. It can be seen that a Health Index (Health Rating) of 6 and less only requires ongoing monitoring and not replacement.

Condition	HI Range	Remnant Life	Probability of Failure	Health Index	Schedule 12a Terms	Definition
Unknown					Grade unknown	Condition unknown or not yet assessed
Bad	10	At EOL (< 5yrs)	High	10 + (9 - 10]	Grade 1	End of serviceable life, immediate intervention required
Poor		5 - 10 yrs	Medium	(8 - 9] (7 - 8]	Grade 2	Material deterioration but asset condition still within serviceable life parameters. Intervention likely to be required within 12 months.
Fair		10 - 20 yrs	Low	(6 - 7] (5 - 6] (4 - 5]	Grade 3	Deterioration requires assessment and ongoing monitoring
Good	0	20yrs +	Very Low	(3 - 4] (2 - 3] (1 - 2] (0 - 1]	Grade 4	Good or as new condition

102 Orion's own ranking operates on a 10 to 100 scale that works in reverse to the asset health rating. 10 indicates the worst condition and 100 the best. A ranking of above 60 is generally indicated as 'green' and 60 to 40 rating as amber. Below 40 ratings are generally indicated red. Again, there are a small number of exceptions to this colour coding rationale in the database.

103 Asset replacement costs are based on standard per unit costs.

104 The year of replacement indicates the year in which Orion has included the estimated cost in the CPP.

105 The Commission and Strata constructed an Excel based tool that allows sensitivity analysis of the above parameters to be undertaken and

displayed graphically on an Asset Replacement Dashboard. A snapshot of the Dashboard is reproduced below.

106 Forecasts of resulting Orion ranking and asset health rating are made using a copy of the original 'Analysis' sheet provided by Orion. The Health and Orion ratings for each year of the CPP are calculated by assuming that when a relay or switchgear is replaced it gets a new rating. If a relay is not replaced it retains the previous year's rating, plus a deterioration factor reflecting its older age calculated by dividing the range of the Health/Orion scale by an assumed 50 year life.

Replacement Capex Dashboard

Orion CPP Proposal

Analysis of Replacement Capex

Controls

Condition type

- Expansive
- Restrictive

Retain	Condition	Apply Condition(s)
Orion Rating > or =	60	Apply Orion Rating condition
Health rating < or =	5	Apply Health rating condition
Manufacturing date > or =	1970	Apply manufacturing date condition

Alternate Scenario Summary

Savings	$7M
	20%
Avg Asset Life	26.99
2014 Δ	-2%

1975

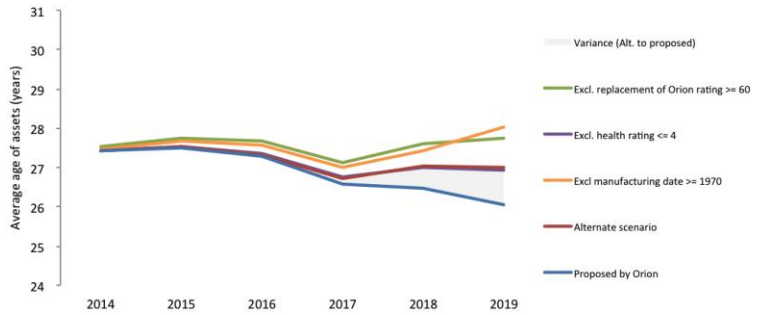
	20% saving
62	60
4	5
2000	1970
Restrictive	

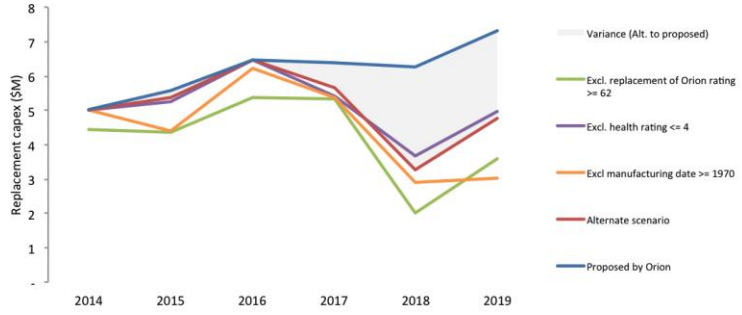
Average Age of Assets

	2014	CPP Period 2015	2016	2017	2018	2019
Proposed by Orion	27.44	27.50	27.30	26.57	26.46	26.05
Excl. replacement of Orion rating >= 60	27.54	27.74	27.69	27.12	27.61	27.74
Excl. health rating <= 4	27.44	27.55	27.35	26.76	27.01	26.94
Excl manufacturing date >= 1970	27.45	27.68	27.57	27.00	27.43	28.03
Alternate scenario	27.44	27.54	27.33	26.71	27.02	26.99
Alternate Variance to Orion Proposed	-	+0.03	+0.03	+0.14	+0.56	+0.94

Replacement Capex ($000)

	2014	CPP Period 2015	2016	2017	2018	2019	CPP Total	
Proposed by Orion	5,025	5,598	6,485	6,404	6,263	7,335	32,086	
Excl. replacement of Orion rating >= 62	4,431	4,372	5,362	5,324	1,997	3,582	20,638	
Excl. health rating <= 4	5,025	5,241	6,485	5,432	3,674	4,981	25,814	
Excl manufacturing date >= 1970	5,001	4,405	6,224	5,385	2,891	3,024	21,929	
Alternate scenario	5,025	5,382	6,485	5,648	3,271	4,781	25,568	80%
Variance Alt. to Proposed	-	216	-	756	2,992	2,554	6,518	20%





Notes

1. This is based on the data provided by Orion for Switchgear and Circuit Breakers only.
2. Certain data provided has been excluded as it is not complete due to lookup errors.

107 Use of the Dashboard allowed scenario analysis for a range of parameter values to be assessed. The resulting expenditure forecasts, average asset age profile, Orion ranking and Asset Health rating are determined and provided in charts.

4.4 Findings on replacement capex

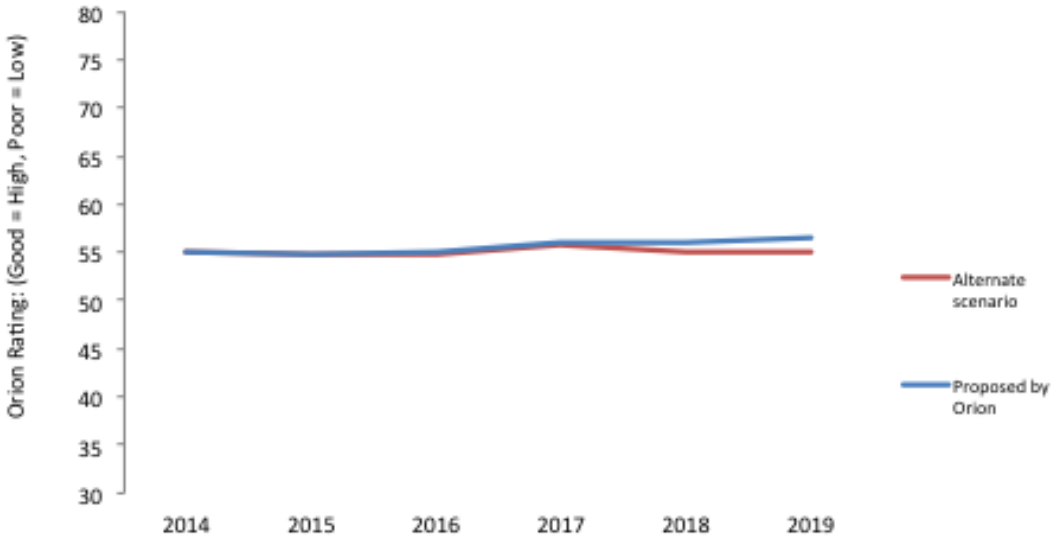
4.4.1 Switchgear

108 The results of our analysis on the switchgear database are reproduced below. The scenarios are based on the exclusion of assets with good condition ratings and manufacture dates.

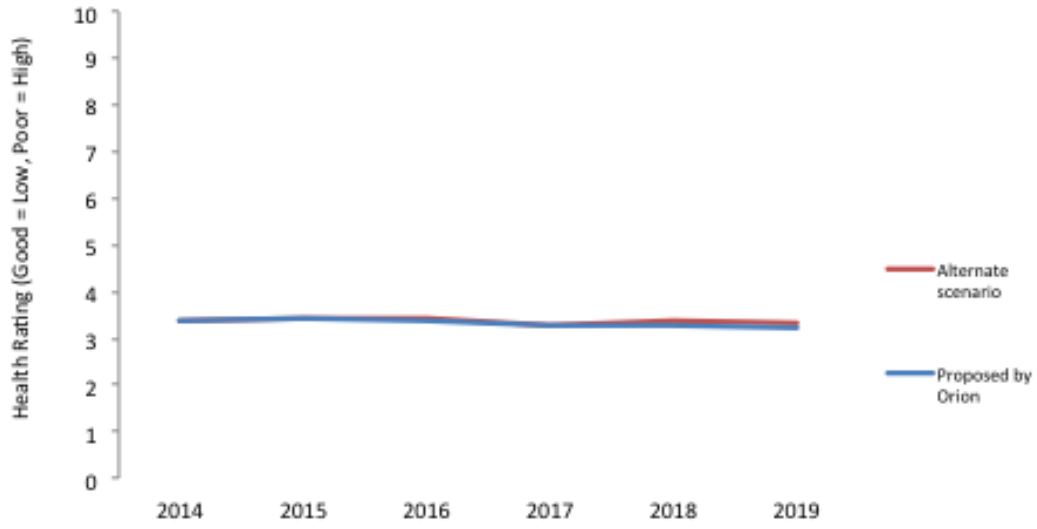
109 The alternative scenario requires all conditions (assets with > 60 Orion ranking, < 5 Health Rating and manufactured post 1970) to be met for that item to be excluded from the forecast.

110 The information presented below provides the resulting Orion Ranking and Health Rating, average asset age and then the resulting replacement capex profile.

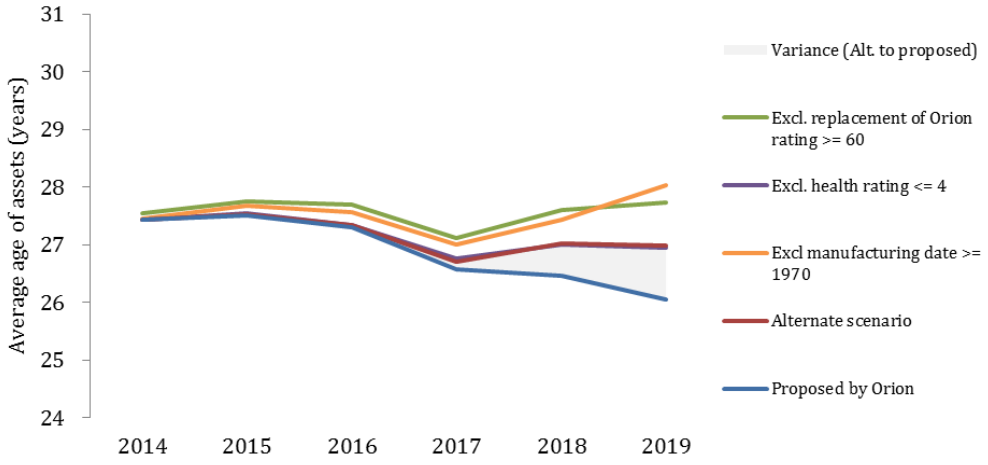
Orion Ranking		CPP Period				
	2014	2015	2016	2017	2018	2019
Proposed by Orion	55.14	54.78	54.93	56.05	55.92	56.51
Alternate scenario	55.14	54.74	54.88	55.84	55.10	55.14
Variance Alt. to Proposed	-	0.04	0.04	0.21	0.81	1.37



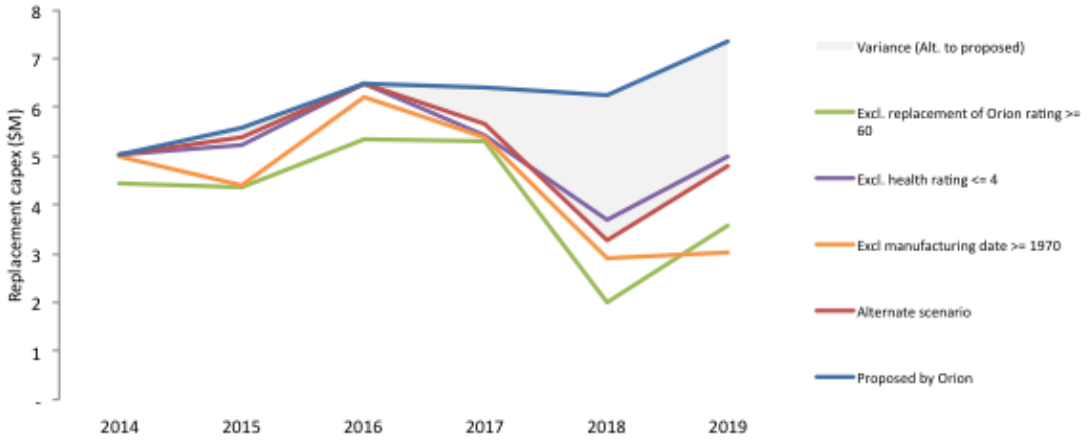
Health Rating		CPP Period				
	2014	2015	2016	2017	2018	2019
Proposed by Orion	3.38	3.42	3.40	3.26	3.28	3.22
Alternate scenario	3.38	3.42	3.41	3.28	3.36	3.35
Variance Alt. to Proposed	-	- 0.00	- 0.00	- 0.02	- 0.08	- 0.13



Average Age of Assets		CPP Period				
	2014	2015	2016	2017	2018	2019
Proposed by Orion	27.44	27.50	27.30	26.57	26.46	26.05
Excl. replacement of Orion rating >= 60	27.54	27.74	27.69	27.12	27.61	27.74
Excl. health rating <= 4	27.44	27.55	27.35	26.76	27.01	26.94
Excl manufacturing date >= 1970	27.45	27.68	27.57	27.00	27.43	28.03
Alternate scenario	27.44	27.54	27.33	26.71	27.02	26.99
Alternate Variance to Orion Proposed	-	+0.03	+0.03	+0.14	+0.56	+0.94



Replacement Capex ($000)		CPP Period					
	2014	2015	2016	2017	2018	2019	CPP Total
Proposed by Orion	5,025	5,598	6,485	6,404	6,263	7,335	32,086
Excl. replacement of Orion rating >= 60	4,431	4,372	5,362	5,324	1,997	3,582	20,638
Excl. health rating <= 4	5,025	5,241	6,485	5,432	3,674	4,981	25,814
Excl manufacturing date >= 1970	5,001	4,405	6,224	5,385	2,891	3,024	21,929
Alternate scenario	5,025	5,382	6,485	5,648	3,271	4,781	25,568
Variance Alt. to Proposed	-	216	-	756	2,992	2,554	6,518



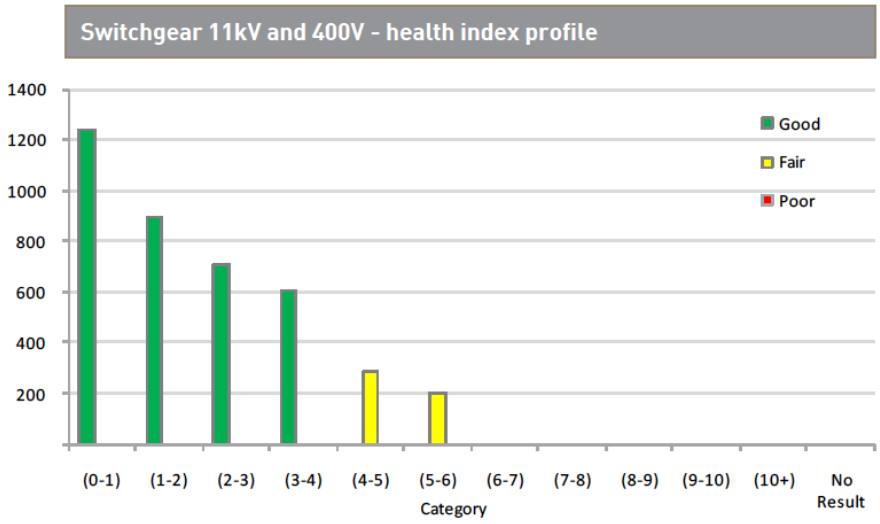
111 Testing across a range of scenarios has shown that Orion's proposal for switchgear replacement includes assets that are rated to be in good and/or fair condition (under both CBRM health rating and Orion's ranking).

112 It has also shown that Orion's proposed expenditure within the CPP period will bring the average age of switchgear down from 27.44 to 26.05 years. The alternative scenario maintains average asset age at 27 years whilst bringing down the required expenditure for the CPP by 20%.

113 The Verifier concluded that the actual expenditure level for switchgear replacement is *driven by increased replacement volumes in order to maintain the current switchgear health index*[13]. Yet the dashboard analysis shows that the health index can be maintained at a lower cost.

114 Orion's information shows that the condition of the switchgear fleet is predominantly in good condition.

[13] Geoff Brown & Associates, Verifier report A5.7 page A29 (CPP paginated page 100277)



Source: Orion

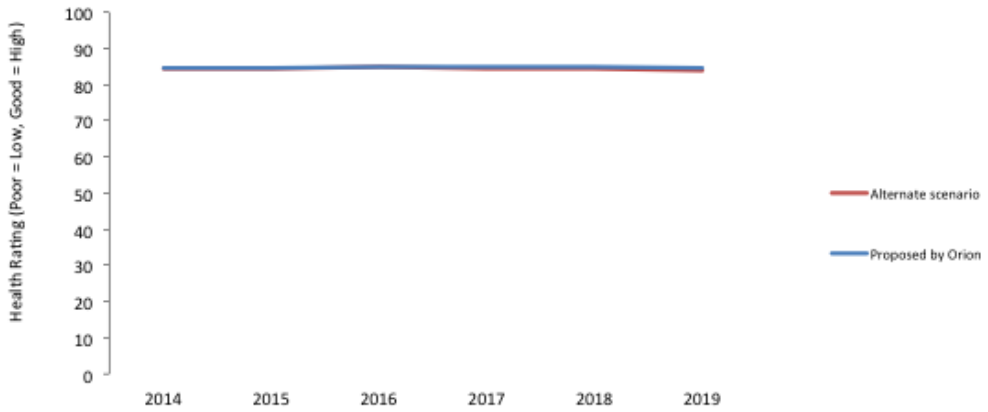
115 The changes Strata has made in the alternative scenario in the dashboard analysis results in a movement in Orion ranking and asset health rating within 2% of the rating scales. In Strata's view, this is a small change, which should not have any noticeable effect on the reliability of services to consumers.

4.4.2 Protection relays

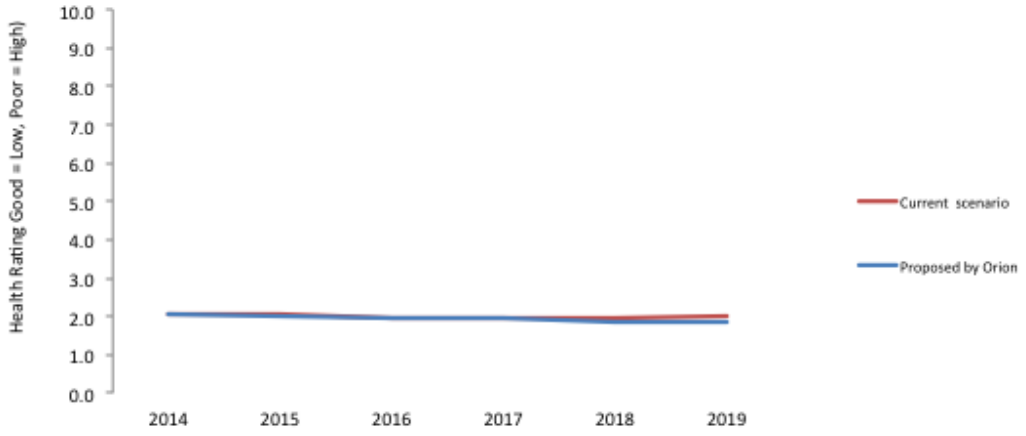
116 The same methodology used for switchgear has been applied to protection relays.

117 The alternative scenario requires all conditions (assets with > 60 Orion ranking, < 4 health rating and manufactured post 2003) to be met for that item to be excluded from the forecast.

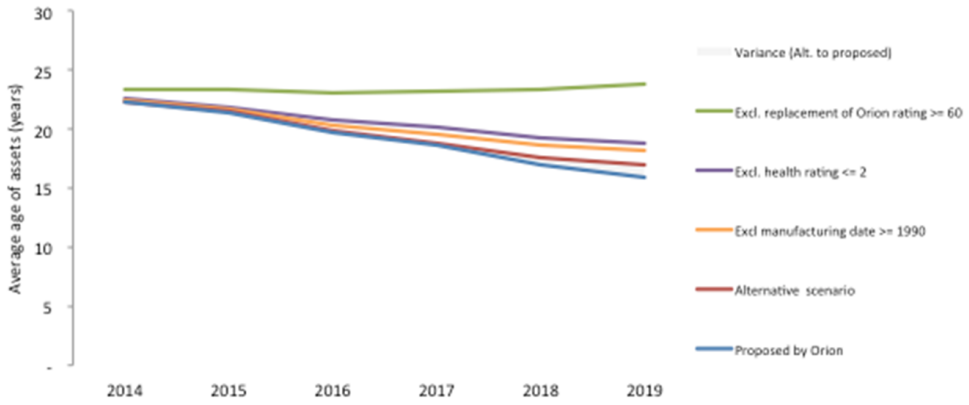
Orion Ranking		CPP Period				
	2014	2015	2016	2017	2018	2019
Proposed by Orion	84.59	84.64	84.84	84.67	84.82	84.61
Alternate scenario	84.58	84.59	84.77	84.49	84.32	83.65
Variance Alt. to Proposed	0.01	0.05	0.07	0.18	0.50	0.96



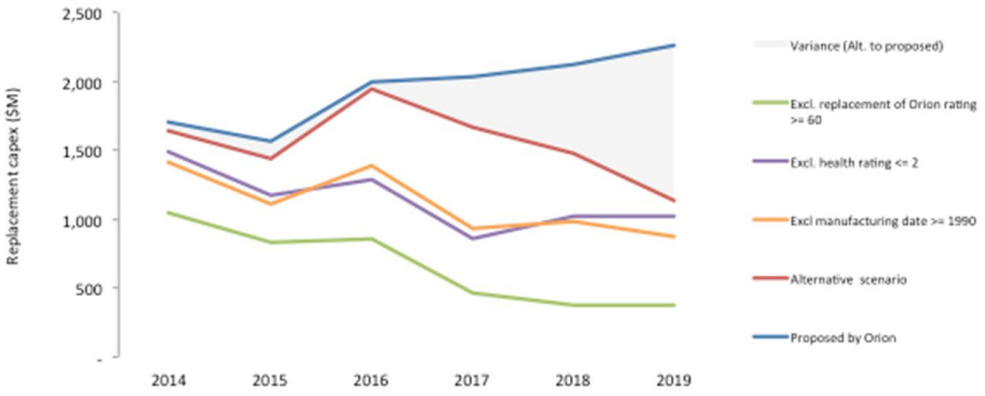
Health Rating		CPP Period				
	2014	2015	2016	2017	2018	2019
Proposed by Orion	2.07	2.03	1.97	1.95	1.87	1.84
Current scenario	2.07	2.04	1.98	1.98	1.95	1.99
Variance Alt. to Proposed	-0.00	-0.01	-0.01	-0.03	-0.08	-0.15



Average Age of Assets		CPP Period				
	2014	2015	2016	2017	2018	2019
Proposed by Orion	22.28	21.39	19.71	18.57	16.94	15.87
Excl. replacement of Orion rating >= 60	23.35	23.32	23.06	23.22	23.41	23.85
Excl. health rating <= 2	22.52	21.90	20.73	20.16	19.30	18.79
Excl manufacturing date >= 1990	22.36	21.64	20.29	19.60	18.62	18.11
Alternative scenario	22.30	21.46	19.81	18.80	17.53	16.93
Alternate Variance to Orion Proposed	+0.02	+0.08	+0.10	+0.23	+0.59	+1.06



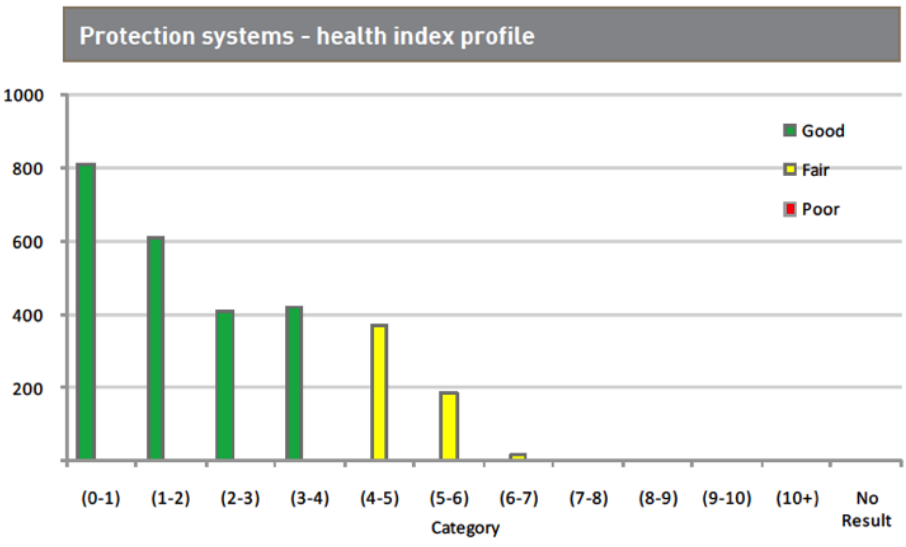
Replacement Capex ($000)		CPP Period						
	2014	2015	2016	2017	2018	2019	CPP Total	
Proposed by Orion	1,702	1,564	1,998	2,031	2,124	2,263	9,980	
Excl. replacement of Orion rating >= 60	1,050	827	858	467	375	376	2,903	
Excl. health rating <= 2	1,489	1,174	1,291	859	1,019	1,019	5,362	
Excl manufacturing date >= 1990	1,408	1,114	1,395	933	982	874	5,298	
Alternative scenario	1,648	1,435	1,942	1,672	1,472	1,134	7,655	77%
Variance Alt. to Proposed	54	129	56	359	652	1,129	2,325	23%



118 Testing across the range of scenarios has shown that Orion's proposal for protection relay replacement includes assets that are rated to be in good and fair condition (under both CBRM health rating and Orion's ranking). It has also shown that the CPP proposed expenditure will bring the average age of switchgear down from 22.28 to 15.87 years.

119 The alternative scenario reduces the average asset age close to that proposed by Orion's at 16.93 years whilst bringing down the required expenditure for the CPP by 23%. Movements in asset condition indicators under the alternative scenario are within 1% and, as for switchgear, should not materially affect reliability of supply risks.

120 Orion's asset health index for its protection relays shows that the majority of the assets are in good condition with none being in poor condition.



Source: Orion

121 Through the dashboard it was found that for relays increasing the Orion Rating to > or = 80 and the Health Rating to < or = 2 had no material effect on the resulting average asset age or capex. This result indicates that a proportion of the relay assets included in the CPP proposal have good health ratings and are currently less than 10 years old.

4.4.3 Conclusions from use of the Dashboard

122 Strata has concluded that the replacement capex forecast is larger than would be expected to be required given the:

(a) age and condition of the assets

(b) impact of the network development programme

(c) need to manage workload through the city rebuild period.

It is Strata's view that the replacement capex for switchgear and protection relays has the potential to be reduced through the deferral of some of the proposed replacements beyond the CPP period. This can be achieved whilst keeping asset condition indicators to a change of within 2% of the rating scale. It can also be achieved without increasing the average asset ages above the current level and, in the case of relays, maintaining Orion's proposed reduction of asset age.

123 Given the network development and city reconstruction related activities to be undertaken over the CPP period, Strata would expect that Orion would take every opportunity to manage its replacement programme to within that which is absolutely necessary. The Dashboard analysis indicates that Orion has the ability to manage within a lower expenditure forecast than that proposed yet still maintain reasonable levels of asset condition and average age.

124 It is acknowledged that some assets that are in good condition may be replaced due to their inclusion in larger (e.g. total substation) replacement packages. However, it is not expected that this should have a material impact on the condition and age based replacement approach adopted by Orion. In the information provided, and in the on-site workshop, Orion has not provided additional reasons and justifications why assets should be replaced other than for condition, risk and age reasons.

125 Based on our assessment of the asset data provided by Orion, Strata considers that the asset replacement expenditure actually spent is likely to be below that proposed by Orion for the CPP. Our analysis indicates that this is likely to be in the order of 20% for switchgear and 23% for relays.

4.5 Application of the results to total replacement capex

126 Orion has not extended its asset condition ratings to other asset classes and so are not treated in a similar way to switchgear and protection relays.

Therefore the Dashboard approach cannot be used to establish an estimate of the potential headroom for these asset classes. Strata has therefore considered whether it is reasonable to apply similar rates of reduction to other asset replacement asset categories.

127 Points that Strata has taken into consideration are:

(a) Switchgear and protection relays represent 49% of the total replacement capex budget, which is normally considered to be a large proportion for a sample;

(b) Information provided by Orion on transformers shows that this asset category includes assets which are predominantly in good condition with the remainder in fair condition;

(c) Transformers combined with switchgear and protection relays make up 57% of the proposed replacement capex;

(d) That asset condition should be the primary driver of the replacement programme and that the average asset age across asset categories is not significantly high; and

(e) The Verifier's conclusions that:

(i) the forecast transformer replacement programme is *higher than it needs to be*[14]:

(ii) for total asset replacement there is *little evidence to support the proposed level of increase being needed to mitigate a deterioration asset condition problem*[15];

(iii) whilst some increase in asset replacement expenditure is warranted, the proposed expenditure is not fully justified[16].

128 The information Strata has reviewed and the asset condition summaries indicates that there is scope to delay replacement capex expenditure without taking the assets into unacceptable risk of failure.

129 Our conclusion is that the replacement capex forecast could be reduced by 20% without impacting on reliability in the CPP period. Strata takes this view because the combination of the Orion ranking and the asset health rating provides a strong indication that these assets are in reasonable condition. Due to the condition of the existing assets, Strata does not

[14] Geoff Brown & Associates, Verifier report page A35 (CPP paginated page 100197)

[15] Geoff Brown & Associates, Verifier report page A36 (CPP paginated page 100198)

[16] ibid

consider that there should be a need to make a material change to opex to account for this adjustment to the replacement programme.

130 Taking the above into consideration, Strata has formed the view that it is reasonable to assume that similar levels of headroom in the total replacement capex budget will be available. Strata therefore recommends that a replacement capex budget of 80% of Orion's proposal better reflects what will be required to be spent to maintain current average asset ages and hold assets at the good/fair end of condition ratings..

131 This reduction in the replacement programme will also allow Orion to better manage the coming period of increased development activity. For example, the replacement of switchgear will increase the number of network switching operations, outage planning and risk management. This will be coincident with increased switching and outage management requirements for the network development programme.

4.6 Other considerations regarding replacement capex

4.6.1 Cost estimation and prudent decision application

132 Strata noted that the replacement capex forecast is made up from individual unit costs that take into account historical actual costs. In previous reviews of electricity network businesses, Strata has found that this method has a tendency to over-estimate costs that will actually be incurred.

133 Strata has observed in undertaking expenditure reviews that budgets and forecasts are generally developed well ahead of the time in which they will be implemented. Many projects will be scoped at a high or conceptual level with costs based on unit cost values for components of the projects. When the implementation of the projects is progressed beyond the concept estimate stage, project scopes and forecast costs will be refined and firmed. At this point, more detailed engineering analysis and prudent decision making will be applied, which generally leads to overall lower actual than forecast expenditure.

134 In establishing a view of expenditure that is likely to be incurred, it is necessary to apply some top down judgement across the portfolio of work on the level of adjustment that it is appropriate to make to a bottom up estimate. In other reviews, Strata has used historical differences between forecast and actual expenditure as an indication of potential estimating and prudency gains. For Orion, availability of such historical information is limited and the effect of the two post earthquake years makes use of historical performance difficult.

135 Even though limited information has been available on this, based on our experience from other reviews, Strata considers an adjustment of 5% to take into account gains from cost estimating accuracy improvements and

prudent decision-making should be applied to the proposed replacement capex expenditure.

4.6.2 Impact of the development capex forecast

136 During one of the workshops with Orion, it was identified that the forecast replacement capex includes a number of assets that will not require replacement because this requirement will be superseded by the network development programme implementation. Strata considers that this should have been taken into account when setting the expenditure forecast and Strata has discussed this with Orion.

137 Orion's response to the above suggestion was that, even if it had taken these assets out of the replacement programme, other replacements would have been brought forward to 'fit the budget'. Orion informed Strata that it considers that the proposed level of expenditure is required to enable contractors to maintain adequate resources and management practices over the longer term.

138 Given the proposed step change in replacement capex, the large network development programme and the broader Christchurch rebuild programme, it is unlikely that contractors will be placed in a position of maintaining insufficient work to sustain appropriate business practices. Therefore maintaining unnecessary contractor work volumes should not be a concern to Orion. Accordingly Strata considers that an adjustment to the proposed replacement capex should be made to take into account the impact of the development programme.

139 Orion could not provide an indication of the size of a potential reduction. Given the size of the development programme, particularly in regard to major projects, Strata's opinion is that a conservative assumption would be in the order of 5% of the replacement capex budget.

4.6.3 Deliverability

140 In its report, the Verifier commented that it is not clear that *an expenditure increase of this magnitude is deliverable* and that the actual expenditure for FY2013 would provide an indication of the deliverability of the proposed CPP capex[17]. Orion has now provided[18] the following FY 2013 outcome:

	CPP proposal ($m)	Actual Value ($m)	Difference ($m)	Difference %
Lines and Cables	5.1	3.5	1.6	31%
Switchgear	9.2	3.1	6.1	66%
Transformers	1.4	0.7	0.7	50%
Other	7	5.4	1.6	23%

[17] Geoff Brown & Associates, Verifier report page A37(CPP paginated page 100199)

[18] Orion response to Commerce Commission question #022

141 The difference between planned and actual expenditure for FY 2013 is significant. Of particular importance is the variation for switchgear and transformers that form a major proportion of the replacement programme expenditure for the CPP proposal.

142 Strata considers that the variations for FY 2013 support a conclusion that, in practice, the proposed replacement capex expenditure for the CPP is optimistic and is unlikely to be achieved in practice. Strata considers that during the CPP Orion will find opportunities to delay replacement of assets in fair to good condition, apply prudent decision making that reduces costs, reduce the number of assets to be replaced due to the development programme and realise cost reductions due to more accurate cost estimating.

4.7 Recommendations on replacement capex

143 A replacement capex forecast that is 70% of Orion's proposal would better reflect what Orion would be expected to spend over the CPP period. The reduction of the proposed expenditure reflects:

(a) the ability to delay a proportion of the proposed replacements where assets are in good condition, whilst maintaining the current average asset age;

(b) the ability to make improved prudent decisions on asset management as a result of the acquisition of improved asset condition assessment practices as the CBRM is rolled out;

(c) cost estimation accuracies that will be realised as the replacement programme is implemented;

(d) the impact of the network development projects on the replacement capex programme; and

(e) the need to manage workloads across the overall expenditure programme.

144 Accordingly, Strata recommends the following adjustments:

(i) a reduction of 20% of the proposed expenditure to account for asset condition ratings and average asset age;

(ii) a further reduction of 10% to account for cost estimation accuracy and prudent decision making that would lead to the deferral of some replacements. For example, the impact of the development capex projects on the replacement capex programme.

5 Opex programmes of work

5.1 Opex overview

145 The CPP includes $210.5m ($2013) for network, management and operations opex. The components of the opex forecast in the CPP are shown in Figure 6. Scheduled Maintenance, Network Management and Operations and General Management and Overheads make up the bulk of opex. However, emergency maintenance shows significant increases above pre earthquake levels.

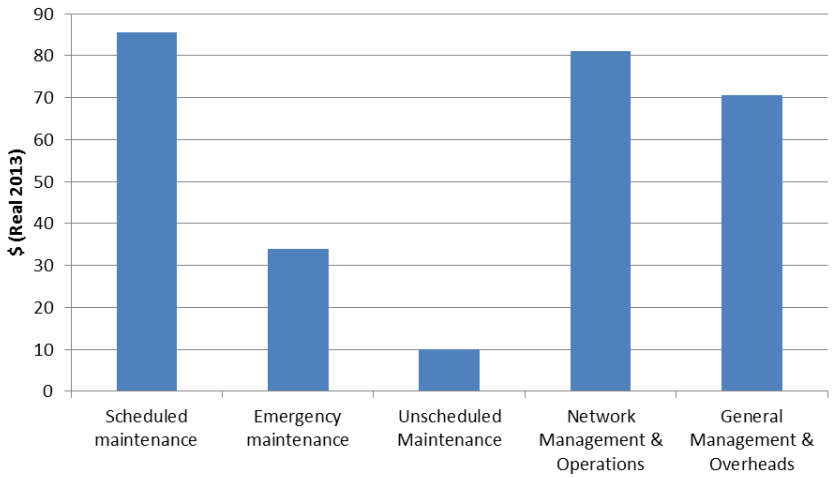


Figure 6: Proposed CPP Opex by category

Source: Commerce Commission

146 Figure 7 shows the percentage changes in opex between the base year and the CPP. Emergency maintenance and Network Management Operations are the most significant contributors to the increase in opex.

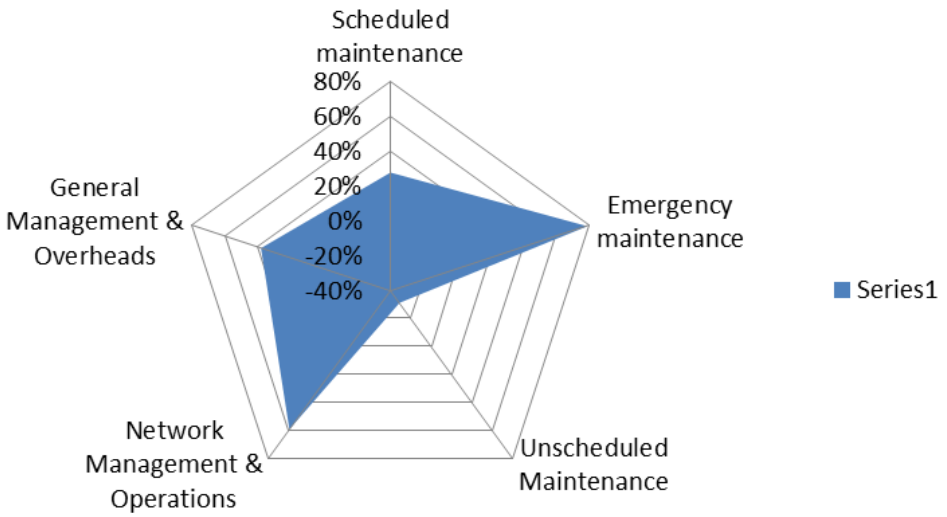


Figure 7: Step changes in Opex (CPP vs Base Year)

147 The step change since the 2011 earthquake can also be seen in Figure 8. It is noticeable that Orion is forecasting that the impact of the earthquakes on opex will be continuous throughout the CPP period.

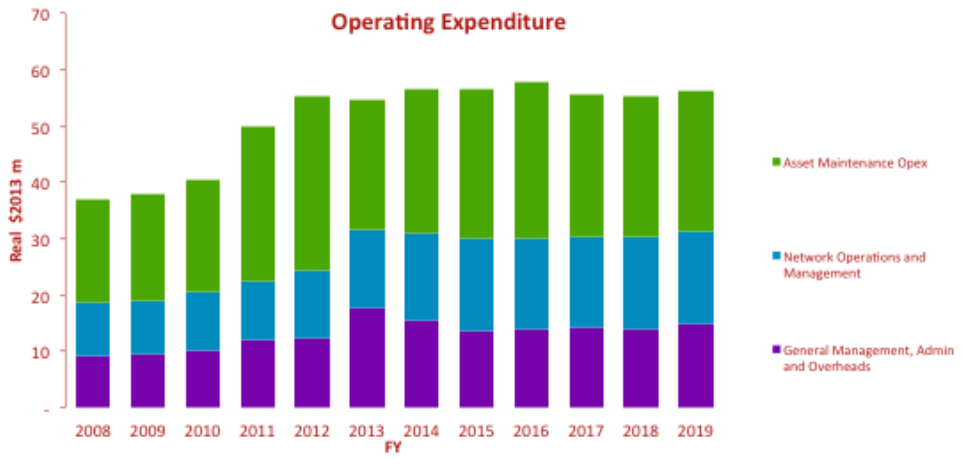


Figure 8: Operating expenditure profile

Source: Commerce Commission

148 The Commission has asked Strata to focus its review on the asset related opex categories of Emergency Maintenance and Network Operations Management.

5.1.1 Asset related opex

149 Step changes in Orion's proposed opex above the pre earthquake levels are attributable to the ongoing effects of earthquake damage on the network. In scheduled maintenance (Figure 9) the increase in operations is largely due to the effects of the Christchurch rebuild which will bring

significantly more activity in terms of network connections and switching requirements due to the level of development and replacement capex.

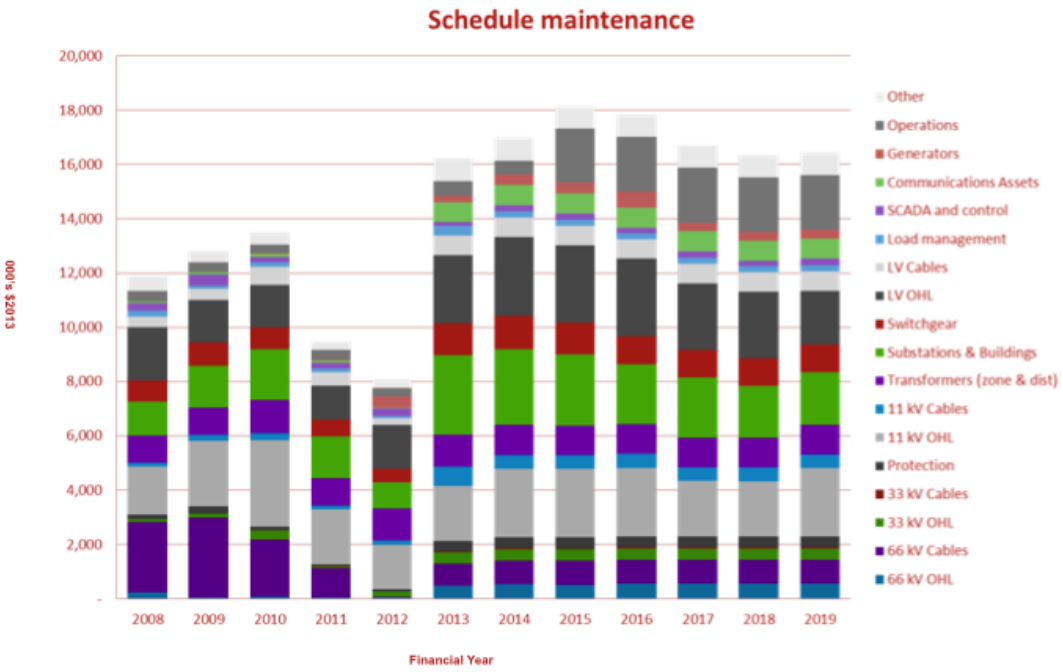


Figure 9: Scheduled maintenance

Source: Commerce Commission

150 The major contributors to the step change in emergency management arise from expected defects that may occur in 11kV and low voltage cables due to the earthquakes. It is important to note that Orion is expecting the higher levels of defects on cables to continue through the CPP period. Included in FY16 is a provision of $1.1m (real $2013) for the relocation of critical stores managed by Connetics. This provision has been allocated across all emergency maintenance categories in 2016.

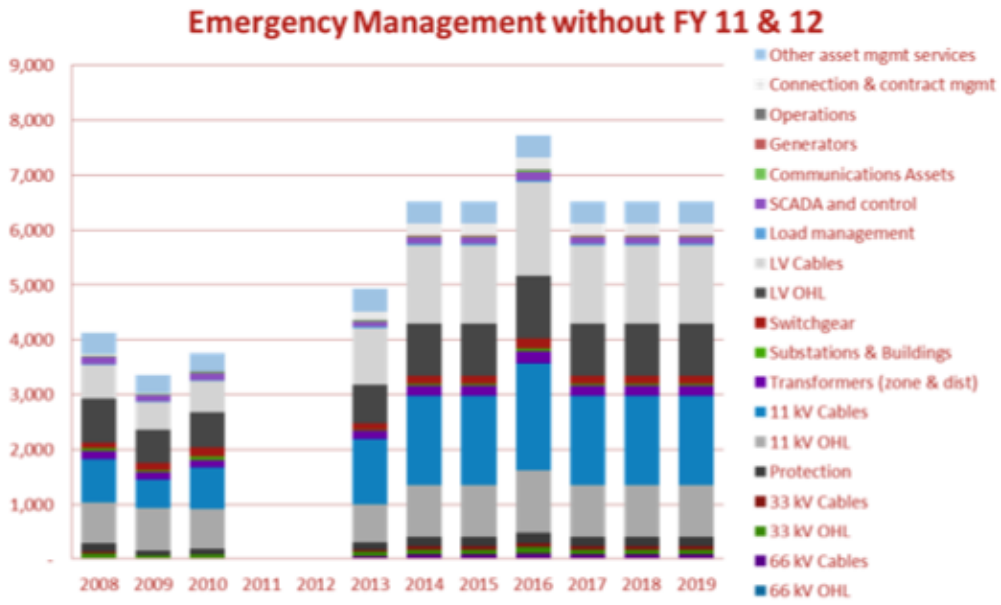


Figure 10: Emergency Maintenance excluding FY11 and FY12[19]

Source: Commerce Commission

151 Orion has also included an increase in opex to take account of the proposed acquisition of the sub-transmission spur assets from Transpower.

152 Other main drivers of increases include the addition of a contingency factor of $7.5M for the CPP period.

5.1.2 Overheads

153 The Commission has asked Strata to consider the reasonableness of the proposed increase in staffing levels in the Infrastructure Management division. Orion has forecast the following changes to staffing levels.

[19] FY11 and FY12 earthquake impacted years are omitted because Strata is presenting the difference between pre and post earthquake expenditure.

Infrastructure Management FTE's	2010	2012	2019	2025
Safety and risk	2	3	4	3
Strategic Planning	6	3	5	4
Asset Management	29	37	39	33
Engineering Support	9	8	10	8
Lifecycle Management	14	24	28	24
Operations	40	50	59	55
Total FTE's	100	125	145	127

Source: Orion Infrastructure (or network management and operations) staff projections (excluding technical engineers) 20th May 2012

154 The proposed staffing changes for 2019 (e.g. the CPP period) are significant when compared to the pre earthquake levels.

Safety and Risk	100%
Strategic Planning	-17%
Asset Management	34%
Engineering Support	11%
Lifecycle Management	100%
Operations	48%

155 In discussions, Orion sets out that it established its staffing forecasts on a bottom up basis. Each department has assessed its future staffing needs on the basis of:

(a) reducing workload on individuals;

(b) reducing outstanding accrual levels;

(c) reducing overtime;

(d) managing expected increases in workload due to the increase in capex and opex related activities; and

(e) managing increasing workload and customer interaction due to expected increases in numbers of connection applications and other volume related work.

5.2 Findings on opex

5.2.1 Asset related opex

156 In section 4.6 of its report, the Verifier sets out how Orion has prepared forecasts for each of the opex categories. We have noted the Verifier's comments and observations on the policies and planning standards that Orion has in place. We share the Verifier's and EA Technology's view that any shortcomings in procedural documentation are compensated for by strong internal communications and talented staff.

157 The Verifier has highlighted the following key issues in relation to the opex forecast:

(a) the incidence of failure rates for underground cables are forecast to be constant across the CPP period;

(b) that Orion has not applied any specific opex reduction initiatives other than efficiency gains from its competitive tendering process; and

(c) the inclusion of a contingency provision of $7.5m, which the Verifier concludes is unnecessary.

158 Our on-site workshop and review of the Verifier's work has led us to conclude that the opex forecast is generally reasonable, taking into account the uncertainties of the post-earthquake environment. However, in line with the Verifier's findings, we have specific concerns regarding:

(a) the basis and reliability of assumptions for the number of increased costs relating to the number of forecast defects;

(b) the potential for opex reduction initiatives; and

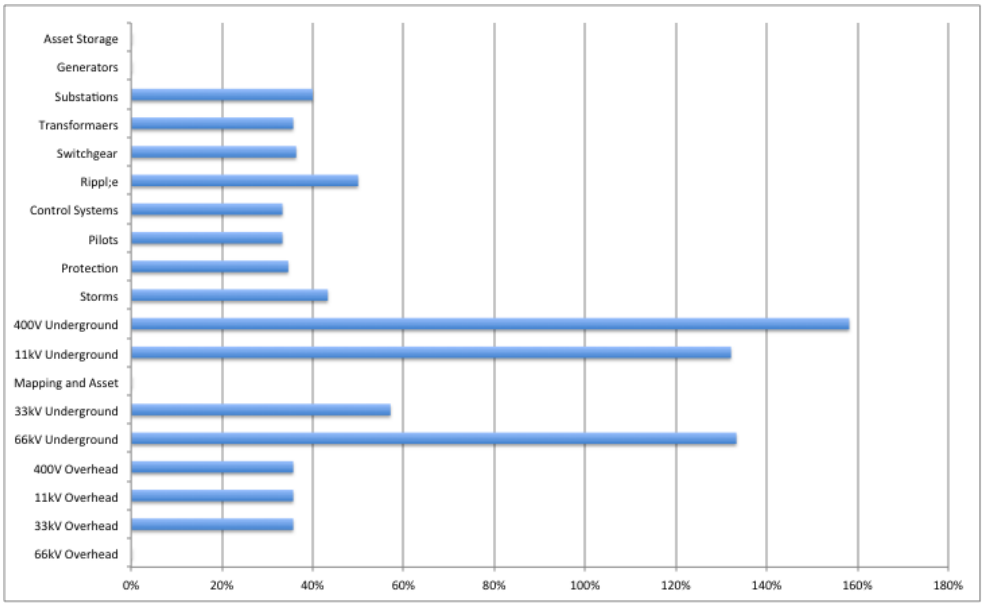
(c) the contingency factor.

159 Orion provided its emergency works data for 2010 (actual) and 2014 (forecast)[20]. Orion has extrapolated the emergency maintenance for each of the subsequent years of the CPP[21]. The data includes fixed and variable components that Strata understands is used for establishing contracts with external contractors. The total annual emergency maintenance costs for each year of the CPP have increased by 76% above 2010.

160 Orion informed the Verifier that it had assumed a failure rate for underground cables 30% higher than pre earthquake levels[22]. However, cost increases for emergency maintenance for underground cables are significantly higher than 30% with increases of 133% for 66 kV, 57% for 33kV, 132% for 11 kV and 158% for 400kV. These three asset types drive a major proportion of the step change in the emergency maintenance opex forecast.

161 Orion's forecast increase between 2010 and 2014 for variable emergency works incidents can be seen for a range of asset categories in Figure 11.

Figure 11: Variable Emergency Works opex percentage difference between 2012 actual and 2014 forecast



Source: Orion Emergency Works Breakdown

162 Establishing a reasonable forecast for incidence of future faults is difficult as pre-earthquake data is likely to be inappropriate. This is particularly the

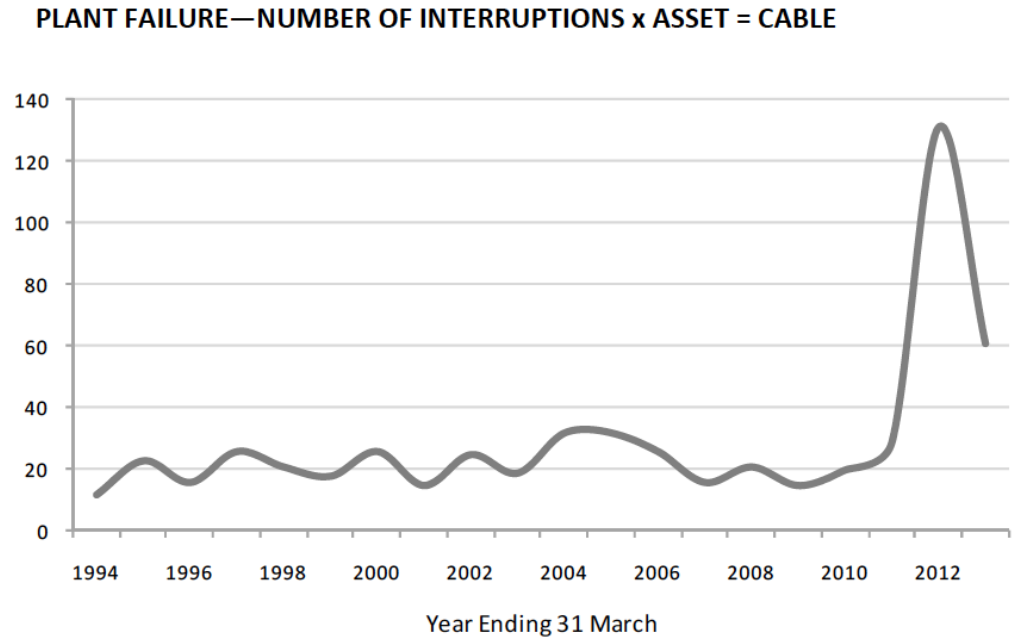
[20] \\VERDI\groupsg$\Asset Management\A Management\Operational Read Write Areas\Lifecycle Management\CPP\Com Com Emergency Works

[21] For 2016 the $1.2m provision for the relocation of the critical stores facility has been added to the extrapolation.

[22] Geoff Brown Associates Verifier Report section 6.4.1.2 Paginated reference 100204

case for underground assets for which condition information is difficult to obtain. Orion informed us that its expectation was that faults would continue to occur as damaged cables further deteriorate over time. No empirical evidence was provided to support this assumption but in Strata's opinion, this seems to be reasonable.

163 Orion's 2013 Asset Performance report shows that whilst cable faults that led to supply interruptions increased dramatically during the earthquakes, they appear to have significantly reduced since the earthquakes subsided.



Source: Orion Asset Performance 2013

164 Orion informed the May 2013 Workshop that a key assumption for its forecast increase in emergency maintenance is the expectation that faults, particularly on underground cables, will continue at a high rate throughout the CPP period. Orion considered that cable faults that were as yet undetected would emerge over time and particularly during periods of high moisture content in soils.

165 Interestingly, in its Seasonal Weather Summary[23]NIWA record that for 2012:

> *It was an extremely wet winter for the north and east of the South Island, being the wettest winter on record for Timaru. Above normal soil moisture levels were observed on the Kaikoura Coast and in south Canterbury.*

[23] https://www.niwa.co.nz/climate/summaries/seasonal

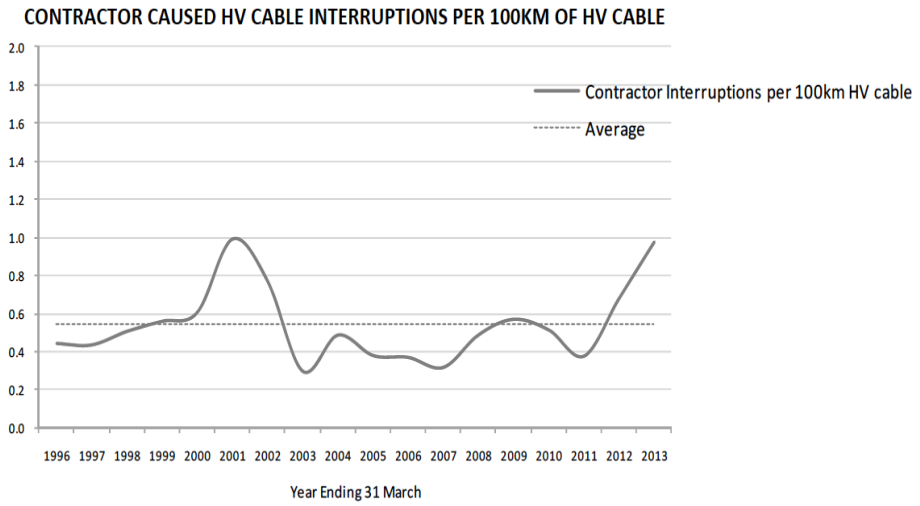
166 In its Seasonal Winter Summary for 2012 NIWA records 297mm of rainfall for Christchurch, which was 161% above normal. In its Winter 2012 report, NIWA records that on 23 August, there was surface flooding in large parts of Christchurch.

167 In Strata's view, whilst we accept that the total extent of the damage to cables may take some time to emerge, the wet conditions are likely to have tested and exposed the more severely damaged high voltage cables. Orion's claim that dry conditions have not tested the cables appears not to be supported by the NIWA data.

168 Whilst it is logical that incidence of cable faults may remain higher than pre earthquake levels for some time, the basis of Orion's assumptions for the 133%, 132% and 156% increases in costs for the total emergency maintenance for cables are not supported in the documentation provided in the CPP application.

169 From discussions during workshops with Orion, Strata understood that the increase in cable faults included an expected increase in incidents relating to contractor caused damage to underground cables. We considered that this was understandable given the activity related to the Christchurch rebuild and given the actual increase in these incidents (see Figure 12).

Figure 12: Third party Interruptions – contractor damage to cables



Source: Orion Asset Performance 2013

170 Strata considers that applying an increased management focus on preventing construction damage will deliver reduced risk from reconstruction related incidents. We also note that construction damage costs due to contractor negligence would be expected to be recovered from the contractor or their insurers rather than consumers. Subsequent to further clarification questions, Orion has confirmed that the CPP expenditure forecast for emergency maintenance is net of contractor caused damage.

171 Accordingly, the increase in emergency maintenance is due to forecast earthquake related damage and increases in contractor costs.

172 Whilst we acknowledge the difficulty in forecasting future failures, particularly for buried cables, we remain unconvinced of the robustness of Orion's defect assumptions. The more recent fault performance data suggests that the outlook could become more optimistic.

173 Strata notes that the Verifier agreed with the premise that *a 30% increase in fault rates does not justify a 90% increase in repair costs*[24]. However the Verifier concluded that *there was sufficient hard evidence available to indicate that the 30% assumption could be flawed and that actual fault rates over the forecast period may be much higher.* The Verifier concluded that it had no basis for finding Orion's CPP forecast to be unreasonable.

174 Whilst we agree with the Verifier regarding the level of uncertainty regarding future fault rates on the cables, we consider that the level of proposed expenditure has not been fully explained. In Orion's response to the Verifier[25] it provides some updated information of 11kV cable faults for 2013 indicating that these represent a 290% increase from 2010 levels. This is consistent with the information provided in the 2013 Asset Performance report discussed earlier.

175 In particular, we have been unable to reconcile the forecast defect rates with the increases in expenditure. The reason for this is that we have seen no information or analysis to support the fault rates on which the expenditure figures have been derived. Given that some time has now passed since the CPP was developed, we would expect that analysis of the types of faults being encountered and cable condition inspections would enable a more informed estimate to be produced.

176 On the basis of the information provided by Orion, Strata considers that, for the purposes of the draft decision, a maximum allowance of 200% of the 2010 emergency maintenance costs for underground cables is appropriate. This would lead to the following adjustments:

	2014 FORECAST	INCREASE ABOVE 2010	MAX ALLOWANCE ABOVE 2010	ANNUAL ADJUSTMENT	RESULTING ANNUAL EMERGENCY MAINTENANCE
66KV U/G	$70	133%	100%	$23	$47
33KV U/G	$55	57%	100%	$0	$55
11KV U/G	$1,625	132%	100%	$520	$1,105
400V U/G	$1,420	158%	100%	$824	$596
TOTAL	$3,170			$1,367	$1,803

[24] Email; GBA to B. Wilson (Commerce Commission) 9th July 2013

[25] ibid

177 The above $1.803m annual adjustment would reduce forecast emergency maintenance by $9m over the CPP period. This is a reduction of 21% of forecast emergency maintenance opex excluding the $1.2m provided for the critical stores relocation.

178 Excluding underground cables, there is an increase in emergency maintenance of 36% ($780,000 p.a) above 2013 levels of expenditure (excluding the relocation of the critical spares store).

5.2.2 Opex cost reduction initiatives

179 Orion informed the Verifier that it did not apply any specific opex reduction initiatives other than efficiencies culminating from its competitive tendering process.[26] Given that the significant increases in contractor costs that Orion identified were driven by the need to retain staff against competing work options, we would have expected to see evidence of a concerted effort to manage this situation more vigorously. Of particular concern is the increase that may be acquired by Orion's own subsidiary, Connetics.

180 The agreed increases in contractor costs appear to be based on the rationale that pressures on labour during the reconstruction will lead to increased costs of local labour. Strata has not been asked by the Commission to undertake a review of the legitimacy of Orion's assumptions on labour costs but considers that such a review should also include a review of the drivers of recent increases in agreements with contractors.

181 It is difficult to accept that the only specific opex reduction considered was to take into account competitive tendering. Orion is an innovative company with highly talented and skilled staff; it is inconceivable that this organisation will not find innovative ways to place downward pressure on expenditure.

182 Continuous improvement theory applies the principle that improvements can only be realised if they are measured. The absence of any measurable opex reduction efficiency initiatives indicates that there is likely to be potential to identify and realise gains. Quantification of the expected benefits arising from investment in improvements made in one period must be taken into account when forecasting expenditure for the next period. It is not sufficient to state that these benefits are implicit in the forecasts.

183 Strata accepts that it is reasonable to assume that Orion's focus on implementation of opex efficiencies would have slowed during its response to the earthquakes. However, in the reconstruction environment, it will be important to ensure that all available efficiencies are realised so that costs can be contained.

[26] Geoff Brown Associates Verifier Report paragraph 6.4.1.2 Paginated 100205

184 Given the continuing investment that Orion has made in improved asset management data, information and management, we consider that it is important that potential for gains from opex reduction initiatives already implemented are taken into account when establishing the expenditure forecast. As a minimum, Strata would have expected to see Orion targeting and delivering efficiency and prudency gains of at least 5% on its opex programmes.

5.2.3 Contingency factor

185 The scheduled maintenance contingency is the one included in the forecast opex.

186 Strata agrees with the Verifier that the $7.5m contingency factor has not been adequately substantiated. The increase in opex, combined with Orion's ability to manage scheduled maintenance within explicit budget allowances, make it difficult to accept the need for a contingency.

187 We consider that the proposed contingency component should be rejected because:

(a) it has not been adequately justified; and

(b) any variations in the costs components of scheduled maintenance can be managed within the dynamics of the overall budget.

5.3 Increases in personnel

188 Strata has two major concerns with the methodology used by Orion to develop its staffing level forecasts:

(a) no organisation wide optimisation or calibration has taken place; and

(b) it is likely that there is potential to reduce workload and improve process efficiency.

189 Orion is proposing step changes in development capex, replacement capex and opex. The level of these changes would present a significant challenge to any organisation. Compounding these challenges is the fact identified in discussion with Orion that its staff have gone through a major disruptive experience that has left a legacy of stress and tiredness.

190 Orion's response to this challenge has been to require each business division to review its staffing levels against future workloads, taking into account current staff issues. Whilst a legitimate starting point, this approach, on its own, will inevitably lead to a suboptimal result and an excessively high forecast.

191 An example of the lack of optimisation is the increases in FTE that several managers had built into their forecasts on the basis of increased workload due to the acquisition of the Transpower spur assets. The simple

aggregation of each manager's estimate is likely to result in an inflated overall figure. We found no indication that an optimisation had taken place. We asked the specific question of Orion's management which confirmed that no organisation wide optimisation review had occurred. Therefore Orion could not have ascertained if the total increase in FTEs attributable to spur asset acquisitions was reasonable.

192 Whilst consideration of increasing staff to meet expected increases in workload is a legitimate response, it is not the only response that management should take into account. Strata considers that Orion should also explore options to:

(a) reduce activities that can be reasonably delayed; and

(b) introduce process improvements that will reduce workload on staff.

193 Strata considers that its proposed adjustments to network development capex, asset replacement capex and opex will reduce the workload on staff, allowing the proposed FTE increases to be reduced.

194 Orion has also introduced online connection application facilities that will streamline the process for applicants and reduce workload on staff. This is an excellent example of types of efficiency gains that can be made. Other processes that are expected to see step changes in use should also be reviewed to identify similar opportunities to make improvements and efficiency gains before FTE changes are proposed.

195 Whilst it is difficult to estimate the impact that process improvements can make on staffing levels, it became clear during the onsite sessions with Orion that insufficient consideration had been given to this when setting the staffing requirements.

196 Staffing at March 2012 was 25% above that in 2010. This is understandable given the massive response required due to the earthquake. Increasing FTE's by a further 20 staff to 45% above the 2010 level requires significant justification. In Strata's view, based on discussions with and presentations given by individual managers, there is room for significant optimisation and challenge to the proposal.

197 In particular, Strata considers that an increase in personnel numbers in asset management, lifecycle management and operations should be reviewed.

198 In Strata's view, Orion has provided insufficient justification for the proposed increase in staffing levels from 2012 and such an increase should be limited to 50% of that proposed by Orion (a decrease of 10 FTE's). This reduction would still leave staffing levels at 35% above that in 2010, which we consider is a reasonable allowance for the level of work proposed over the CPP period.

5.4 Recommendations on opex

199 The above adjustments in opex will result in the following downwards adjustments:

(a) the removal of the unsupported contingency sum of $7.5m;

(b) a further $9m reduction in emergency maintenance opex to take into account a reasonable expectation of future cable fault rates;

(c) a further reduction of 5% to scheduled maintenance and unscheduled maintenance to reflect the expected gains from improved asset knowledge and management, and prudent decision making;

(d) A further saving of $5.1m over the CPP period from staffing levels being reduced by 10 FTE's as a result of limiting proposed staff increase by 50% from 2012.

200 Our estimate is that the above adjustments will result in an overall downwards adjustment in the order of 12.5% ($26.4m) to opex.

	$ million
Total Network, Management and Operations Opex	$210.5
Less contingency	$7.5
Less emergency maintenance adjustment	$9.0
Less 5% efficiency and prudency adjustment to scheduled and non scheduled maintenance	$4.8
Less savings in proposed FTE	$5.1
Total adjustments	$26.4
Resulting opex	$184.1
% adjustment	12.5%

6 Concluding comments

201 Strata's conclusions are based on a top down assessment methodology that tests the sensitivity of assumptions and, through this, identifies areas where gains are likely to be realised in practice. The top down assessment was supplemented with more granular bottom up analysis where the drivers of expenditure were unable to be clearly identified and/or understood.

202 The accuracy of any forecast is reliant on key assumptions. Given the uncertainty of the Christchurch reconstruction and the continuing impact of the earthquakes in terms of equipment failure rates, any forecast will be sensitive to changes in these assumptions.

203 Orion's forecast in the CPP sets out that, within a five year period, it intends to:

(a) increase subtransmission resilience to high impact, low probability events through major strategic 66kV subtransmission development;

(b) upgrade a significant proportion of the 33kV subtransmission to 66kV;

(c) integrate transmission spur assets into Orion's network management;

(d) implement an accelerated asset management work programme that will reduce the average asset age for major asset types through a step change in asset replacement activity;

(e) undertake a near 100%[27] increase above pre-earthquake levels in emergency maintenance fault repairs ;

(f) increase infrastructure management staffing to 145% of pre-earthquake level to manage expected increases in workload due to Christchurch reconstruction.

204 The CPP as proposed provides for significant increases in network development, asset replacement capex and opex. At the same time, Orion intends to acquire additional subtransmission assets from Transpower. This would represent an extremely ambitious programme during normal times.

[27] Total fixed and variable components - \\VERDI\groupsg$\Asset Management\A Management\Operational Read Write Areas\Lifecycle Management\CPP\Com Com Emergency Works

205 The unique situation in Christchurch will require the application of restraint to ensure that activity is limited to what is needed and what can be achieved. Strata's opinion is that further restraint can be applied to the capex and opex proposals and that the application of this restraint will assist in the efficient delivery of the overall programme.

206 Strata considers that this programme, as proposed by Orion, is unlikely to be delivered in its entirety because;

(a) key assumptions on which the expenditure forecasts are based will change over time;

(b) priorities will change as information and knowledge of the state of the network and external factors improves;

(c) the benefits of Orion's investment in CBRM and other improvements will enable gains to be realised;

(d) constraints in available resources are likely to occur;

(e) there are other uncertainties due to the Christchurch reconstruction.

207 Given the extent of the activity proposed, Strata considers that Orion should review the proposal to identify and implement opportunities to prioritise and, if possible, delay expenditure. So long as this can be achieved safely whilst maintaining reasonable levels of performance and capability.

208 Taking these factors into account, Strata considers that it is unlikely that the capex and opex as proposed for the CPP will be actually incurred.

209 Analysis undertaken by the Commerce Commission and Strata indicates that adjustments to the proposed expenditure for the CPP will be required to produce a reasonable forecast that reflects what will actually need to be, and reasonably can be, spent. In Strata's opinion the CPP proposal does not fully meet the Expenditure Objective to be efficient costs that a prudent regulated EDB would require to:

(a) meet or manage expected demand at appropriate service standards; and

(b) comply with applicable regulatory obligations.