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## **Submission on Implications of evolving technologies for pricing of distribution services**

### **Introduction**

1. This is Vector's submission on the Electricity Authority's (the Authority) Consultation Paper on the implications of evolving technologies for pricing of distribution services (the Consultation Paper). It may be publicly disclosed. Vector's contact for this submission is:

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### **Executive summary**

2. For well over a century, the traditional electricity supply chain provided consumers with little choice. Recent technological advances has turned the electricity industry on its head by providing consumers with ever-increasing choice on how they meet their energy requirements.
3. Technology-empowered and environmentally-aware consumers are now driving rapid changes in the way services are accessed and priced across a broad range of industries. These consumers want simplicity, convenience, quality, sustainability and value, and they want it at their fingertips. In the electricity industry, the challenge for incumbents is to evolve to meet the demands of this new generation of consumers, while the challenge for regulators is to ensure there are no regulatory impediments to them doing so.
4. Vector has responded to the questions posed by the Authority's Consultation Paper separately. Our position can be summarised into the following points:
5. *The observations in the Consultation Paper seem more supported by economic theory than any evidence of consumer preference or behaviour.*

The Authority does not appear to have engaged with consumers or provided evidence from other jurisdictions or industries to support its observations. For example, in the highly competitive telecommunications market, pricing structures have evolved from “peak” pricing to “all-inclusive” plans in response to consumer preferences.

6. *Pricing structures can be improved.* Vector recognises that there are better pricing structures than anytime-consumption prices to appropriately signal to consumers the potential cost of their usage on our network. Transitioning to new pricing structures will need to balance being service-based, on the one hand, with meeting consumer needs on the other. Structural price changes should be gradual, and common and sunk costs should be recovered over a broad base.
7. *The answer will be consumer-driven.* The Authority appears to be seeking pricing structures that will drive change to consumer behaviour. The aim of service-based pricing should be to signal to consumers the cost of providing a service, not to elicit a pre-defined behavioural response. Consumers may prefer simplicity and convenience and may not be interested in changing their behaviour if the perceived inconvenience to them outweighs the cost reduction they might gain. The challenge for a distributor will be to implement pricing structures that meet consumer preferences, send the right signals and are well understood by consumers.
8. *Pricing structures should not be obscured by retailers.* Vector is concerned that efforts made to signal service-based pricing will be distorted by retailers’ re-bundling prices. Retailers need to change their behaviour and ensure that price signals are passed through to end-consumers. Vector’s experience with its residential time of use pricing (that only one retailer makes available to consumers) and mandated Commerce Commission price reductions suggests that the Authority’s confidence in retailers reflecting service-based prices through to customers may be misplaced. Most retailers have resisted transparency in the breakdown of charges on the consumer’s bill. The Authority, to date, has also resisted requiring retailers to have transparency on their bills.
9. *Regulatory frameworks should be flexible.* Differences in network characteristics, along with consumer preferences and responses to new technology, means that the regulatory framework should be sufficiently flexible so as to enable distributors to develop pricing structures that can reflect and evolve with its network and consumers.
10. *Minimise regulatory barriers to reform.* The operation of the current price cap form of regulation could inhibit pricing reform. Regulated revenues under the Distribution Price-Quality Path (the DPP) regime are sensitive to estimated and actual quantities. To the extent that these quantities are materially

different, a breach of the DPP or an under-recovery of revenue can ensue. Co-ordination between the Authority, the Commerce Commission (Commission) and industry is needed to minimise regulatory impediments to pricing structure changes.

11. *The LFC regulations should be repealed.* The Electricity (Low Fixed Charge Tariff Option for Domestic Consumers) Regulations 2004 (the LFC regulations) have introduced inefficiencies and inequities. They have prevented the development of consumer-centric pricing options and will continue to do so until they are repealed. The Authority focuses on the definition of a variable charge in the LFC regulations, in an effort to demonstrate the LFC regulations and service-based pricing are compatible, but the issues are present regardless of the interpretation of the definition of fixed and variable charges.
12. *Regulation should be technology-agnostic.* It is important that stakeholders, including regulators, remain technology-agnostic. Technologies are likely to change over time, both in nature and affordability, and ostracising one while advocating others may itself drive perverse outcomes. Rather, the focus of industry consultation should be about how to best ensure cost reflectivity is achieved in a tariff reform process that is sensitive and responsive to the constant evolution of technology and changing consumer preferences.

## **Response to questions**

*Q1 What are your views on the scope of the Authority's review? Please give reasons for your answer.*

Vector considers itself at the forefront of providing consumers with choice and enabling the adoption of new technologies and so is encouraged by the Authority's recognition that these technologies will have implications for traditional pricing structures. The Authority's approach of taking a broad consultative approach, without proposing any specific solution, encourages the robust discussion needed to determine an appropriate outcome.

*Q2 What other technologies do consumers invest in or use that are likely to have a material effect on investment or operation of distribution networks? Please give reasons for your answer and an estimate of when you expect the technologies will have a material effect.*

The Authority has recognised many of the key technologies that currently, or have the future potential to, affect distribution networks. While identifying those technologies is important in demonstrating how technological uptake can affect the operation of, and investment in, the distribution network, Vector cautions against focussing on or singling out any particular technology. Technology will invariably evolve in ways no one can predict. Vector believes the industry and regulators should be focused on removing any regulatory barriers and establishing the right incentives that are appropriately responsive to *any* technological development. In other words, regulation should be technology-agnostic.

*Q3 What do you think about the Authority's concerns that existing distribution pricing structures do not reflect the costs of the different distribution services provided and may not be durable?*

In the past, the consumer had little choice on how their energy demands were met. Metering infrastructure was far less sophisticated than today, with manually-read meters only capable of measuring usage or maximum demand over a defined period of time. As a result, consumption-based prices were possibly the most appropriate structure for the time.

In the face of increasing consumer choice enabled by evolving technology and significant improvements in metering technology, Vector sees that the

current consumption-based pricing structures<sup>1</sup> are not best suited to pricing the services distributors provide to consumers. We believe changes to distribution price structures are required but these changes may be hindered by regulation, including the revenue uncertainty of price restructuring under the current price cap formula, and the LFC regulations. A more detailed discussion of these regulatory concerns can be found in Vector's response to Q10.

*Q4 What is your view of the potential for a significant amount of inefficient investment in solar panels if distribution pricing structures continue to be based primarily on a consumption-based approach?*

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*Q5 What is your view of the potential for inefficient investment in distribution networks if there is a high uptake of electric vehicles and distribution pricing structures continue to be based primarily on a consumption-based approach?*

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*Q7 What is your view of the potential for alternative distribution pricing structures to promote more efficient investment by consumers in heat pumps and / or LEDs?*

Vector recognises that there are better pricing structures than anytime-consumption prices to send the appropriate price signals to consumers but that these should not be at the expense of consumer preferences.

It is important that stakeholders, including regulators, remain agnostic towards particular technologies. These are likely to change over time, both in nature and affordability. Rather, the focus of industry consultation should be about how to best ensure cost reflectivity is achieved in a pricing reform process that is sensitive and responsive to consumer preferences and how they choose to meet their energy requirements.

The extent of inefficient investment in solar PV is grossly exaggerated by the NZIER through its simplification of working assumptions. Although some

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<sup>1</sup> Vector would like to clarify the definition of "consumption-based pricing" (paragraphs 5.1.6 through to 5.1.8). Although the Authority acknowledges that there are some exceptions, those few exceptions do not discourage the Authority thereafter from treating the terms 'consumption-based' pricing and 'anytime-consumption' pricing synonymously. Although the distinction may appear benign, it is important. Time of use pricing is also a form of consumption-based pricing, but is better capable of signalling network congestion than anytime-consumption prices. Throughout this document, Vector will adopt the term 'anytime-consumption' pricing.

simplifications are recognised at paragraph 5.2.13 (footnote 64), such as the number of apartment dwellers and tenanted properties, other factors will also limit uptake, including affordability, and site-specific issues such as slope, direction, size and type of roof. These assumptions are by no means trivial, and likely explain why solar PV installations in NZ are fewer than 7,000 at August 2015 (Figure 4). This is in stark contrast to the modelled case by the NZIER where, in the space of a year, rooftop solar installations under current prices increase to 150,000 in 2016 (Figure 7). The disconnect between current and projected installations cannot be ignored, and undermines the creditability of the inefficient investment calculations by the NZIER by exaggerating the extent of the potential problem.

The Authority reflects on the absence of meaningful day/night pricing differentials at paragraph 5.3.14, considering that a \$0.10/kWh differential will provide a “modest network usage incentive” at paragraph 5.3.13. Their concern appears to be that current day / night price differentials may not “adequately signal to the consumer the high costs potentially imposed on the distribution network”.

Under a service-based (or cost-reflective) pricing approach, the price a consumer pays for a distribution service reflects the cost of providing that service. The expected consequence, as the Authority notes at paragraph 6.1.2, should be to “signal to users the cost of new capacity in a way that encourages efficient network and consumer investment.” Provided pricing is in place that is service-based while meeting consumer preferences then the Authority should be agnostic to behavioural outcomes. In the example of electric vehicle charging, if consumers are receiving the right cost signal, even if that signal is considered “modest”, and consumers do not adjust their charging time, then this itself is not a failing or “inefficiency”. The consumer is prepared to fund any necessary network augmentation through the service-based price. This approach is also consistent with the Authority’s concern around the potential for over-investment in technology at paragraph 5.4.17 where it notes that “prices above cost could encourage inefficient over-investment in batteries.” The importance is that the price signal is comprehensible and capable of eliciting a behavioural response. This is discussed further in our response to Q8.

Just as anytime-consumption pricing structures may over-value the benefit (if any) from solar generation during the middle of the day, contrarily, anytime-consumption pricing structures may under-value the cost of heat pump usage during the morning and evening peaks.

*Q6 What is your view of the potential for battery technology to defer or avoid investment to augment distribution networks?*

Vector believes benefits from avoided network augmentation can be realised with battery technology. This will take the form of embedding the technology directly into the grid<sup>2</sup> and through home installations with the potential for direct EDB demand management (load control)<sup>3</sup> and / or pricing incentives<sup>4</sup> to effect or encourage power reduction or grid injection during peak network periods.

Vector shares the Authority's expectation that the cost of battery technology will reduce significantly over time and, as the return on investment profile improves, so will the uptake of home-based batteries.

*Q8 What is your view of distributors' options for structuring their pricing?*

Vector generally agrees that:

- i. there is no one 'right' pricing structure or set of pricing options for all distributors (para. 6.1.2)
- ii. there will be inherent trade-offs with competing objectives (para. 6.1.3)
- iii. distributors should consider consumer preferences (para. 6.1.9)
- iv. distributors need to engage with consumers (para. 6.2.1), including retailers, and
- v. any material change to pricing structures may need to be gradual (para. 6.3.2)

*i. there is no one 'right' pricing structure or set of pricing options for all distributors*

The individual circumstances of New Zealand's electricity distributors are varied, for example in relation to:

- The penetration of smart meters;
- The extent of spare capacity in the network;
- The cost and nature of network augmentation;

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<sup>2</sup> For example, Vector is developing a pilot scheme to test the technical and financial viability of using Tesla Energy's Powerpack batteries to defer sub-transmission investment at its Glen Innes substation in 2016.

<sup>3</sup> Vector, *Electricity Asset Management Plan Update Information Disclosure 2015*, p19

<sup>4</sup> Vector, *Pricing Methodology, Electricity Distribution Network, from 1 April 2015*, p36

- Seasonal and locational weather conditions;
- Composition of consumer base between residential, small business, commercial and industrial users, each having unique load profiles that reflect varying patterns of consumption; and
- Consumer demographics, in particular the appetites of consumers for new technology.

Providing a flexible framework for distributors to respond to the unique characteristics of their network, the individual consumer preferences on their network, and the inclination and ability of retailers operating in their network to pass through pricing signals, will better place distributors to deliver longer-term investment efficiencies.

*ii. there will be inherent trade-offs with competing objectives*

Approaching pricing structure reform will require careful consideration of the trade-off between the extent of cost-reflectivity and the practical understanding of the price signal. As Origin Energy notes in its response to Networks NSW Issues Paper on the matter of cost-reflective network prices:

*"the most economically efficient tariff may not always deliver an optimal outcome simply because the customer does not understand the signal and therefore how to respond. Conversely, tariff solutions that are perceived as second best may actually deliver better network outcomes because they are simpler and easier to understand and therefore they generate the intended customer response."<sup>5</sup>*

*iii. distributors should consider consumer preferences*

Anytime-consumption pricing is well understood by residential consumers and is within their control to influence for the purpose of reducing total charges. Demand and capacity charges, while better reflecting network congestion, are more sophisticated units of measure, less well understood, and therefore may be considered less controllable by consumers<sup>6</sup>.

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<sup>5</sup> Origin, *Response to NNSW Issues Paper*, cited in Essential Energy, *Tariff Structure Statement*, 27 November 2015, p38

<sup>6</sup> This was highlighted in roundtable discussions conducted by Networks NSW ahead of their development on cost-reflective prices: "a customer, who is currently on a tariff with a demand component, expressed surprise at being penalised due to an outlying peak reached only once during a billing period. They thought that demand should be calculated on a more persistent level. This, however, is just not the nature of a demand tariff which necessarily penalises customers who demand a high level of energy, even if it is just once in a billing period."



Some consumers prefer the simplicity of anytime-consumption pricing<sup>7</sup>. Some energy retailers market their product as “easy”<sup>8</sup>. Others have introduced “levelised” bills for those consumers who prefer consistency in paying the same amount each month<sup>9</sup>. Distributors will need to take account of these preferences when designing service-based pricing structures.

*iv. distributors need to engage with consumers, including retailers*

Change in pricing structures will inevitably bring about transaction costs for both end consumers and retailers. To the extent that retailers pass through the new pricing structures, then for some consumers, savings may be enjoyed immediately without any change in behaviour. These consumers will be using electricity in such a way as to have little or no impact on network congestion. Conversely, for other consumers, typically with ‘peakier’ load profiles, electricity bills could increase, as their consumption patterns contribute to the requirement for new network investment due to network congestion and the new pricing structure charges more for such behaviour. The extent to which consumers will respond to the resulting financial impact will depend on individual circumstances, including their understanding of the causal impact between their usage decision and their electricity bill. Even consumers with a relatively high price elasticity of demand may not be particularly responsive if they do not sufficiently understand the link between their usage and their electricity charges. This is not a triviality. The best intended service-based pricing structure will fail to deliver the most optimal outcome if it not well understood by the consumer.

Regardless of any network pricing structure change, retailers are expected to continue to include consumption-based price components in their charges. Retailers are faced with other significant costs, including the wholesale cost of electricity which are levied on a throughput basis. Consumption-based charges are therefore considered the optimal mechanism to recover wholesale energy costs. Where demand- or capacity-based pricing structures are adopted by distributors, this will mean multiple price signals, measured on different bases, will be faced by end consumers. The multiple price signals may cause confusion amongst some consumers.

*v. any material change to pricing structures may need to be gradual*

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<sup>7</sup> British Gas, for instance, simplified its prices into two types: variable and fixed. Subsequent internal research demonstrated that 83% of customers found the new tariff structure good, very good or excellent with only 6% not supporting the changes. Energy and Climate Change Committee, *Consumer Engagement with Energy Markets*, Ev 76

<sup>8</sup> <https://www.contact.co.nz/personal/products/electricity> (accessed 8 January 2016)

<sup>9</sup> Meridian offers “Levelpay”

Vector agrees that meaningful changes to pricing structures should be introduced in a measured, gradual manner. The roll out of smart meters in Victoria from 2004<sup>10</sup> with distributor time of use pricing presents a cautionary tale of the mismanagement of mandating of a package of new technology and prices where consumers are not sufficiently engaged. The subsequent backlash around the mandatory rollout lead the Victorian Government to introduce a moratorium on time of use (or “flexible”) pricing in 2010<sup>11</sup> after which adopting the time of use price was voluntary<sup>12</sup>. In its first Tariff Structure Statement, Victorian-based United Energy was wary that consumers may not “have the time or interest to understand the complexity of energy pricing”<sup>13</sup> therefore requiring that “the extent of change and the timeframes are manageable”<sup>14</sup> when pursuing pricing reform.

The Authority suggests, as an example at paragraph 6.3.2, that consumers with small-scale distribution generation (eg. rooftop solar) may be first candidates in the path to transition to service-based prices. Vector does not support singling out a particular group of consumers for future price structure changes.

Vector believes a more appropriate transitional path may be achieved through the Authority’s alternative example, where consumers who are newly connected to the grid are subjected to service-based pricing structures. New consumer connections will neither gain nor lose from the service-based pricing structure as there is no direct comparison to be made.

*Q9 What needs to occur for distributors to amend their distribution pricing structures to introduce more service-based pricing?*

In our view there is no one ‘right’ pricing structure. Distributors must be given the regulatory flexibility to able to adopt the right approach for their particular circumstances. They must not be unnecessarily constrained by regulations such as the LFC regulations.

*Q10 Would a change to the applicable rules encourage change to pricing structures?*

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<sup>10</sup> MBIE, *Overview of the Victorian Smart Meter Program*, p2

<sup>11</sup> p5

<sup>12</sup> Interestingly, fewer than 1% of United Energy customers have volunteered for time of use pricing. See United Energy, *Shape our energy future together, Tariff Structure Statement 2017-20*, p37.

<sup>13</sup> United Energy, *Shape our energy future together, Tariff Structure Statement 2017-20*, p14.

<sup>14</sup> p4

Vector sees two ways in which rule changes would further encourage a change to pricing structures:

- By repealing the LFC regulations to increase distributors' options for adopting more service-based pricing; and
- By changing the Default Price Path to remove the risks of breaching the price path or under-recovering revenue.

#### *i. LFC Regulations*

The LFC regulations unnecessarily and unhelpfully restrict distributors' options for structuring prices, including adopting more consumer-centric and service-based pricing. Further, they drive inefficiencies and inequities in distributors' pricing structures.

By capping the fixed price a distributor can charge at no more than 15c per day and by prohibiting tiered or stepped variable charges, the LFC regulations restrict the use of consumer-centric pricing approaches seen in other markets. Pricing such as "fast, super-fast and lightning-fast" broadband packages or "all you can eat" mobile phone plans would run afoul of the LFC regulations.

The Authority notes at paragraph 6.1.3 that prices set at incremental cost will generally not be sufficient to recover all of the common network costs, so prices must be marked-up above incremental costs. The 15c fixed price cap forces these mark-ups to be applied to variable prices, which increases the marginal cost of consumption and so distorts consumers' decisions about how they use the network and make investments. Mark-ups on fixed prices would not have the same effect as they do not increase the marginal cost of consumption.

While the Authority argues that demand and capacity prices are variable prices under the LFC regulations, this doesn't address the issues: the consumer-centric pricing approaches described above are still not permitted; and marked-up demand and capacity prices, while an improvement on marked-up anytime-consumption price, nonetheless still increase marginal costs and distort usage and investment decisions.

#### *ii. The Default Price-Quality Path*

Under the Default Price-Quality Path, the introduction of a new pricing structure (such as service-based pricing) may require the estimation of historical quantities. To the extent that estimated quantities are different from those which ultimately transpire, this may give rise to actual revenue that is markedly different from notional revenue. There is a risk that the

Commission may question the reasonableness of the ex-ante quantity estimate and hence the distributor's compliance statement.

Similarly there is a risk of the reverse occurring, where differences between estimated and actual quantities cause actual revenue to be significantly less than notional revenue. Further, a consequence of compliance being assessed using lagged quantities is that any increase in a price that leads to a reduction in the quantity associated with that price will cause a distributor's actual revenue to be less than its notional revenue. This reduces the attractiveness of structural changes such as a move to service-based pricing, as they will almost certainly require increases in some price components.

At best these risks serve to slow down the pace of change and at worst discourage change altogether.

*Q11 What incentives could be introduced to encourage change?*

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*Q12 What other options would ensure distribution pricing structures are service-based?*

Vector is confident that following the repeal of the LFC regulations and changes to the Default Price Path, commercial incentives driven by changing consumer preferences and emerging technologies will be sufficient to encourage distributors to adopt service-based pricing structures.

However Vector is less confident that these pricing signals will be passed on to consumers by retailers. Vector's experience in the past with its residential time of use pricing (that only one retailer makes available to consumers) and mandated price reductions suggests that the Authority's confidence in the retail sector to reflect these service-based prices may be misplaced. Intervention such as mandatory itemising of distribution prices on consumer bills may be required.

*Q13 Do you have any suggested improvements to the distribution pricing principles in Appendix B? What are your views on the recommendations made by Castalia noted above and in Appendix B?*

Vector agrees with Castalia that each distribution pricing principle cannot be adhered to simultaneously. Vector asks that the Authority provide a prioritisation that reflects the relative importance of each distribution pricing principle.

Vector does not agree with Castalia that a fuller description of distributors' capital contribution policy is required in their pricing methodology.

*Q14 Do you have any suggested improvements to the distribution pricing information disclosure requirements in Appendix B?*

The Authority's Information Disclosure guidelines are broadly the same as the Commerce Commission's Information Disclosure requirements and are therefore no longer required.

*Q15 What other issues with the current distribution pricing arrangements should the Authority address?*

The main aspects of distribution pricing have been covered in our responses. At this stage, there is nothing further we wish for the Authority to address.

*Q16 How will New Zealand-specific circumstances influence the effects of evolving technologies in this country?*

Vector does not consider that predicting the effects of specific technologies in particular geographical regions is necessary to ensure that the regulatory environment will enable distributors to respond appropriately to evolving technology.

Yours sincerely

For and on behalf of Vector Limited

A handwritten signature in blue ink, appearing to read 'Richard Sharp', with a question mark at the end.

Richard Sharp  
**Head of Regulatory**