

Service Based Pricing Review 2017

the lines
company



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Statement from The Lines Company Board of Directors

Pricing Review 2016 – 2017.

Summary

The Lines Company Limited (TLC) Board has received the final reports of the independent review of the service-based pricing approach it applies to electricity lines charges on its network.

This statement provides a summary of the recommendations, the next steps the TLC Board will follow, including consideration of how it could be implemented, and invites customers and other stakeholders to provide feedback to the recommendations through further community engagement.

Background

On 6th September 2016, the TLC Board commenced an independent review of the service-based pricing approach applied to electricity lines charges in the King Country area operated by TLC.

After 10 years of the current methodology being applied, it was felt that a full substantive review was warranted to provide a positive plan going forward for future pricing decisions, particularly as there have been several changes in the market environment since the introduction of peak pricing.

Terms of Reference were published for the review, and the Board appointed Roger Sutton and PwC, led by national energy practice Director Lynne Taylor, as independent consultants to undertake the review.

See http://www.thelinescompany.co.nz/media/tlc-terms-of-reference-pricing-review-06-sep-2016_final.pdf

The terms of reference clearly set out pricing history, the objectives, scope, options, the engagement process and timeline - culminating in the release of the final report in March 2017.

We are pleased to advise that the process has run to time and with this statement, the board publically releases the review from Roger and PwC.

See www.thelinescompany.co.nz/news/pricing-review

Reviewers

We would like thank Roger Sutton and Lynne Taylor and her colleagues for undertaking the independent review. This has been a Board initiative to give the work due weight and ensure it has a fresh set of qualified eyes examining the matter.

Community engagement has been extremely positive, the work is of a high standard and importantly has challenged the TLC Board and management as to how we improve delivery of a service-based pricing approach.

We would like to thank the many people that have contributed to the process, including:

- Hon Louise Upston, MP for Taupo
- Barbara Kuriger, MP for Taranaki – King Country
- Ian McKelvie – MP for Rangitikei
- Mayor Max Baxter – Otorohanga District
- Mayor Brian Hanna – Waitomo District
- Mayor Don Cameron – Ruapehu District
- Mayor David Trewavas – Taupo District
- Management and staff of The Lines Company
- Community leaders
- The Electricity Authority
- The Electricity Networks Association
- Utilities Disputes Ltd (Formerly The Electricity and Gas Complaints Commissioner).

Review Summary

The review has recommended that we move away from the current approach which is based on a 'variable demand charge' to a 'variable time of use' charge, also referred to as 'Time Of Use' (TOU), which simplistically means that pricing for lines are applied based on the time of day customers use energy.

The authors noted that in their view, under the current methodology:

- too much emphasis is placed on recovering revenue from a single demand charge, particularly revenue to meet peak load growth
- customers find it hard to make sensible decisions about whether to consume or conserve electricity
- what customers do over a year doesn't impact them until the following year
- complex business rules are required to cope with customers moving in and out of properties and for customers with legacy metering.

While the current system is arguably a better way to recover the costs of network growth under service-based pricing, the review concludes that TOU would be more equitable, have greater simplicity, and be more transparent – and therefore a better fit based on the criteria set by the TLC Board.

The Board are receptive to the TOU approach, and note that it is also consistent with pricing systems being adopted by neighbouring distribution networks in New Zealand.

Fairness

An important point to understand is that the questions asked were about finding the fairest and most equitable way to distribute the cost of maintaining the lines network. Any change of approach will not change the amount of revenue required, just the way that cost is allocated between the customers. Therefore, a change to TOU or any alternative approach for that matter, will inevitably increase or decrease the costs allocated to individual customers, leading to winners and losers from a cost outcome perspective. The extent to which this will occur will be one of the matters that the Board will consider.

Features of TOU Pricing

In considering pricing TLC would expect the effect of the demand charge to be moderated because under a time-of-use pricing regime:

- network pricing will be known in advance by consumers
- quantities will be known by the consumer in a more timely manner and can be responded to more quickly.
- invoices will be issued the month after consumption
- providers of crucial controllable load can be rewarded.

Direct Billing

TLC is unique in that we bill customers directly, rather than through a retailer. While direct billing is out of scope for the review, the issue has nonetheless been raised, and the Board will consider this at a subsequent stage in light of the potential move to TOU.

Next Steps

The Company will now engage again with the community to talk through the findings of the review and the consequences of changing to such a system.

The Board have further retained Roger Sutton to head the community consultation process over the March to May 2017 period. Further details of community meetings will follow shortly from TLC.

Further, TLC's CFO Kevin Barnes will head up the evaluation of the recommendations from a project and technical perspective, while incoming CEO Sean Horgan will take overall responsibility. Sean and Kevin will work closely with the Board to finalise recommendations regarding any expected changes.

Following that, the TLC Board will need to decide whether to change to TOU and if so, the design parameters and the timeline to do so.

The Board will need to consider many important factors in making such a change, including:

- The feedback we get from community leaders and customers
- Ensuring we work within regulations around pricing resets
- Making sure our IT systems and meters can accommodate a change in charging method, and in what timeframe
- That we have the staff resources available to manage a change process.

Given the tight regulations around pricing resets and the need to undertake a change process professionally, we would realistically be looking at 2018 before we could make a change of this magnitude.

Conclusion

The TLC Board have received the review as a positive step forward and we have appreciated the significant contributions and feedback from the community, and again thank Roger Sutton and Lynne Taylor and PwC for their diligence. We will now seek further feedback from customers and other stakeholders on the recommendations.

The Board have had the opportunity to review the papers in draft, and the recommendations are supported in principle. The work now commences to ensure that if we adopted a TOU system, there are no unintended consequences, especially from a technical point of view around meters and billing systems, and importantly that such a system will be acceptable to customers.

Our goal remains to implement an equitable, simple and transparent pricing system for our customers.

The Board have also outlined during this process the overall company objective to be a valued service provider in the community, and a key business enabler. That remains the lens with which we view the final recommendation and outcomes.

On behalf of the Board



Mark Darrow
Chairman

MARCH 24, 2017

THE LINES COMPANY

SERVICE BASED PRICING REVIEW

INTRODUCTION

The Board of Directors of The Lines Company (TLC) have initiated a comprehensive and independent review of TLC's service based pricing methodology.

The main objective of the review is to understand how a pricing methodology can be applied to achieve optimum equity, simplicity and transparency for the customers on TLC's network.

In undertaking our review, we have reviewed TLC's pricing methodology documentation and other supporting disclosures, discussed TLC's pricing approach with local customers and community stakeholders, and met with TLC's board, management, customer service and pricing teams to better understand the pricing methodology.

A key part of the process was a technical review of the pricing methodology that was carried out by PricewaterhouseCoopers. An important part of this technical review was to use defined criteria to evaluate the current pricing methodology and to provide a framework for the improvements sought. A copy of the PricewaterhouseCoopers report is attached.

Our work focused on pricing for the 24,000 mass market customers rather than the 42 major customers.

The scope of the review is described in detail in the Terms of Reference (TOR), dated 6 September 2016 and can be found on the TLC website.

THE APPROACH

The approach in preparing this report involved:

- Engaging with customers through a series of focus groups to understand their views on the pricing and any issues with it.
- Meeting with local stakeholders, including political leaders, representatives of interest groups and representatives from the shareholder (WESCT)

- Meeting with central Government policy makers to understand their views on the pricing and the improvements they think could be made.
- Investigating other forms of pricing, by reading reports and also meeting and talking with experts with experience with electricity line pricing. This includes reading other independent reports prepared for parties that have taken issue with TLC's current pricing system.
- Meeting with the management of TLC and reading and reviewing the various reports on the pricing prepared by the company and its advisors.
- Carrying out a technical review of the current pricing methodology. This involved appraising it against the criteria defined by TLC, examining how refinements would improve its performance. This technical review also compared how alternatives rated against this criteria.

KEY FINDINGS

We recommended that TLC move away from its current service based pricing approach to a usage based system with different Time of Use Prices (TOU pricing) applying, depending on the time of day customers use energy. We believe TLC should move away from its current pricing system which is largely based on peak demand.

A Time of Use pricing system would be more equitable, have greater simplicity and be more transparent for customers than the current pricing system. It better meets the criteria laid out by TLC in its Terms of Reference.

We also recommend that TLC simplify its pricing by removing the transformer charge. It should also do away with the complexity of different prices for different geographic areas and different prices depending on whether the customer is urban or rural. We recommend that TLC has one price level across the network.

This a major change in how TLC operates and will take some time to implement. It will also mean that some customers will pay more for their electricity and some will pay less.

We make no recommendations regarding the pricing for the 42 major customers. While some refinements to better signal the costs of incremental load growth are probably justified, we make no detailed recommendations. In the time allowed we have not analysed the relative cost allocations between major customers and mass market customers. However we do recommend that the company considers lowering the threshold for major customers to include more mass market customers.

Our analysis and comments in the rest of this report apply only to mass market customers.

BACKGROUND

Underlying Cost Structures

New Zealand has 29 electricity line companies of varying sizes, supplying areas with quite different geographic characteristics and types of customers.

The area TLC supplies is sparsely populated, has no major cities and supplies many holiday houses that use electricity spasmodically. The geography of the area is also difficult, with terrain that makes maintaining the network expensive. Much of the network is old and while a lot of capital has been spent in the last 10 years replacing equipment that has come to the end of life, more needs to be spent to keep the network operating reliably and safely.

The fundamental characteristics of the area supplied by TLC mean that costs and prices will be higher than most other parts of New Zealand for a typical customer. Compared to the line companies that supply dense urban populations in Auckland or Wellington, we would expect that TLC's costs (excluding Transmission) would be about twice as much.

History of the Current Pricing System

In 2000 reform legislation separating Lines and Energy functions took effect. It was no longer possible for network companies like TLC to cross-subsidise Lines charges from Energy Profits.

In 2005, TLC started billing separately from the electricity retailers.

In 2007, TLC the current pricing system based on, capacity, demand and dedicated assets. This change in pricing approach was designed to be a more equitable way allocating costs between customers. Prior to 2007, TLC's mass market customers paid a daily fixed charge and and a volumetric energy charge. There were also additional charges for holiday homes.

In 2009, TLC started a rollout of advanced meters. This rollout continues and is approximately 80% complete across the network.

Current Pricing System

TLC's current pricing approach has the following key features:

- target revenues below regulated allowances
- 24 consumer groups (defined by region, density, voltage and capacity) and 42 individual major consumers
- dedicated cost recovery for 13 major customers on non-standard contracts
- shared cost recovery for other major customers and standard customers
- fixed charges which recover about half of the distribution cost recovery, charged on a capacity basis for most customers, and a monthly fixed fee for low use customers. All distribution costs are recovered via fixed charges for major customers
- variable charges which recover the remaining distribution costs and all transmission costs. These are charged on a peak demand basis for standard customers, and a peak capacity basis for major customers
- dedicated transformer charges for those standard and low use customers using a TLC transformer with 3 or less connections, charged as a fixed monthly fee
- meter, relay, billing, connection, disconnection and account services fees
- capital contributions for customers located in remote parts of the network.
- some customers pay dedicated asset charges where the customer owns a line but TLC maintains the line.

More detail on TLC's pricing can be found in the PWC report and on the TLC website.

Changing Pricing Drivers

Since the introduction of peak pricing, a number of the pricing drivers have changed.

- **Peak load growth has reduced.**

In 2007 when the current pricing system was introduced, many parts of the network were growing and this drove new investment so peak pricing made good economic sense. Currently the network is seeing little growth, and the investment needed to meet this growth is small. This is consistent with what is occurring nationally. Better energy efficiency in the

form of heat pumps, insulation and better lighting have all reduced energy demand. It is possible that the demand based pricing has also helped reduce peak growth. The installation of the new meters has also seen an increase in ripple hot water control. This ripple control of hot water is important and if it was lost, would increase network loadings significantly which would drive new investment.

- **The cost of meeting peak load growth is expected to decrease.**

Batteries are dropping in price and this is expected to continue. In 5 to 7 years many industry experts predict that peak load growth for a range of network constraints will be met by using batteries.

- **Transpower is likely to change how it charges.**

The Electricity Authority is currently consulting on transmission pricing. The direction it has signaled is a major move away from peak based pricing.

While the cost of growth on the network has dropped, the costs of maintaining the existing network continues. Poles and wires need to be replaced, transformers and switchgear need maintenance. Trees need to be trimmed away from lines and repairs need to be made to the network when things go wrong or due to weather events.

WHAT DO CUSTOMERS THINK?

As part of the review, we wanted to understand what customers thought of the current pricing system. To better understand this, five focus groups were held with groups representing local customers. The focus groups were held in Turangi, Taumarunui, Te Kuiti, Otorohanga and Ongarue. In addition we also met with a group in Ohakune that broadly represented local business interests in that community.

The people invited to join the focus groups were selected as a cross section of the community in each area. We also asked where practical, local Mayors and other political

leaders for their suggestions of who could contribute. In the end the focus groups were attended by a total of 53 people, representing Budget Advisory Services, Federated Farmers, Grey Power, local businesses, Maori groups and also leaders from groups that have been formed to challenge TLCs pricing. In addition, we also talked or met with a further 20 or so customers that had views they wanted to share.

Three of the Focus Groups were facilitated by the Electricity and Gas Complaints Commission (now renamed Utility Dispute Resolution Services). At the end of each focus group, notes were written up and these notes were then circulated to the attendees to ensure we had accurately recorded their views.

The main themes to come through from the focus groups were:

- Stakeholders are concerned about the impact of the TLC's pricing on the community.
- Stakeholders consider the pricing methodology and business rules which implement it, very complicated and difficult to understand.
- Some stakeholders consider TLC's line charges expensive and unfair.
- Some customers have particular issues with the unpredictability and volatility of the demand charging, and the inability to respond to the pricing signal in a timely way.
- Some customers feel they make poor investment and usage decisions due to pricing complexity.

Customers Don't Understand the Current Pricing.

We found the lack of understanding customers had of the pricing, particularly significant.

Few of even the most informed customers could calculate how much it would cost to run a 2 kW heater on a cold winter evening during a control period.

No one we met understood that the structure of TLC's pricing meant that they paid probably the lowest prices in the country for electric hot water heating. We met a number of customers that had made expensive investments to reduce electricity costs that made little economic sense.

While some customers do understand the pricing, and are making well informed usage and investment decisions, the majority don't understand it and some are suffering as a result.

TECHNICAL REVIEW OF PRICING AGAINST DEFINED CRITERIA.

As part of the review, PricewaterhouseCoopers carried out an evaluation of the current pricing system against criteria defined by TLC. The evaluation also examined how alternatives rated using the same criteria.

TLC's current pricing methodology rated well on many of the evaluation criteria in principle, but in practice it did not score as well. This is largely because implementing such complex pricing is very difficult with mass market customers. It also didn't score well in terms of equity and efficiency because prices didn't align well with costs and the complexity drove inefficient customer behaviour and investment.

The alternative of replacing the demand charge with with a TOU charge was found to better meet the criteria.

More detail can be found in the PwC report.

RECOMMENDATIONS

We recommend that TLC move away from its current pricing system including the peak pricing component. I have a number of reasons for this.

1) Many of the original economic reasons which drove the introduction of the pricing have changed. The network is growing only slowly, the incremental cost of growth is not high and Transpowers' pricing is less likely to be focused on peaks.

2) It's very difficult for customers to understand. This means that many customers can't make sensible decisions on whether to consume or conserve electricity. It also makes it hard for them to make sensible investment decisions to reduce their electricity costs.

3) The current pricing system incorporates a lag. What you do this winter doesn't impact on you until the following year. New investments a customer makes in energy saving appliances, new usage patterns are not rewarded or penalised for a long period of time. For many, this serves to discourage behaviour change. It also means that by the time the next year's billing period starts, with a higher or lower charge than expected, customers can't remember what they did "right or wrong". For customers who move between rental properties, it's especially frustrating as what they pay is heavily influenced by how the previous tenant used electricity.

4) The current pricing must have complex business rules to cope with customers moving in and out of properties and for customers with legacy metering. This complexity has costs and inevitably leads to conflict between customers and TLC.

5) The complexity of the pricing means the company must produce its own bills. This involves maintaining a billing system, sending out invoices and running a customer call centre. This adds costs. While the question of TLC continuing to bill customers separately is outside our brief, we question whether the costs exceed the benefits. If the pricing system we recommend is implemented, and assuming that the business rules associated with supplying customers are not too complicated, there would be little reason for the company to continue to bill customers directly.

Replacement Pricing System.

I recommend that TLC change to a **TOU** (Time of Use) pricing system with a **daily fixed charge**.

Under TOU pricing with a fixed daily charge, electricity prices are set for a specific time period on an advanced basis. Prices paid for energy consumed during these periods are pre-established and known to customers in advance, allowing them to vary their usage in response to such prices and manage their own energy costs by shifting usage to a lower cost period or reducing their consumption overall.

TOU Prices with Three Time Periods

Typically prices would have three time periods, **peak time, shoulder periods and night periods**. The highest prices applying at peak times and the lowest prices at night. What that means is customers can choose how they manage their energy. They could decide to optimise usage during night-time rates and minimise usage during peak time. This usage would be reflected in a monthly bill which would be transparent and easy for customers to understand.

The time of use pricing should apply all year round and seven days a week. This is because the TLC system peaks not just in winter, but during other periods with loads caused by dairying practice and peak holiday home usage.

Any pricing system which is based on consumption, naturally means costs are higher in winter. than in summer for most customers due to winter heating. With TOU pricing, customers will pay more in winter. The difference with the current system is that customers will know what the charges will be ahead of time and can make better informed decisions about their energy consumption. The monthly bills will reflect the usage from the previous month.

Simplify Pricing. Remove Transformer Charges, Capacity Charges and Geographic Pricing.

I also recommend that TLC simplifies its pricing by removing the transformer charge. The current pricing system also incorporates different prices for different geographical areas and also different prices depending on whether the customer is rural or urban. I recommend that TLC has one price level across the network.

While the transformer and the geographically based prices make the prices more cost reflective in an accounting sense, it adds cost and complexity to the pricing system. The complexity also makes it very difficult for an energy retailer to bill for the line charges and therefore locks TLC into billing customers directly.

Higher Charges for New Connections.

TLC currently has connection charges for new customers that are lower than many other lines companies. It makes up for this by having an explicit transformer charge. If TLC were to follow our advice and no longer have a transformer charge, then it would need to reconsider its connection charges.

Make Daily Fixed Charges High

The fixed daily charge should be relatively high. Most of the costs of maintaining and operating the network are fixed, and it makes good economic sense to recover costs in a similar way. A relatively high fixed charge would also help ensure that holiday home owners who use comparatively small amounts of energy would pay a fairer share of the costs of running the network.

To what extent the fixed charge reflects the capacity a customer requires or uses we have not come to a conclusion. A fixed charge that is related to actual capacity adds a complexity that makes implementation expensive.

All electricity distributors, including TLC, are subject to the Low Fixed Charge (LFC) regulations which limit daily fixed charges for customers whose annual consumption falls below certain thresholds. For customers located in the North Island and the upper part of the South Island, this threshold is 8,000 kWh per annum. The LFC regulations do not apply to holiday homes.

COULD WE IMPROVE THE CURRENT PRICING SYSTEM?

In our review, we carefully considered what improvements could be made to the current pricing system to improve it, focusing on making it easier to understand and less unpredictable. The improvements would have involved:

- 1) Measuring the peaks over a longer period of time, rather than the 6 two hour periods. This would make the pricing less volatile.
- 2) Clearly defining when the peaks would occur, for example saying they could only occur between certain time periods. This would have improved the predictability of the pricing. We also considered a warning period so customers knew a control period was coming.
- 3) Greater use of technology so customers knew what their peak charges were in real time. While the company has made great progress in this area, for many customers it is still very difficult to use and understand the metering.

- 4) Re-balancing the peak demand and capacity component. The current low price of the capacity charge compared to the peak demand charge means that customers with low peak demands don't pay their fair share of the fixed costs of running the network.

Even with these improvements we think a **TOU** pricing system is superior. The current pricing system with improvements is still very difficult for customers to understand, is volatile and has the time lag problem. We also think that TOU pricing will be much more likely to be accepted by customers.

We talked to many in the electricity industry about TLC's pricing for mass market customers. While many expressed enthusiasm for TLC's current form of pricing, when asked how you would implement this type of pricing in a way that was easy to understand and didn't have other issues, there were no clear ideas or plan on how to achieve this.

IMPLEMENTATION

The new TOU pricing system will have winners and losers. Some customers will pay more, while others will pay less. This is the case with any change in pricing system. Customers that use little energy during peak times pay very low line charges and customers that use large amounts during peak time pay comparatively high line charges.

The recommended TOU pricing system will lead to less extreme pricing outcomes. It will mean that some customers will face significant increases in line charges. This won't be popular. This was discussed with some customers at the focus groups who pay very low line charges. Some of them responded that they would be happy to pay more in line charges if the alternative system was less volatile and more readily understandable.

The current pricing system has bills of constant size through the year. The new system we are recommending is based on energy usage. The more you use in a month, the more you pay. For the majority of customers, this will mean higher winter bills and lower summer bills.

Discount for Controlled Water Heating

The current pricing system rewards customers with controllable water heating with lower line charges compared to uncontrolled water heating. This load control is important as a large amount of water heating load is turned off during peak times and this helps to keep network loads down.

This gives customers a strong signal to have a controlled water heater. However, another way to encourage water heater control is to offer lower TOU prices to customers with water heating control. Alternatively TLC could offer a rebate or discount to customers with peak controlled water heating. Even when batteries become economic controlling water heating at peak times will still make good economic sense.

Calculating the Detailed Prices. Further discussions with stakeholders.

The detail of the what the new TOU prices look like and the level of the fixed charge has not been calculated. This includes the balance between the fixed daily charge and the variable TOU prices. The details of these prices will have significant impacts on customers with different usage characteristics. It will also impact on the scale of the winners and losers compared to current prices.

I recommend that further discussions are held with stakeholders on the implementation of the new pricing system. The purpose of the discussions wouldn't be to come to agreement about the new prices but more to get further community input on how to structure the prices to best meet the needs of customers. Final decisions on the pricing structure and levels would always rest with the board of TLC.

This is a major change in pricing and won't be able to be implemented quickly. While the Terms of Reference noted the desire to have some changes made by 1 April 2017 we doubt this will be possible. We also think that because the change is so major, consultation with customers and stakeholders should take place before the new prices are implemented.

OTHER ISSUES

New Technology

The electricity industry is changing as new technologies become cheaper. The most significant of these are photovoltaics (solar power), batteries and electric cars. Both have greatly reduced in price over the past few years and are widely expected to continue to reduce in price.

Photovoltaics have now reduced to a price where they are marginally economic for some customers paying electricity prices that include line prices that are fully variable and have no TOU structure. Solar energy output follows the output from the sun, highest at solar noon and highest in summer. It is most economic for customers that therefore use large amounts of energy around solar noon or the middle of the day.

Line prices that have high TOU prices around the middle of the day that incentivises solar power doesn't make much sense. It rewards a new technology that doesn't help the network by reducing costs.

The current TLC Pricing System gives a good economic signal to customers considering investing in a solar power system. The marginal cost of using electricity in the middle of the day or generating electricity in the middle of the day is low.

The current system also gives smart pricing signals of when to charge an electric car, which is anytime except peak times. The same for batteries. It gives a very strong signal to use batteries that absorb energy at off peak times and discharge them at peak times.

The current TLC Pricing System gives the best economic signals to the new emerging technologies of any pricing system we have investigated. Although the current pricing levels with a very high peak charge gives too strong a signal to invest in batteries.

The recommended TOU pricing structure with higher prices at peak times and lower prices at off peak times will also give good economic signals to these new technologies.

Charging Vacant Properties

A number of customers raised the issue of being charged line charges for vacant properties. The basis for this is that even when a property isn't using any electricity the network still needs to be maintained. While it is unpopular with the owners of vacant properties it reduces the costs to the other customers. It is a bigger issue for TLC than for other line companies because the proportion of vacant properties on the network is comparatively high.

The ability of TLC to charge vacant properties can only occur because TLC bills customers itself. If the line billing was done by retailers it would be difficult to collect this revenue. However, some of this revenue could be levied on vacant property owners by simply having a reconnection charge when a vacant property was reconnected.

The Lines Company: Service Based Pricing

Technical Review

Final Report

March 2017



Mark Darrow
Chairman
The Lines Company Limited
PO Box 281
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16 March 2017

The Lines Company: Service Based Pricing – Technical Review

Dear Mark

We are pleased to provide our report which sets out our technical review of The Lines Company's pricing methodology. This report is provided in accordance with the terms of our letter of engagement dated 20 September 2016, and is subject to the restrictions set out in Appendix A.

Where provision has been made for copies of this report to be made available to the public these copies are subject to the conditions described within our Terms of Business. We will not accept any duty of care (whether in contract, tort (including negligence) or otherwise) to any person other than you, except under the arrangements described in the Letter of Engagement and Terms of Business.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Lynne Taylor'.

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Executive summary

Introduction

The Board of Directors of The Lines Company (TLC) have initiated a comprehensive and independent review of TLC's pricing methodology.

The overarching objective of the review is to understand how a pricing methodology can be applied to achieve optimum equity, simplicity and transparency for the customers on TLC's network.

Our role has been to assist the project team with the technical review of the pricing methodology.

In undertaking this role, we have reviewed TLC's pricing methodology documentation and other supporting disclosures; discussed TLC's pricing approach with local customers and community stakeholders; and met with TLC's board, management, and customer service and pricing teams.

Background

TLC connects 24,000 customers to the national grid through 4,400 kilometres of high voltage and low voltage lines, spread over 13,700 square kilometres located in the Otorohanga, Waitomo, Ruapehu and Taupo districts.

TLC's supply area is characterised by:

- sparsely populated areas
- small urban communities
- rugged terrain
- a high proportion of 'low use' customers
- a high proportion of tenanted or holiday homes

- a mix of industry, dairy and other seasonal loads influenced by tourism and holiday demand
- limited growth in residential and commercial electricity demand, with growth mainly located in the Hangatiki and Whakamaru regions in the northern part of the network, and Ohakune in the south
- potential for some large customer agricultural and industrial development, particularly in the north.

Current pricing methodology

TLC's current pricing approach has the following key features:

- target revenues below regulated allowances
- 24 consumer groups (defined by region, density, voltage and capacity) and 42 individual major customers
- dedicated cost recovery for 13 major customers on non-standard contracts
- shared cost recovery for other major customers and standard customers
- fixed charges which recover about half of the distribution costs - charged on a capacity basis for standard customers and a monthly fee for low use customers. All distribution costs are recovered via fixed charges for major customers
- variable charges which recover the remaining distribution costs and all transmission costs. These are charged on a peak demand basis, measured during periods of load control for standard customers, and a peak capacity basis for major customers
- dedicated transformer charges for those standard and low use customers using a TLC transformer with 3 or less connections, charged as a fixed monthly fee

- meter, relay, billing, connection, disconnection and account service fees
- capital contributions for customers located in remote parts of the network.

Network cost drivers

We have considered the underlying cost drivers for TLC's network, as these determine the current and future costs of supply which must be recovered from customers through prices. For the foreseeable future, TLC is expected to:

- focus on managing the existing network including maintaining power quality and asset quality and replacing end of life assets
- is currently not constrained, subject to continued load control at peak times - recent GXP investments have resolved potential constraints for some regions, although recent analysis suggests that within the planning period security issues may emerge in the regional transmission system in the north and supply capacity at Hangatiki may become constrained
- experience relatively low growth over most of the network. Expected growth is largely attributable to the dairy sector or large agricultural or industrial loads
- have lower solar uptake than national averages
- continue with active demand side management to manage the network including to reduce peak load. Load control is a critical component of TLC's demand side management capability, which is also supported by demand pricing.

Given these network cost drivers, the current pricing methodology's strong focus on reducing peak demand may be less critical in terms of managing network costs, subject to continued use of load control.

Stakeholder views

We have consulted with stakeholders including local community leaders and customers. We have learned that customers and local stakeholders:

- are concerned about the impact of TLC's pricing on the community
- consider the pricing methodology is too complex and difficult to understand
- have particular issues with the unpredictability and volatility of the demand charges, and the inability to respond to the pricing signal in a timely way
- have made sub-optimal investment and usage decisions due to pricing complexity
- some customers consider TLC's line charges are expensive and inequitable.

Evaluation of current methodology

TLC have identified an overarching objective for this review, which is to achieve a pricing methodology that is equitable, simple and transparent for customers.

In support of this objective, TLC has also defined criteria to be used to evaluate the current pricing methodology and to guide the improvements sought. We consider these criteria are reasonable for this purpose.

TLC's current pricing methodology rates well on many of the evaluation criteria in principle, but in practice we consider it does not score as well. The table overleaf provides a summary of our assessment of the current pricing methodology against the evaluation criteria.

Assessment against criteria

Methodology criteria	
Equity	<p>In principle, attempts to allocate costs on a user pays basis and to those which contribute most to peak demand.</p> <p>In practice, requires a number of assumptions and judgements; prices do not fully align with underlying cost allocations; and the very high demand charge results in an inequitable allocation of fixed costs, partly due to the volatile nature of the demand charge.</p>
Efficiency	<p>In principle, encourages efficient network use and investment by signalling the higher costs of peak load.</p> <p>In practice, customers are over-penalised for use at peak times, and pricing complexity results in sub-optimal investment and consumption decisions.</p>
Customer control	<p>In principle, peak pricing facilitates demand response with associated cost savings for customers over time.</p> <p>In practice, as the pricing signal is lagged, and the load control periods are not known in advance, customer response is impeded.</p>
Compliance	<p>The pricing methodology is compliant, although in practice there is some complexity in demonstrating compliance.</p>
Implementation criteria	
Clarity & transparency	<p>TLC's pricing methodology has not been used widely by the electricity distribution sector to date. Where it has been used by other suppliers, generally it has not been passed on to end customers, other than large customers.</p> <p>In practice this approach has not yet been successfully implemented for small and medium sized customers, other than on a trial or opt-in basis.</p> <p>Currently TLC's pricing methodology is not sufficiently clear or transparent for many of its customers.</p>
Stability	<p>In principle, a pricing methodology with a variable charge component will result in some pricing volatility for customers.</p> <p>In practice, within a pricing year TLC's pricing methodology is more stable than most as the variable and fixed charges are billed in equal monthly instalments.</p> <p>However, the charge is volatile on a year on year basis as the charging quantities are derived from short periods of time; during periods of abnormal usage; and only during load control periods - which may vary year on year.</p>
Practicality	<p>In principle, the introduction of smart meters facilitates the practical implementation of the pricing methodology.</p> <p>In practice, TLC's methodology has revealed a number of implementation challenges, including measuring demand.</p>
Durability	<p>In principle, the pricing methodology can be durable subject to customer acceptance.</p> <p>In practice, it requires regular management and refinement due to changing business rules, and currently suffers from mixed acceptance within TLC's community.</p>
Transition and implementation	<p>TLC continues to transition to its current methodology, as smart meters are installed, and the approach continues to be refined.</p> <p>Initial implementation of the demand charges was a challenge.</p>

Refinements and alternatives

We have considered options for refinements to the existing methodology and alternative methodologies. In doing so we have been particularly mindful of:

- the views expressed by customers about the current approach and their experiences with it
- the challenges facing the network over the ten year planning horizon
- TLC's current billing, metering and customer service infrastructure
- existing and emerging electricity distribution pricing practice in New Zealand, and internationally.

Potential refinements to the current pricing methodology

We consider that the current pricing methodology can be refined to better meet the evaluation criteria, and alleviate some of the customer concerns. We note that any refinements to the current pricing methodology are likely to result in increased charges for some customers and reduced charges for others.

Before any refinements or alternatives are developed and implemented, we recommend that customers and stakeholders are consulted on the proposals.

Potential refinements include:

- review and update the consumer groups to simplify them and reduce reliance on allocation rules
- review and update revenue allocations to consumer groups to better reflect underlying costs
- rebalance fixed and variable charges to better reflect underlying costs
- improve demand measurement to reduce volatility, increase predictability and improve customer acceptance and understanding. Options include standardising control periods, increasing the number of peak periods and using more recent peak period data.

These refinements may reduce the impact of the current demand charges for some customers, and assist all customers to respond more appropriately to price signals.

However, underlying complexity and perceived inequity in the current pricing methodology is likely to continue even if such refinements are introduced.

Potential alternative to the current methodology

A change to an alternative pricing methodology may better meet the overarching objectives of equity, simplicity and transparency, while also satisfying the remaining evaluation criteria.

A recommended alternative for consideration is to replace the variable demand charge with a variable time of use (TOU) charge, incorporating higher peak prices and lower shoulder and off peak prices.

We consider that TOU pricing may have advantages for TLC and its customers at this time because it retains a peak signal, but implements it in a way that is easier for customers to understand and respond to.

Although a TOU peak signal is weaker than the current demand pricing approach, TLC's network is largely focussed on maintaining and renewing the current network. Some network constraints may emerge in the north during the planning period, however customer specific investments will address a significant portion of the additional forecast load.

Accordingly, at this time we expect that TLC can - with continued use of load control at peak times - accommodate a more balanced pricing structure which is more simple and transparent for customers. We do not consider this will significantly compromise TLC's equity and efficiency objectives.

We expect that other electricity distributors will develop and test new pricing approaches over the next few years, including TOU, demand and capacity pricing options. These developments may be suitable for TLC and its customers at some stage in the future.

The table overleaf provides a summary assessment of the status quo and the suggested pricing refinements and alternatives against the evaluation criteria.

Other potential pricing changes

We have also identified other potential refinements which TLC could consider to further improve its pricing methodology. These include:

- remove the dedicated transformer charge to reduce complexity
- widen the capital contribution policy to improve equity and efficiency
- increase fixed charges for holiday homes to improve equity and reduce complexity
- further incentivise customers to make controllable load available to improve efficiency
- review major customer pricing structures to improve equity and efficiency
- review transmission pricing once the new Transmission Pricing Methodology (TPM) is known.

These can be implemented alongside the potential refinements to the current method, and the recommended TOU alternative.

Assessment of the current pricing methodology and potential refinements and alternatives against criteria

Criteria	Status quo	Refine current demand pricing	Adopt TOU based pricing
Methodology criteria			
Equity	Currently does not achieve equitable outcomes as prices do not align with underlying costs, and the demand charge does not result in a fair allocation of fixed costs, partly due to the volatile nature of the demand charge	Adjusting the weighting between demand and fixed pricing will improve equity. Better understanding and customer responsiveness will also improve equity	Further improves equity due to improved customer response, and rebalancing of peak and off peak charges
Efficiency	Customers are over penalised for consumption at peak times and pricing complexity results in sub-optimal investment and consumption decisions	Improving the predictability, responsiveness and reducing the volatility in demand charges will improve efficiency as consumer response should improve as a result. Lower demand charge will improve alignment with underlying network costs	Maintains incentives for efficient use of the network, commensurate with the current and forecast network focus A lower cost method to implement and manage
Customer control	As the pricing signal is lagged and load control periods are not known in advance, customer control is obstructed	Customer control should improve if demand charges are reduced, and they become more predictable and responsive	Improves customer control because the quantity measurement is more easily understood and more responsive. Maintains incentives to manage peak load
Compliance	Is compliant, albeit with some complexity in practice	The proposed refinements will not have a notable impact on compliance	Not expected to introduce any particular compliance issues
Implementation criteria			
Clarity & transparency	Currently not sufficiently clear or transparent for many customers	Refinements will improve clarity and transparency, but complexity for customers will remain	Expected to significantly improve clarity and transparency over demand pricing
Stability	A stable methodology within a pricing year, as fixed and variable charges are billed in equal monthly instalments Volatile on a year on year basis for customers, due to how peak demand is measured, and the change in load control periods from one year to the next	Any changes will initially introduce transitional price movements, and some customers will face higher charges and others lower charges Increasing the weighting of fixed charges, and changing the measurement periods should reduce volatility for some customers	Any changes will initially introduce transitional price movements. Generates more seasonal variation in customer bills but potentially less year on year variation Increasing the weighting of fixed charges reduces volatility
Practicality	There have been a number of implementation challenges, including in how to measure and estimate peak demand	Many of the practical challenges remain. The proposed refinements will introduce additional implementation challenges to be overcome	Initial implementation will raise issues to be overcome. In the longer term, a more practical option, requiring fewer business rules
Durability	Business rules continue to be developed and refined to support the methodology. As customer acceptance is mixed this method may not be durable for TLC	In principle a durable method, although durability is dependent on consumer acceptance and the ability of TLC to adequately support the methodology	Provides a customer centric option which is appropriate for the network's current outlook. TLC may choose to adopt more durable approaches in the longer term

Criteria	Status quo	Refine current demand pricing	Adopt TOU based pricing
Transition & implementation	Any changes will need careful planning and testing before implementation. Some customers can be expected to pay more for their electricity, and others less, when changes are introduced. Overall equity can be improved as a result		

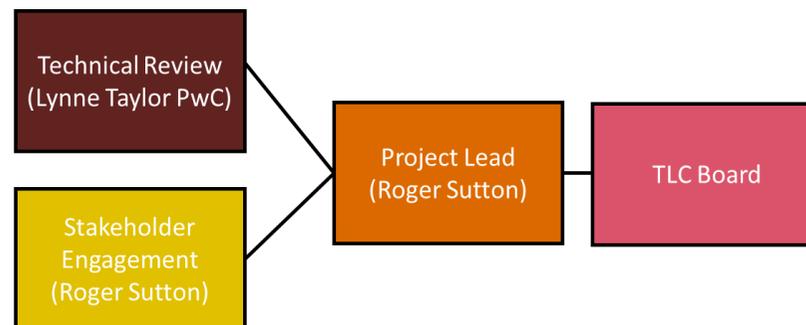
Introduction

Scope of the review

2. In September 2016, the Board of Directors of TLC initiated a comprehensive and independent review of TLC's service based pricing methodology. The scope of the review is described in detail in the Terms of Reference (TOR), dated 6 September 2016.
3. The overarching objective of the review is to understand how a pricing methodology can be applied to achieve optimum equity, simplicity and transparency for the customers on TLC's network. The TOR includes a number of criteria against which the current pricing methodology is to be evaluated, and to guide potential improvements to the methodology.
4. At a high level, the TOR defines the scope of the review as follows:
 - research and understand through engagement what TLC customers perceive as fair and equitable
 - review the existing pricing methodology, and its application, against the criteria
 - identify areas where the criteria may not be being optimally met
 - recommend changes, improvements and/or alternatives
 - consult with stakeholders on the recommendations
 - scope an implementation plan for any changes.

Project team

5. The project team is made up as follows:



Technical review

6. Our role has been to assist the project team with the technical review of the pricing methodology. Our focus has therefore been to:
 - appraise the existing pricing methodology against the criteria
 - consider options for refinements to the existing methodology, and/or alternative methodologies and assess them against the criteria
 - report our technical findings
 - assist the Project Lead to compile the findings and recommendations of the review consistent with this report.
7. In undertaking our review, we reviewed TLC's pricing methodology documentation and other publicly disclosed information including TLC's Asset Management Plan (AMP) and annual regulatory disclosures.
8. We also discussed TLC's pricing approach with local customers including in focus group sessions. These were run in conjunction with local community leaders throughout TLC's supply area in November 2016.
9. In addition we met with TLC's board, management, and customer service and pricing teams to better understand the pricing methodology.

10. We greatly appreciate the assistance we have received in this respect.

Background

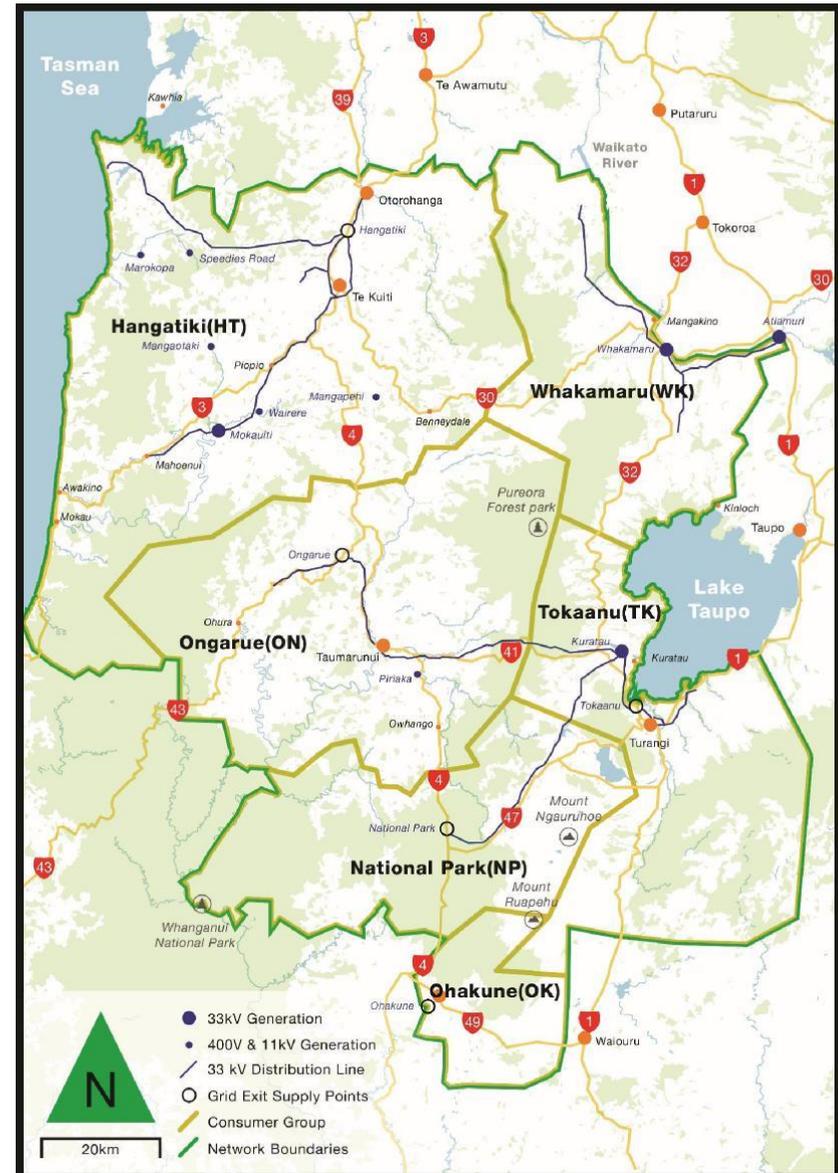
11. TLC is one of 29 electricity distribution businesses that supply customers with electricity lines services in New Zealand. TLC connects 24,000 customers to the national grid through 4,400 kilometres of high voltage and low voltage lines, spread over 13,700 square kilometres.

12. TLC's network supply area is illustrated on the map opposite.

13. The network area is characterised by:

- sparsely populated areas
- small urban communities
- rugged terrain
- embedded hydro generation
- a high proportion of low use customers
- a high proportion of tenanted or holiday homes
- a mix of industry, dairy and other seasonal loads influenced by tourism and holiday demand
- limited growth in residential and commercial electricity demand. This is mainly located in the Hangatiki and Whakamaru regions in the northern part of the network and Ohakune in the south
- potential for large customer agricultural and industrial development, particularly in the north.

Figure 1: TLC's supply area



Current pricing methodology

Summary

14. TLC's current pricing methodology is documented on TLC's website.

15. The pricing methodology comprises four stages, as follows:

- determine target revenue
- identify consumer groups
- allocate target revenue to consumer groups
- develop prices to recover target revenue and send price signals to customers.

16. A description of each stage of the 2016 pricing methodology follows.

Target revenue

17. Target revenue for the pricing year commencing 1 April 2016 (PY17) is \$41.5m, as illustrated opposite. We note TLC's annual target revenue has increased in recent years.

18. Capital related costs¹ make up the majority of TLC's target revenue, followed by transmission costs.

19. In PY17 TLC set target revenue at a level below total costs. In effect this will result in TLC earning a return on investment (ROI) lower than the target return inherent in TLC's regulated price cap.²

¹ Comprising return on capital invested and return of capital invested (depreciation)

² For more information on price regulation of electricity distribution businesses, refer to the Commerce Commission's website

20. TLC's electricity distribution business reported a post-tax ROI for PY16 of 4.83%³. The Commission's mid-point regulated benchmark was 5.37%

Table 1: Target revenue (PY17)

Cost	Component	\$m
Distribution	Capital related	25.3
	Maintenance	5.3
	Customer and administration	5.5
Pass through	Rates and levies	0.4
Recoverable	Transmission	7.7
Total cost		44.3
Target revenue		41.5
Budgeted under recovery of total cost		2.8

Source: TLC Pricing Methodology 2016

Consumer groups

21. Consumers are defined as either standard contract customers or non-standard contract customers.

22. Standard contract consumer groups are determined by reference to:

- region (each served by a transmission point of supply)
- capacity (comprising two bands: above and below 100 kVA)
- demand density (comprising high and low density: above and below 50 kVA/km)
- high voltage (HV) and low voltage (LV) customers.

³ Neighbouring distributors recorded higher ROIs for the same period as follows: Unison Networks 6.48%, Powerco 6.36% and Waipa Networks 5.35%.

23. There are 24 standard contract consumer groups in the <100kVA capacity band, with a further 42 major customers⁴ in the >=100 kVA capacity band.
24. The allocation of customers between consumer groups is illustrated in the tables below, using 2016 Installation Control Point (ICP) data.⁵

Table 2: Consumer groups <100 kVA capacity (ICPs)

Region	Demand Density and Voltage Group				Total
	HVHI	HVLO	LVHI	LVLO	
Hangatiki	1,402	1,689	4,804	1,085	8,980
Tokaanu	128	103	4,493	53	4,777
Ongarue	480	779	2,825	601	4,685
Whakamaru	103	1,184	800	591	2,678
Ohakune	221	-	1,744	-	1,965
National Park	73	150	390	189	802
Total	2,407	3,905	15,056	2,519	23,887

Table 3: Consumer groups >= 100kVA capacity (ICPs)

Region	Standard	Non Standard	Total
Hangatiki	17	6	23
Tokaanu	6	1	7
Ongarue	2	2	4
Whakamaru	1	1	2
Ohakune	-	2	2
National Park	3	1	4
Total	29	13	42

Source: TLC Pricing Methodology 2016, PwC analysis

⁴ Customers in the >= 100kVA capacity band are referred to as majors. This term also incorporates those customers on non-standard contracts.

⁵ HVHI = high voltage, high density, HVLO = high voltage, low density, LVHI = low voltage, high density, LVLO = low voltage, low density

25. We note that TLC has a more disaggregated consumer grouping approach than other distributors, which generally do not separate their networks into so many regions or density groups.

Allocation of target revenue

26. Where costs are directly attributable to major customers, they are allocated to the customer for pricing purposes. This occurs for major customers on non-standard contracts.
27. For the remainder of customers, target revenue for each consumer group broadly reflects historical allocations. We understand these allocations were derived using regulatory asset base (RAB), line length (km), density (kVA/km) and connection (ICP) data. In recent years average annual price movements have been assigned to each consumer group each pricing year.
28. TLC is currently developing a cost of supply model. The purpose of this model is to use updated cost drivers to allocate distribution costs between region, capacity, density and voltage groupings. It is expected that this modelling will assist TLC to understand how closely the current revenue allocation aligns with underlying costs for each consumer group.

Pricing structure

29. The target revenue for each consumer group is recovered via delivery prices. These cover distribution costs, pass through costs and recoverable (transmission) costs.
30. For customers on standard contracts, distribution prices⁶ comprise the following:

⁶ These prices also recover pass through costs.

Table 4: Distribution price components

Price	Plan	Unit
Distribution Fixed	Standard	\$/kVA/month
	Low User	\$/month
	Major	\$/kVA/annum
	Dedicated Transformer	\$/month
Distribution Variable	Standard & Low User	\$/kW/month

31. For customers on standard contracts, transmission prices comprise:

Table 5: Transmission price components

Price	Plan	Unit
Transmission Variable	Standard & Low User	\$/kW/month
	Major	\$/kVA/annum

32. For customers on non-standard contracts, distribution prices reflect a fixed monthly charge, and transmission prices reflect a \$/kVA/month charge.

33. TLC also charges meter and relay fees, billing fees (for major customers) and connection, disconnection and specified account service fees. TLC does not charge capital contributions other than for new connections located in remote parts of the network.

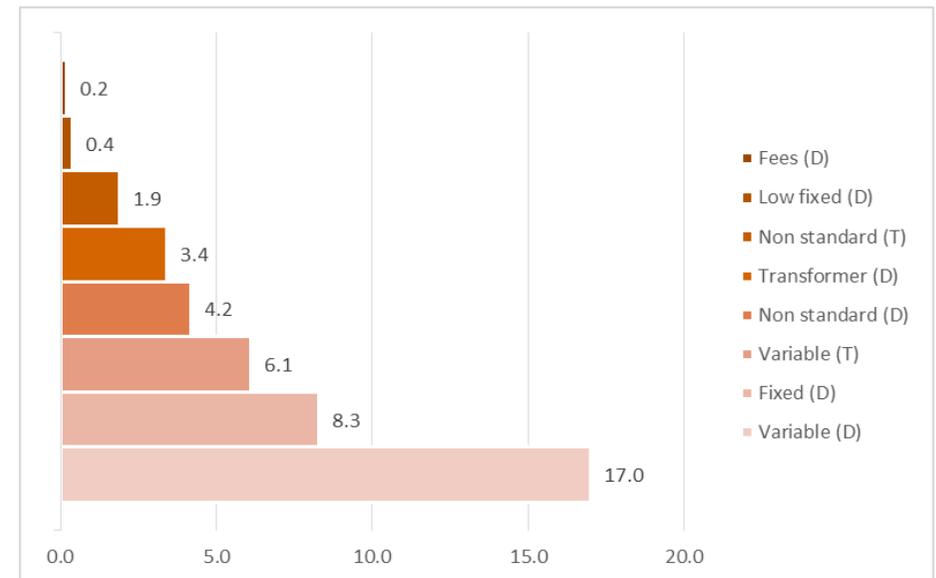
34. A full schedule of prices is available on TLC’s website. A schedule of pricing components and consumer groups is included in Appendix B.

Revenue recovery

35. The figure below shows the expected total revenue recovery by price component for PY17⁷:

- total target distribution (D) revenue is \$33.5m, of which approximately half (\$17m) is expected to be recovered via variable prices
- total target transmission (T) revenue is \$8.0m, which is fully recovered via variable prices.

Figure 2: Revenue by price component (\$m)



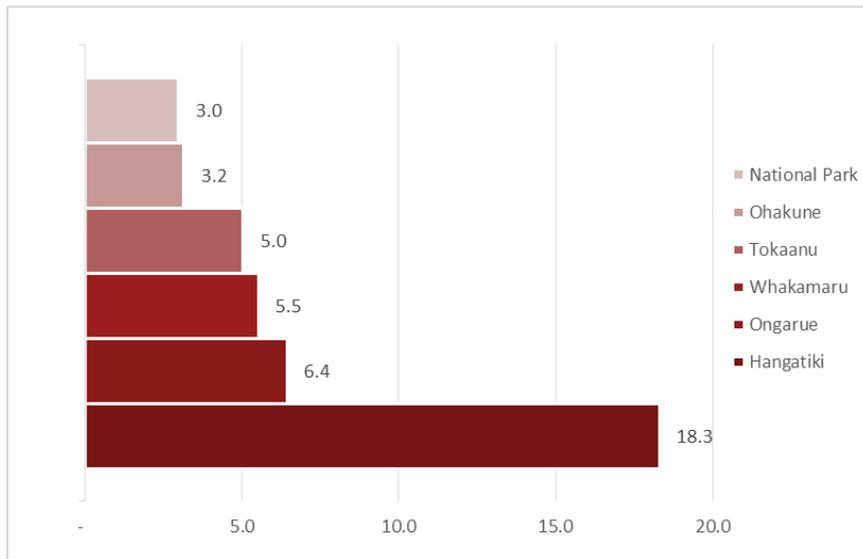
Source: PwC analysis, TLC Pricing Methodology 2016

⁷ The figures in this section of the report exclude meter and relay revenue, consistent with TLC’s pricing methodology documentation

36. The figure below shows target revenue recovery by pricing region for PY17:

- approximately 44% of revenue is recovered from the Hangatiki region and another 16% from the Ongarue region
- the two smallest regions, National Park and Ohakune, together contribute approximately 15% of revenue.

Figure 3: Revenue by region (\$m)



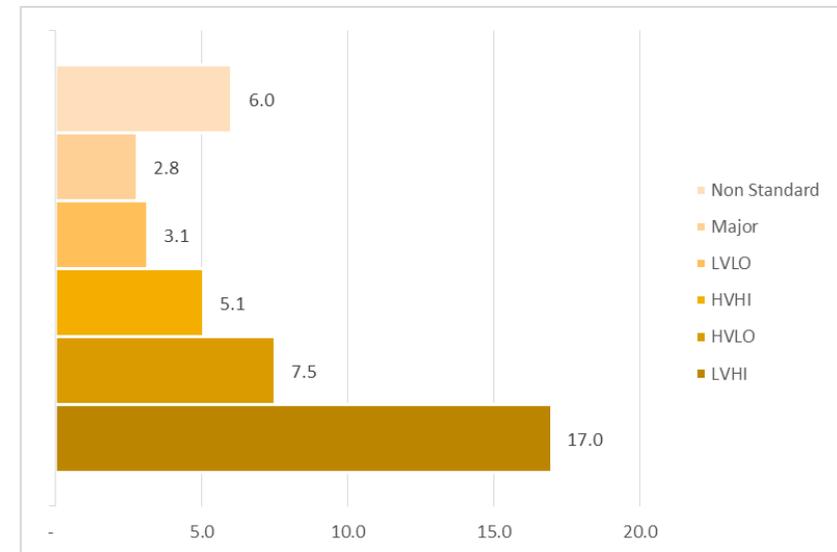
Source: PwC analysis

37. The figure opposite shows revenue for all regions by consumer group:

- standard customers located in high density (HI) areas are expected to contribute 53% (\$22.0m) of total revenue
- standard customers located in low density (LO) areas are expected to contribute approximately 26% (\$10.6m) of total revenue

- majors (including non-standard contract customers) are expected to contribute 22% (\$8.8m) of revenue in PY17.

Figure 4: Revenue by consumer group (all regions) (\$m)



Source: PwC analysis

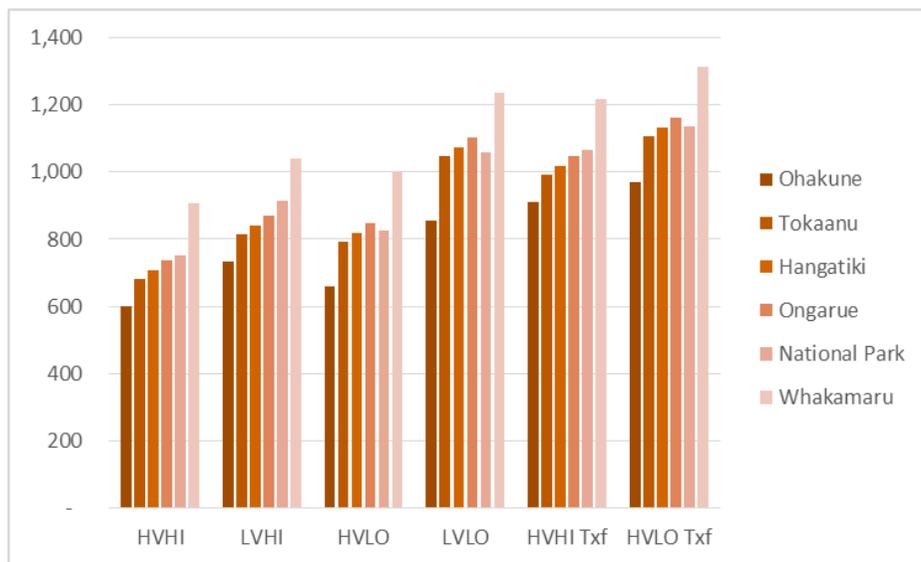
38. The figures above illustrate the importance of the variable charge and the Hangatiki region to the overall revenue recovery. Customers located in high density areas also contribute significantly to total revenue.

Pricing relativities

39. Under TLC's approach standard customers located in different regions, and in different locations within a region, incur different delivery prices. For illustrative purposes, we have compared the total distribution charge (including metering and relay charges) incurred by a standard consumer⁸ located in each region, for each density and voltage group.

⁸ Assuming annual demand of 2.65kW

Figure 5: Comparable network charge by region (\$ p.a.)

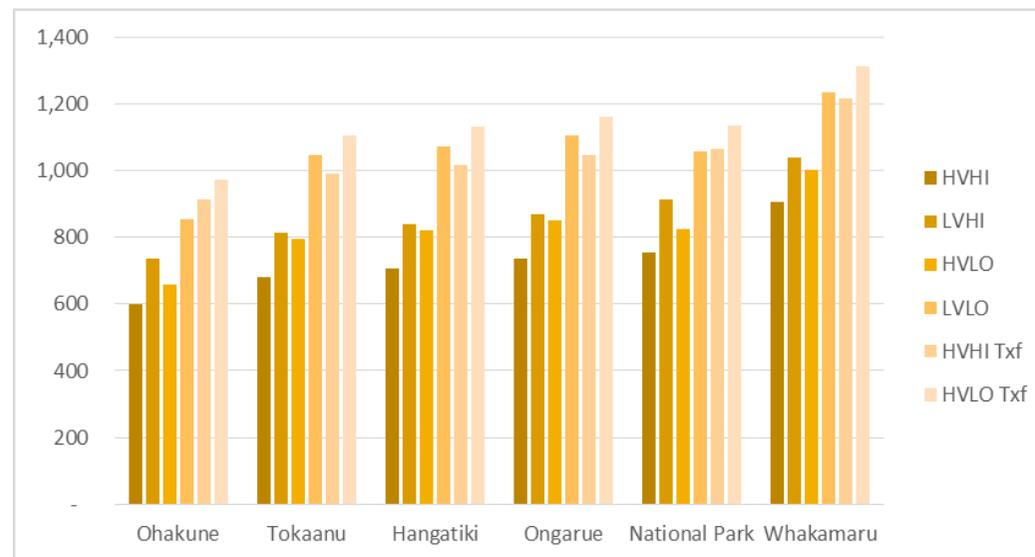


Source: PwC analysis

40. As illustrated above:

- distribution charges for customers located in the Whakamaru region are higher than for those located in other regions. This is offset by lower transmission charges⁹, as this region is supplied directly from the generation plant located in the Whakamaru district
- distribution charges are the lowest for customers located in the Ohakune region
- customers located in the Tokaanu, Hangatiki, Ongarue and National Park regions have charges which are broadly similar.

Figure 6: Comparable network charge by consumer group (\$ p.a.)



Source: PwC analysis

41. As illustrated above, within each region:

- customers located in high density areas have lower charges than those located in low density areas
- customers allocated to the HV consumer group also have lower charges than those allocated to the LV consumer group
- customers who incur a dedicated transformer charge are connected to the LV network but are assigned to HV consumer groups for pricing purposes
- customers in low density areas with dedicated transformer charges incur the highest charges overall.

⁹ Transmission charges are not included in the values shown in Figures 5 and 6.

Low user charges

42. All electricity distributors, including TLC, are subject to the Low Fixed Charge (LFC) regulations¹⁰ which limit daily fixed charges for customers whose annual consumption falls below certain thresholds. For customers located in the North Island and the upper part of the South Island, this threshold is 8,000 kWh per annum. As TLC does not apply a kWh charge, a demand threshold of 2.65kW is applied for LFC compliance purposes.
43. The figures opposite compare total annual network charges for standard and low user customers located in the Hangatiki region. The standard customer is assumed to have total demand of 2.65kW, and the low use customer, 2.38kW demand¹¹. As illustrated opposite:
- total charges are slightly lower for the low user, reflecting lower demand
 - the network variable component for the low user substitutes for a large proportion of the network fixed component of the standard user
 - the dedicated transformer charge is consistent for low and standard users.
44. As TLC has over 7,000 ICPs on low user charges. The variable component of prices has a particularly significant impact on these customers, who make up approximately 25% of the customer base.

Figure 7: Hangatiki network charges (standard user) (\$ p.a.)

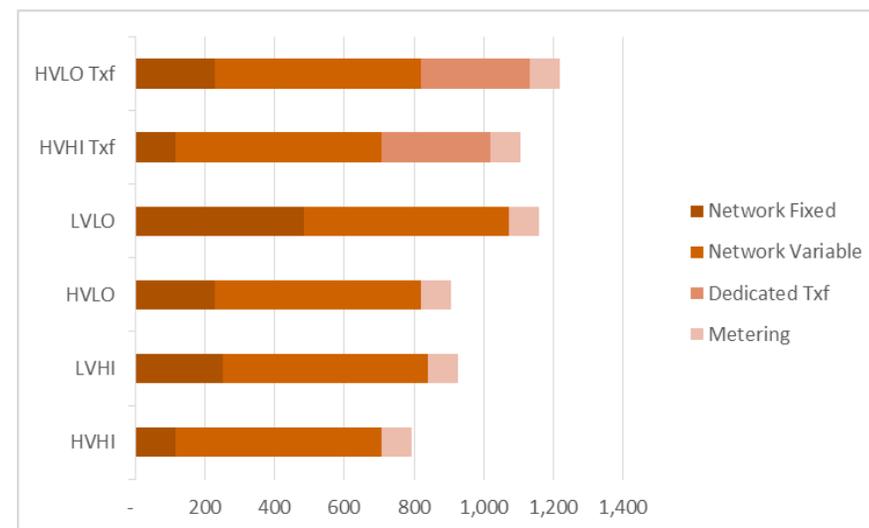
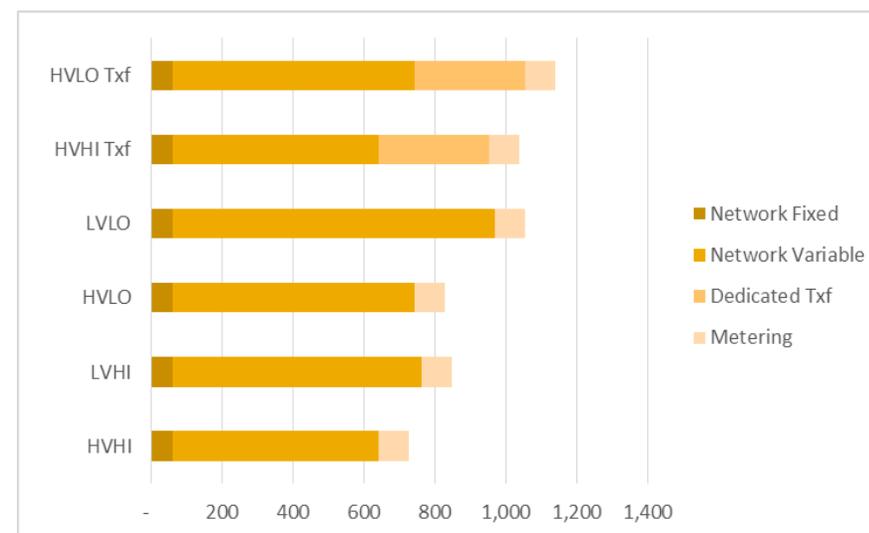


Figure 8: Hangatiki network charges (low user) (\$ p.a.)



Source: PwC analysis

¹⁰ Electricity (Low Fixed Charge Tariff Option for Domestic Consumers) Regulations 2004

¹¹ Consistent with TLC's Pricing Policy, available on TLC's website

Implementation of the pricing methodology

Business rules

45. TLC has developed a number of business rules to implement its pricing methodology. These are heavily influenced by the variable (demand) pricing which comprises more than half of the total delivery revenue.
46. These rules include:
 - how peak demand is measured
 - defining load control periods
 - whether adjustments are made to measured demand under certain circumstances, such as when customers move into a new residence, or meters change
 - how customers without demand metering are billed
 - how vacant and tenanted properties are billed.

Measuring demand and capacity

47. TLC's variable charges are calculated on the basis of kW load for each connection. Load is measured as the six highest two hour peaks recorded during periods of load control.
48. Load control periods are aligned to Transpower's lower North Island Regional Coincident Peak Demand (RCPD) periods, as a proxy for TLC's network peak demand.¹² Load control may also be used at other times for network operating purposes.
49. The kW load quantity is calculated once a year, using each customer's six highest peaks from the past year, generally recorded during the previous winter.

50. At the beginning of each pricing year, pricing notifications are sent to customers advising them of their kW load quantity. The variable charge is then recovered in 12 equal monthly instalments, from April to March, using the kW measure from the prior year.
51. Not all customers are currently billed on the basis of load measured in this way. This is because smart meters are not yet installed at all ICPs, and some customers who do have smart meters have opted to have their load measured using TLC's profile method.
52. Loads are estimated for these customers using load profiles which are derived from information from a sample of other customers. Separate profiles are used for dairy, temporary accommodation and standard connection customers.
53. Network fixed charges are charged on the basis of kVA capacity for those on standard user pricing plans. Low users are charged a fixed price per day in accordance with the LFC regulations. For most customers, kVA capacity is the capacity established at the time of initial connection, subject to minimum capacity thresholds.¹³

Transformer charges

54. Where a distribution transformer owned by TLC supplies 3 or less connections, a separate transformer charge applies in addition to network fixed and variable charges. This charge is billed as a fixed charge per month, and varies by transformer size.
55. The charge is intended to recover the cost of the transformer and the associated LV assets. Accordingly any connections subject to a transformer charge are allocated into HV consumer groups for pricing purposes. They therefore avoid the higher network charges associated with the LV consumer groups.

¹² This load control practice also helps TLC to minimise its transmission charges under the current TPM.

¹³ A more comprehensive description of how kW load and kVA capacity are measured is included in TLC's Pricing Policy

Billing and metering

56. TLC directly meters and bills its customers for delivery charges and other fees. This is unique in New Zealand, as other electricity distribution companies pass on their charges to retailers who are responsible for customer metering and billing. Some distribution companies direct bill major customers.
57. TLC elected to direct bill its customers when the current pricing methodology was first introduced. As a result, TLC operates a customer service centre which provides services not generally performed by other distribution companies.
58. TLC also offers a prompt payment discount (of 10%) for those standard customers who pay their bills by the due date.

Customer service

59. TLC's customer services have evolved since the initial move to direct billing. Over time, TLC has revised the information available to customers about its pricing approach, including the information included on customer bills, on its website, in pricing documents and notifications and through its call centre.
60. This has been necessary because the demand pricing approach in particular was unfamiliar to customers when it was first introduced, and a number of refinements which have been made since then have caused some pricing volatility and uncertainty for customers.

Network cost drivers

Cost of supply

61. To help us evaluate TLC’s pricing methodology we have considered the underlying cost drivers for the network, as these determine the current and future costs of supply which must be recovered from customers through prices.

Operating and capital expenditure

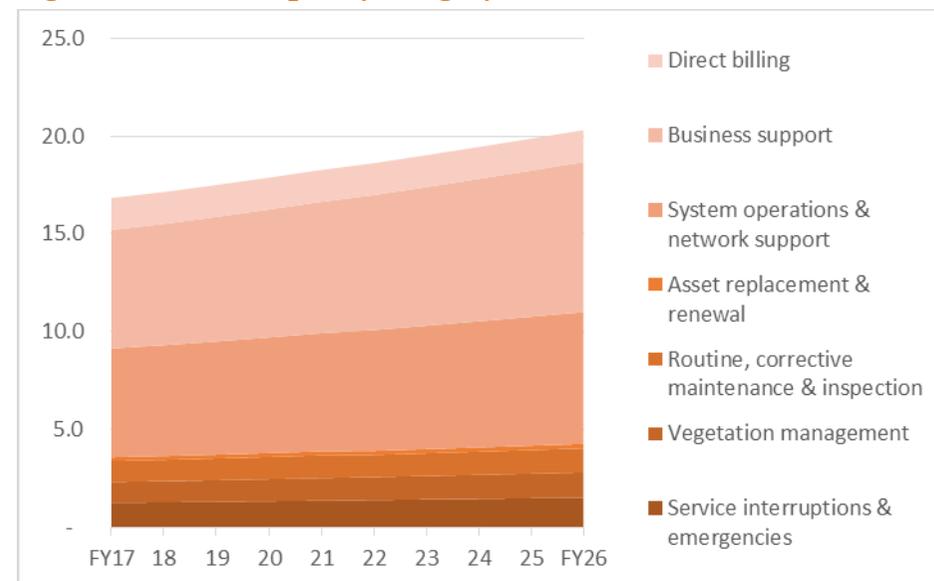
62. TLC publishes ten year forecasts of operating (opex) and capital (capex) expenditure, by expenditure category. These forecasts are explained in TLC’s Asset Management Plan (AMP) which is available on TLC’s website.

63. As demonstrated in the tables and figures opposite and overleaf:
- network opex makes up approximately one third of the forecast opex, with the majority of opex associated with business support and system operations and network support activities
 - TLC’s direct billing costs comprise 13% of forecast opex, and in FY16 made up 18% of total opex
 - operating costs are forecast to remain relatively stable over the ten year planning period. Increases in total opex largely reflect allowances for inflation.
 - the total value of opex over the forecast period is less than the total value of capex (shown overleaf).

Table 6: Actual and forecast opex (\$m nominal)

Operating costs (\$m)	Actual		Forecast	
	FY16		FY17-FY26	
	\$m	%	\$m	%
Service interruptions & emergencies	1.1	10%	13.8	11%
Vegetation management	0.9	8%	11.7	9%
Routine, corrective maintenance & inspection	0.9	8%	11.5	9%
Asset replacement & renewal	0.3	2%	2.1	2%
Total Network	3.2	28%	39.0	32%
System operations & network support	2.3	21%	23.4	19%
Business support	3.8	33%	45.0	36%
Direct billing	2.0	18%	16.3	13%
Total Non Network	8.0	72%	84.6	68%
Total Operating Costs	11.2	100%	123.6	100%

Figure 9: Forecast opex by category (\$m nominal)

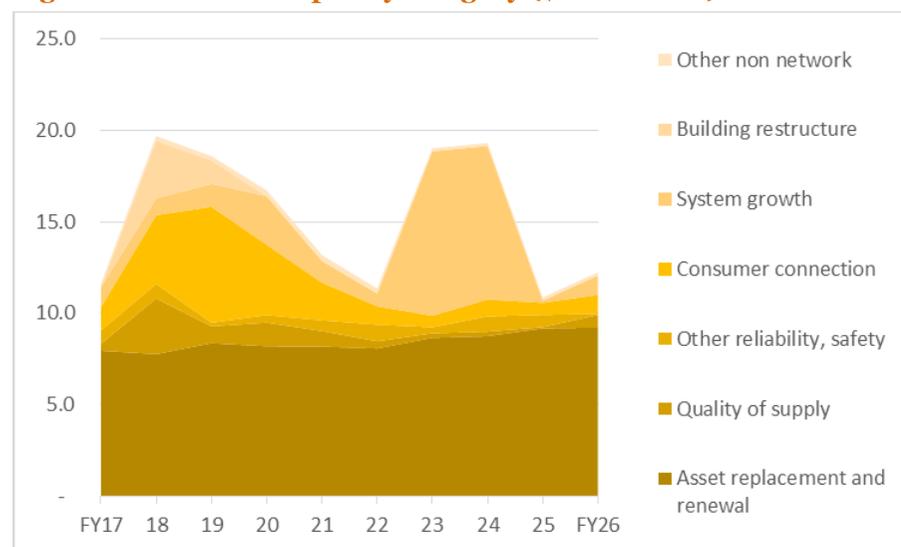


Source: TLC 2016 Information Disclosures, PwC analysis

Table 7: Actual and forecast capex (\$m nominal)

Capital costs (\$m)	Actual		Forecast	
	FY16		FY17-FY26	
	\$m	%	\$m	%
Consumer connection	1.5	14%	21.5	14%
System growth	0.1	1%	26.4	17%
Asset replacement and renewal	6.5	62%	84.4	55%
Asset relocations	-	0%	0.1	0%
Quality of supply	0.3	3%	8.1	5%
Other reliability, safety	1.1	11%	5.5	4%
Total Network	9.5	91%	146.1	96%
Building restructure	-	0%	4.4	3%
Other non network	0.9	9%	2.3	1%
Total Non Network	0.9	9%	6.7	4%
Total Capex	10.4	100%	152.7	100%

Figure 10: Forecast capex by category (\$m nominal)



Source: TLC 2016 Information Disclosures, TLC forecasts, PwC analysis

64. As demonstrated opposite:

- capex is dominated by asset replacement and renewals, which together with investments in quality of supply and other reliability, safety and environmental improvements make up approximately 65% of total forecast capex
- consumer connection capex makes up 14% of the forecast. It is abnormally high in FY18 and FY19 reflecting planned investment to support the NZ Steel mill
- system growth capex makes up 17% of the forecast - it also varies across the planning period. Approximately half of this expenditure reflects potential TLC contributions in FY23 and FY24 towards additional 220kV assets to supply the Hangatiki region
- non-network capex is not significant, and predominantly reflects the planned restructure of the head office building located in Te Kuiti during FY17 and FY18.

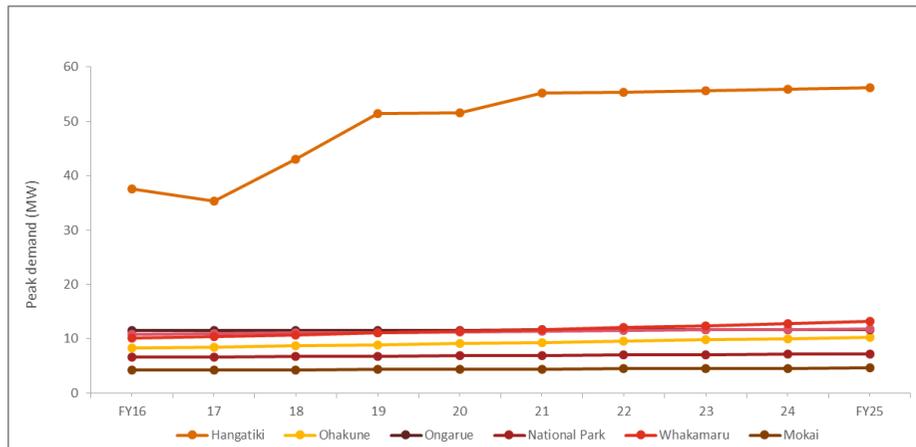
Network growth

Network growth

65. TLC's network growth outlook is relatively modest throughout the planning period with 1.4% per annum (in terms of peak and total consumption) used as a planning assumption. This is reflected in the expenditure forecasts which highlight a focus on asset maintenance and capital renewals, along with network and business support expenditure, with some targeted network reinforcement/upgrade expenditure.

66. Growth varies by region, as illustrated in the peak demand forecast overleaf. This forecast assumes continued demand side management (refer to the discussion below).

Figure 11: Peak demand forecast at point of supply (MW)



67. This illustrates that:

- the major growth is forecast to occur at Hangatiki. This largely reflects potential expansion of the steel mill at Taharoa and other industrial and agricultural developments
- incremental growth is also forecast for that region, as well as Whakamaru and Ohakune
- there is minimal forecast growth in peak demand across the remainder of the network during the planning period.

68. Currently solar uptake in TLC’s region has been relatively low. Given the low growth, climate and customer mix, we expect that solar uptake will be lower than the national average during the planning period. This is consistent with TLC’s AMP.

Demand side management

69. TLC currently has a significant focus on demand side management to reduce peak demand, defer investment in additional network capacity and minimise Transpower’s charges. This occurs through:

- load control - TLC uses ripple relays to control hot water and other assigned loads during Transpower’s lower North

Island regional peaks and at other times for network operational purposes

- auxiliary generation - some customers operate generators to reduce their peak demand
- demand pricing - TLC’s network and transmission variable prices encourage customers to reduce demand during load control periods.

70. TLC has advised us that currently approximately 5MW of peak load is shed on winter evenings as a result of load control, and the restored load is about 15MW. This generally occurs three or four hours after the hot water load is initially shed.

71. Appendix C shows TLC’s monthly, weekly and daily load profiles by region. The largest region, Hangatiki, has summer peaks. These will generally fall outside Transpower’s RCPD periods which determine when TLC is load controlling.

Network constraints

72. The AMP also considers network constraints during the planning period, and indicates that, assuming continued demand side management:

- recent Transpower investments at the Ohakune and National Park GXPs provide adequate capacity at these points of supply for the planning period
- as little growth is expected in the Ongarue and Tokaanu regions, these points of supply also have sufficient capacity for the foreseeable future
- the Hangatiki point of supply may become constrained during the planning period due to possible agricultural and industrial sector investments and security issues within the wider regional 110kV system
- a new 10MVA substation in the Whakamaru area will be required during the planning period to meet demand growth

- TLC's 33kV subtransmission lines are not expected to be constrained during the planning period.

73. TLC also provided us with additional analysis of potential feeder constraints for the planning period. The following table summarises the results of the analysis of five representative feeders.

Table 8: Feeder constraint analysis

Feeder	Load growth p.a.	Constraint	Solution	Cost (\$m) over ten years
Maihihi (dairy)	1%	Voltage	Capacitors, peak load control	0.05
Rangitoto (industrial)	0.5%	Voltage	Adjust tap changers	0.09
Matapuna (residential)	0%	Voltage	Adjust tap changers	0.09
Western (rural residential)	0%	Overloaded SWER	SWER substation earthing	0.10
Kuratau (holiday)	1.5%	Voltage	Adjust tap changers	0.001

Source: TLC

74. Extrapolating these results over all 38 feeders suggests an average annual investment of \$0.3m to address feeder constraints. We note that these constraints are largely due to power quality issues.

Long run marginal cost

75. Using forecasts of system growth capex and load growth derived from TLC's AMP and more recent forecast data provided by the company we have estimated TLC's long run marginal cost (LRMC) of incremental capacity as between \$70-\$80 per kW per annum over the next ten years. This analysis excludes the potential incremental load and investment for the steel mill and assumes continued active use of demand side management to maintain power quality and reduce peak load.

76. The distribution peak demand charges paid by TLC's customers are currently 2 to 6 times higher (per kW per annum) than this estimate.

Summary of cost drivers

77. In summary we note that for the foreseeable future, TLC's network will:

- focus on managing the existing network including maintaining power quality and asset quality and replacing end of life assets
- have few capacity constraints - recent GXP investments have resolved potential constraints for some regions, although recent analysis suggests that constraints may emerge at Hangatiki within the planning period
- experience relatively low growth over most of the network. Expected growth is largely attributable to discrete customers or locations
- have lower solar uptake than national averages
- continue with active demand side management to manage peak load. Load control is a critical component of TLC's demand side management capability, which is also supported by demand pricing.

Evaluation of current methodology

Objective of the review

The objective of this review is to understand how a pricing methodology can be applied to achieve optimum equity, simplicity and transparency for the customers on TLC's network.

78. The TOR state:

- the key aim is to develop and implement a pricing approach that is as equitable and as acceptable as possible for all customers
- TLC's prices need to not only allocate distribution costs fairly to its customers but also be considered as appropriate
- it is intended to conclusively address all issues raised so TLC has a final and robust conclusion to any on-going debate.

79. The TOR note that developing a future service based methodology will require the management of possible conflicting criteria. Trade-offs will result and when and where they do, the overarching objective (above) is to be given priority.

Evaluation criteria and pricing principles

Evaluation criteria

TLC has defined criteria to be used to evaluate the current pricing methodology and to guide the improvements sought. The criteria are set out in full in Appendix D.

80. In Appendix D we also show how these criteria align with the Electricity Authority's (Authority) pricing principles.

Table 9: Evaluation criteria

Methodology Criteria	Implementation Criteria
Equity	Clarity & transparency
Efficiency	Stability
Customer control	Practicality
Compliance	Durability
Transition and implementation	

81. The overarching objective of the review assists us to prioritise the evaluation criteria by highlighting equity, simplicity and transparency as of particular interest for this review. We consider these criteria are reasonable for this purpose.

Customer views

82. We have drawn on our discussions with stakeholders including local community leaders, customers and TLC staff in completing this assessment.

83. In these discussions a number of common themes have emerged about how TLC's current pricing methodology is perceived by customers. These views were expressed by customers who had successfully reduced their delivery charges by reducing consumption at peak times, as well as those who had not.

84. We learned that customers and community stakeholders:

- are concerned about the impact of TLC's pricing on the community. These concerns include perceived detrimental impacts on welfare, quality of life and local business development

- consider the pricing methodology and business rules which implement it are complicated and difficult to understand
- have particular issues with the unpredictability and volatility of the demand charges, and the inability to respond to the pricing signal in a timely way due to the lag between peak demand measurement and billing
- have made sub-optimal investment and usage decisions due to pricing complexity
- some stakeholders consider TLC's line charges are expensive and unfair.

How well does the existing pricing methodology meet the criteria?

85. In the remainder of this section we evaluate TLC's existing pricing methodology against the criteria noted above.

Equity – allocate costs proportionately to customers, be causer/user pays, reward demand-side behaviour where results are symmetrical to supply-side demand for the service

86. The current pricing methodology allocates costs to customers as follows:

- customers are assigned to consumer groups, based on location, supply voltage and customer size. The revenue requirement is also allocated to consumer groups, and recovered from the customers assigned to the relevant group
- within each customer group, the revenue requirement is allocated between fixed and variable charges. For variable charges, the revenue requirement is allocated between customers based on peak demand (kW) measured during control periods.

Pricing zones

87. TLC's disaggregated customer grouping approach results in variations in unit charges for similar customers located in different regions, and different parts of a region. While this approach may appear equitable, it is not fully supported by underlying cost allocations, and it contributes to pricing complexity.

88. We question whether such a disaggregated approach is appropriate for TLC's network given:

- the small customer base
- the lack of significant urban areas
- the small number of customers allocated to some groups (customer groups range in size from approximately 50 ICPs to 4,800 ICPs)
- that costs for each customer group are not directly known, and must be allocated from shared costs
- that assumptions and judgements are required to determine the boundaries between consumer groups and how costs are allocated to them
- that inequities arise at the boundaries between high and low density consumer groups
- the need to continually update groupings as network density changes¹⁴
- major customers do not contribute to shared costs in a similar way to standard customers
- that service levels differ across the network, in particular for remote areas, which is not reflected in the cost allocations.

¹⁴ We understand that the boundaries for density groups have not been updated for some time.

89. We note that other distribution companies in New Zealand have not adopted such a disaggregated consumer grouping method. For example, Unison Networks, at TLC's eastern border, has two pricing zones for standard customers:

- Taupo/Rotorua: servicing approximately 48,000 ICPs
- Hawke's Bay: servicing approximately 63,000 ICPs.

90. Waipa Networks at the northern border has just one pricing zone, and differentiates standard consumers by end use:

- residential: including approximately 19,500 ICPs
- general: including approximately 5,500 ICPs.

91. Powerco, which owns the network at TLC's southern border (Powerco's Western network), has two pricing zones for standard customers:

- Zone A which supplies just over 115,000 ICPs located in zones with higher average density
- Zone B which supplies just over 50,000 ICPs located in zones with lower average density.

92. Aggregating consumer groups will increase the averaging of cost allocation for TLC's customers relative to the status quo. We note there is averaging inherent in all consumer grouping. Assuming the resulting costs fall between stand alone cost and incremental cost, then they may be regarded as 'economically efficient' as defined in the Authority's pricing principles.

Price components

93. Currently about 60% of revenue is recovered through variable (demand) prices. For standard consumers this equates to about 65% of revenue on average (100% of the transmission costs plus approximately 60% of distribution costs). For low use customers the proportion of revenue recovered through variable charges is higher. For major customers, variable pricing makes up approximately 30% of revenue (which is all transmission costs).

94. TLC's demand pricing approach rewards those customers:

- with controlled hot water supply
- who are able to move non controlled demand outside of load control periods
- who have invested in alternative supply sources which are able to be used during load control periods.

95. Maintaining incentives for load management during network peaks is important as it helps defer investment in additional network capacity and maintain acceptable levels of power quality and reliability. The current AMP assumes these incentives remain. It assumes that TLC continues to physically manage load through load control, customers are incentivised to make controllable load available and move discretionary load to off-peak times, through pricing.

96. Our analysis of the costs which make up the revenue requirement suggest the variable pricing component could be reduced. TLC's cost structure (for at least the next ten years) is largely driven by routine operating costs, network maintenance and asset renewals expenditure which predominantly reflect fixed costs.

97. This suggests that customers who have low peak demand, and therefore low demand charges, currently may not be contributing sufficiently to TLC's fixed costs.

98. Our LRMC estimate derived from the ten year planning data also suggests that TLC's unit demand (kW) prices are too high. This means that currently customers may be unduly penalised for consumption at peak times.

99. We note that the LFC regulations limit the fixed proportion of customer's bills for low use customers. These regulations apply for residential customers at their primary place of residence. Currently TLC has approximately 7,000 customers on a LFC pricing plan. These customers are particularly exposed to TLC's demand charges.

100. TLC recovers 100% of its transmission costs through variable prices. This ties into the TPM which currently allocates Transpower's

interconnection charges to customers on the basis of RCPDs. We note that the Authority is proposing a move away from this methodology, which is likely to reduce the ability of Transpower's customers (including TLC) to avoid transmission charges through demand side management.

Efficiency – promote the efficient use of the electricity network assets, where necessary signal network constraints

101. In principle, peak demand pricing is consistent with promoting efficient use of the network, as it allocates more costs to those which influence the capacity of the network, which is a key driver of cost in the long term.

102. While this approach can generate highly efficient outcomes, those outcomes may not be being achieved by TLC because it is difficult for customers to appropriately respond to the peak signals.

103. We also note that efficiency outcomes may not be achieved by the current peak charges because:

- subject to continued use of load control, most of the network is not expected to be subject to significant constraints during peak periods across the planning period. Transmission investments over the past few years have alleviated the constraints which were anticipated when demand pricing was first introduced.¹⁵
- while there are some challenges expected in meeting large customer needs, customer specific solutions are expected to be developed
- the control periods are determined with reference to Transpower's regional peaks. These do not consistently coincide with the periods of peak demand throughout TLC's network

- currently the peak charges significantly exceed the incremental cost of additional capacity for TLC for the foreseeable future
- the complexity in the current approach adds cost to the organisation which offsets the efficiency gains sought.

Customer control – customers receive information in timely manner and control the cost of service through demand response, customers have options, prices and usage information promote responsive behaviour

104. Currently the signals customers receive about their use of the network are suboptimal because:

- customers do not know in advance when load control will be operating, and therefore cannot plan their demand response
- customers are informed of their six highest two hourly peaks and the associated charges ex post, at the beginning of the following price year. It is difficult for customers to recall their demand during those peaks, which generally occur sometime during the past winter
- any subsequent modifications in behaviour do not flow through to delivery charges until the following pricing year.

Compliance – comply with the Authority's pricing principles and other legislation

105. We understand that the current pricing methodology is compliant with the relevant regulations and pricing principles, although we note that there have been some compliance challenges due to the unique nature of this pricing approach in New Zealand.

106. We expect compliance may be simplified in the future as regulatory regimes evolve to accommodate a wider range of service based options.

Clarity & transparency – prices are understandable to customers, implemented without unnecessary complexity, robust mathematically

107. While TLC has invested considerable effort in explaining its pricing methodology, it is evident that the demand charging approach is

¹⁵ We note that analysis undertaken over the past few months indicates that capacity and security issues may emerge in the wider 110kV system which supplies Hangatiki. Transmission level investment may be required to resolve this, and if so, TLC is likely to share a portion of the cost.

complex and not well understood by customers. This has had a negative impact on customer utility and added cost to the organisation.

108. Small and medium customers are more familiar with fixed electricity prices and variable electricity prices based on units of consumption – as charged by retailers and other distributors.
109. Some of TLC’s customers now have a better understanding of demand pricing in principle, although there appear to be different levels of understanding in practice.
110. For example, some customers have installed solar panels and/or gas hot water heating in an attempt to reduce their demand charges. Neither of these investments are likely to achieve this. Peak use is only measured during times of load control - when hot water heating is generally turned off - and solar generation is likely to be negligible at these times.
111. Other customers have benefitted by installing auxiliary generation which is able to be used at peak times to minimise delivery charges.
112. Some customers have significantly changed their behaviour in order to minimise consumption during peak times and have had notable reductions in their demand charges. Other customers have attempted to reduce their consumption at all times, not just during periods of load control, with greater loss of utility for less financial benefit.
113. It is our view that the current pricing methodology is the most complex in New Zealand for small and medium customers, largely due to:
 - the fact that demand based pricing is not familiar to electricity customers
 - the need for demand estimates where inadequate metering infrastructure is available
 - the lagged nature of the peak signal, which requires particular solutions when customers move property or tenants change. This also contributes to customer confusion and dis-satisfaction

- the unpredictability of load control periods, which adds complexity for customers attempting to manage their peak demand. For example, customers explained to us that they avoid having family to stay, especially during the winter, because of concerns that this may influence their peak charges.

Stability – stable for customers year on year, only change to the extent that underlying demand changes, deliver stable revenue to TLC

114. The way in which demand is measured tends to introduce annual volatility for customers. This is partly because of the heavy weighting towards the demand charge component of TLC’s delivery charges, which may be:
 - up to 70% of the annual charge for a standard customer
 - up to 90% of the annual charge for a low use customer.
 115. As peak demand is measured from the six highest two hour peaks recorded during periods of load control, it reflects a very small proportion of annual consumption. In addition, because it measures the highest peaks, it captures abnormal usage. These features tend to result in year on year volatility for customers.
 116. As demand quantities are known before prices are set, and as the demand charges are billed in 12 equal monthly instalments, the current approach delivers very stable revenues for TLC.
 117. TLC has also made a number of refinements to the methodology since it was first introduced. While targeted at resolving specific challenges, these have introduced some volatility in how customers are charged.
- Practicality – efficiently implemented with existing technology*
118. When the current pricing methodology was introduced, the technology available to TLC was not sufficient to support the approach. Most customers were billed on the basis of estimated demand quantities derived from profiles.

119. Overtime these profiles were expanded and refined to improve the demand estimates for customers without smart meters. TLC is partway through a smart meter rollout which is progressively reducing reliance on demand estimates. It is estimated that approximately 65% of customers will have smart meter data as the basis for their demand charges for PY17.

Durability – will last for a long time

120. Once full smart meter capability is achieved, the current approach may become more durable, although this is dependent on customer acceptance.

121. It is a method that will accommodate emerging technology well because it is aligned, in principle, with the long term costs of providing distribution services. This durability is subject to customer acceptance, which is currently mixed.

Evaluation summary

122. TLC’s current pricing methodology rates well on many of the evaluation criteria in principle, but in practice we consider it does not score as well. The table below provides a summary of the discussion set out above.

Table 10: Evaluation criteria summary

Methodology criteria	
Equity	In principle, attempts to allocate costs on a user pays basis and to those which contribute most to peak demand. In practice, requires a number of assumptions and judgements; prices do not fully align with underlying cost allocations; and the very high demand charge results in an inequitable allocation of fixed costs, partly due to the volatile nature of the demand charge.
Efficiency	In principle, encourages efficient network use and investment by signalling the higher costs of peak load. In practice, customers are currently over penalised for use at peak times and pricing complexity results in sub-optimal investment and consumption decisions.
Customer control	In principle, peak pricing facilitates demand response with associated cost savings for customers over time. In practice, as the pricing signal is lagged, and the load control periods are not known in advance, customer response is impeded.
Compliance	The pricing methodology is compliant, although there is some complexity in demonstrating compliance in practice.
Implementation criteria	
Clarity & transparency	TLC’s pricing methodology has not been used widely by the electricity distribution sector to date. Where it has, generally it has not been passed on to end customers, other than large customers. In practice this approach has not yet been successfully implemented for small and medium sized customers, other than on a trial or opt-in basis. Currently TLC’s pricing methodology is not sufficiently clear or transparent for many of its customers.

Stability	<p>In principle, a pricing methodology with a variable charge component will result in some pricing volatility for customers.</p> <p>In practice, within a pricing year TLC's pricing methodology is more stable than most as the variable and fixed charges are billed in equal monthly instalments.</p> <p>However, the charge is volatile on a year on year basis as the charging quantities are derived from short periods of time; during periods of abnormal usage; and only during load control periods - which may vary year on year.</p>
Practicality	<p>In principle, the introduction of smart meters facilitates the practical implementation of the pricing methodology.</p> <p>In practice, TLC's methodology has revealed a number of implementation challenges, including measuring demand.</p>
Durability	<p>In principle, the pricing methodology can be durable subject to customer acceptance.</p> <p>In practice, it requires regular management and refinement due to changing business rules, and currently suffers from mixed acceptance within TLC's community.</p>
Transition and implementation	<p>TLC continues to transition its current methodology, as smart meters are installed, and the approach continues to be refined.</p> <p>Initial implementation of the demand charges was a challenge.</p>

Refinements and alternatives

Options assessment

123. Consistent with our TOR, we have considered options for refinements to the existing methodology and alternative methodologies for TLC in moving towards a more service based approach. In doing so we have been particularly mindful of:

- the views expressed by customers about the current approach and their experiences with it
- the challenges facing the network over the ten year planning horizon
- TLC's current billing, metering and customer service infrastructure
- existing and emerging electricity distribution pricing practice in New Zealand, and internationally.

Network challenges and infrastructure

124. We have learned that:

- for the foreseeable future TLC's focus will be on maintaining and operating the existing network, managing power quality and meeting incremental load growth, some of which will be managed through customer specific solutions
- recent Transpower investments have relieved potential GXP constraints which existed when the current pricing methodology was first implemented, although a new regional transmission security constraint in the north may emerge during the planning period

- demand side management is a critical component of TLC's network management strategy
- the current pricing methodology requires significant resources to implement and manage
- metering capability is improving, which is also increasing TLC's load control capability
- many customers and stakeholders do not support the current pricing methodology.

Pricing reform

125. Globally there is emerging focus on more service based electricity distribution pricing structures. The trigger for this has been the impact of emerging technologies, such as solar panels, electric vehicles and more energy efficient homes and appliances, on consumer demand; and the range of pricing options now available with smart meter technology.

126. The Authority and the Electricity Networks Association (ENA) are currently focussing on assisting distributors to consider how to transition to more cost reflective pricing structures.¹⁶

127. Demand pricing, time of use (TOU) pricing and capacity pricing (in various forms) are increasingly viewed as more service based than the traditional two part pricing structures¹⁷ commonly used by distributors and electricity retailers. These more cost reflective pricing options are currently used for larger customers by many distributors.

128. TLC's move away from traditional pricing structure in 2007 was ground breaking in New Zealand partly because the prices were passed directly to TLC's customers.

¹⁶ For example, ENA, New pricing options for electricity distributors, November 2016

Electricity Authority, Implications of evolving technologies for pricing of distribution services, November 2015

¹⁷ Comprising a fixed daily charge and a variable charge based on units (kWh) consumed.

129. Generally, where other networks have introduced more cost reflective pricing structures for standard customers, there has been a low uptake by customers as they have alternative options available to them, or the prices are repackaged by retailers into more standard formats.
130. Demand pricing is viewed as cost reflective for distributors because it allocates costs to customers based on their demand at peak times. Peak consumption influences the capacity of the network required to meet customer demand, and is a key driver of long term asset related costs.
131. Capacity pricing reflects charges based on nominated or installed capacity for a connection, usually measured as kVA. It therefore also signals the costs of network capacity.
132. TOU pricing is pricing that varies by time of day, and may include higher prices during peak periods and lower prices during shoulder and off peak periods. It is generally less effective at signalling the costs of incremental capacity, although this is dependent on the differential between peak, shoulder and off-peak prices.
133. Fixed prices also typically make up a component of distribution pricing structures. The LFC regulations limit the fixed component of distribution prices for many residential customers in New Zealand.

Refine or replace?

134. We have considered whether the evaluation criteria could be better met by refining the existing methodology, or adopting an alternative approach. Our assessment considers each of the four components of the pricing methodology, as described in the 'Current pricing methodology' section of this report.

Target revenue

135. We have not formed a view on how TLC sets its target revenue as this is outside our terms of reference. However we note:
- TLC currently sets its target revenue below the level permitted by the Commerce Commission

- TLC's annual target revenues have increased in recent years
- we expect TLC's network to incur higher average costs of supply than most networks in New Zealand due to its low customer density, remote and rugged terrain and lack of significant urban centres
- the current pricing methodology causes TLC to incur billing, metering and customer service costs not faced by other distributors
- any change to the pricing methodology is likely to impose additional costs on TLC in the short term, although savings may be expected in the longer term if pricing complexity is reduced and customer understanding, acceptance and responsiveness improves.

Consumer groups

136. For the reasons set out in the previous section, we consider the consumer grouping can and should be simplified. Other distributors do not employ such a disaggregated consumer grouping approach. In our view, simplifying this can reduce cost and complexity without significantly compromising equity and efficiency objectives.
137. If the existing consumer groups are retained, we recommend that the analysis and criteria supporting the grouping methodology is reviewed and updated. The current groupings reflect an approach which was implemented a number of years ago and we expect there are some anomalies in it, given the network has developed since that time. The allocation of customers to groups also needs to be updated to ensure it is consistent with the intended methodology.
138. If a more simple consumer grouping approach is adopted, issues for further consideration could include:

- whether regional groupings for allocating transmission costs should be retained
- how customers which physically connect directly to the HV network are treated

- whether separate recognition of those with controlled load should be incorporated into consumer grouping.

Allocation of target revenue to consumer groups

139. Refinements to the target revenue allocations will be influenced by any changes to consumer grouping. However, we note that:

- with the exception of customers on non-standard contracts, TLC does not currently allocate revenue to consumer groups. Rather, once a general price movement has been agreed, it has been TLC's practice in recent years to apply it equally to all consumer groups
- revenue allocations therefore reflect proportions derived from historical allocations
- a large proportion of the current revenue requirement reflects costs which are shared by multiple customers and are not directly attributable to consumer groups. The exception is costs associated with assets dedicated to individual customers on non-standard contracts.

Pricing structure

140. If the current pricing methodology is retained, the following pricing structure features could be refined to better meet the pricing objective and evaluation criteria and result in better outcomes for customers:

- increase the fixed and reduce the variable component of the network charge for standard customers, including holiday homes, to better reflect underlying costs
- specify load control periods used for demand measurement purposes in advance to improve predictability and customer control
- develop a more current demand measure to allow customers to respond more quickly to pricing information
- extend the number of peaks used to determine the demand measure, to reduce year on year volatility.

141. A TOU approach could also be considered as an alternative option. We consider that TOU pricing can generate better outcomes for TLC and its customers as it:

- incorporates peak pricing signals, which are an integral part of TLC's demand side management strategy and provide customers with the correct pricing signals for investment and usage
- is easier to understand for customers who are familiar with kWh charges, as electricity retailers use them. Other consumer goods, such as airline tickets, also incorporate TOU (peak and off peak) pricing
- addresses the predictability, responsiveness and control issues with the current demand pricing approach, allowing customers to manage their energy costs by shifting daily use between peak, shoulder and off peak periods
- reduces the impact of abnormally high usage on annual charges
- addresses the significant exposure of low use customers to peak demand charges
- helps to ensure solar customers contribute fairly to network costs by incorporating a peak charge differential
- potentially removes the need for a separate billing system.

Other potential changes

142. Other changes which could be introduced to help meet the overall pricing objective include:

- removing the dedicated transformer charges for standard and low use customers, and recovering these costs through network charges, to reduce complexity

- widening the capital contribution policy to ensure all customers requiring new and upgraded connections contribute fairly to the costs of those connections
- increasing fixed charges for holiday homes, to ensure they contribute fairly to the costs of providing the network services they require
- further incentivising customers to make controllable load available. Options include pricing discounts for controlled load, or pricing rebates. TLC may also consider working with the community to ensure sufficient controllable load is available

- reviewing transmission cost recovery, in particular once the new TPM emerges. TLC’s current method is closely tied to Transpower’s interconnection charge, which is not included in the proposed new TPM
- reviewing major customer pricing to ensure large customers are contributing fairly to network costs, while receiving appropriate pricing signals for new investment and usage
- reviewing the vacant property pricing rules, including the role of disconnection and reconnection fees.

Evaluation summary

143. The following table provides a summary assessment of the suggested pricing refinements and alternatives against the evaluation criteria.

Table 11: Assessment of proposed refinements and alternatives against criteria

Criteria	Refine current demand pricing	Adopt TOU based pricing
Methodology criteria		
Equity	Adjusting the weighting between demand and fixed pricing will improve equity. Better understanding and customer responsiveness will also improve equity	Further improves equity due to improved customer response, and rebalancing of peak , shoulder and off peak charges
Efficiency	Improving the predictability, responsiveness and reducing the volatility in demand charges will improve efficiency as consumer response should improve as a result. Lower demand charge will improve alignment with underlying network costs	Maintains incentives for efficient use of the network, commensurate with the current and forecast network focus A lower cost method to implement and manage
Customer control	Customer control should improve if demand charges are reduced, and they become more predictable and responsive	Improves customer control because the quantity measurement is more easily understood and more responsive Maintains incentives to manage peak load
Compliance	The proposed refinements will not have a notable impact on compliance	Not expected to introduce any particular compliance issues

Table 11: Assessment of proposed refinements and alternatives against criteria (cont.)

Criteria	Refine current demand pricing	Adopt TOU based pricing
Implementation criteria		
Clarity & transparency	Refinements will improve clarity and transparency, but complexity for customers will remain	Expected to significantly improve clarity and transparency over demand pricing
Stability	Any changes will initially introduce transitional price movements, and some customers will face higher charges and others lower charges Increasing the weighting of fixed charges, and changing the measurement periods should reduce volatility for some customers	Any changes will initially introduce transitional price movements. Generates more seasonal variation in customer bills but potentially less year on year variation Increasing the weighting of fixed charges reduces volatility
Practicality	Many of the practical challenges remain. The proposed refinements will introduce additional implementation challenges to be overcome	Initial implementation will raise issues to be overcome. In the longer term, a more practical option, requiring fewer business rules
Durability	In principle a durable method, although durability is dependent on customer acceptance and the ability of TLC to adequately support the methodology	Provides a customer centric option which is appropriate while the network remains largely unconstrained. TLC may choose to adopt more durable approaches in the longer term
Transition & implementation	Any changes will need careful planning and testing with customers before implementation Some customers can be expected to pay more for their electricity, and others less, when changes are introduced. Overall equity can be improved as a result	

Appendix A - Important notice

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Appendix B - TLC's pricing methodology

Pricing Components

Delivery charges (FY16)

Charge	Major Users	Standard Users	Low Users	All/Other	\$m
Network Fixed Capacity	\$/kVA/annum	\$/kVA/month			8.3
Network Fixed Low User			\$/month		0.4
Network Variable Demand		\$/kW/month	\$/kW/month		17.0
Dedicated Transformer Charges				\$/unit	3.4
Streetlight charges				\$/mount \$/asset \$/kW	0.7
Non Standard Contracts	\$/annum				3.5
Transmission Variable Demand		\$/kW/month	\$/kW/month		5.3
Transmission Variable Connection	\$/kVA/annum				0.7
Transmission Variable Individual Peak Demand	\$/kVA/annum				1.0
Transmission Variable Co-incident Peak Demand	\$/kVA/annum				0.5
Total Delivery Charges					40.8

Other charges (FY16)

Charge	Major Users	Standard Users	Low Users	All/Other	\$m
Line Maintenance				\$/metre	0.0
Billing	\$/month				0.0
Relay Fee				\$/month	0.3
Meter Fee				\$/meter/ month	3.4
Remote Register Fee				\$/month	0.0
Current Transformer Fee				\$/month	0.1
Load shifting charge				\$/month	0.0
De / energisation				\$/request	0.2
Service fees (accounts, processing, statements)				\$/hr, \$/request	0.2

Source: TLC's Delivery Price Schedules and Pricing Methodology, PwC analysis

Consumer grouping

Grouping	Category
Customer	<ul style="list-style-type: none">• Major User (>100kVA capacity)• Standard User (Commercial and Residential) (<100kVA capacity)• Low User (Primary Residence) (<2.65kW)• Non Standard Contract• Streetlighting
Region/Point of Supply	<ul style="list-style-type: none">• Hangatiki• Ongarue• National Park• Ohakune• Tokaanu• Whakamaru
Demand Density	<ul style="list-style-type: none">• HVHI (High Density)• HVLO (Low Density)• LVHI (High Density)• LVLO (Low Density)

Source: TLC's Delivery Price Schedules and Pricing Methodology

Appendix C - Load profiles

The profile of demand across the pricing regions is shown in the figures overleaf. This data shows load profiles which include the impact of demand side management such as load control and demand pricing. Load profiles show some variation, with winter peaks in the south, and summer peaks in the north. Daily load profiles are consistent with predominantly residential and dairy load, showing morning and evening peaks.

The monthly demand data shows:

- summer peaks in the Hangitiki and Whakamaru regions, with some monthly variation influenced by industrial load
- winter peaks in Ohakune and National Park and to some extent Tokaanu
- some increase during the summer holiday season in Tokaanu and Ongarue.

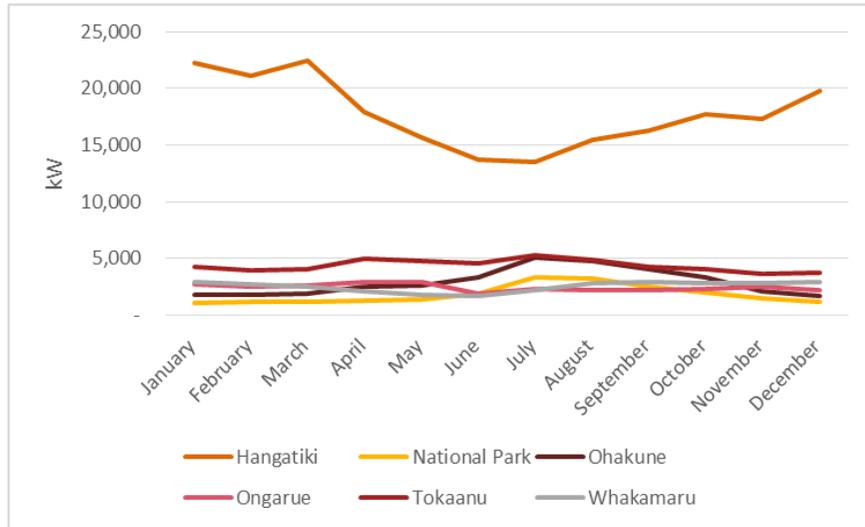
The weekly demand data shows:

- a weekend reduction in the Hangatiki region, reflecting the drop off in the commercial and industrial load
- a weekend increase in Ongarue and a lesser extent Tokaanu
- reasonably flat profiles across the week for the other regions.

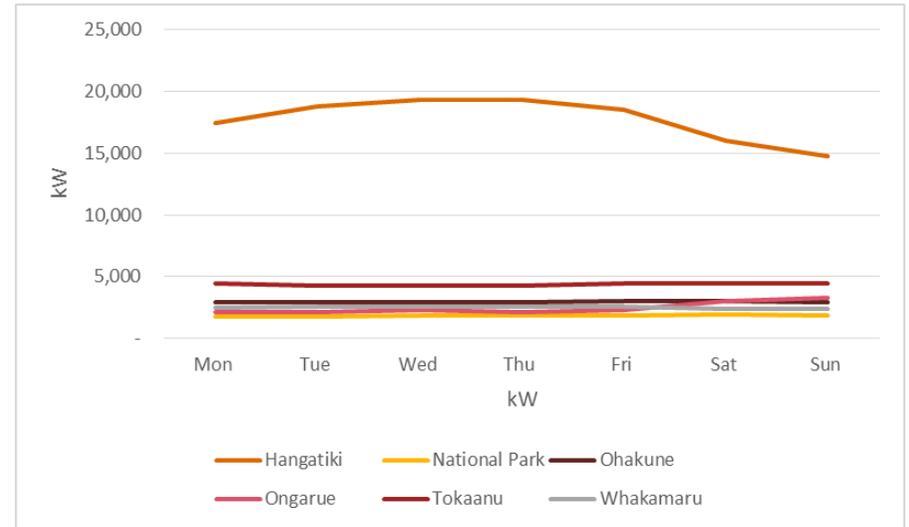
The daily demand data shows:

- morning and afternoon peaks for all regions other than Ongarue
- more significant peaks in Hangatiki and Whakamaru, which commence slightly earlier, reflecting the dairy load.

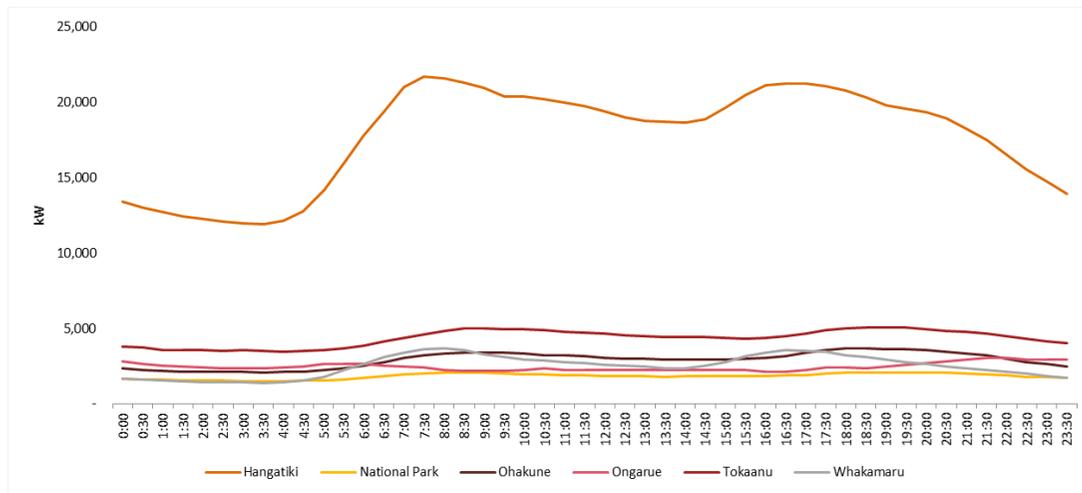
Average monthly demand (kW)



Average weekly demand (kW)



Average daily demand (kW)



Source: PwC analysis

Appendix D - Evaluation criteria

TLC evaluation criteria

Pricing methodologies and the actual prices that result should seek to achieve:

TLC Criterion	Objective
Equity	Allocate distribution costs proportionately to customers Be causer/user-pays based Reward demand-side behaviour, where results are symmetrical to supply-side demand for the service
Efficiency	Promote the efficient use of electricity network assets Where necessary, signal network constraints
Customer control	Customers should receive the information they require to manage their demand for service in a timely manner and be able to control the cost of the service by changing their demand The information should be available in an economically efficient form that gives customers options and allows them to control the cost of the service Prices and usage information should promote responsive behaviour from consumers
Compliance	Comply with the Electricity Authority's pricing principles Align with other legislation including, Low Fixed Charge regulations, Distributed Generation Code, Continuance of Supply, Commerce Commission Input Methodologies, Health and Safety
Clarity and transparency	Understandable to customers Able to be implemented simply without unnecessary complexity Robust mathematically
Stability	Be stable for customers year-on-year, and only change to the extent that the customers' underlying demand for the services change Deliver stable revenue to TLC to enable it to continue to invest in and maintain the network
Practicality	Efficiently implemented with existing technology
Durability	Last for a long time
Transition and implementation	Address any technical and customer issues relating to any changes

Authority's pricing principles

Principle	Alignment with TLC's Criteria
<p>a) Prices are to signal the economic costs of service provision, by:</p> <ul style="list-style-type: none"> (i) being subsidy free (equal to or greater than incremental costs, and less than or equal to standalone costs), except where subsidies arise from compliance with legislation and/or other regulation; (ii) having regard, to the extent practicable, to the level of available service capacity; and (iii) signalling, to the extent practicable, the impact of additional usage on future investment costs. 	<ul style="list-style-type: none"> • Compliance • Equity • Efficiency
<p>(b) Where prices based on 'efficient' incremental costs would under-recover allowed revenues, the shortfall should be made up by setting prices in a manner that has regard to consumers' demand responsiveness, to the extent practicable.</p>	<ul style="list-style-type: none"> • Equity • Efficiency
<p>(c) Provided that prices satisfy (a) above, prices should be responsive to the requirements and circumstances of stakeholders in order to:</p> <ul style="list-style-type: none"> (i) discourage uneconomic bypass; (ii) allow for negotiation to better reflect the economic value of services and enable stakeholders to make price/quality trade-offs or non-standard arrangements for services; and (iii) where network economics warrant, and to the extent practicable, encourage investment in transmission and distribution alternatives (e.g. distributed generation or demand response) and technology innovation. 	<ul style="list-style-type: none"> • Efficiency • Equity • Durability • Control
<p>(d) Development of prices should be transparent, promote price stability and certainty for stakeholders, and changes to prices should have regard to the impact on stakeholders.</p>	<ul style="list-style-type: none"> • Stability • Clarity & transparency • Transition & implementation
<p>(e) Development of prices should have regard to the impact of transaction costs on retailers, consumers and other stakeholders and should be economically equivalent across retailers.</p>	<ul style="list-style-type: none"> • Practical • Transition & implementation