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More Efficient Distribution Prices

Submission to the Electricity Authority

Final – 19 February 2019

From the Electricity Networks Association

Contents

1. Introduction

The Electricity Networks Association (ENA) appreciates the opportunity to make a submission to the Electricity Authority on More Efficient Distribution Prices: What Do They Look Like?

The ENA represents all New Zealand's 27 electricity distribution businesses (EDBs) or lines companies, who provide critical infrastructure to New Zealand residential and business customers. Apart from a small number of major industrial users connected directly to the national grid and embedded networks (which are themselves connected to an EDB network), electricity consumers are connected to a distribution network operated by an ENA member, distributing power to consumers through regional networks of overhead wires and underground cables. Together, EDB networks total 150,000 km of lines. Some of the largest distribution network companies are at least partially publicly listed or privately owned, or owned by local government, but most are owned by consumer or community trusts.

2. Pricing reform in the 'real world'

Pricing reform is a key priority for the ENA

Pricing reform is a priority workstream of the ENA and will play an important role in delivering optimal outcomes to consumers in the context of ongoing technological development and changes in the way that electricity is generated and consumed.

Along with other industry stakeholders, the ENA has been and continues to be an active participant in progressing reform of distribution pricing. The most recent work that has been undertaken by the ENA and members is briefly summarised in Appendix 2.

The ENA currently has two working groups looking into the design and implementation of pricing reform. A new joint workgroup is being formed to specifically focus on formulating and implementation roadmap and is tasked with a preliminary report to stakeholders by April 2019.

Careful implementation and transition are crucial to successful price reform

The work carried out by the ENA workgroups has revealed that there will be material downsides for large groups of consumers from reform to the distribution component retail pricing. The analysis strongly indicates that careful transitioning is essential if reform to distribution pricing is to be successful.

Analysis by the ENA and joint workgroups has also identified that there are material practical issues to be dealt with across the industry to successfully implement reform at an operational level. The more 'efficient' pricing options (demand and capacity-based options) would take years to implement for some industry participants.

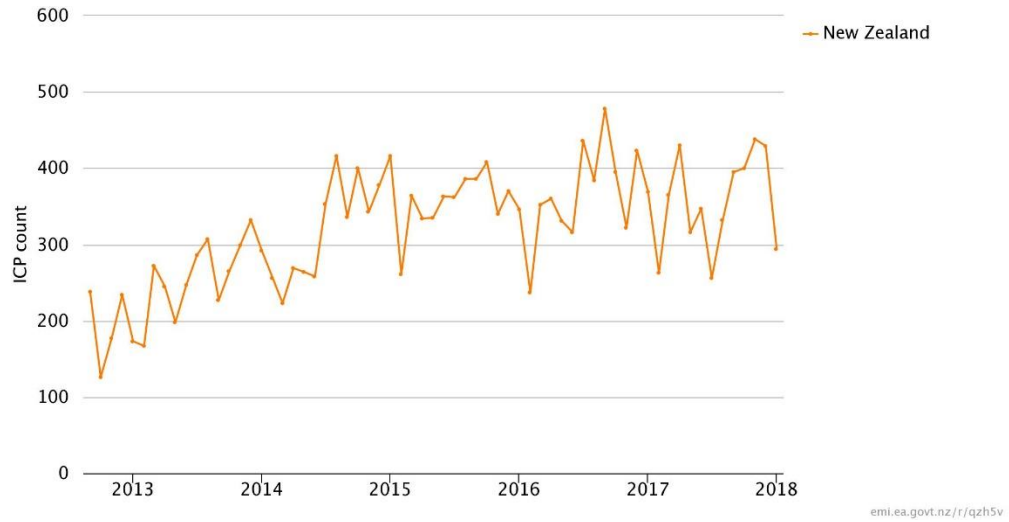
In light of these discoveries, as mentioned above, the industry agreed a joint work group is needed to carefully plan implementation. This group has already met and is tasked with a preliminary report to stakeholders by April 2019. (See Appendix 3 for the terms of reference).

The ENA considers that it is most important to go about the process of implementing pricing reform in a systematic and detailed way. This is necessary to achieve durable efficiency gains, when the industry implements price reform in the real world. There is too much at stake to risk poor implementation. (Refer to Appendix 2 for a more detailed description of the ENA reform process).

The ENA considers that the dis-benefits from not urgently reforming distribution pricing that are often cited by the Authority are materially over-stated.[1] The very low levels of technology investment in recent years suggest to ENA members that the urgency for reform that was recorded in the 2015 NZIER report is also overstated.[2]

The uptake of solar distributed generation in New Zealand is currently 1%, as compared with an uptake in excess of 10% that was estimated in 2015 for to occur within a 3-year period. Rather than accelerating, the annual number of new installations of solar distributed generation have been reasonably constant over the past 3 years.[3]

Number of new solar distributed generation installations



These observed outcomes do not reduce ENA's commitment to pricing reform but do indicate that time can be afforded for a careful and robust process for implementation.

[1] Reference NZIER 2015.

[2] Reference Neil Walbran submission and analysis to the Authority January 2019.

[3]

Well over half of EDBs has pricing available for residential/low capacity customers to signal busy periods

The Authority states that current standard distribution prices do not signal when the network is congested, or when there is plenty of capacity. There are, in fact, many networks that have standard pricing that provides a signal of when network busy periods typically occur. A number of networks have had time-of-day and/or demand pricing in place for a number of years, including Alpine Energy, Aurora (Dunedin), Electricity Invercargill, Network Waitaki, Orion, Otago JV, Powerco (West), The Lines Company and Powernet.[4] Some other networks, such as WEL Networks and Waipa, are in the process of transitioning to time-of-use prices as standard rates.

Time-of-use pricing signaling morning and evening peaks has also been introduced on an opt-in basis on numerous networks - for example, Centralines, Counties, Electra, Unison, Vector, WEL and Waipa. Other networks offer opt-in day/night pricing - for example Buller, Network Tasman, Top Energy and Westpower. In addition, there are a number of trials underway which consider types of congestion price signaling, including in conjunction with retailers, providing lessons for EDBs and the industry more generally. For example, Wellington Electricity has trialed time of use pricing for EV users, providing the industry with insights into the EV charging behavior of trial customers according to their pricing structure.

In total, 75% of connections are served by networks that at least have an option available to consumers that provides time-of-day price signals. Moreover, more sophisticated pricing is provided to large customers, including through demand charges.

With the widespread availability of time-of-day distribution pricing (at least as an option, and, in numerous cases, applied to all kWh), as well as some use of demand pricing, NZ has a high level of innovation and progress when compared internationally.

Price reform developments in New Zealand so far are a good base to continue to improve on, with key learnings able to be shared among ENA members and more broadly.

The ENA supports a principles-based approach

ENA supports principles-based approach to distribution pricing. This guides the implementation of pricing reform and allows the strategic thinking of the EA to be melded with the practical experience of industry participants in what is clearly a complex field. The ENA's specific comments on the proposed changes to the principles are set out in response to Question 3 below.

[4] Day/night pricing on these networks has signalled that the night period, between 11pm and 7am (or in some cases 9pm and 7am) is the period of lowest capacity utilisation.

The LFC continues to hinder efficient pricing

ENA members do not align with the Authority's position on the low fixed charge regulations. While it is a widely held view that the regulations are flawed and poorly targeted, they nevertheless remain in force. We have and will continue to advocate for the repeal of the regulations, but regulation is, rightly, the job of government and its agencies. While the regulations are in place, we will comply.

Members consider that these regulations hinder pricing reform as follows:

- They prohibit stepped and tiered prices.
- Complexity - the requirement for retailers and distributors to offer two price plans for every one they put into the market.
- Unintended consequences following the implementation of pricing reform.

A more detailed discussion of ENA views on the LFC are included in our questions 7 response.

3. Answers to consultation questions

Question 1

Do you agree that distributors need to reform their prices? What is the reason for your answer?

From the ENA's perspective (and we believe the industry's perspective as well), this is an irrelevant question. There is widespread recognition of the need for reform and well-resourced workstreams focusing on how to reform network prices, not whether this is a good idea.

In 2017, the ENA published A Guidance Paper for Electricity Distributors, which was a result of two ENA consultations on pricing reform, in 2015 and 2016.

Part 1 of the 2017 publication is titled "The Need for Change" and it discusses in detail the case for change to distribution pricing, the impact of technology, emerging cross-subsidies, and the disadvantages of legacy pricing for consumers.

ENA also made comment on the need for distribution pricing reform in its submission to the Electricity Pricing Review.

Question 2

How important and urgent are the issues identified by the Authority?

Distribution pricing reform is complex and challenging. It must be managed carefully to mitigate the negative impact on some consumers, especially less informed or engaged consumers, and consumers in energy hardship. Our research has conclusively shown that in the short-term the very customers that will benefit in the long-term from reform (those who are unable to access new technologies) are very likely to face increased bills. This issue must be carefully managed.

Members are collectively and individually testing different ways to charge for network services that better reflect the costs and services being provided.

While the sector is committed to new pricing methods, there is a wide range of practical issues to manage. These include impacts on consumers (and, in particular, those in energy hardship), data transfer, transmission pricing, billing, technical implementation challenges, and the Low Fixed Charge Regulations. The rural/urban cross subsidy is another complicating factor.

While we appreciate the Authority's motivation in pushing hard for change, ENA members are also wanting progress, but on a least-regrets basis to avoid alienating stakeholders including retailers, unduly upsetting consumers, and avoiding or reducing the potential for politicization of change. Speed of change is important, but less so than identification of durable, stable solutions that are broadly publicly acceptable and capable of being acted on by consumers. There are well-recognised

examples of pricing reforms that have gone awry, attracting undue political attention that has then resulted in interventions that have hindered reform.

In regard to the Authority's position that retailers should not be obligated to directly pass through network prices, the ENA agrees that direct pass through should not be mandated. But we see little merit in designing price structures that customers would find unpalatable, such that all retailers substantially depart from the network pricing structure, but at the cost of increased risk premiums to cover the risk of revenue-cost mismatches. In ENA's view, we should seek pricing structures that are likely to be passed through to consumers, whilst achieving the objectives of service-based, cost reflective pricing. That necessitates direct engagement with consumers to ascertain pricing approaches that consumers will find acceptable.

Question 3

Do you agree with proposed Distribution Pricing Principles?

ENA strongly supports principles-based regulation, rather than prescriptive requirements.

Before commenting on the principles, we note that the Authority has changed its definition of the basis of distribution prices from "cost-reflective, service-based" to "cost-reflective, benefits-based". The ENA would find it useful for the Authority to explain the change in lexicon, so that we can understand if the Authority's expectations have changed. Paragraph 3.7 bullet point 2 states that distribution prices should "assign costs to each user on the basis of their use or benefit". We request that the Authority provide further detail on what it considers EDBs might do to assign costs on the basis of individual user benefits.

We discuss the key changes in the following table:

Being time and location specific	The ENA does not support this principle: 1. It may not prove necessary to set time-based prices to achieve efficient outcomes. For example, a controlled EV price is not time-based, but can achieve efficient charging of electric vehicles 2. Location-specific prices would be a substantial departure from the current norm of prices applying across broad regions. If the Authority considers that location-specific prices should apply, then we suggest that it needs to consult much more proactively with consumers on the

	community acceptance of location-based pricing (e.g., rural/urban). 3. Capacity charges may not be time-based and therefore would be inconsistent with this principle. The Authority has said capacity charges would attract 5 gold stars.
Charging costs to a specific user or users	This is already handled by the requirement that prices be subsidy-free. It is also unclear what this principle really means. Suppose that a network business upgrades a cable to a particular community. Does the Authority expect some direct recovery of that asset from that community?
Simplification of principle (d)	We disagree with the removal of promotion of stability and certainty and having regard to the impact on stakeholders. Consumers have expressed value in stability and they individually make long-term investment decisions that require a degree of stability in network prices. Understanding consumer impacts of network decisions is a strong regulatory drive elsewhere. Removal of this principle would seem to cut against the expectation of greater customer/stakeholder engagement going forward.
New principle (e)	This is not achievable by distributors. Retailers control the prices that are reflected to consumers. The Authority has eschewed mandatory network price pass through.

Question 4

What changes would you recommend to the proposed Distribution Pricing Principles, and why?

Overall, the ENA is supportive of the Authority's continuing focus on a principles-based approach to distribution pricing, rather than a prescriptive approach. However, the devil is always in the detail and in this case the focus of the specific principles is important, as we describe in the table above.

Ultimately, we do not believe that changes are required to the pricing principles. The existing principles are based on solid economic foundations and recognise the importance of customer-focus and engagement in making changes from the status quo. We think the principles are unlikely to change the already strong motivations on distributors to make reforms and, ironically, the new principles as written create some confusion, as set out in our comments above.

Question 5

What if any changes would you propose to the star-ratings to better reflect the relative efficiency of distribution prices?

The ENA considers a star-rating system is fraught with complexity (given that it would have to account for local circumstances), penetration of smart meters, capacity constraints, growth, customer mix, etc) and likely to be ignored or disputed by distributors if these complexities are not addressed. For example, in Table 1 (page 19), the Authority provides a one-star rating for a flat kWh charge as a network use charge. However, we note that:

- EDBs are forced to offer a low fixed charge option (for which about 2/3 of residential customers are eligible).
- If a network has little congestion, a flat c/kWh charge for network access may, given the constraint on fixed charges, be a highly efficient (and arguably fairer) way of charging to recover the cost of access since it meets the efficiency criterion of a broadly-based price that limits distortions on use.

With respect to network connection, we are unsure why the Authority rates capital contributions and gifted assets as five-star approaches, whereas a fixed charge receives only a two-star rating.

Similarly, we do not understand why the Authority would seek to compare the ratio of fixed-variable against a notional efficient ratio of 80:20, when the LFC Regulations require EDBs to offer a 15c per day option, which two thirds of residential customers are better off on. Even with a change in residential price structure to a more efficient approach, the LFC Regulations will not diminish the extent of customers who would be better off on an LFC option.

In our view, the rating system is likely to generate debate and prove a distraction from the task of reforming prices. Moreover, there seems little point in applying the star-rating system to current price books given that EDBs, by and large, are in the process of making reforms.

The Authority has also set aside recognition of the variation in “flat rate” prices which EDBs use. Within price packages there are controlled, uncontrolled, night and day options which provide a degree of recognition of time of use. While these may be blunt instruments, they achieve efficient outcomes (e.g., efficient procurement of water-heating load control that can be operated dynamically).

Retailers are developing EV tariffs off the back of night rates to encourage overnight charging. Accordingly, if the Authority does implement a star-chart system, it will need to evaluate the effectiveness of those flat-rate prices in achieving efficient outcomes.

We would also encourage the Authority to consider the field of behavioural economics and "nudges" to achieve efficient outcomes. A theoretically pure economic price signal may not be necessary to achieve efficient outcomes. For example, a discounted flat-rate price applying to controlled EV loads could readily generate efficient outcomes, if the discount gives enough of a "nudge" for consumers to accept controlled EV charging.

The stated objective is for the star-rating system to create a sharper focus on distribution pricing reform. A complex star-rating system appears to be a costly, time consuming way of achieving this objective. If there is continued concern with progress of reform, then this can be discussed directly with the relevant EDB(s).

Question 6

How long do you think distributors would reasonably need to introduce the different price structures discussed above?

As outlined above, ENA members are focusing on the pre-work needed to reform their pricing. This will be followed by engagement with customers and stakeholders.

In its submission to the EPR, the ENA noted that members would be in a position to make decisions about pricing reform starting in 2020. Currently ENA members are collectively and individually examining different ways to charge for network services so that consumers have incentives to use electricity in ways that will save them money immediately for some, and also over the longer term.

Introduction of new pricing options does not mean that all customers will be switched to the new pricing methods on 1 April 2020. Many ENA members will be phasing the introduction to all customers from that date. It will still take some time for all distributors to reform their prices depending on the extent of rate shocks and the need to conduct trials to determine the most effective approaches in each network area amongst other things. It will take longer again for these prices to filter through to consumers depending on how long it talks retailers to pass the price signals through.

Question 7

Can you illustrate how and to what extent the LFC regulation hinders price reform?

ENA members do not align with the Authority's position on the low fixed charge regulations in the context of distribution reform. While it is a widely held view that the regulations are flawed and poorly targeted, they nevertheless remain in force. It must therefore be that government and officials judge the regulations to still be appropriate, even in the context of new technologies. It is

not for regulated parties to seek ways to undermine or work around government policy. We have and will continue to advocate for the repeal of the regulations, but regulation is, rightly, the job of government and its agencies. While the regulations are in place, we will comply.

Members consider there are three main ways that the low-fixed charge regulations are unhelpful to pricing reform:

- The prohibition on stepped and tiered prices.
- Complexity - the requirement for retailers and distributors to offer two price plans for every one they put into the market.
- Unintended consequences post reform implementation

Prohibition on Stepped and Tiered Pricing

The prohibition on stepped and tiered pricing is included in the regulation under Part 10.

New, efficient approaches to distribution pricing can be divided into two types – kWh-based time of use pricing (this is only weakly cost-reflective); and kW-based charging. An effective kilowatt-based charging requires stepped and tiered pricing. For example, customers on 8kW capacity could be billed a certain amount per kilowatt per time period while larger consumers who want 15 kW capacity will be charged a higher amount, but a lower per kilowatt price.

These charges would appear to not conform with the LFC regulations. The ENA and EA have been working on this problem together over the past two years, with the Authority putting forward the view that there is a 'work around' to the regulations. This work around involves describing the separate steps and tiers as "different energy packages".

ENA members have concerns that the "different energy packages" approach is legally robust and note that it appears to be against the letter of the regulations in preventing stepped and tiered pricing.

Complexity

Electricity consumers want simplicity in their bills and in their dealings with their electricity companies. These views have been given consistently in feedback from ENA's customer engagement programme. The low-fixed charge regulations require retailers, in addition to a 'normal' pricing offer, to also offer a low-fixed charge option to most consumers using less than 8,000 kWh a year (which is most consumers, as the average electricity consumption according to MBIE data is now down to 7,000 kWh a year).

Introduction of new pricing is complex enough, but the difficulty is compounded by the requirement to have two tariffs for every one offering in the market. True, this complexity exists at the moment, but the current volumetric model, however flawed, has been in place for many decades and is well understood by retailer and distributors. New pricing is more complicated, especially in dealing with

consumers receiving bill shocks, and ensuring that distributors neither undershoot or overshoot their revenue targets.

Unintended consequences

A typical distributor's annual revenue requirement from a residential customer is of the order of $900-$1000 per year. The low fixed charge delivers only $54.75 per annum, less than 6% of annual required revenue, necessitating a significant variable charge to recover revenues. Flat per kWh charges deliver a constant, low revenue recovery rate, which delivers a comparatively low incentive to avoid use of the network.

Compare that to a capacity charge used to recover the residual revenue requirement. An average domestic customer requiring 8kW of capacity would attract a charge of around $100 per kW. The question is whether $100 per kW is a large enough incentive to convert electric heating to gas, electric hob to gas hobs? The point is that the LFC requires EDBs to variabilise significant proportions of their revenues, and while flat kWh charges might create distortions, other charging structures create potential for other distortions that are not well understood.

The Authority floats the possibility that a seasonal TOU tariff could be a "stepping stone" to more cost reflective pricing, but this creates a design challenge for the EDB in designing an LFC compliant price structure. In particular, consumers would likely find it is advantageous to arbitrage between the LFC and standard option with the change in seasons: an LFC consumer in summer and a standard consumer in winter.

Although the EDB could seek to prohibit this kind of conduct, motivated consumers could change the name on the account when switching. Moreover, a seasonal TOU approach under LFC regulations would have a particularly high winter variable charge, which would strongly discourage winter power consumption (conversion to gas, wood, or no-heating) and lead to extremely high winter bills.

Such a pricing approach would likely be highly unattractive to consumers and therefore retailers would probably smooth prices between summer and winter, taking the risk that a consumer has a higher winter peak profile than assumed. Accordingly, if retailers are likely to rebundle the network price, but increase risk margins, we would question what is being achieved with a seasonal TOU approach. Such distortions could be substantially ameliorated were fixed charges set at more appropriate levels.

The key point is that when moving away from flat kWh charges, the LFC Regulations inherently require an increase in the variable price signal to consumers however they are constituted (i.e., capacity, demand, or peak-kWh)). While new structures might solve one perceived "problem" (e.g., over-incentivising solar) it is likely to create other new incentives on consumer behavior, that could be far worse from an efficiency perspective.

These consequences are largely untested and therefore create significant design and implementation hurdles for EDBs. The LFC Regulations may not prevent reform, but they create significant issues

that must be considered, and which will dramatically slow the pace of meaningful reform, as well as reduce the effectiveness of final designs because of the need to create structures and rules/enforcement approaches that prevent arbitrage.

Question 8

How accurately has the Authority categorised distributor revenues and costs? How could this be done more accurately?

We have little to say on this section of the consultation paper. While the LFC Regulations continue to require EDBs to variabilise fixed costs and two-thirds of customers are eligible for this option, it is an academic exercise to determine the split between fixed and variable costs.

We would make one point of caution: growth capex will frequently incorporate elements of replacement expenditure, as investments can include both characteristics. An EDB may replace an aged asset with a larger capacity asset to meet forecast demand growth over the asset life. The incremental costs of growth on top of the replacement cost are not separately disclosed.

Question 9

What if any would be better indicators of the efficiency of distribution prices, or the ambition of and progress being made by distributors on their price reforms?

Efficiency of distribution prices will ultimately be measured by consumer action although that will also be a function of the degree to which distribution prices are passed through to consumers. Those signals will also be potentially clouded by the way energy and transmission is priced within delivered bundled retail tariffs. To the extent that the 'shape' of distribution prices is passed through to consumers, questions regarding the efficiency of distribution prices will include:

- are load shapes less peaky than today;
- have consumers responded to signals with off-peak EV charging;
- are solar panels installed with batteries, or are stand-alone solar arrays being installed only for non-economic reasons (given solar currently costs more on a c/kWh equivalent than large scale generation)?

ENA supports outcome-based measures, not specific judgements on prices against theoretical benchmarks, especially when network prices may be rebundled by retailers.

Regarding progress with reform, the ENA has identified that a partnership with retailers (in aggregate) will be required to achieve timely reform and we are in the process of developing a shared road-map. In addition, a key step in the reform process is consumer engagement, which will assist us in determining the nature of reforms as well as an ultimate timetable. We think the next measurable progress step will be EDBs developing and implementing meaningful consultation with consumers on reform options. Our expectation is this will be occurring in 2019.

Question 10

What assistance could the Authority (or other stakeholders) offer distributors in order to speed up reform, or help remove or reduce barriers to distribution price reform?

The ENA has studied the impacts of various new pricing options on individual and groups of consumers. The analysis provided disturbing results, showing that negative bill shocks will be felt by those who can least afford them, and that the number of consumers negatively impacted is material enough to be worrying.

The Authority is correct in saying that distributors must be active in their communities with the message that price reforms will help avoid bill increases that would otherwise occur in the future. In reality, consumer communications about their network charges is practically very difficult. We know from our recent research that consumers are simply not interested in engaging in a discussion about their electricity network bill. They do, however, become interested if their bill increases.

The wider industry has a responsibility to resolve this situation over the long term, which could be supported by Government endorsement of higher fixed charges (perhaps by way of a Government Policy Statement).

The EA could also help would be to strongly support the removal of the low-fixed charge regulations and to maintain a consistent approach to distribution pricing principles and objectives.

Another important way for the Authority to be supportive would be to remove the uncertainty around transmission pricing so that this and distribution pricing arrangements can work together for consumers.

4. Conclusion

Thank you for the opportunity to comment on the draft distribution pricing principles and associated monitoring and ratings proposals.

We hope that this submission provides both the Authority and stakeholders insight into the advanced work that ENA members, and the wider electricity industry, are doing to progress pricing reforms. As is evident, this reform needs to take place in the real world and be reflective of the wants and needs of consumers, based on what is known today, and how this will change in the future.

Distribution pricing is not the end game. The objective is for consumers to face the cost of energy, distribution and transmission so they can make choices that are efficient.

Appendix 1 - Members

The Electricity Networks Association represents the following 27-member companies:

Alpine Energy
Aurora Energy
Buller Electricity
Counties Power
Eastland Network
Electra
EA Networks
Horizon Energy Distribution
Mainpower NZ
Marlborough Lines
Nelson Electricity
Network Tasman
Network Waitaki
Northpower
Orion New Zealand
Powerco
PowerNet
Scanpower
The Lines Company
Top Energy
Unison Networks
Vector
Waipa Networks
WEL Networks
Wellington Electricity Lines
Westpower

Appendix 2 - ENA reform process

Background

The ENA efforts at reforming pricing are managed through the Distribution Pricing Working Group (DPWG), made up of all ENA members. In 2018 the DPWG had two workgroups looking into the design and technical implementation of distribution pricing reform. Both groups have largely completed their work and are assembling outputs (analytical IP and models) for use by EDBs in their own pricing reform efforts, and by industry stakeholders. The ongoing need for these workgroups will depend on implementation planning that is underway.

From its earlier work in 2016 and 2017, the DPWG has developed a clear view of how important distribution pricing reform is and that it needs to be implemented extremely well in a consumer - orientated low risk fashion.

The ENA supports a principles-based approach to distribution pricing but members consider that the practical level dis-benefits from not reforming distribution pricing that are often cited by the Authority are materially over-stated.[5] The very low levels of technology investment in recent years suggest to ENA members that the urgency for immediate future pricing reform that was recorded in the 2015 NZIER report is also overstated.[6]

Along with other industry stakeholders, ENA remains an active participant in progressing reform of distribution pricing. Work group analysis indicates that there are material practical issues to be dealt with across industry to successfully implement reform at an operational level. The more 'efficient' pricing options (demand and capacity-based options) would take years to implement for some industry participants.

In light of these discoveries, the industry has agreed that a joint work group is needed to carefully plan implementation. This group is being formed and is tasked with a preliminary report to stakeholders by April 2019.

Analysis of pricing reform impacts

The ENA's Strategic Pricing Work Group engaged in a project which has examined a range of pricing options in relation primarily to residential and other low-capacity connections. The project has involved: (1) identifying pricing options for analysis; (2) constructing a pricing model to implement a number of those pricing options under an example revenue requirement; and (3) examining outcomes that may be expected in terms of bill impacts and the change in incentives for investment in and use of a number of emerging technologies. This Appendix provides an overview of that

[5] Reference NZIER 2015.

[6] Refer Neil Walbran submission and analysis to the Authority January 2018.

analysis and identifies similarities and points-of-difference from the pricing structures and processes for developing pricing that have been set out in the Authority's Consultation paper.

Candidate Pricing Options

The starting point was the identification of broad range of pricing options (see **Error! Reference source not found.**) which used combinations of the pricing types identified in the ENA's 2017 Guidance Paper.[7] The intention of this process was to identify pricing combinations for further analysis. These options include two of the three pricing structures identified by the Authority in the Consultation Paper – that is, Fixed + seasonal TOU and Fixed + static demand. The ENA's list of pricing options did not include a dynamic demand charge due to the difficulties in implementing these types of pricing. However, critical peak charges (applied as a per kWh price) were included as a potential option which allows actual peaks to be signaled to consumers.

Pricing options identified for analysis

Fixed + TOU (kWh)	Option 1a: Fixed + TOU (3 definitions)
	Option 1b: Fixed + seasonal TOU (2 definitions)
	Option 1c: Fixed + seasonal TOU + network demand charge (14 ND variations)
	Option 1d: Fixed + seasonal TOU + critical peak charge (7 CP options)
	Option 1e: Fixed + seasonal TOU + critical peak rebate
Demand (kW)	Option 2: Fixed + Network demand (14 ND variations)
Capacity	Option 3a: Fixed + Customer Demand (14 CD variations)
	Option 3b: Fixed + Booked Capacity with excess capacity charge
	Option 3c: Installed capacity + TOU
	Option 3d: Customer demand+ TOU (14 ND variations)
Base case	Option 0a: Fixed + flat rate kWh

Process for determining prices

Two alternative approaches were utilised to determining prices. The first was similar to that set out in Steps 5 and 6 of the Authority's Consultation paper (p. 16) in that the LRMC was estimated and used to determine pricing for the peak element of the pricing structure. Residual costs were then recovered through fixed charges, [8] or in some structures a type of capacity charge. A second approach was built into the pricing model to reflect uncertainty regarding the LRMC and future congestion, particularly in the context of evolving technology, and uses a parameter-driven structure.

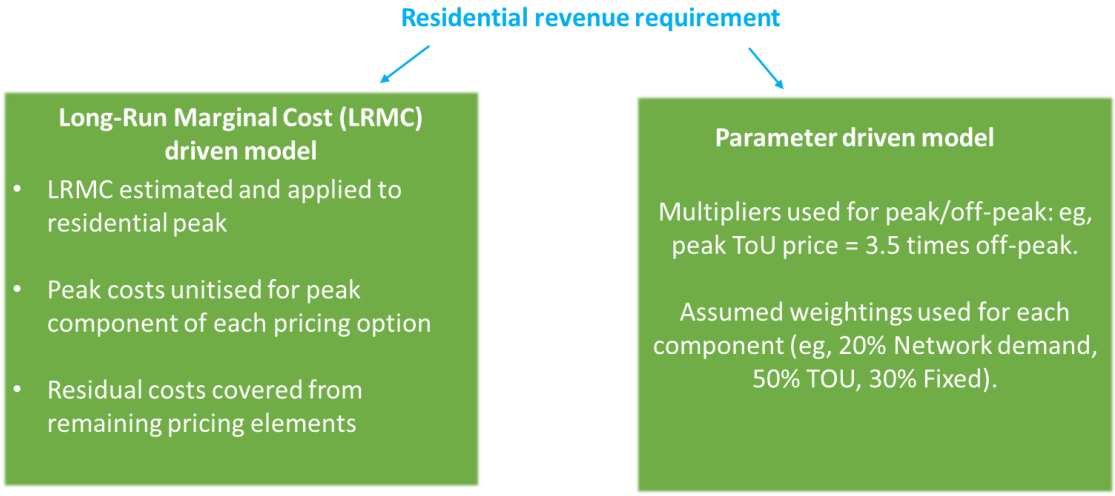
The LRMC-driven model drew on information disclosed in Asset Management Plans, using capital expenditure associated with System Growth along with an estimate of associated operating expenditure and demand forecasts to estimate the long run average incremental cost. This data

[7] ENA (August 2017), A Guidance Paper for Electricity Distributors on new pricing options.

[8] In the scenario without LFC constraints, residual costs can be fully recovered through fixed charges, however in the scenario without LFC constraints some residual costs are recovered through kWh charges (eg, during off-peak periods).

provided a readily available source of information for an average incremental cost calculation for the purposes of the ENA's modelling, however it is recognized that there are other methodologies for calculating LRMC. The model examined pricing both with and without the constraint of the LFC Regulations.

The alternative parameter-driven model determined prices using assumed weightings of individual price components (eg, for the fixed price component and peak price component) and ratio input parameters (eg, peak to off-peak ratios). The use of this model reflects that a pragmatic view may be necessary, particularly in the context of electric vehicles. It seems very likely that EVs will form a significant load in future and could have a significant impact on distribution networks. However, there is a high degree of uncertainty as to how significant the impact on networks will be in terms of the extent of congestion impacts, the capital expenditure required and the resulting LRMC. Exactly how quickly uptake will occur, when (and where) EV users will charge their vehicles is unknown. As a result, some degree of peak signal may be considered appropriate to pre-empt the effects of EVs on a distribution networks even if where a network is not currently constrained.



The ENA's intention is that the pricing model as well as the insights gained through its implementation provide an information resource to assist EDBs in their analysis and implementation of more efficient prices.

Calculating bill impacts

The pricing options analysis applied the resulting pricing scenarios through an anonymised half hourly data set provided by Counties Power to assess customer impacts.

Analysis of the data set using examine consumption and demand profiles was conducted to provide further insights into the drivers of customer impacts. A key finding of the analysis was that kW (or kVA) pricing constructs have a wide variation of pricing impacts around the average as compared with TOU pricing. A relatively small proportion of consumers are significantly affected by bill impacts with TOU options – eg. For TOU for a set of example prices, 86% of consumers face less than +/- $50 annual bill impact. In comparison, under the example kW prices, 80% of connections face bill impact

of more than +/-$50, and 65% of connections face a bill impact of more than +/-$150. While it may be that technological development (eg. home battery storage) provide some ability for consumers, retailers or other third parties to reduce these impacts to some extent, it is unclear that these will be cost-effective in the foreseeable future.

Investigating impacts by technology profile

A number of technology profiles were tested against prices from pricing model to examine how well each pricing structure addresses pricing challenges. In particular, how well the pricing signals the cost that a particular usage profile imposes on the network. This work in ongoing and there are some obvious difficulties in determining costs imposed by individual profiles, given that the demand profile of an individual residential user typically has very little impact on network costs.

The chart below provides a high-level summary of the findings. Of particular relevance to the pricing structures identified by the Authority in its consultation paper are that:

- while seasonal pricing has the potential to signal congested times, implementation and definition of peak periods is particularly important. Seasonal pricing results in sharp pricing signals (as compared with, say, non-seasonal TOU). As a result, if standard TOU peak periods are adopted (eg, 7am-11am and 5pm-9pm) and if those periods include times that are not strictly peaks then seasonal TOU pricing can create even more distortion than flat rate kWh prices
- although non-seasonal TOU has limited bill impact, it still delivers strong incentives to charge EVs off-peak
- network demand charges perform well with regard to reflecting congestion costs
- customer demand charges reflect that costs aren't driven by kWh and give incentives to smooth load profiles

Pricing challenge	Profiles tested	Flat rate kWh	TOU (morning & evening peak)	Day/Night	Seasonal TOU	Network Demand	Customer Demand
Network congestion	EV charging during (1) Evening peak time (2) Night time use (3) Early morning	No difference in charges by profile – no incentive to charge off-peak	Strong incentive to charge off-peak	Incentive to charge at night	Very strong signals to charge off-peak (during busy season)	Good incentives to charge off-peak	Some incentives to charge off-peak to smooth own load profile
Costs aren't driven by kWh	PV based on solar irradiance estimates (without battery)	Strong incentive to reduce kWh even when no network cost reduction	Incentive to reduce kWh even when no network cost reduction	Strong incentive to reduce kWh even when no network cost reduction	Depends on peak period definition	Reflects zero impact on peak costs	Reflects zero impact on network costs

Implementation planning has now started.

The DPWG has turned its attention to considering issues around consumer responses to different pricing options and especially how to transition from flat rate kWh pricing given the constraints (eg. Low-user fixed charge), the logistical challenges with implementation (eg. data and system issues), and expectations of regulators and politicians who want to see benefits sooner rather than later. This stage of the reform process is complex, involves a diverse range of stakeholders, and has many unknowns. We will need to experiment with prices, conduct trials, survey stakeholders and carefully assess risks (financial and reputational). This will take time and requires budget, from both the ENA and industry participants. Implementation is not a stage that ENA members can undertake by themselves.

The first step is to put a small industry group together to collaboratively develop an industry 'roadmap' of pricing reform over an extended period of time. A term of reference is currently being developed for the roadmap project. Timing wise, the objective is to have the collaborative roadmap project completed by end April 2019 simply because we need it, but it could also be helpful for the EPR panel and will be a strong signal to regulators and politicians that the industry is leading the reform process.

Stakeholder engagement

With the two workgroups having finished the bulk of their work, outputs were shared with a range of stakeholders in October and November:

- A briefing (via a slide pack) of workgroup outputs was provided to ERANZ, MBIE, EA, ComCom and Transpower, as well as ENA members via the DPWG. Results were also shared with EDB CEOs at their October forum.
- The government price review panel was provided with a face-to-face briefing.
- A stakeholder workshop, with approximately 80 attendees, was held in November.

Workgroup outputs, consumer perspectives from our focus groups, and our thinking on next steps/implementation, were all discussed with an engaged audience. We received very good feedback. ENA is currently looking into resource requirements for developing implementation and transition plans.

Appendix 3 - Joint industry roadmap for price reform - Scope of Work

The need for distribution pricing reform has become more important in the context of the choices consumers now have to invest in, and operate, plug in electric vehicles, small scale distributed generation, batteries, and home energy management systems. In addition, the ongoing deployment of smart meters enables the use of more sophisticated distribution pricing structures than have been possible in the past. These developments have led to recognition that distribution pricing structures should become more efficient and reflective of network costs, in order to avoid inefficient investments. Distributors are committed to reforming their approaches to pricing and note the updated pricing principles recently released by the Electricity Authority[9].

The joint reform process to date

The need for a joint industry roadmap follows from the pricing reform developments during 2017 and 2018:

- The detailed analytic work on distribution pricing options carried out by the ENA's Distribution Pricing Working Group (DPWG);
- The work of the joint distributor and retailer Technical Implementation Working Group (TIWG) to address the technical issues raised in the 2017 Guidance paper[10] and,
- Agreement amongst a gathering of retailers and distributors on July 4, 2017 that a joint approach to work groups would be a benefit to all stakeholders, and that work group membership should be equal numbers of distributors and retailers.

The 2017 Guidance Paper identified several technical implementation issues that need to be resolved if pricing reform is to be successful. The work of the TIWG has been successful in addressing these issues and doing so collaboratively.

A related, joint exercise was promoted at a second distributor and retailer meeting held November 12, 2018. This meeting agreed that another combined retailer and distributor group was needed, solely for the purpose of developing a joint implementation roadmap so that participants, regulators and other stakeholders can see a fully developed path to efficient electricity pricing for consumers.

The purpose of the group is to consider a pan industry roadmap

To consider the issues and timing faced by distributors, regulators, MEPs, and retailers on the path to delivered efficient network pricing. The group will present its work as a roadmap that informs

[9] Electricity Authority *More efficient distribution prices Consultation paper* 11 December 2018

[10] Electricity Networks Association *A guidance paper for Electricity Distributors on Pricing Reform* August 2017 Final

all stakeholders' understanding of the issues and timing towards the introduction of efficient distribution pricing