



Dunedin City Holdings Limited

Review of Aurora Energy Limited / Delta Utility Services Limited – Network Safety Concerns

December 2016

PRIVATE & CONFIDENTIAL

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1. Executive Summary

1.1. Background

In the month of October 2016, a former employee of Delta Utility Services Limited ("Delta"), Richard Healey, went to the media to raise a number of issues in relation to the state of the network and his concerns for the health and safety of Delta's employees and the public. As a result of this, DCHL has requested Deloitte to review certain aspects of Aurora Energy Limited's ("Aurora") and Delta's respective businesses.

The focus of this engagement is on Aurora and Delta, insofar as it relates to the specific matters set out in Section 2.2. The primary focus is on asset, people and process matters as they relate to the network asset owned by Aurora. However, aspects of Delta's operations are included as the service provider to Aurora. Accordingly this engagement is not intended to be a comprehensive review of the overall performance of either company.

1.2. Scope

In summary our scope was to:

- Understand the Aurora electricity network safety concerns with regards to the awareness and flow of information from a board and management perspective.
- Understand whether the company has a Whistle-Blower policy and/or what other systems/processes are in place to capture staff concerns.
- Understand the emergency/contingency planning that is in place should a health and safety issue arise (including if an issue arose with regards to a pole).
- Understand if there are any other health and safety issues that management are aware of that are considered high risk and have the potential for reputational damage and/or physical harm.
- Understand if there are any concerns that have come to light as a result of the increased focus on the asset management plan ("AMP").

In relation to the above scope we have also reported on those matters that we believe have been contributing factors to the issues that have been raised.

1.3. Richard Healey – Issues Raised

The scope of this engagement was developed in response to the issues that have been raised by Mr Healey in the media. Mr Healey has raised a number of issues in relation to the state of the network and his concerns for the health and safety of Delta's employees and the public. In addition, Mr Healey has also raised a number of issues relating to systems and processes and the environment under which Aurora has operated that have led to the current state of the network.

1.4. Historic Performance

We make the following comments in relation to the historic performance of Aurora:

- Net profit for the year (before subvention payments) has been relatively constant for the last five years, ranging from \$11.7m in 2016 to \$13.9m in 2013.
- Equity to total assets has ranged from a high of 52.3% in 2007 to 42.1% in 2016. This has largely been driven by capital expenditure being substantially debt funded during this period of time.
- Dividends paid to shareholders (in the form of either dividends or subvention payments) have ranged from a high of \$15.1m in 2008 to \$8.25m in 2016.
- Capital expenditure has remained relatively constant from 2007 through to 2014 (ranging from a low of \$15.5m in 2008 to a high of \$23.2m in 2010). There was an increase in 2015 to \$35.4m and a further increase in 2016 to \$37.2m. Some of this growth has been driven by expansion to the network through customer growth (largely Central Otago) and expenditure on systems and asset replacement/renewal. In addition, network maintenance expenditure has increased in the past five years.

We acknowledge that the current Board has overseen this increase in capital expenditure. However it should be noted that the expenditure on replacement and renewal has dropped from \$12.3m (2014) to \$7.3m (2016). Almost one third of the total capital expenditure in 2016 related to system growth.

1.5. Key Findings

1.5.1. The Network

The Aurora network is an aged network (we do note there are two networks in operation being the Dunedin network and the Central Otago network – we refer to these collectively as the Aurora network throughout this document). The estimated useful lives of the respective components that make up the network are known from both an industry and company perspective. This should therefore lend itself to planning for future maintenance and replacement strategies.

There has been an under investment in asset inspections/condition monitoring, planned maintenance and asset replacement over the last 25 – 30 years. This can be evidenced by a number of factors, the primary indicator being the high volume of assets that have been self-assessed as requiring replacement.

1.5.2. Board/Management Awareness

One of the key aspects of this review was to understand whether the board and management have been aware of the state of the network and the issues that Mr Healey has raised. We are comfortable the board and management were aware of the issues raised, prior to the recent statements made to the media. This can be evidenced in a number of ways, including:

- The AMP contains a number of statements that clearly communicate the state of the network. The AMP also highlights a large number of assets for recommended replacement. The board is heavily involved in the process of developing and finalising the AMP.
- LineTech Consulting Limited were engaged by Delta in 2010 and provided a report clearly highlighting issues with regards to vegetation management and poles. Aurora has made

significant progress in relation to vegetation management. However, the poles issue has not been addressed to the same extent.

- The board have referenced the Aged Network and the under investment in the network in numerous board reports and presentations to DCHL.
- A number of people within the business that have raised their concerns with regards to the state of the network to management over a long period of time.

1.5.3. Business Planning / AMP

We believe Aurora's business planning / AMP has been influenced by two factors:

- Equity Ratio - the board's self-imposed requirement to maintain an equity ratio of between 50% - 42%.
- Shareholder Returns - the requirement to provide a short term return to the shareholder. DCHL has requested annual dividends from Aurora.

These two factors have been prevalent in the documentation we have reviewed and appear to have a strong influence with regards the way the board and management approach planning. What this does is drive a planning process that already has a regulated income stream, a planned dividend, a targeted net profit after tax required to support the planned dividend, a targeted debt level and by default a targeted level of capital expenditure that is available. The board, and management, then effectively work through a prioritisation process to work out how best to invest the capital expenditure that is available.

We acknowledge that the Aurora Directors agreed to the annual dividends only after recording that in approving the higher dividends it had acted in the best interest of the company's ultimate shareholder and debt funder.

The board, and management, have not approached the business planning process from the perspective of the infrastructural asset first (i.e. what expenditure is required to ensure the network has the appropriate risk profile balanced with the long term returns over the life of the network). We believe for an infrastructural asset such as an electricity network a longer term view is required (30 to 50 years wouldn't be unreasonable given the life of the network) in order to understand the long term investment profile and the long term returns. A longer term view would allow the board and management to make decisions that are in the best interests of the company over the long term. It would also facilitate understanding of likely peaks and troughs in relation to capital expenditure and conversely potential returns for shareholders. This is particularly relevant for Aurora given the aged network and the requirement to renew certain parts of the network in the short-medium term that will likely generate returns in the medium-longer term.

1.5.4. The Board

The board has communicated their concerns to DCHL over a number of years, in respect of the aged network, the need to invest in a renewal programme and the implications this is likely to have on short term shareholder returns. However, we do not believe this was done in a robust enough manner with a clear focus on the level of investment required to replace those assets that have been assessed as requiring replacement in the AMP. We would have expected more thorough analysis and discussion around such a scenario. In the event the board believed an AMP with a capital expenditure escalation was required in order to obtain the appropriate risk profile for the network, consideration of the impact on the equity ratio and the short term returns to shareholders should have been secondary matters.

1.5.5. Aurora/Delta Legal Structure / Separation

We believe the current structure, with both the asset owner and the contractor being led by the same CEO, and governed by the same Directors (albeit that separate boards exist), is fraught with challenges insofar as optimising the performance of the respective parts of the business. Under the current structure, there is a lack of the necessary tension that you would otherwise have between an asset owner (customer) and the service provider (supplier). We believe the current structure has the following flaws:

- A lack of clear focus on a single purpose. The two businesses, an asset owner, and a service provider, are very different businesses. The skillsets required to govern and manage these businesses are very different and the competing requirements of the business complicate the achievement of the respective company's goals.
- There is a natural conflict between the two businesses. One of the asset owner's primary objectives is to procure service provision at lowest cost whilst maintaining appropriate quality standards and timeliness. One of the service provider's primary objectives is to maximise profit in relation to undertaking work for the asset owner. It is difficult to understand how these two objectives can be effectively managed under the same governance and management structure.
- Clear separation of the two businesses would better define the customer/supplier relationship. This would result in an improvement in the documentation required to let work, deliver work, adherence to delivery standards and reporting on performance.

We acknowledge that Aurora has been working for some time on a restructuring programme that has similar outcomes to those highlighted above.

1.5.6. Asset Management Plan / Asset Management Planning

Aurora is required to prepare a ten year AMP on an annual basis. The purpose of the plan is to document the asset management practices Aurora uses to maximise the life cycle benefits and protect the long term value of its assets.

The capital and operating/maintenance expenditure forecast in the 2016 AMP is \$417m. This is an increase on the amounts that had been forecast in earlier AMP's (2013 AMP = \$335m, 2014 AMP = \$358m, 2015 AMP = \$372m) and evidence that Aurora has been investing more, and was planning to invest more in the next ten years.

The AMP clearly illustrates those parts of the network that are aged and require replacement. There is a high volume of assets that have been categorised as either C1 – Replacement

recommended or C2 – Intervention likely within three years. The AMP, in relation to the self-assessment does provide the reader with an understanding of the state of the network. However, there is disconnect between the self-assessment and the planned maintenance activities (including replacement).

A scenario based on accelerating expenditure, and addressing those assets requiring replacement, has not been prepared in the past. We would expect a scenario such as this to form the basis for a robust discussion around the desired risk profile of the network and the implications this has on other aspects of the business (including the financial performance of the business, the debt profile and returns to shareholders). We believe this should be a key requirement when working through the annual AMP process.

1.5.7. Pole Maintenance Issues

Aurora has approximately 54,000 poles, which are predominantly constructed out of either pre-stressed concrete or hardwood. These poles support sub-transmission, distribution, and low voltage conductors. The pole population has been installed progressively, with the most significant period of growth in the mid-1960s. The structural integrity and performance of pole assets is critical to ensuring the safety of staff and the public, as well as maintaining reliability of supply for customers.

In terms of providing context as to the current condition of the pole network, as at 10 October 2016, Aurora had 1,109 condition 0 and 1,707 condition 1 poles. Condition 0 is defined as a pole that is not fit for working load. Condition 1 is defined as a pole not fit for design load. Regulation 41 of The Electricity (Safety) Regulations 2010 sets out that all poles assessed as Condition 0 must be replaced within 3 months and all poles assessed as Condition 1 must be replaced within 12 months. A comparison of the number of Condition 0 and 1 poles with the level of pole replacements conducted by Aurora shows that in the majority of cases these timeframes cannot have been met.

Aurora has an audited safety management system. This means that Regulation 41 does not apply (Regulation 39 sets out that Regulations 40 to 46 do not apply to works covered by an audited safety management system; regulations 47 to 56 cover those works instead). However, it is not clear to us the specific aspects of the audited safety management plan that would provide comfort that the regulated timeframes do not have to be met (i.e. other than targeting high density areas as a prioritisation initiative there doesn't appear to be any other significant risk based assessment tool that would suggest longer time periods are appropriate).

Subsequent to the intense media interest, Aurora has developed a plan to replace all Condition 0 and Condition 1 poles by 31 December 2017.

1.5.8. Health and Safety

We have not undertaken a comprehensive review of health and safety nor an audit of any kind. However, we have obtained an understanding of the health and safety framework, obtained an understanding of the systems and processes used to manage health and safety aspects and have spoken to a number of employees on how good the health and safety environment and culture is. We make the following comments in relation to this:

- There are two distinct aspects to consider when understanding health and safety at Aurora/Delta. These are:

- Health and safety insofar as it relates to people and how the companies support their people and establish systems and process to manage employee health and safety;
- Health and safety relating to the environment (or more specifically to the network asset with respect to both Delta staff and the public).
- **People/culture** - from the evidence we have reviewed, and the interviews we have conducted, it is apparent that Aurora/Delta has improved significantly with regards its health and safety culture, specifically in respect of the awareness of staff and the focus on keeping staff safe. The majority of staff interviewed described an open culture where they feel comfortable raising issues.

There are several forums where health and safety matters are discussed and it is evident that it is a priority for the Board.

- **Health and safety relating to the environment/assets** – the network is aged and of greater concern is that fact that many parts of the network haven't been maintained and/or require replacement. It is inevitable that this increases the level of risk inherent in the network that could have implications for staff and/or members of the public. This is evidenced by the concerns expressed by the staff that we interviewed (further supported by the document submitted to Aurora management as reported in the Otago Daily Times on 1 December 2016) and the number of "do not operate" notices on equipment in the network.

1.5.9. Summary of Recommendations

We believe Aurora and Delta need to make significant changes to the respective businesses as a response to the issues that currently exist. The table below summarises the recommended changes:

Area of Business	Recommendations
Board	DCHL should consider the future make-up of the respective boards with a view to improving diversity of thought at a time when the respective companies are likely to undergo significant change.
Long Term Planning	Aurora should undertake a planning exercise that spans at least 30 years in order to better understand the future investment and maintenance profile, the implications on debt levels and shareholder returns. The foundation for this planning exercise should commence with the requirements from the network asset and the risk profile that is appropriate for the company. The other factors should then be overlaid when developing business plans or the AMP.
Structure	<ul style="list-style-type: none"> Aurora and Delta should have different board members with no commonality. Aurora and Delta should have separate CEO's. Aurora should directly employ resource to allow it to effectively run an asset management business. <p>Aurora should enter into a service provision agreement for a fixed period of time with Delta, for certain core services, to allow for a sensible transition to the proposed structure and to provide Delta with sufficient time to focus on the core aspects of that business. Aurora will also be in a position to engage other service providers for programmes of work as will likely be required based on the pole acceleration programme and likely changes to the AMP.</p>
Asset Management Planning	<ul style="list-style-type: none"> A scenario, based on accelerating expenditure, and addressing those assets requiring replacement, should be prepared as part of the AMP process to aid the decision making process. Without this scenario management and the board are likely to be unaware of the expenditure required to mitigate some of the risks that currently exist with regards assets assessed as requiring replacement. We note a scenario such as this has recently been prepared for the 30 November 2016 board meeting. A reconciliation, or comparison, between the self-assessed condition of the assets and the planned replacement programme should be prepared as part of the AMP process. This would clearly highlight any gaps and allow an assessment to be made on the risk profile of the network. Investment should be made in an asset management system that has robust controls in place with regards the capture of data, a focus on the asset lifecycle costs and on performance reporting. Plans should be accelerated to understand the condition of certain classes of asset in order to better understand the risks that may exist and to better inform the replacement and maintenance plans. We note that for a number of asset classes the condition assessment is currently based purely on age as a proxy. A physical inspection may give rise to a different assessment. Culturally, the Asset Management team needs to change. A culture is required that focuses primarily on the health of the asset, encourages challenge and debate and brings with it a healthy scepticism and risk based approach when introducing change to the network.
Health & Safety	<ul style="list-style-type: none"> The Board and management of Aurora need to adopt a more transparent approach with staff and the public. There needs to be acknowledgement of the state of the network along with detailed plans on how these issues are going to be rectified. Improvements are required to ensure that q-pulse is a more comprehensive tool to manage health and safety incident capture, analysis, reporting and provides the source for future improvement initiatives.

1.5.10. Organisational Change and Accelerated Programmes of Work

The recommendations we have made involve significant organisational change. These changes, along with the recently announced accelerated pole replacement programme and the need to accelerate plans to better understand the condition of other asset classes, will place a significant amount of pressure on the companies.

Given the environment, it is important to appropriately plan the changes and ensure that any accelerated programmes of work are planned and the associated risks are well understood and managed. There may be a temptation to commence the accelerated programmes of work in order to demonstrate tangible change. However, the respective boards/management need to be very conscious of not introducing more risk to the network through being overly ambitious.

1.6. Use of Report

We have prepared this report for the use of the DCHL.

Our report is not to be used for any other purpose, recited or referred to in any document, copied or made available (in whole or in part) to any other person without our prior written consent. We accept and assume no duty, responsibility or liability to any other party in connection with the report or this engagement, including without limitation, liability for negligence in relation to the findings expressed or implied in this report.

2. Objective, Scope & Approach

2.1. Background

In the month of October 2016, a former employee of Delta, Mr Healey, went to the media raising a number of concerns alleging safety risks on the Aurora electricity network. As a result of this, DCHL has requested Deloitte to review certain aspects of Aurora and Delta's respective businesses.

The focus of this engagement is on Aurora and Delta, insofar as it relates to the specific matters set out in Section 2.2. The primary focus is on assets, people and process matters as they relate to the network asset owned by Aurora. However, aspects of Delta's operations are included as the service provider to Aurora. Accordingly this engagement is not intended to be a comprehensive review of the overall performance of either company.

2.2. Scope

- Understand the Aurora electricity network safety concerns with regards to the awareness and flow of information from a board and management perspective. This will include:
 - Understand when management identified potential issues;
 - Understand how management assessed the potential risk relating to the network safety concerns;
 - Understand the severity/importance management placed on the issue;
 - Understand whether Mr Healey's concerns had been raised within the organisation during his tenure with the company (or whether similar concerns had been raised by other staff members);
 - Understand managements' plans with regards to resolving the issues (including timing) and any changes to the plans with regards to the review of poles to gauge completeness of the review (i.e. to ensure the review covered all poles and the risk of further identification is minimised); and
 - Understand the communication between management and the board with regards to the issues.
- Understand whether the company has a Whistle-Blower policy and/or what other systems/processes are in place to capture staff concerns.
- Understand the emergency/contingency planning that is in place should a health and safety issue arise (including if an issue arose with regards to a pole).
- Understand if there are any other health and safety issues that management are aware of that are considered high risk and have the potential for reputational damage and/or physical harm.
- Understand if there are any concerns that have come to light as a result of the increased focus on the asset management plan.

2.3. Approach

In undertaking this engagement, we have performed the following tasks:

- Interview key members of the management team;
- Interview board members (or a representative of);
- Interview a selection of employees with proximity to the area in which Mr Healey worked to gauge whether this, or any other similar issue has been raised in the past and if so what action was taken (we have interviewed approximately 50 management, Board members and staff and former staff, including Mr Healey);
- Review of documentation that management have relied on and provided to the board;
- Provide a Deloitte contact for Aurora/Delta employees to contact on a confidential basis to raise any concerns they may have with regards to the safety of the work environment; and
- Provide a report summarising our findings.

2.4. Limitations

- We have not audited or otherwise verified the information provided and/or the representations made to us by Delta/Aurora or other parties interviewed.
- We have not undertaken a technical review/engineering assessment of the network assets.
- The Energy Safety Service branch of WorkSafe are currently undertaking a "documentation audit" of Delta/Aurora as a response to the concerns that have been raised. Deloitte has not been engaged to perform a similar audit or review of the health and safety aspects at Delta/Aurora.
- The Services will not constitute an assurance engagement in accordance with New Zealand standards for assurance engagements, nor will they represent any form of audit under New Zealand standards on auditing (International Standards on Auditing (New Zealand)), and consequently, no assurance conclusion nor audit opinion will be provided. We do not warrant that our enquiries will identify or reveal any matter which an assurance engagement or audit might disclose.

3. Context

3.1. Richard Healey - Issues Raised

The scope of this engagement was developed in response to issues that have been raised by Mr Healey in the media. Based on our review of television, print and internet media relating to the issues raised by Mr Healey, a review of the email correspondence between Mr Healey and the CEO and our interviews, we have attempted to best summarise these as follows:

Issue Raised	Reference
Pole Safety Issues	4.3
<ul style="list-style-type: none">• The condition of a number of poles in the Dunedin and Central Otago networks are not safe (evidenced by the company's assessment of the condition of the poles and the number of incidents);• There are approximately 3,000 poles that have been assessed as condition 0 and condition 1 poles; the majority of which are not scheduled to be replaced in an appropriate timeframe;• Temporary solutions are being employed for a longer period than is appropriate.	4.5
Other Network Asset Issues - the condition of other network assets (including conductors, transformers, cast iron potheads, cables, oil filled switchgear, airbrakes etc.) are not safe and/or reliable.	4.3
Red tags had not been applied to poles assessed as condition 1.	5.3
Safety Alert memo, in relation to the need to apply red tags to poles assessed as condition 1, was watered down.	5.3
Previously red-tagged poles were reclassified in the company's systems due to a software change.	5.4

In our discussions with Mr Healey he indicated that he voiced his concerns a number of times during his employment. These concerns were raised as part of his day to day interactions with other staff members rather than anything more formal.

In terms of the layout of this report we have addressed these either as part of the wider issues reported, or where it has been specifically addressed we have referenced in the table above.

3.2 Summary of Historic Performance - Aurora

The table below summarises the historic performance of Aurora:

Years ended 30 June		2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Energy delivery reliability (average time without supply per customer per annum)	minutes	235.0	137.3	123.6	77.5	123.9	131.8	93.2	65.4	134.4	102.0
Total Revenue	\$000	100,032	99,462	92,895	90,560	85,922	80,293	78,799	81,687	76,606	71,267
Net profit for the year (before subvention payments)	\$000	11,713	13,426	12,900	13,874	13,178	12,791	16,630	16,604	16,376	17,568
Cashflow from operating activities	\$000	23,286	20,392	24,278	20,228	21,825	26,134	24,720	27,677	23,598	28,806
Equivalent dividends (actual dividends plus after tax value of subvention payments)	\$000	8,250	10,000	10,000	14,000	12,354	12,003	15,032	14,377	15,054	8,969
Shareholder's equity	\$000	183,648	182,550	180,983	178,005	177,345	176,512	175,753	174,287	173,001	172,086
Total assets	\$000	436,452	413,855	390,882	383,272	373,653	368,165	357,332	346,104	334,366	329,195
Return on average equity		6.40%	7.40%	7.20%	7.80%	7.50%	7.26%	8.90%	8.89%	8.85%	10.07%
Equity to total assets		42.1%	44.1%	46.3%	46.4%	47.5%	47.9%	49.2%	50.4%	51.7%	52.3%
Capital Expenditure	\$000	37,196	35,421	21,260	18,841	18,316	22,128	23,246	22,767	15,474	17,656
Network Maintenance	\$000	20,721	20,224	17,618	15,567	15,636	15,049	14,593	14,136	13,586	11,020

We make the following comments in relation to the historic performance of Aurora:

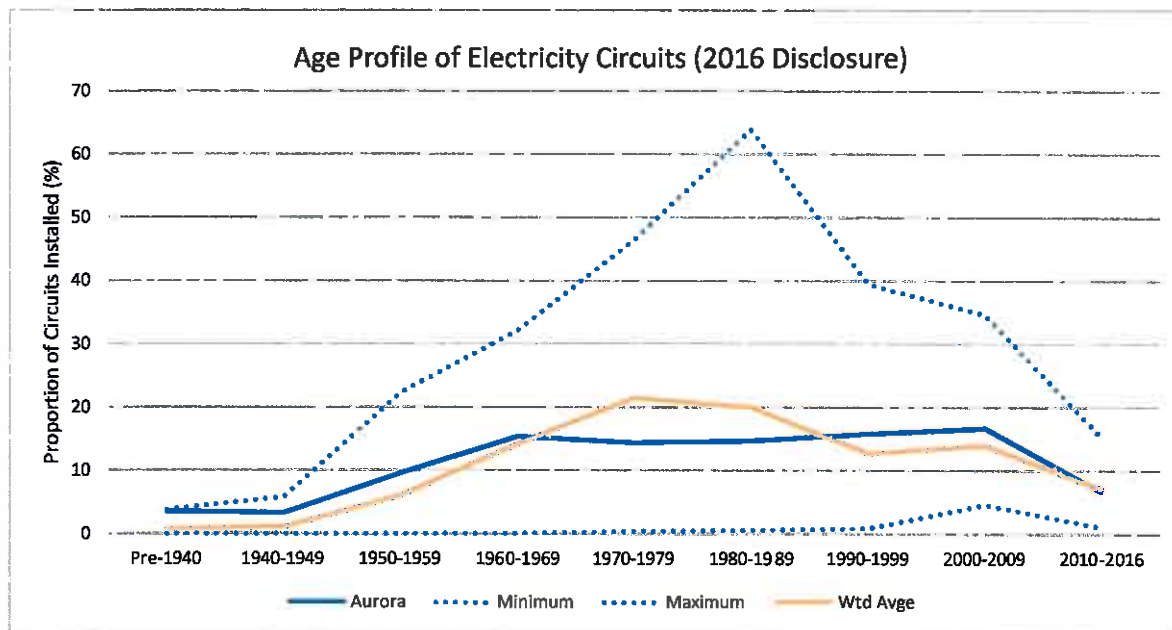
- Net profit for the year (before subvention payments) has been relatively constant for the last five years, ranging from \$11.7m in 2016 to \$13.9m in 2013.
- Equity to total assets has ranged from a high of 52.3% in 2007 to 42.1% in 2016. This has largely been driven by capital expenditure being largely debt funded during this period of time.
- Dividends paid to shareholders (in the form of either dividends or subvention payments) have ranged from a high of \$15.1m in 2008 to \$8.25m in 2016.
- Capital expenditure has remained relatively constant from 2007 through to 2014 (ranging from a low of \$15.5m in 2008 to a high of \$23.2m in 2010). There was an increase in 2015 to \$35.4m and a further increase in 2016 to \$37.2m. Some of this growth has been driven by expansion to the network through customer growth (largely Central Otago), expenditure on systems and asset replacement/renewal.

We acknowledge that the current Board has overseen this increase in capital expenditure. However it should be noted that the expenditure on replacement and renewal has dropped from \$12.3m (2014) to \$7.3m (2016). Almost one third of the total capital expenditure in 2016 related to system growth.

- There has been a general upward trend in the average time without supply per customer on an annual basis.

3.3. The Network

The Aurora network is an aged network. The chart below shows the age profile of electricity circuits installed by decade for Aurora in comparison to the range of profiles and weighted average for the industry.



Higher than average proportions of the Aurora network were constructed at either end of the profile, providing a mixed picture, although the long tail by age is predominantly associated with Dunedin.

We make the following comments in relation to the network:

- The graph above highlights that the Aurora network is not an outlier with respect to its age profile. The estimated useful lives of the respective components that make up the network are well known from both an industry and company perspective. This should therefore lend itself well to planning for future maintenance and replacement strategies.
- We understand that routine proactive maintenance was undertaken on a number of the assets until the early 1990's. A run to fail model was then adopted for a number of the components of the network since this time.
- There has been an under investment in asset inspections/condition monitoring, planned maintenance and asset replacement over the last twenty years. This can be evidenced by:
 - The number of assets whereby the condition is not known (i.e. through a lack of routine inspections and planned maintenance);
 - The number of assets that have been classified as "recommended replacement" that have not yet been replaced and/or aren't included in the ten year AMP as being replaced;
 - The number of assets that have the status "do not operate";

- The feedback we obtained from the Delta employees that install and maintain lines, cables and equipment on the network;
- The feedback we obtained from Delta employees that had experience working on other networks;
- The recent acceleration of the pole replacement programme, a primary driver being to "catch up" to where Aurora would like to be with regards the replacement of poles;
- The recent consideration of what now needs to be done with regards other network assets i.e. understanding their condition and planning for their replacement to achieve an acceptable risk profile.

4. Key Findings

4.1. Board/Management Awareness of the State of the Network

4.1.1. Board/Management Awareness

One of the key aspects of our review was to understand the Aurora electricity network safety concerns with regards to the awareness and flow of information from a board and management perspective. We make the following comments in relation to this:

- Aurora is required to prepare a Ten Year AMP. The purpose of the AMP is to document the asset management practices Aurora uses to maximise the life cycle benefits and protect the long term value of its assets. The AMP process does have extensive involvement from both senior management and the board. The AMP contains a number of statements, and assets highlighted for replacement, that support the view that both management and the board have been aware of the state of the network.
- The AMP clearly highlights a number of assets, across many asset classes, which have been classified as "Replacement Recommended." This makes it clear to the reader as to the condition of certain assets.
- LineTech Consulting Limited were engaged by Delta in 2010. The output from this engagement was a report, dated August 2010, and titled "A review of asset maintenance practices on the Aurora network." The report highlighted major funding challenges within maintenance work and highlighted two key areas (paraphrased):
 - Vegetation management – planned maintenance should be increased to ensure compliance with relevant legislation, reduce the likelihood of faults (and fault related expenditure) and reduce the safety risk to the public.
 - Poles – there is an aging pole population that is not being replaced at an appropriate rate to ensure that a major problem (and associated costs) does not occur in the next few years. In practical terms, if no different action is taken, the number of red tagged (condition 0) poles will increase rapidly at some point within the next ten years and a managed programme of forward replacement will become less and less possible.
- A report was prepared in March 2013 by Delta's Asset Specialist setting out that expenditure of approximately \$100m was required to bring the network up to compliance with minimum legal standards and Aurora's own internal policy. This was submitted to the former GM Asset Management of Delta. No material change in expenditure resulted from this.
- Reference to the "Aged Network," and under investment in the network, have been included in numerous board reports and presentations to DCHL.
- Board members and senior management acknowledged that they were aware of the state of the network and have been actively trying to improve the condition of the network, whilst balancing capital constraints and the requirement to provide a short term return to the shareholder.

We can therefore conclude the board and senior management were aware of the state of the network.

4.1.2. Business Planning / AMP

We believe Aurora's business planning / AMP has been influenced by two factors:

- Equity Ratio - the board's self-imposed requirement to maintain an equity ratio of between 50% - 42% (noting this has been forecast to decline to 37.5% in 2020 – this figure does not include the additional debt required for funding the accelerated pole replacement programme).

We understand the board had engaged an external consultant to advise them on an appropriate equity ratio for a company such as Aurora. Since this time the board has been very focused on remaining within the self-imposed equity ratio. Whilst we haven't formed a view on what is an appropriate equity ratio for Aurora we believe it is important to model and understand the longer term performance of the company in order to be able to effectively evaluate an appropriate equity ratio.

- Shareholder Returns - the requirement to provide a short term return to the shareholder. DCHL has requested annual dividends from Aurora.

These two factors have been prevalent in the documentation we have reviewed and appear to have a strong influence with regards the way the board and management approach planning. What this does is drive a planning process that already has a planned dividend, a targeted net profit after tax required to support the planned dividend, a targeted debt level and by default a targeted level of capital expenditure that is available. The board, and management, then effectively work through a prioritisation process to work out how best to invest the capital expenditure that is available.

We acknowledge that the Aurora Directors agreed to the annual dividends only after recording that in approving the higher dividends it had acted in the best interest of the company's ultimate shareholder and debt funder.

The board, and management, haven't approached the business planning process from the perspective of the infrastructural asset first (i.e. what expenditure is required to ensure the network has the appropriate risk profile balanced with the long term returns over the life of the network). We believe for an infrastructural asset such as an electricity network a longer term view is required (30 to 50 years wouldn't be unreasonable given the life of the network) in order to understand the long term investment profile and the long term returns. A longer term view would allow the board and management to make decisions that are in the best interests of the company over the long term. It would also facilitate understanding of likely peaks and troughs in relation to capital expenditure and conversely potential returns for shareholders. This is particularly relevant for Aurora given the aged network and the requirement to renew certain parts of the network in the short-medium term that will likely generate returns in the medium-longer term.

Our recommendations:

- Aurora should undertake a planning exercise that spans at least 30 years in order to better understand the future investment profile, the implications on debt levels and shareholder returns.
- On the basis of longer term planning the board should reconsider the equity ratio range that is appropriate (noting the company's returns are regulated and therefore there is more certainty in relation to revenues than may otherwise be the case in a non-regulated business).
- The focus of the business planning / AMP process should be shifted to firstly start with the requirements from the network asset and the risk profile that is appropriate for the company. The other factors should then be overlaid when developing business plans or the AMP.

4.1.3. The Board

We have not undertaken a comprehensive review of the performance of the board. However, we have reviewed a number of board reports, DCHL board briefings and have interviewed each of the current board members in relation to the specific terms of reference. We make the following observations in relation to this:

- The current board comprises:
 - Ian Parton (Chair) – appointed 25/10/12
 - David Frow – appointed 25/10/12
 - Trevor Kempton – appointed 01/11/13
 - Stuart McLauchlan – appointed 01/06/07
 - Stephen Thompson – appointed 01/06/16
- The board was aware of the issues that have been raised in the media, the state of the network and the need to renew certain assets quicker than had been planned.
- The board has been consistent in their communication to DCHL with regards to the state of the network. The excerpts from various DCHL briefing documents evidence this:
 - Aurora is in the renewal phase of the infrastructure cycle.
 - Aurora's distribution assets at LV ("Low Voltage") and MV ("Medium Voltage") are amongst the oldest in the country.
 - Life-extension strategies are being pursued for the likes of hard wood poles, however the age profile of assets is such that significant renewal capital requirements are anticipated.
 - Proposed AMP requires an uplift in expenditure to address historic underinvestment in network. That will constrain shareholder dividend flows in medium term, but protect revenue streams from core assets.
 - Risk of further breaches unless reinvestment occurs (in relation to the regulatory quality standards).

4.2. Aurora/Delta Legal Structure / Separation

Aurora and Delta are both 100% subsidiaries of DCHL. The entities are governed by individual boards. However, the directors are common across the two boards. Aurora contracts the roles of the Chief Executive Officer, the Company Secretary and the asset management function to Delta under a performance-related contract that runs through to 30 June 2017. We make the following comments in relation to the current state:

- Aurora and Delta have been working through an organisation restructure, “Project New Energy.” One of the primary objectives of Project New Energy is to enable Delta and Aurora to perform at higher levels by improving business processes, being more customer focussed and by being clearer around accountabilities and performance. In addition, the boards and the CEO, have engaged Energia Limited to review options, and recommend a preferred solution for structuring Aurora and Delta. Their recommendations are largely premised on the separation of the asset ownership activities (Aurora) from the service provision activities (Delta).
- We believe the current structure, with both the asset owner and the contractor being led by the same CEO, and governed by the same Directors (albeit that separate boards exist), is fraught with challenges insofar as optimising the performance of the respective parts of the business. With both the asset owner and the service provider being governed by the same directors, and led by the same CEO, there is a lack of the necessary tension that you would otherwise have between an asset owner (customer) and the service provider (supplier). We believe the current structure has the following flaws:
 - A lack of clear focus on single purpose. The two businesses, an asset owner, and a service provider, are very different businesses. The skillsets required to govern and manage these businesses are very different and the competing requirements of the business over complicate the achievement of the respective company’s goals.
 - There is a natural conflict between the two businesses. One of the asset owner’s primary objectives is to procure service provision at lowest cost whilst maintaining appropriate quality standards and timeliness. One of the service provider’s primary objectives is to maximise profit in relation to undertaking work for the asset owner. It is difficult to understand how these two objectives can be effectively managed under the same governance and management structure.
 - Related party rules exist, as part of the regulated environment, that govern the pricing between a contractor and related asset owner. One of the valuation approaches available to Delta and Aurora is an agreed price to the extent that Delta undertakes at least 50% of its work with third parties. We believe there is too much focus on the related party rules within the respective companies and this has the ability to influence behaviours.
 - Clear separation of the two businesses would better define the customer/supplier relationship. This would result in an improvement in the disciplines surrounding letting work, delivering work, and adherence to delivery standards and reporting on performance.

- In relation to asset management planning we believe it is likely (whether conscious or not) that Aurora takes into account the capacity of Delta in terms of its ability to complete the planned work (noting this will have an impact on the profitability of Delta of which both the board and the CEO have a vested interest in) rather than starting from a position of what is needed to be done and then sourcing suppliers to deliver the required work. If there were clear separation the asset owner would simply focus on what is needed from an asset management planning perspective and would then focus on procuring the service provision, whether this be from Delta or other service providers.

We acknowledge that Aurora has been working for some time on a restructuring programme that has similar outcomes to those highlighted above.

We make the following recommendations:

- Aurora and Delta should have different board members with no commonality.
- Aurora and Delta should have separate CEO's.
- Aurora should directly employ resource to allow it to effectively run an asset management business.
- Aurora should enter into a service provision agreement for a fixed period of time with Delta, for certain core services, to allow for a sensible transition to the proposed structure and to provide Delta with sufficient time to focus on the core aspects of that business. Aurora will also be in a position to engage other service providers for programmes of work as will likely be required based on the pole acceleration programme and likely changes to the AMP.

We believe the implementation of these recommendations will achieve the following:

- Allow each of the companies to focus on their core business.
- Allow each of the companies to secure the requisite skills to govern and manage their business.
- Allow each of the companies to develop their own culture that is centred on the nature of their workforce and the respective company's objectives.
- This will better define the customer/supplier relationship and introduce the tension that is necessary between the two companies. This should result in an improvement in the disciplines surrounding letting work, delivering work, adherence to delivery standards and reporting on performance.
- Allow Aurora to 'freely' procure from service providers outside of the 'group' in order to meet their work requirements.

We also note that it will take time to implement these recommendations and it will be important to plan the transition appropriately.

4.3. Asset Management Plan

Aurora is required to prepare a ten year AMP on an annual basis. The purpose of the plan is to document the asset management practices Aurora uses to maximise the life cycle benefits and protect the long term value of its assets. The AMP provides (as extracted from Aurora’s AMP):

- Visibility of the level of performance on the network;
- Visibility of the risks Aurora’s network faces, and systematic processes in place to mitigate those risks;
- Guidance on asset management activities to the contractor;
- Visibility of forecast investment programmes to external users of the AMP; and
- Evidence of continuous improvement in asset management practices.

We make the following comments in relation to the AMP and the asset management function of the business:

- The AMP is a comprehensive document that, in our view, does provide the reader with an understanding of the current state of the network. We note that this view is limited by the fact that large parts of the network are yet to be physically inspected and have their condition assessed.
- The capital and operating/maintenance expenditure forecast in the 2016 AMP is \$417m. This is an increase on the amounts that had been forecast in earlier AMP’s (2013 AMP = \$335m, 2014 AMP = \$358m, 2015 AMP = \$372m) and evidence that Aurora has been investing more, and was planning to invest more in the next ten years.
- Section 5 of the AMP – Lifecycle Asset Management – covers the condition of the assets and the planned replacement volumes.

In relation to the condition of the assets Aurora has adopted an approach based on the framework presented within the AHI guidelines, that is, assessment of asset condition derived from a combination of different inputs weighted appropriately resulting in a condition grading system that is consistent across all asset classes. We note where Aurora has not physically inspected the asset, age is often used as the proxy.

- We acknowledge that AHI are not definitive but rather a tool that can be refined to support the application of good engineering judgement. AHI provide an indication of potential risk areas and highlight opportunities that can be more fully explored.

The table below shows the asset condition grades used and the condition interpretation:

Asset Condition Grade	Condition Interpretation
C5	As new condition
C4	Some deterioration present
C3	End of life drivers present, regularly monitored
C2	Intervention likely within 3 years
C1	Replacement recommended

- In relation to the various asset classes Aurora has a relatively high volume of assets that have been categorised as either C1 – Replacement recommended or C2 – Intervention likely within three years. This provides the reader with an understanding of the state of the network. However, there is disconnect between the self-assessment and the planned replacement. Examples of this include:
 - Poles - 2,121 were classified as C1 - replacement recommended (noting this number has increased since the date the AMP was published). However, only 340 were planned to be replaced in 2017 (noting 600 were planned to be reinforced – refer Section 5.1).
 - 6.6/11kv ground mounted ring main units - 184 were classified as C1 – replacement recommended. However, only 8 were planned to be replaced in 2017.
 - Pole Mounted Transformers – 102 were classified as C1 and 1,357 were classified as C2. A programme of condition-based monitoring will be deployed starting in FY17 to better assess the remaining life and to determine a replacement plan.
 - Overhead lines – Distribution lines (6.6kv and 11kv) – approximately 1,250 kilometres of conductor length is classified as C1 – replacement recommended (noting the assessment has been performed based on age of asset). There is an acknowledgement of the need to critically evaluate the level of replacement required and detailed condition assessments are planned for 2017.

We have included these examples merely to illustrate that whilst the AMP is clear as to the condition of certain assets there is disconnect between the self-assessed condition and the timing for the planned replacement.

- A reconciliation, or comparison, has not been performed between the self-assessed condition of the assets and the planned replacement programme. We would expect that this would be a fundamental part of the AMP process in order to understand the implications any gaps have on the risk profile of the network. We would also expect that this would form the basis of robust discussion firstly amongst the senior management team and secondly at the board.
- A scenario based on accelerating expenditure, and addressing those assets requiring replacement, has not been prepared in the past. We would expect a scenario such as this to form the basis for a robust discussion around the desired risk profile of the network and the implications this has on other aspects of the business (including the financial performance of the business, the debt profile and returns to shareholders). We believe this should be a key requirement when working through the annual AMP process.

We make the following recommendations:

- A reconciliation, or comparison, between the self-assessed condition of the assets and the planned replacement programme should be prepared as part of the AMP process. This would clearly highlight any gaps and allow an assessment to be made on the risk profile of the network.
- Plans should be accelerated to understand the condition of certain classes of asset in order to better understand the risks that may exist and to better inform the replacement and maintenance plans.
- A scenario, based on accelerating expenditure, and addressing those assets requiring replacement, should be prepared as part of the AMP process to aid the decision making process. Without this scenario management and the board are likely to be unaware of the expenditure required to mitigate some of the risks that currently exist with regards to assets assessed as requiring replacement.

We note a scenario such as this has recently been prepared for the 30 November 2016 board meeting.

4.4. Asset Management Planning

Aurora's asset management planning processes have improved over the last few years, as supported by the improvement in Energia Limited's most recent assessment, using the Commerce Commission's Asset Management Maturity Assessment Tool ("AMMAT") (refer page 176 of the 2016 AMP).

We make the following comments in relation to Aurora's asset management planning:

- The Asset Management Team is aware that further improvements need to be made to this area of the business. Section 8.4 of the AMP identifies the actions required for improvement.
- Aurora does not have a comprehensive asset management system. We understand the company has been investigating the acquisition of an asset management system for the last three years and a system is still included in the company's short term plans. A comprehensive asset management system should act as the company's source of data when it comes to the following asset attributes:
 - A record of the assets owned;
 - The condition of the assets;
 - The remaining life of the asset;
 - Planned maintenance expenditure in relation to the asset;

The date of last inspection and the date for future inspection for condition monitoring purposes.
- We understand Aurora/Delta have a number of other systems in place that capture asset information. However, they are disparate, the company continues to have many paper based systems and processes in place, and these make it difficult to monitor performance and easily extract performance information.
- Whilst the data set in relation to Aurora's assets has been improving, there is further work to be done to in relation to understanding the condition of certain classes of assets (the majority of this is highlighted in the AMP).
- The relationship between the Asset Management team and the field staff is not healthy. This is evidenced through an apparent breakdown in communication between the two teams that has manifested itself in a number of ways. Examples of issues raised included the lack of field staff involvement in the AMP process and capital expenditure decisions. We have not investigated these matters further as we believe the majority of these concerns would be alleviated through some of our earlier recommendations, specifically the structural separation of the two parts of the business.
- As noted earlier, we believe the Asset Management team has approached their future asset replacement strategy from the perspective of - "how much is available for capital expenditure and how best can we prioritise this" - rather than focusing first on the requirements from the asset's perspective based on the desired risk profile. There does not appear to have been sufficient analysis with respect to what the future expenditure

should look like, prior to considering the other business drivers that impact performance. This can be evidenced by:

- A scenario based on accelerating expenditure, and addressing those assets requiring replacement, has not been prepared in the past.
- There is no evidence of robust discussion with the CEO that clearly takes an 'asset first' approach.
- There is no evidence of robust discussion with the board that clearly takes an 'asset first' approach.
- There is evidence of Delta employees raising their concerns with regards the state of the assets in a variety of ways (and in one particular case referenced elsewhere in this report concerns were dismissed on the basis of affordability without the necessary discussion/debate)

We make the following recommendations:

- The company should continue to investigate and acquire an asset management system that has robust controls in place with regards the capture of data, a focus on the asset lifecycle costs and on performance reporting.
- Plans to understand the condition of certain classes of asset should be accelerated in order to better understand the risks that may exist and to better inform the replacement and maintenance plans.
- Structural separation, as recommended in section 4.2, should be planned and implemented. This will allow the Asset Management team to focus solely on the performance of Aurora's assets.
- Culturally, the Asset Management team needs to change. A culture is required that focuses primarily on the health of the asset, encourages challenge and debate and brings with it a healthy scepticism and risk based approach when introducing change to the network.

4.5. Pole Maintenance Issues

Aurora has approximately 54,000 poles, which are predominantly constructed out of either pre-stressed concrete or hardwood. These poles support sub-transmission, distribution, and low voltage conductors. The pole population has been installed progressively, with the most significant period of growth in the mid-1960s.

The structural integrity and performance of pole assets is critical to ensuring the safety of staff and the public, as well as maintaining reliability of supply for customers.

We make the following comments in relation to Aurora's asset management planning:

- A report was commissioned in August 2010 by the CEO to develop a set of prioritised maintenance schedules and to develop a rolling 12 month forward maintenance plan. The report was completed by LineTech Consulting Limited and is titled "A review of asset maintenance practices on the Aurora network." One of the key findings of the report was in relation to the replacement of poles. The key extracts from the report are set out below:

"There are various maintenance philosophies that can be applied to maintaining poles. The present practice is effectively a "just in time" one where poles are replaced when they fail a routine inspection.

Examination of the pole data clearly shows that continuing this approach will result in a situation in the immediate future where very large numbers of poles will need to be replaced at the same time which creates logistic issues and results in additional costs.

In summary it is our view.....that there is an aging pole population that is not being replaced at an appropriate rate to ensure that a major problem (and associated costs) does not occur in the next few years.

If no different action is taken, the number of red tagged poles will increase rapidly at some point in the next 10 years and a managed programme of forward replacement will become less and less possible."

The report goes on to set out that the average number of poles replaced per year in the period 2002 – 2010 was 280. The report compares this amount with a calculated average number of pole replacements required per year of 3,241.

Even allowing for calculation methods and assumptions it is evident that at this stage a material increase in pole replacements was required.

We have been informed that the Aurora/Delta Board requested that the full report was not tabled at a Board meeting. An executive summary was provided instead.

The data for pole replacements in the period 2002 – 2016 is set out below.

Year	Poles replaced	Year	Poles replaced
2002	305	2010	127
2003	201	2011	573
2004	277	2012	812
2005	237	2013	646
2006	330	2014	684
2007	365	2015	878
2008	421	2016	796
2009	293	2017 (Jul – Nov)	262

It is not clear what actions were taken by Aurora as a result of receiving this report but as can be seen from the table above, whilst the number of poles replaced did increase, it was not a large enough increase to address the issues highlighted by LineTech Consulting Limited. Budgeted expenditure for pole replacement for 2015/16 was \$4.85m. Actual expenditure was \$5.4m. The 2016/17 budget included \$3m for pole replacement and a further \$1m for pole reinforcement (noting that the cost per pole for reinforcement is less than the cost per pole for replacement).

- As at 10 October 2016, Aurora had 1,109 condition 0 and 1,707 condition 1 poles. Condition 0 is defined as a pole that is not fit for working load. Condition 1 is defined as a pole not fit for design load.

Regulation 41 of The Electricity (Safety) Regulations 2010 sets out that all poles assessed as Condition 0 must be replaced within 3 months and all poles assessed as Condition 1 must be replaced within 12 months.

A comparison of the number of Condition 0 and 1 poles with the level of pole replacements conducted by Aurora shows that in the majority of cases these timeframes cannot have been met.

- Aurora has an audited safety management system. This means that Regulation 41 does not apply (Regulation 39 sets out that Regulations 40 to 46 do not apply to works covered by an audited safety management system; regulations 47 to 56 cover those works instead).

It is not clear to us the specific aspects of the audited safety management plan that would provide comfort that the regulated timeframes do not have to be met (i.e. other than targeting high density areas as a prioritisation initiative there doesn't appear to be any other significant risk based assessment tool that would suggest longer time periods are appropriate).

- Subsequent to the intense media interest in October 2016, Aurora has developed a plan to replace all Condition 0 and Condition 1 poles by 31 December 2017.

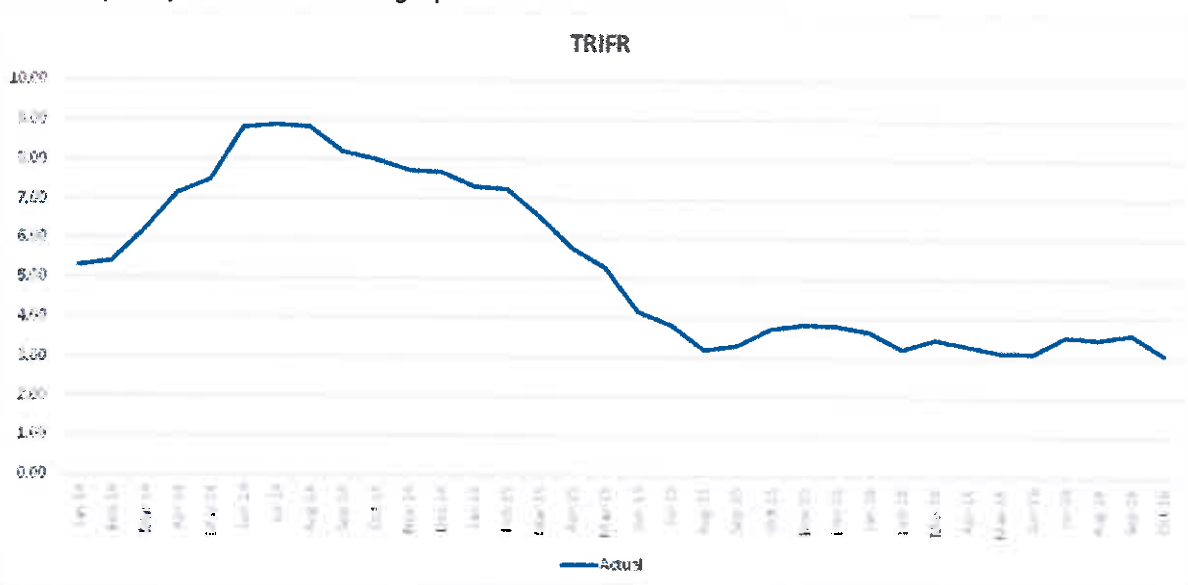
- In March 2013 ten year forward work programmes for operational expenditure were prepared for the Dunedin and Central Otago networks for the period 2014 – 2023. These were prepared by the Delta Asset Specialist after a request from the Delta Asset Manager to prepare a budget for operational expenditure based on the needs of the organisation and ignoring any financial constraints. We make the following comments in relation to this:
 - This budget was prepared on the basis of compliance with Health and Safety requirements (NZ Law and internal to Delta), with NZ Law and Regulations governing Electrical Utility businesses, Aurora Policy as written and Delta Policy as written and that finances and resources are available as required rather than a philosophy of “stay within “X” dollars”.
 - The budget totalled \$100m (\$43m for the Dunedin Network and \$57m for the Central Otago Network) and significant sums were included for work on vegetation management and pole replacement.
 - We have seen further correspondence from the Asset Manager to the Delta General Manager Asset Management on 1 April where it is confirmed that the 2013/14 budgets for the two networks have to be at similar levels to 2012/13. The amounts that were eventually included were \$5.0m for Dunedin and \$4.3m for Central Otago.
 - The Asset Manager provided the General Manager Asset Management with a list of all the maintenance that would not be completed as a result of this decision not to increase operational expenditure. We have included this at Appendix III.
 - In addition, the Asset Manager made the following comments:
 - *“However, many staff across Delta (including myself) have very real concerns about the immediate (and on-going) liabilities and risk being carried by the business, particularly due the (sic) resource and budget constraints that we are currently required to work within. Minimum requirements aren’t being met as a result which bring with it the potential for significant offence penalties and related legal action.*
 - *More urgency is required to act on these issues and while I appreciate that staff need time to carry out appropriate risk assessment to help inform on the above, this does not prevent ELT from the fundamental discussions required to address the current business model and resources required to address the minimum as well as continue to fund and deliver the quantum of work required to make in-roads into the backlog of network investment required.”*
 - We have been advised by the CEO that this has not previously been brought to his attention or the subsequent General Manager Asset Management.

4.6. Health & Safety

We need to be clear that we have not undertaken a comprehensive review of health and safety nor an audit of any kind. However, we have obtained an understanding of the health and safety framework, obtained an understanding of the systems and processes used to manage health and safety aspects and have questioned a number of employees to obtain their perspectives on the state of the health and safety environment and culture. We make the following comments in relation to this:

- There are two distinct aspects to consider when understanding health and safety at Aurora/Delta. These are:
 - Health and safety insofar as it relates to people and how the companies support their people and establish systems and process to manage employee health and safety;
 - Health and safety relating to the environment (or more specifically to the network asset with respect to both Delta staff and the public).
- **People/culture** - from the evidence we have reviewed, and the interviews we have conducted, it is apparent that Aurora/Delta has improved significantly with regards to its health and safety culture, specifically in relation to the awareness of staff and the focus on keeping staff safe. The majority of staff interviewed described an open culture where they feel comfortable raising issues.

There are several forums where health and safety matters are discussed and it is evident that it is a priority for the Board. Refer to Appendix I for an overview of the health and safety framework. This improvement is evidenced by a drop in the Total Recordable Injury Frequency as set out in the graph below.



- We have reviewed the documentation associated with the Health and Safety Committee and we note the attendance of the Board of Directors at a Safety Day on 1 April 2016 where Directors met with focus groups from the various parts of Delta.
- Delta has also implemented an incident management system (q-pulse) where all incidents and near misses are recorded. General consensus amongst staff was that whilst the introduction of q-pulse was a step in the right direction further improvements could be

made with training, better understanding who can enter incidents into q-pulse, structured reporting on the incidents entered into q-pulse and structured follow up on incidents that have been logged.

- The Board and management receive reports on the highest severity asset failures. However, the detailed assessment and close out of enquiry on these needs to be improved. Whilst these have been captured in q-pulse since mid-2014, they are not collated and analysed to provide information on themes and trends (such as analysis of failure modes and corrective actions). We understand that this will be a prime responsibility of the Head of Asset Strategy role under the proposed organisational restructure. This is an important step.
- We obtained feedback from staff that there was often a lag between a policy being introduced and the policy being implemented in the field. More communication is required around change in policy, and buy-in from all levels of management, to ensure the policy has the required impact on the actual activities undertaken. In addition, there was also concern as to a possible disconnect between regulatory requirements and the company's systems and processes to meet these requirements.
- **Health and safety relating to the environment/assets** – as stated earlier the network is aged and of greater concern is that fact that many parts of the network haven't been maintained and/or require replacement. It is inevitable that this increases the level of risk inherent in the network that could have implications for staff and/or members of the public. This is further evidenced by the concerns expressed by the staff that we interviewed and the number of "do not operate" notices on equipment in the network.
- We understand that the "do not operate" notices are a source of frustration for the Delta staff in the field as they can be called to jobs and discover that they cannot operate key pieces of equipment. However, we also note that the "do not operate" notices are a mechanism to protect staff from working on assets that have been identified as higher risk.

There are currently 91 assets across both networks that are subject to either do not operate or do not operate live notices. Whilst we acknowledge that as a percentage of the total assets on the networks this is small, it is unclear how the situation could arise where there are any do not operate notices on a network for extended periods of time unless the asset is deemed redundant.

We make the following recommendations:

- The Board and management of Aurora need to adopt a more transparent approach with staff and the public. There needs to be acknowledgement of the state of the network along with detailed plans on how these issues are going to be rectified.
- Improvements are required to ensure that q-pulse is a more comprehensive tool to manage health and safety incident capture, analysis, reporting and provides the source for future improvement initiatives.

4.7. Pole Acceleration Programme

In the aftermath of Mr Healey's resignation, and subsequent appearances in various media, Aurora committed to replacing the 1,109 Condition 0 and 1,707 Condition 1 poles (as at 10 October 2016) by 31 December 2017. This represents a significant acceleration, and increase over the previous planned expenditure, as the current version of the AMP was for all Condition 0 poles to be replaced by March 2020. This has required a request for an additional \$26m in order to fund this programme (the Accelerated Pole Replacement Programme ("APRP")).

The Aurora CEO set this out in a paper to the Board on 31 October 2016 entitled Accelerated Pole Replacement Plan which proposes a programme where Aurora ensures that by 31 December 2017:

"All existing condition 0 poles are replaced and, where condition 0 poles remain, they are programmed for replacement within 3 months of their identification, or such longer period as may be appropriate and reasonable, provided that a specific risk mitigation plan has been prepared and approved for each individual pole affected; and

All existing condition 1 poles are replaced and, where condition 1 poles remain, they are programmed for replacement within 12 months of their identification, or such longer period as may be appropriate and reasonable, provided that a specific risk mitigation plan has been prepared and approved for each individual pole affected.

Priority, in the initial months of this programme, would be placed on replacement of condition 0 structures."

Concerns have been raised by a wide range of people interviewed as to the ability to deliver this programme within the timeframe communicated to the board and to the public. However, we understand these issues are understood by management and there is awareness as to the scale of the project.

We understand management has prepared a number of project planning documents. It is crucial that all such documentation is scrutinised carefully and that risks are considered and discussed with a sufficient level of challenge and rigour. In addition to this, strict project management disciplines must be maintained if the project is to be completed on time and within budget.

5. Other Matters

5.1. Pole Nailing/Reinforcement

The concept of pole nailing/reinforcement was first introduced to the company early 2015. Pole nailing/reinforcement in its simplest form involves reinforcing a pole that is compromised due to below ground deterioration, by incorporating a range of vertical beams and connectors to strengthen the existing pole. We make the following comments in relation to this:

- The concept was investigated by the Asset Management Team with a view to assisting with addressing the aging pole concerns. In July 2015, the Asset Strategy team presented the business case for reinforcement to the Strategic Review Committee ("SRC") for approval, and it was subsequently included within Aurora's lifecycle asset strategy for this asset class. The Board received a paper requesting capital expenditure of \$1m in respect of pole reinforcement for the 2017 financial year on 30 June 2016.
- A number of steps were undertaken following the approval of the business case. These included entering a short term lease agreement to enable assessment of the pole nailing provider's plant and equipment (an Australian provider), receiving training in the technique from the provider and nailing a sample of poles and working with another network in New Zealand to understand their use of the technique.
- In September 2016, due to a number of concerns that had been raised (including whether nailed poles could be climbed, whether nailed poles were suitable for all ground types, and questions over the extent to which nailing a pole did extend the life of an aged pole), the pole nailing programme was put on hold.
- We have reviewed the business case. Whilst there was a risk analysis completed the risk analysis does not appear robust. Particularly with regards to the introduction of a new technique to the network and the implications to both the network and the people that work on the network.
- The failure to undertake the necessary due diligence and risk analysis at an early stage (pre-business case would be the expectation) resulted in the company committing unnecessary expenditure and creating an expectation with senior management and the board of a more cost effective solution to the aged pole issue. The benefits from the pole nailing/reinforcement programme were then factored into the 2016 AMP. It also appears that there were delays in the project team communicating their concerns to the CEO and the board.

We make the following recommendations:

- A robust risk assessment and due diligence should be performed prior to the completion of the business case, particularly in relation to introducing a new technique and/or asset into the network. The completion of this process at an early stage would ensure that management have confidence in proposed initiatives prior to communicating with the board.

5.2. Deuar Pole Testing

The traditional condition assessment of poles is carried out by an experienced lineman who performs a visual assessment, and in the case of a wooden pole performs a hammer test at the base of the pole, probes with a screwdriver or steel bar at ground level and applies mechanical force to the pole by way of a rocking motion. Should there be any concerns then an excavation around the pole to a depth of 300mm - 400mm occurs visually checking the below ground portion for signs of decay.

In 2014, Delta made a decision to undertake an alternative method of pole testing known as Mechanical Pole Testing ("MPT") or Deuar testing (named after the individual who developed the test). This is a mechanical test that measures the strength of the pole and is also used in New Zealand by two other networks. This instrument employs a chain at the pole base plus a portable hydraulic arm that leverage's off the chain to apply a mechanical bending movement on the pole approximately 1.5 m above the ground line.

Delta sought the opinion of Hyland McQueen Limited (an Australasian based engineering consultancy servicing the electricity industry) on this matter who in a letter dated 26 February 2013 concluded that Deuar testing was their preferred method. They did note that *"the actual method underpinning the calculations is not disclosed by Deuar and this is a concern"*.

The rationale for adopting Deuar testing was set out in a PowerPoint presentation dated 17 July 2014 entitled "Enhanced Pole Condition Monitoring Technology."

Whilst we acknowledge that Aurora has sought to increase the rigour and reduce the subjectivity in relation to its pole testing, we make the following comments in relation to this:

- We have been informed that there has been no scientific peer review of this system to provide Aurora with the confidence it needs to rely on this. In addition, there has been no assessment of the tool from a risk perspective and/or to verify the scientific basis of the tool; and
- The system is being used differently in Dunedin to Central Otago (two protractors are used in Dunedin; only one is used in Central Otago).

We make the following recommendation:

- Whilst this method does appear to be less subjective than the traditional testing, it is important that Delta satisfies itself that it is reliable, that it is being used consistently and the results are robust and reliable.

5.3. Safety Alert

One of Mr Healey's major concerns was highlighted when he investigated a pole failure at Northburn Station (pole number 11272). Mr Healey was tasked with completing the Incident Cause Analysis Method (ICAM) investigation into this incident which occurred on 1 September 2016. This is a well-recognised investigation methodology and training is provided on this by the Electricity Engineers Association via Safety Wise Solutions (SWS) who are the license holder for the ICAM training in Australasia.

It is standard practice during such investigations to review the condition of the poles on either side of the failed pole as they will have been subject to unquantified shock loads by the pole between them falling. During this investigation Mr Healey identified that one of the adjacent poles was listed as Condition 1 in Delta's GIS system but did not have a red tag attached. Delta policy at that time was for all Condition 1 poles to be red tagged as do not climb.

Mr Healey conducted further work on this matter. The extract from the ICAM report is set out below:

"There are approximately 965 poles on the Aurora network recorded as "condition 1" in the last year, given that no pole inspector has confirmed that they tag "condition 1" poles, it seemed prudent to survey a small sample of those poles to check for the presence of red tags. Of the poles examined, 15% carried the required tag.

This, admittedly limited, sample suggests that on the Aurora network there are around 820 structures, already identified as sub-standard that do not have the required warning tag fitted.

It may be that the failure to tag these poles has been occurring for more than one year and that a larger proportion of our around 2000 condition 1 poles are affected."

A number of drafts of the ICAM were completed before it was finalised. This is standard practice as a number of individuals review drafts prior to reports being issued.

Subsequent to the finalisation of the ICAM report, a safety alert "Missing Red Tags" – was issued on 30 September 2016, alerting all staff to the issue identified during the ICAM investigation and giving instructions on what procedures to follow in light of the discovery that condition 1 poles were not red tagged.

A first draft of the Safety Alert was completed on 27 September by Mr Healey. This was modified by the Operations Manager before being distributed. The most material change between the two versions is that the wording in relation to the issue was softened significantly from *"..... a large number of poles (probably less than 1,000) have been tested and been found to be "Condition 1" – but no red tag has been applied to them"* changed to *"..... some poles assessed as being defective may not have been Red tagged in accordance with Aurora procedures"*.

We have been informed that as at 7 November 95% of the population of poles in question had been re checked to confirm that they have the correct safety tag in place as a visual reminder for line workers not to climb. Of the poles checked, 64 had been replaced and 400 had a red tag. The remaining 1,610 had no red tag.

5.4. Changing Status of "Unsafe" Poles

One of the concerns raised by Mr Healey relates to the "changing condition of unsafe poles to safe". We have discussed this with relevant staff and have been informed that this relates to a data migration error when information on pole status was being uploaded into Aurora's GIS system. The error caused the condition status to change for 43 poles. The error was detected by Aurora's internal validation processes and was corrected.

We make the following recommendation:

- Management satisfies itself that the appropriate change processes are in place when making software, or other changes, that impact the condition assessment of the network or any other aspect of the network.

5.5. Whistle-Blower Policy

Delta has a policy entitled Protected Disclosures ("Whistleblowers"). This document was created in December 2011 and defines how Delta ("the Company") will comply with the Protected Disclosure Act 2000 ("the Act"). The purpose of the policy is to provide information and guidance to any employee who may wish to raise an allegation of serious wrongdoing by the Company. The Act protects employees from retaliatory action by the Company if allegations are made in accordance with the Act and this policy.

We have reviewed Delta's Whistleblower policy and it appears fit for purpose. We have been informed that it is designed more for staff who have concerns over integrity and ethical matters such as fraud, rather than health and safety concerns. We have discussed the various forums through which staff can raise such concerns in paragraph 4.6 of this report.

Staff should be reminded of the existence of the policy and of the various ways in which they can report concerns. Staff should also be reminded that the Protected Disclosure regime relates to any concerns they may have, not just matters relating to fraud.

5.6. Emergency / Contingency Planning

We have reviewed a document entitled "Delta Incident Management Guide" which contains the incident management response plan and role responsibilities in the event of a significant incident impacting Delta and its customers. The document contains the following key elements:

- Roles and responsibilities for key staff (including CEO, incident controller, media spokesperson, operations management, finance information and communications technology, supplier and risk, human resources and facilities management). These role descriptions include checklists of immediate priorities.
- Quick reference guide flowchart.
- Incident classification table.

We make the following recommendations:

- Ensure that all staff are aware of the existence of the document and that there is sufficient knowledge on the front line as to the steps that should be undertaken in the event of a serious incident.
- Consideration should be given to whether an audit of prior incidents would be appropriate to gain assurance that the procedures as set out in the guide were actually followed in practice.

5.7. Other Health & Safety Issues

Management are not aware of any other health and safety issues other than those already discussed elsewhere in this report that are considered high risk and have the potential for reputational damage and/or physical harm.

We note that Delta's Health & Safety system includes ongoing control monitoring for a set of critical risks which is part of the company's Business As Usual activity. These risks include: live line working; exposure to arc flash; fall from height prevention; working around suspended loads; confined space controls; heavy machinery controls and vehicle safety.

5.8. Other Concerns

No concerns other than those raised elsewhere in this report have come to light as a result of the increased focus on the AMP.

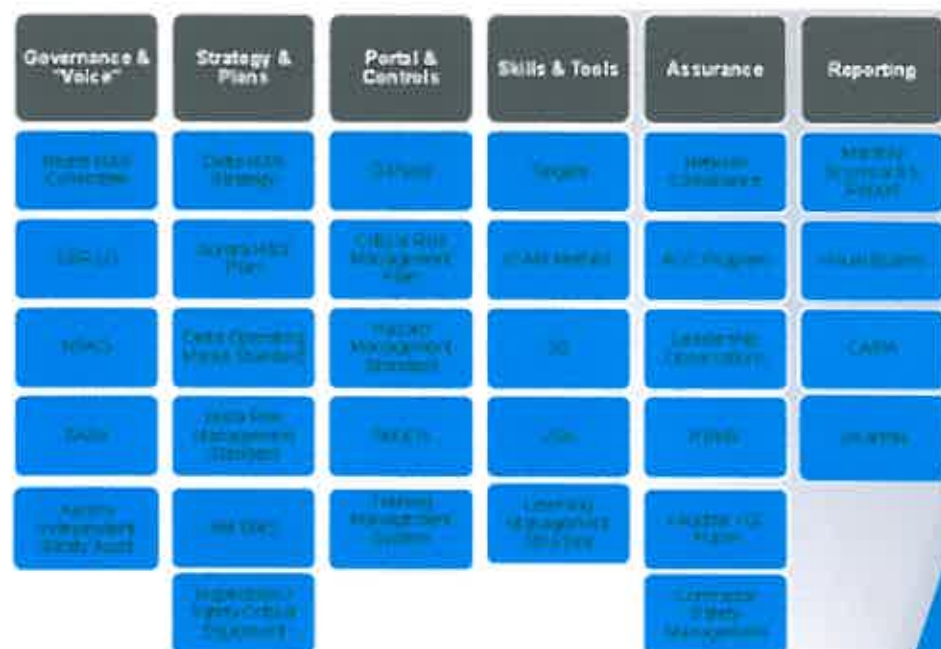
6. Statement of Responsibility

This report has been prepared in accordance with the terms and conditions of the Terms of Reference dated 2 November 2016. The review is subject to the following limitations:

- Our assessments are based on observations from our review undertaken in a relatively short period of time. We have placed our emphasis on the issues that we believe are of significance and have reported in this manner.
- We have not undertaken a technical review/engineering assessment of the network assets.
- The Energy Safety Service branch of WorkSafe are currently undertaking a "documentation audit" of Delta/Aurora as a response to the concerns that have been raised. Deloitte has not been engaged to perform a similar audit or review of the health and safety aspects at Delta/Aurora.
- Recommendations for improvement should be assessed by management/board to understand the full commercial impact before they are implemented.
- We have not audited or otherwise verified the information provided and/or the representations made to us by Delta/Aurora or other parties interviewed. However, where practicable we have obtained evidence to validate our findings.
- The Services will not constitute an assurance engagement in accordance with New Zealand standards for assurance engagements, nor will they represent any form of audit under New Zealand standards on auditing (International Standards on Auditing (New Zealand)), and consequently, no assurance conclusion nor audit opinion will be provided. We do not warrant that our enquiries will identify or reveal any matter which an assurance engagement or audit might disclose.
- This report has been prepared for distribution to the DCHL. We disclaim any assumption of responsibility for any reliance on this report to any other persons or users, or for any purpose other than that for which it was prepared.

Appendix 1 – Delta Health and Safety Management System

Health and Safety Management System



Appendix 2 – Extract from March 2013 email from Asset Manager to GM Asset Management

Future Requirements & Concerns

While the 'second cut' draft budget for 2013/14 (as shown in Tables 1 and 2) has been working to a \$9.2M limit, the reality of what is actually required is much different. Initial reviews and assessments indicate that, to catch-up with the historic underspend and address the minimum legal requirements, a budget in the order of \$42.6M for Dunedin and \$56.8M for Central is required (which was reflected in the 'first cut' budget (see attached email). The main area demanding this level of spend is for Planned Maintenance (specifically Distributions Substations (testing and inspections); Lines & Cables (pole renewals, inspections and vegetation).

While it is acknowledged that it would be unrealistic to spend this amount in a single year, it does reflect the amount of work required to bring the network up to the standard believed to be necessary. Further analysis is needed to provide a true reflection of the associated timeframe and to refine costs. However, an indication of the impact of staying within the 2013/14 budget limits compared to these requirements is outlined in Appendix 1.

Over the coming year, the Asset Management Team will be working through the budget lines to **assess** the risk-cost trade off impact of the budget constraints so that these can be better articulated to management and the Board in the future.

However, many staff across Delta (including myself) have very real concerns about the immediate (and on-going) liabilities and risk being carried by the business, particularly due the resource and budget constraints that we are currently required to work within. Minimum legislative requirements aren't being met as a result, which brings with it the potential for significant offences, penalties and related legal action.

More urgency is required to act on these issues and while I appreciate that staff need time to carry out appropriate risk assessment to help inform on the above, this does not prevent ELT from the fundamental discussions required to address the current business model and resources required to address the minimum as well as continue to fund and deliver the quantum of work required to make in-roads into the backlog of network investment required.

Appendix 3 – Appendix to March 2013 email from Asset Manager to GM Asset Management

APPENDIX 1

Dunedin

- No earth repairs of non-compliant earths
- No condition inspection of ground mounted Aurora assets
- No CBD MDI Winter readings
- No condition assessment of HV GM SW Gear (Oil tests etc)
- No Distribution Substation enclosure maintenance
- 50% reduction in fiberglass cover refurbishments (5 covers rather than 10 covers).
- 97% reduction in Condition Zero pole replacement (19 poles rather than 661 poles)
- No Condition 1 or 2 pole replacement (1281 poles)
- No Condition 0, 1 or 2 crossarm replacement (640 arms)
- No new wooden pole testing technology introduced¹
- 97% reduction in Condition 0 vegetation management
- No Condition 1, 2 or 3 vegetation management (16,851m all together)
- No LV Link Box maintenance
- No Zone Substation building / compound maintenance
- No sub transmission Line Earth Tests
- No 33kV ABS service
- No 33kV OH CB service
- No inspection Silverstream Bridge Abutment
- 57% reduction in Telecom Changeovers (216 poles rather than 500² poles)
- 29% reduction in Close Approach (\$50K rather than \$70K³)
- 23% reduction in Inspection Services (\$250K rather than \$325K⁴)

Central

- No earth repairs of noncompliant earths
- No condition inspection of ground mounted Aurora assets
- No condition assessment of HV GM SW Gear (Oil tests etc)
- No Distribution Substation enclosure maintenance
- 95% reduction in Condition Zero pole replacement (38 poles rather than 718 poles).
- No Condition 1 or 2 pole replacement (2,105 poles)
- No Condition 0, 1 or 2 crossarm replacement (4,567 arms)
- No objective wooden pole testing technology introduced
- 94% reduction in Condition Zero vegetation management (2,228m rather than 36,399m)
- No Condition 1, 2 or 3 vegetation management (29, 351m)
- No Service Box inspection
- No Zone Substation building / compound maintenance
- No sub transmission Line Earth Tests
- No 33kV ABS service
- No 33kV OH CB service
- 25% reduction in Telecom Changeovers (27 poles rather than 36 poles)
- 74% reduction in Close Approach (\$22K rather than \$85K)



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