

IT'S TIME TO REFORM DISTRIBUTION PRICING

This short paper provides distribution company Board members and senior executives with an overview of the Authority's current thinking on distribution price reform.

DISTRIBUTION PRICES ARE SENDING THE WRONG SIGNALS

Distribution prices recover around 37% of the average electricity bill in New Zealand¹, including transmission costs. It is in the long-term interest of consumers that the costs of distribution networks are efficient, that is, as low as possible.

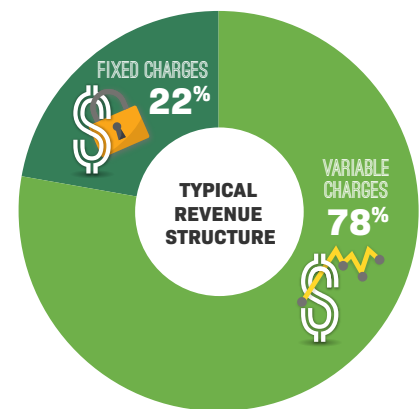
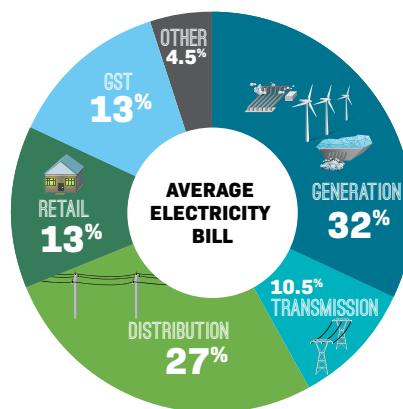
Distributors run primarily fixed-cost businesses, but recover most of their costs using a variable charge – a flat per kWh charge that does not reflect the costs of providing the services and is not well linked to the benefits derived by those using the services of distributors.

This is inefficient. Consumers end up paying more than they need to. This is because flat per kWh prices do not signal to consumers when the network is congested and costly to use, or when there is spare capacity.

These distorted price signals result in unnecessary investments, costing consumers more.

This pricing regime also means as consumers invest in new technologies (such as solar panels) more and more of the network costs are pushed onto consumers who do not use those technologies. These consumers will be over-represented by low-socioeconomic households who are unable to afford solar panels. This outcome is unsustainable.

In 2015, NZIER estimated that just in relation to solar panels alone this process could increase distribution charges by up to 30% over 10 years. This would add 10% to the retail bills of consumers without solar panels.² They effectively end up cross-subsidising others to over-invest in solar panels. The economic cost of this outcome occurring has been estimated in billions of dollars.³



Note: This data is the average for the 5 biggest distributors by ICP count.

¹ Distribution prices include distribution and transmission costs, which account for 27% and 10% of the average electricity bill respectively.

² See NZIER 2015, *Effects of distribution charges on household investment in solar*, available at ea.govt.nz

³ See NZIER 2015, and Concept Consulting 2017, *New technologies + old tariffs = problem!*, available at www.concept.co.nz

DISTRIBUTION PRICES ARE SENDING THE WRONG SIGNALS CONTINUED

The Authority published a consultation paper on the need for distribution price reform in 2015. Also, distributors have been studying pricing options and working on implementation issues. This work, led by the Electricity Networks Association, is heartening. But given the cost pressures faced by consumers and the looming commercial implications for electricity distribution businesses of inefficient

investments, the need for price reform is more urgent than ever.

The Authority needs to see the distribution networks act with ambition and urgency on reforming their price structures. They should put in place concrete transition plans now, rather than wait.

We will soon publish a consultation paper proposing to amend the Distribution Pricing Principles to make clear our expectations. We will also propose a distribution pricing monitoring regime, so we

can track distributors' progress on price reforms and engage with distributors and their communities on this progress.

Distribution price reform is a key means for distributors to respond to the opportunities and threats posed by new technologies and also policies aimed at reducing greenhouse gas emissions. Price reform will require strong leadership from distributors and active engagement with the community and other stakeholders, such as retailers.

WHY ARE CURRENT DISTRIBUTION PRICES A PROBLEM?

Inefficient distribution prices create unnecessary costs for consumers. The Authority's concern is not the total amount of revenue distribution businesses recover. That is set by the Commerce Commission for most distributors and by the firms themselves for those consumer controlled distributors that are subject to information disclosure regulation only. The Authority's interest is that distributors apply *efficient* price structures to generate revenue.

IT INCREASES THE COST OF ELECTRICITY FOR ALL CONSUMERS

Current standard distribution prices do not signal when the network is congested nor when there is plenty of capacity. That means consumers have few incentives to avoid using power-hungry appliances or delay charging their electric vehicle when the network gets congested. Distributors interpret the congestion as a need to invest in more network capacity. This ends up unnecessarily increasing consumers' power bills.

Source: Concept Economics, 2018. *Driving Change – Issues and options to maximise the opportunities from large-scale electric vehicle uptake in New Zealand*, available at www.concept.co.nz.

SCENARIO

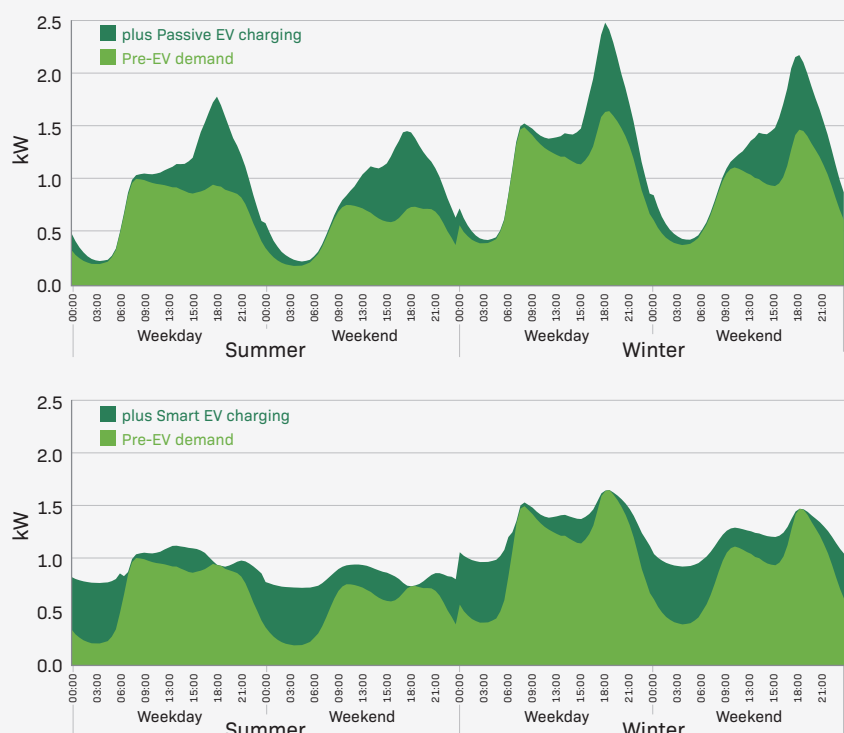
Reducing demand might be the cheapest option for addressing congestion. But without a clear price signal consumers will not know *when* to adjust their use of the network.

Demand response can be as simple as adding a time switch to a storage hot water cylinder – to avoid heating water over peak demand periods – or as sophisticated as adding

a battery to a rooftop solar panel installation to draw on at peak time.

Figure 1 illustrates the difference for the network if households charge their EV when they get home or use smart (off-peak) charging. Prices that accurately signal the costs and benefits of using the distribution network give parties the right incentives to adjust their demand.

Figure 1: Effect of passive and 'smart' EV charging on household demand profile



IT CAN LEAD TO POORER POWER QUALITY AND POWER CUTS

Another problem is current standard distribution prices give consumers few incentives to pay attention to how their actions are affecting network power quality. For example, if a cluster of EVs are put on to charge at the same time this can create voltage problems and power cuts. Distributors would end up installing extra capacity – that all consumers would pay for, or consumers continue to experience poor service quality. The result is increased bills and dissatisfied customers.

SCENARIO

Five households on the same street buy EVs and install 7 kW in-home chargers. As appliances in an average household have a combined load impact of around 2.5 kW, adding 7 kW to the peak load is like adding nearly 3 new houses to the local network.

All five households charge their vehicles when they get home from work, adding to the already high evening peak load. This causes very low local voltage, which all neighbours notice. Clusters of solar panel installations can create similar

problems when passing clouds simultaneously shade and then re-expose the solar panel cluster to full sunlight.

The local distributor has no operational visibility of these problems – until customers complain about poor power quality or the distribution transformer is overloaded leading to a fault. Efficient prices would give those with EVs and solar panels incentives to shift their demand to off-peak periods or store their excess solar energy and use it at peak times.

IT ALLOWS PEOPLE TO SHIFT THEIR SHARE OF COSTS TO OTHER USERS

People are able to take steps to reduce their own electricity bill by installing solar panels, but this does not necessarily reduce distributors' costs. Distributors end up raising their flat, per-kWh charges to recover their costs. As this goes on, prices become even less cost-reflective. As a result even more consumers are encouraged to make investments to avoid the increasing distribution network costs. It pushes more of the cost of the network onto those who have not made such investments. This cost spiral is unsustainable. It undermines the commercial returns for distributors and the durability of network prices.

SCENARIO

Distributor network costs are driven by periods of peak demand, such as network congestion during a cold winter evening. But current standard distribution practice is to charge consumers based on total electricity distributed (that is, c/kWh charges), not peak demand.

Without distribution price reform, consumers have an incentive to over-invest in solar panels, because these reduce the total kWh consumers draw from the network – but not at peak times. This effect is real and large. The expected cost of this overinvestment is estimated to be \$2.7–5 billion over 25 years.⁴

Because lower socio-economic households and renters are less likely to install solar panels, they actually end up subsidising the typically wealthier households that do. This is because distributors will need to increase their kWh prices to recover the same total revenue from a decreasing number of kWh supplied from the network. It is important to note that doing nothing will cause significant price impact for consumers. Therefore this cost should be accounted for when assessing benefits of price reform.



WHAT NEEDS TO BE DONE ABOUT IT?

Efficient distribution network prices will help address these issues. At a 2016 conference there was near-unanimous industry agreement that distribution prices need to change. There is less agreement on how or when prices should change.

PRICES THAT ARE COST-REFLECTIVE AND BENEFITS-BASED

Distributors need to better align their prices with the drivers for their costs.

As the distribution service is mainly a fixed-cost business, the first and easiest thing distributors can do to improve the efficiency of their prices is to change the balance from variable charges to fixed charges as the way to recover network costs. There is still a place for variable charges, but these should signal the marginal cost of network congestion and losses, and the impact of consumers' actions on power quality.⁵

Rebalancing network tariffs to better reflect distribution cost characteristics will not only improve the efficiency of distributors' prices, it will also improve their revenue certainty.

RESTRICTING THE USE OF NEW TECHNOLOGIES IS A RECIPE FOR INEFFICIENCY

A distributor could address some of the problems outlined above by imposing restrictions, such as quotas on the number of new technologies (EV's, PV and batteries) that can connect to the network, or other restrictions on how or when they can be operated. But quantity and similar types of restrictions are a recipe for inefficiency. They are unlikely to be acceptable to the public or to the Government – which has strongly signalled its desire for New Zealand to transition to a low-carbon economy.

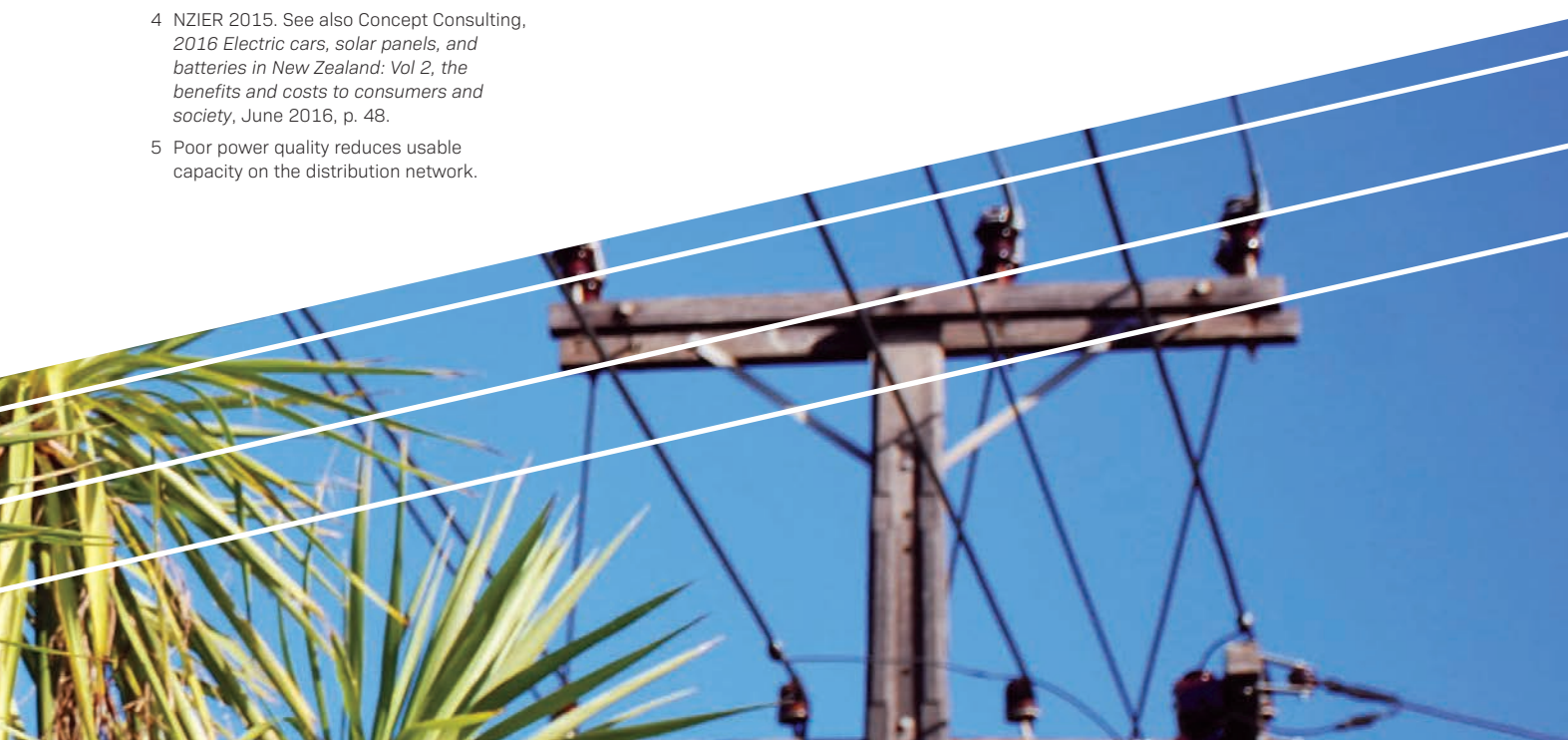
LOW FIXED CHARGES REGULATION IS NOT A BARRIER TO MAKING PROGRESS

Distributors have in the past expressed a concern that the low fixed charges regulation may limit their options. This regulation requires distributors to offer a low fixed charge tariff. Most recently, the Electricity Price Review raised concerns about unintended consequences of this regulation and whether it was effective at targeting those who need help.

In any case, the Authority considers the regulation does not prevent distributors from adopting more efficient prices. For example, it does not prevent distributors adopting variable charges based on capacity, peak demand or time of use. All of these vary according to when and how much electricity is consumed. Also, the regulation applies to residential customers only, who account for only part of electricity consumed on distribution networks.

4 NZIER 2015. See also Concept Consulting, *2016 Electric cars, solar panels, and batteries in New Zealand: Vol 2, the benefits and costs to consumers and society*, June 2016, p. 48.

5 Poor power quality reduces usable capacity on the distribution network.



HOW CAN DISTRIBUTORS DO THIS?

THERE ARE MORE EFFICIENT AND PRACTICAL PRICING OPTIONS

It is appropriate that distributors design their own price reforms. But it is important to note that some price structures are more efficient than others.

We have ranked various distribution price structures by their efficiency – that is, the extent to which these price structures are cost-reflective and benefit-based. As a result we identify three key models that are an improvement on the status quo:

- Fixed charges + seasonal time of use charge
- Fixed charges + static demand charge
- Fixed charges + dynamic demand charge

None of these models is complex – each has a fixed and a variable (marginal cost) charge.

Fixed charges would recover the largely fixed costs of providing the network, and any connection costs. The variable charge would signal the (marginal) cost of using the network at a particular time and location. There may also need to be a price component that signals power quality impacts.

We are finalising a consultation paper that will outline the three price structures and summarise our view on relevant details – such as how distributors could allocate the cost of existing assets and that of new distribution assets in a way that promotes efficiency, as well as the economic rationale for different options.

All options require resolution of technical implementation issues. These can be overcome – and indeed have already been overcome by some distributors.

The industry-led Technical Implementation Working Group is helping by working to resolve various operational and systems issues.

STEPS DISTRIBUTORS CAN TAKE WHEN DESIGNING THE DETAIL

The Authority has clear views on what is efficient pricing, but we currently prefer that distributors select price structures that are most efficient given local circumstances.

However, the generic considerations are set out in the following diagram. This draws on advice by NERA Economic Consulting for the Australian Electricity Market Commission.⁶ ENA's 2017 guidance on price options is another relevant resource.⁷

1

ANALYSE NETWORK COSTS AND THE COST OF DRIVERS

2

ANALYSE NETWORK LOAD PROFILES AND EXISTING NETWORK CAPACITY

3

GROUP CONSUMERS BASED ON LOCATION

4

ASSIGN COSTS ACCORDING TO CONSUMER GROUPS OR LOCATION

5

DEVELOP TARIFFS THAT SIGNAL THE MARGINAL COST OF USING THE NETWORK

6

DEVELOP A FIXED TARIFF COMPONENT TO RECOVER REMAINING COSTS

⁶ Based on NERA, 2014. *Economic Concepts for Pricing Electricity Network Services*, Report for the Australian Energy Market Commission, available at www.aemc.gov.au

⁷ Electricity Networks Association, 2017. *A Guidance Paper for Electricity Distributors on new pricing options*. available at www.ena.org.nz



WHEN SHOULD DISTRIBUTORS DO THIS?

WITH URGENCY

Consumers experience the adverse effects of inefficient prices now. The size of the problem will only continue to grow with the uptake of EVs, solar panels and batteries. Distributors should not wait until 2020 to start their transition to more efficient prices.

The Government's focus on transitioning to a low-carbon economy will likely accelerate adoption of such technologies. This makes it even more important that prices send the right signals. It also means the commercial implications

for boards – from being lumbered with inefficient investments and costs increasingly concentrating on a smaller group of consumers – are closing in much faster than recent trends might suggest.

THE LONGER DISTRIBUTORS WAIT, THE HARDER IT WILL BE TO ADDRESS THESE ISSUES

As more consumers invest in emerging technologies, the greater the total cost of the inefficiency and also the harder it becomes to make changes.

Price reform can result in material changes, such as “bill shock” for consumers or systems upgrades for distributors and retailers.

Distributors are likely to want to make their transition to more efficient prices over time, and work

with retailers as intermediaries, so the changes are manageable.

START THE TRANSITION NOW, WITH CONCRETE, TIME-BOUND PLANS

The existing distributor-led roadmaps have lacked rigour and commitment to timeframes.

We expect distributors to put in place concrete transition plans now and make a start on them, rather than wait until 2020 to begin working on a transition.

We propose to formalise our expectations for future roadmaps, so they provide detailed, concrete and time-bound plans for price reform.

WHAT WILL THE AUTHORITY DO TO FACILITATE REFORM?

PRICING PRINCIPLES

In our forthcoming consultation paper, the Authority will propose to amend the Distribution Pricing Principles. The purpose of this is to clarify the aims of and expectations for efficient distribution prices.

MONITORING AND RATING DISTRIBUTORS' PROGRESS

We will also propose to introduce a new monitoring regime to track distributors' progress on price reform. This will draw on existing

information disclosure data. The aim is to encourage distributors to put a sharper focus on price reform.

We will:

- develop a star-rating for each distributor, based on the efficiency of their price structure
- assess the degree to which each distributor's revenue structure aligns with its cost structure
- use these ratings to discuss progress with distributors and publish the results.

We expect to publish findings from our consultation soon after distributors release their annual pricing methodology on 1 April 2019.

The monitoring framework will be confirmed as part of the consultation. We will then undertake the first round of monitoring. We will provide each distributor with its rating and offer the chance to test and discuss its rating and price reform plans with the Authority.

