Distribution Connection Pricing – Assessment of submissions

New Zealand Electricity Authority

2 July 2025

FINAL REPORT

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1. EXECUTIVE SUMMARY

1. "Connection charges" are the fees charged by Electricity Distribution Businesses (EDBs) for a new connection, or an upgrade of an existing connection, to an electricity distribution network. Because these charges typically depend on the circumstances or needs of the customer they are not always set in advance but must often be determined on a case-by-case basis. As the only provider of connection services, EDBs have a degree of market power in the provision of these services. But connection charges are not directly regulated under the existing regulatory framework. The exercise of market power may have the effect of delaying or deterring new connections, or upgrades of existing connections, which may increase the cost and/or slow the process of electrification of key sectors of the New Zealand economy.

2. The New Zealand Electricity Authority (EA) is in the process of developing a set of policies which seek to limit the exercise of market power by EDBs. In the first phase, the Authority is working up a set of "fast-track" proposals which could improve the connection process in the interim until a permanent set of arrangements can be put in place.

3. These fast-track proposals are set out in the Authority's October 2024 Consultation Paper and can be summarised as follows:[1]

   - **Minimum scheme requirement:** Networks will be required to offer a least-cost technically acceptable solution for connecting an applicant to the network unless the applicant asks for specific enhancements. In addition, applicants may request (and networks must offer) a lower-quality/lower-cost 'flexible' connection in which their demand can be curtailed at times of network congestion.
   - **Publishing of unit rates:** Connection charges will be required to be based on published unit rates (e.g., per unit of capacity). This is intended to make charges more transparent, predictable and consistent. This policy should limit the ability of networks to discriminate between connecting customers, acting as a constraint on the exercise of market power.
   - **Pioneer schemes requirement:** Where a 'first mover' or 'pioneer' funds connection assets, networks will be required to offer a scheme in which they collect a contribution from subsequent connecting parties who share those assets and make a payment to the pioneer. This is intended to reduce the disincentive to be a first mover (and/or to delay a connection application to avoid incurring the first-mover costs).
   - **Transparency over connection costings:** Networks will be required to break down the total connection charge into separate components, corresponding to (a) the net incremental cost; and (b) a contribution to the shared network costs. This information must be provided to customers on request.
   - **Dispute resolution requirement:** Connecting parties will have the ability to request a third-party to resolve disputes over connection terms and conditions, drawing on existing arrangements for generator connections in Part 6 of the Code.[2]
   - **Reliance limits:** Networks will not be allowed to increase the ratio of connection charges to connection and system growth investment above the level of this ratio in 2024 (or 47 per cent, whichever is higher). This is intended to prevent networks from increasing reliance on connection charges over time.[3]

[1] These are set out in table 7.1 of the Consultation Paper.

[2] We understand that, in the fast-track proposal, the dispute resolution panel will not be able to rule on the reasonableness of the connection charge for individual connections.

[3] We note that the Authority is not proposing to progress the reliance limits in the short-term. The Authority is re-evaluating options to address risks in this area. As a consequence, analysis of the feedback in the expert economic reports on the reliance limits is not in scope for this paper.

4. These proposals attracted a large number of submissions. The Authority is in the process of considering all of the submissions. Several of the respondents commissioned economic analysis from independent experts to support their position. The Authority has asked CEPA to assess and respond to these expert reports. We understand that the Authority is in the process of evaluating options for the reliance limits and so discussion of the reliance limits is not in scope for this report.

5. Of the Authority's proposals we have been asked to consider the stakeholder feedback on, most attracted little pushback in the expert reports. However, a few attracted significant attention and criticism.

6. Several of the submissions asserted that the Authority had not provided sufficient evidence that there is a problem to be addressed. The Authority relied primarily on evidence of increasing capital contributions (specifically, the ratio of capital contributions to total system growth capex, referred to as 'reliance'). We agree that the Authority could probably do more to document anecdotal or empirical evidence of the exercise of market power with regard to connection charges. However, we are concerned that this obligation to provide evidence not become an undue or disproportionate hurdle. It is widely accepted that EDBs have market power over connection charges. In this context it is not necessary to prove that the economic harm is substantial before taking action. Nor is it likely to be easy to demonstrate that such harm exists.

7. The Authority also proposed longer-term reforms which would require EDBs to set connection charges between the 'Neutral Point' and the 'Balance Point" (discussed in detail below). Several of the submissions criticised the concept of the Neutral Point and the Balance Point as lacking an economic foundation. We disagree with this criticism. Although the terminology is novel, these concepts are soundly based in conventional economic theory, as we demonstrate here. We argue that the Balance Point can be justified on the grounds of non-discrimination; ensuring that like customers are treated alike. By requiring that all customers in a class are treated alike, the Balance Point concept reduces the risk of price discrimination in the setting of connection charges which could undermine the incentive of connecting parties to develop business plans or make investments which rely on connection to the distribution network.

8. Several submissions argued that the Authority's proposals would require setting connection charges below the direct incremental cost of connection. We consider that this reflects a misunderstanding of the Authority's proposals. We point out that – provided the EDB can set new on-going charges for the connecting customer – the concepts of the Neutral Point and the Balance Point are *agnostic* as to the balance between upfront and ongoing charges. An EDB may choose to set the upfront connection charge above or below the direct costs of connection and (depending on the other on-going revenue and costs) could still be pricing consistent with the Neutral Point or the Balance Point. This is discussed in more detail in section 4.2.2.

9. Several submissions argued that connection charges should not be set below the direct incremental cost of connecting, on the basis that doing so reduces the risk of stranded connection assets, and facilitates contestability. We agree with these observations. But, as just emphasised, the Authority's proposals do not go as far as requiring that the connection charges be equal to the direct incremental cost of connection. This would be a more significant regulatory intervention than proposed by the Authority.

10. Although there is scope for some refinement of the Authority's workstream in the light of the submissions received, the bulk of the Authority's proposals remain supported or uncontested. We remain of the opinion that there is the potential for improved regulation of connection charges in New Zealand to materially improve the overall economic outcomes in the sector.

2. INTRODUCTION

11. The Electricity Authority is carrying out a review of the arrangements for distribution connection pricing in New Zealand. Distribution connection arrangements are becoming increasingly important as New Zealand seeks to meet its climate change commitments. As Incenta note:

> "Meeting these commitments is expected to be achieved through the electrification of many existing and new energy loads that otherwise would have been met via other energy sources, spanning use at the industrial level (e.g., conversion of coal or gas process heat to electricity), commercial level (e.g., conversion of gas heating and commercial cooking to electricity and creation of charging stations for electric vehicles (EVs)) and residential level (changes to connections to facilitate conversion of gas appliances to electricity and charging of EVs)."[4]

12. The Authority released a Consultation Paper in October 2024 and received a number of submissions in response.[5] The Authority is considering all of the submissions. Several of the respondents commissioned independent expert economic analysis, including experts' reports authored by HoustonKemp, Frontier, Axiom Economics, and Sapere. CEPA has been asked to comment on and respond to this subset of submissions.

13. Customers of distribution networks in New Zealand may be charged two different types of charges: (a) up-front or one-off charges for a distribution connection and (b) on-going charges for the delivery of electricity over the distribution network (these latter charges may have a fixed and/or variable component and may vary with the size or type of the customer and the time of day and so on). Collectively these two sets of charges must provide enough revenue to cover the total cost of providing distribution services.

14. The on-going charges for EDBs in New Zealand (also known as "lines charges") are set out in advance each year in distribution price schedules[6] which are subject to the regulatory framework established by the New Zealand Commerce Commission. The level of the one-off, or up-front connection charges are, however, not directly regulated under the current regulatory framework.[7]

15. Upfront charges for connection are often linked to the creation of new physical assets which connect a customer's location with the nearest suitable connection point on the distribution network. The cost of these assets depends on, among other things, the size of the connection required and on the distance to the nearest connection point on the shared distribution network. This can vary widely across customers. As a result, connection charges are typically not set in advance but rather are typically bespoke to each customer. A challenge for policymakers is designing a regulatory framework which controls the market power of distribution businesses while reflecting the varying customer-specific and bespoke costs incurred by the distribution business in providing the service.

16. In addition, some connection assets (provided they are suitably sized) can be – and often should be – shared between connecting customers. This gives rise to questions as to how to efficiently size connection assets and how to allocate those shared costs. Furthermore, since the arrival of new customers is, to an extent,

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[4] Incenta, "Electricity Authority's consultation on price and non-price aspects of customer connection: Report for Powerco and Unison", December 2024, para 12(a), page 5.

[5] Electricity Authority, "Distribution connection pricing proposed Code Amendment: Consultation Paper", 25 October 2024.

[6] See, for example, https://www.powerco.co.nz/who-we-are/disclosures-and-submissions/electricity-pricing or https://www.vector.co.nz/personal/electricity/about-our-network/pricing

[7] The revenue from connection charges is, however, indirectly taken into account in the regulatory framework, through the net capital expenditure. Persistently higher revenue from connection charges would be expected to lead to a lower Regulatory Asset Base, a lower annual revenue allowance, and therefore lower on-going charges.

uncertain, there is a further policy challenge in sharing the risk of the timing and size of new connections across connecting customers and the EDB.

17. In recent years, concerns have arisen in New Zealand that the current regulatory regime may not be fully effective. Specifically, concerns have arisen that, under the current regime, EDBs may have an incentive to increase connection charges without an immediate and corresponding reduction in the on-going charges, which could have the effect of deterring new connections, over-compensating the EDB, and/or cross-subsidising of existing customers from the newly-connecting customers. In addition, concerns have been raised about a lack of transparency and consistency in approaches to connection charges across EDBs, and the lack of recourse for customers who are unhappy with the connection charges they have been offered. Finally, there are concerns that the existing arrangements may not lead to efficient sharing of connection assets and the allocation of stranding risk, which may lead to "position in queue" effects – whereby connecting parties seek to avoid paying first-mover costs or having to pay for a 'last straw' augmentation (if they are not deterred from connecting entirely). The Authority is addressing those aspects of these issues that fall within its jurisdiction in this Code amendment process.[8]

2.1. The Authority's Consultation Paper

18. In October 2024 the Authority released a Consultation Paper proposing a set of potential Code changes to improve the regulation of connection charges in New Zealand.

19. That Consultation Paper:

- Notes that electrification is a key to unlocking benefits for consumers and the wide economy. To achieve this the Authority notes that "the regulations and rules that underpin distribution connections need to be more consistent, and we need clear processes and greater transparency to deliver lower transaction costs for those wanting to connect. We also recognise the need for mechanisms to resolve issues when parties have been unable to resolve disputes".[9]
- Notes that distributors have market power over connections as (i) they can control access to the network and (ii) since bypass for most parties is prohibitively expensive.
- Notes that capital contributions (upfront payments by customers for connections) have been increasing as a share of total growth capex in recent years. At the same time, the Authority notes that there is some variation across distributors, with Vector recovering more than 80 per cent of its growth capex in the form of capital contributions (forecast to rise above 100 per cent), whereas the average for other distributors is closer to 30 per cent.
- Notes that there is an overall trend towards higher connection charges, which risks deterring new connections and delaying the benefits of electrification. In addition, connecting parties may be faced connection offers which provide services in excess of their requirements, or which may cost more than is necessary.
- Notes that there are large differences across distributors in the handling of connection charges, increasing the transaction costs for parties which must connect in multiple distribution regions. In addition, there are inconsistencies in pricing structures and in the availability of mechanisms (such as pioneer schemes) to share the risks of new connections. While recognising that it is not necessary to achieve complete harmonization of approaches, the Authority suggests that there is "excessive inconsistency".
- Notes that distributors may have an incentive to change their methodology to increase the connection charges for newcomers without corresponding reduction in the on-going charges. In addition, there are

[8] Issues relating to, say, the total revenue received by an EDB likely fall within the jurisdiction of the Commerce Commission.

[9] Electricity Authority, para 4.8, page 19.

instances of inefficiently low connection charges that are not cost-reflective and result in existing users subsidising newcomers. This may lead to over-engineered connections or connections that would not proceed if they had to cover their incremental cost.

- Notes that the level of connection charges may depend on where you in the queue of connection requests, giving rise to 'position-in-queue' dynamics.
- Notes that there is currently no mechanism for connecting parties to contest or dispute the terms and conditions of connection that they are offered by their distributor.

20. In response to these concerns, the Consultation Paper proposed a series of reforms. These reforms were grouped into two categories: "Fast-track" reforms, which are able to be implemented in the short-term, and more significant "full reform" to be implemented in the medium term.

21. The fast-track reforms outlined in the Consultation paper are:[10]

- **Minimum scheme requirement:** Networks will be required to offer a least-cost technically acceptable solution for connecting an applicant to the network unless the applicant asks for specific enhancements. In addition, applicants may request (and networks must offer) a lower-quality/lower-cost 'flexible' connection in which their demand can be curtailed at times of network congestion.
- **Publishing of unit rates:** Connection charges will be required to be based on published unit rates (e.g., per unit of capacity). This is intended to make charges more transparent, predictable and consistent. This policy should limit the ability of networks to discriminate between connecting customers, acting as a constraint on the exercise of market power.
- **Pioneer schemes requirement:** Where a 'first mover' or 'pioneer' funds connection assets, networks will be required to offer a scheme in which they collect a contribution from subsequent connecting parties who share those assets and make a payment to the pioneer. This is intended to reduce the disincentive to be a first mover (and/or to delay a connection application to avoid incurring the first-mover costs).
- **Transparency over connection costings:** Networks will be required to break down the total connection charge into separate components, corresponding to (a) the net incremental cost; and (b) a contribution to the shared network costs. This information must be provided to customers on request.
- **Dispute resolution requirement:** Connecting parties will have the ability to request a third-party to resolve disputes over connection terms and conditions, drawing on existing arrangements for generator connections in Part 6 of the Code.[11]
- **Reliance limits:** Networks will not be allowed to increase the ratio of connection charges to connection and system growth investment above the level of this ratio in 2024 (or 47 per cent, whichever is higher). This is intended to prevent networks from increasing reliance on connection charges over time.[12]

22. These reforms will go some distance to increasing the transparency and harmonisation of connection charging practices across the EDBs. But, although an important step forward, the Authority recognises that these reforms may not be able to fully constrain the market power of EDBs with regard to connection charges. The Authority writes:

[10] These are set out in table 7.1 of the Consultation Paper.

[11] We understand that, in the fast-track proposal, the dispute resolution panel will not be able to rule on the reasonableness of the connection charge for individual connections.

[12] Analysis of feedback from the expert economic reports on the reliance limit is not in scope for this paper.

"[T]he fast-track Code amendments will still leave distributors with significant residual discretion as to how much cost they allocate to newcomers and how the pricing methodology for this allocation is carried out. This means the Authority will still lack sufficient assurance that connection pricing will be efficient."[13]

23. To address this residual discretion the Authority proposed, as part of the "full reform" to more effectively constrain the connection charges. Specifically, the Authority introduced the concept of the "neutral point" and the "balance point" and proposes to require "distributors to estimate the neutral and balance points and set [connection] charges within a band relative to those points".[14]

[13] Authority, para 8.2, page 70.

[14] Authority, para 8.3, page 70.

3. SUBMISSIONS IN RESPONSE TO THE AUTHORITY'S PROPOSALS

24. The Authority received a large number of submissions in response to its Consultation paper. We were asked to respond to the submissions from economic consultancies: HoustonKemp, Incenta, Frontier, Axiom Economics and Sapere, as well as the cross-submissions from these parties.

25. Some of the expert reports were supportive of the work of the Authority. For example, Incenta observes that it agrees with the principles the Authority has applied:

> "The Electricity Authority and its advisers, CEPA, present a very good discussion of the relevant economic and other principles in relation to the appropriate levels of connection charges"[15]

26. Similarly, Frontier write:

> "We broadly support the Authority's initiative to establish a more robust and consistent approach to connection charging. If well-implemented, this reform can enhance confidence among connecting parties that they are paying charges reflective of the efficient costs of connection. At a minimum, it will increase the transparency regarding what customers can expect to pay when connecting to the network, leading to better informed connection decisions. Additionally, greater regulatory certainty around connection pricing will provide distributors with improved clarity and predictability regarding the costs and revenues associated with new connections. In the context of the anticipated increased electrification of the economy, fostering greater efficiency in network connections has the potential to deliver substantial welfare benefits."[16]

27. We note that most of the Authority's proposals attracted little criticism or objection. Specifically, there was little objection to the proposals for a minimum scheme, and the requirements for publishing unit rates and for enhancing transparency over the components of the connection charge. Similarly, there was little objection to the proposal to allow for dispute resolution offer connection offers.

28. However, the expert reports made a number of specific criticisms to the Authority's proposals which are briefly summarised here, and addressed in detail in the sections that follow:[17]

- **Lack of evidence of a problem:** Several reports noted that the Authority had not set out explicit evidence that EDBs were exercising market power over connection charges in the status quo. For example, Axiom observed that "the analysis is purely theoretical, with no empirical evidence provided to substantiate the claim that connection rates are being constrained to inefficiently low levels".[18] Some reports also argued that no evidence had been presented that "position in queue" issues was a material problem in practice.
- **Concerns relating Neutral Point, Bypass Point and Balance Point:**
    - **Neutral Point and Bypass Point are not valid lower and upper bounds on pricing:** Although some of the expert reports explicitly endorsed the concept of the Neutral Point and the Bypass

[15] Incenta, para 16, page 10.

[16] Frontier, "Efficient pricing of distribution network connections", 18 December 2024, page 4.

[17] Axiom summarised its position as (a) the Authority had failed to demonstrate significant issues with the current connection charging framework; (b) there is no clear connection between the problems the Authority identified and the solutions it proposed; and (c) even if there were a problem it is not clear that the Authority would be the most appropriate entity to address them. Axiom letter of 11 January 2025.

[18] Axiom, "Economic review of problem definition: A report for Vector", December 2024, page 3.

Point as relevant bounds for pricing, some of the expert reports criticised the concept of the Neutral Point as a lower bound on pricing, and/or the Bypass Point as the upper bound.

  - **The Balance Point has no economic significance in pricing:** Even where the Neutral Point and Bypass Point was accepted, some of the submissions criticised the concept of the Balance Point. Frontier, for example, argued that any pricing above the Neutral Point potentially deters new connections and is therefore inefficient. Some expert reports argued that there is no efficiency basis for the concept of the Balance Point.
  - **Neutral Point pricing raises risk allocation and competition issues:** Some reports argued that a requirement to price connections at the Neutral Point would lead to a risk of stranded assets if a new connection ceased to be useful before it reached the end of its technical life. Several reports also argued that pricing at the Neutral Point would reduce the scope for contestability in the provision of connection assets.

- **Incentive issues should be addressed by the Commerce Commission:** Several stakeholders argued that if there is an incentive to increase capital contributions, this should be addressed by changes to the regulatory framework administered by the Commerce Commission. For example, Incenta writes that:

  "Whilst we agree that it is desirable for the EDBs to have a financial incentive to process connection requests and connect customers in a timely manner, a better mechanism to achieve this is to refine the DPP [Default Price Path] regime."[19]

- **Concern that the Pioneer scheme could involve raised administrative costs**: A few reports raised the concern that the administrative costs of the Pioneer scheme could outweigh the benefits.

29. We note at the outset that there were quite strong differences amongst the respondents as to how the Authority's proposals should be categorized. A few of the submissions referred to the proposals as being a significant reform. For example, Axiom Economics refers to the Authority's proposals as "major reforms that would be highly disruptive for EDBs"[20], "substantial changes with far-reaching implications"[21], and a "radical reworking of the connection charging framework"[22]. In contrast, Sapere questions whether the proposals would change much at all:

    "Our final conclusion is that nothing changes with respect to what EDBs can charge for connection in the fast-track proposal. The only limit comes from not allowing EDBs with capital contributions that are higher than the industry average, relative to capital expenditure, to increase capital contributions further. …As the proposed code amendments make little attempt to control the upper limit on costs, we do not consider that the proposed connection enhancement will improve pricing efficiency. … [T]he Authority has just endorsed the status quo of current connection charges. Even the reliance limits on capital contributions still allows every EDB to, at least, do what they currently do".[23]

30. Our understanding is closer to that of Sapere. We understand that – putting aside the reliance limits – the fast-track proposals put forward by the Authority are not primarily intended to directly constrain the pricing discretion of the EDBs. Rather, the primary benefit of the proposals is in increasing the transparency over the methodologies used to determine connection charges (which will likely reduce the diversity and increase the harmonisation of approaches used by EDBs), to reduce the risk faced by first-movers, and to increase the potential for independent dispute resolution.

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[19] Incenta, para 21, page 9.

[20] Axiom, page 1.

[21] Axiom letter of 11 January 2025, page 4.

[22] Axiom letter of 11 January 2025, page 11.

[23] Sapere, Review of the Electricity Authority's proposed amendments to Part 6, December 2024, page 17.

4. RESPONSE TO THE CRITICISMS RAISED

31. Let's turn now to address the individual concerns raised in the expert reports.

4.1. LACK OF EVIDENCE OF A PROBLEM

32. Many submissions expressed concern that the Authority had not provided sufficient evidence that there is a problem with connection charges that needs to be solved. In particular, many submissions argued that no evidence was presented that connection charges in the status quo were deterring efficient connection decisions.

33. This point is argued at some length by Axiom who write:

> "Even if the prevailing capital contribution requirements are 'too high' or 'too onerous' …, it does not necessarily indicate a substantial problem with parties deciding not to connect or delaying their decisions. It could be that most (or even all) parties ultimately proceed with the connection, however begrudgingly, and pay the higher price. If that is the case, then the main concern raised by the Authority and CEPA – electrification demand not connecting – would be purely theoretical and, in practice, illusory.
>
> Almost no evidence has been presented to support the claim that connections are actually being prevented, let alone that those connections would have been efficient. The *Next Steps* document released by the Authority in May included a few anecdotal references to connection costs 'hampering' private sector investments in EV charging stations. However, these assertions were not backed by any quantitative evidence. For example:
>
> - No *empirical* evidence has been provided regarding the number of projects where parties experienced difficulties connecting (unlike, for example, the analysis contained in Ofgem's recent connection boundary discussion note, which is detailed below).
> - Similarly, no quantitative data have been supplied on the reasons behind any such difficulties (e.g., whether they were caused by high up-front charges or other factors) or, importantly, the proportion of projects that proceeded versus those that did not.
> - There is also limited analysis of the *types* of parties facing connection issues, although the Authority seems to suggest that these difficulties primarily affect 'electrification demand' projects, such as EV charging stations".[24]

34. Sapere notes that, while the Authority suggests that some connection charges may be too low, no evidence of this is presented:

> "The Authority believes there are instances of inefficiently low connection charges and that several distributors have extremely low charges. They note that low connection charges can result in:
>
> i. subsidised connections, making existing customers worse off
> ii. an absence of cost-reflective price signals for access seekers, leading to inefficient connection activity, including over-engineered connections, or connections that would not proceed if they had to cover their incremental cost
>
> However, there was no analysis demonstrating that low connection charges are inefficient".[25]

[24] Axiom, section 3.4, page 12.

[25] Sapere, section 5.2, page 16.

4.1.1. Our assessment of "evidence of a problem"

35. The Authority summarises its concerns with the status quo (the "problem definition") as follows:

> "[D]istributors have market power by virtue of their ability to control access to their networks, and because network cost structures mean that bypass is usually prohibitively expensive. Economic regulation, including revenue control for non-exempt distributors, aims to address this. However, distributors can shift expenditure in or out of their regulated asset base by adjusting their connection pricing settings".[26]

36. We understand that several aspects of this problem definition are not contested in the submissions. Specifically, it appears to be widely accepted that:

(a) EDBs have market power over the setting of connection charges;

(b) Connection charges are not subject to any direct regulatory constraints in the status quo[27]; and

(c) Revenue from connection charges (capital contributions as a proportion of growth capex) has been increasing for at least some EDBs.

37. As an example, Axiom writes:

> "It is true that the capital expenditure associated with connection costs is not subject to forensic scrutiny by the Commission. It is also undoubtedly the case that EDBs have market power in the provision of connection services on account of their natural monopoly positions".[28]

Aside: Are all of the Authority's proposals based in market power concerns?

While some of the Authority's proposals (such as the proposals related to the Neutral Point and Balance Point) seem to relate to price controls and market power, other proposals (such as Pioneer scheme, or minimum scheme, or unit costing requirements) seem to be less directly related to market power concerns. Nevertheless, we consider that all of the proposals of the Authority are fundamentally based in market power concerns. The proposed policies differ somewhat from simple, conventional ex ante price controls because connection costs vary from one connection to another, and so regulated connection charges cannot be easily fixed in advance. It is the presence of market power which allows EDBs to, say, charge different amounts to different customers based on their time of arrival, giving rise to position-in-queue dynamics. Similarly, it is the presence of market power which allows an EDB to choose the quality or capacity of the connection offered to the customer. Therefore, even though the Authority's proposals differ somewhat from simple conventional price controls, nevertheless they remain rooted in market power concerns.

38. We agree that the Authority, as the primary proponent of a regulatory change, has an obligation to establish that there is evidence of an economic problem or harm which might justify regulatory intervention.

39. Establishing that EDBs have market power in theory or in principle does not establish that they are, in fact, exercising that market power in practice, or that there is any economic harm arising. We consider that it is not unreasonable to expect the proponent of a regulatory change to produce some empirical or anecdotal

[26] Authority, para 5.3, page 26.

[27] More specifically, forecast revenue from connections is subtracted off the total capex, so EDBs do not benefit from an increase in forecast connection charges, but EDBs do benefit from an increase in connection charges that is not forecast in advance

[28] Axiom, section 2.1, page 5.

evidence that at least some distributors may be using that market power and that this is deterring or hampering efficient connection decisions.

40. We consider that there is a need for balance. By conventional economic reasoning, it is reasonable to assume that the presence of significant market power would be having some impact in the market. But, at the same time, it is reasonable as a matter of good public policy to require some confirmation that the predictions of the economic models are having an adverse effect on this market in practice. This confirmation or verification gives an assurance that the textbook models are not overlooking some key features of the market under examination which might, for example, be constraining market power in unexpected ways. At the same time, we emphasise that the requirement for empirical evidence should not impose an undue or unreasonable hurdle, or as an attempt to shift the burden of proof.

41. When it comes to empirical evidence of a problem, the Authority has focused (although not exclusively) on the fact that capital contributions have been rising as a share of growth capex for some distributors (especially Vector). The problem here is that the link between the total level of capital contributions and the exercise of market power over connection charges is somewhat indirect and imperfect. While it is possible that increasing capital contributions is a signal that connection charges have been increasing, this is not certain for a variety of reasons that are discussed further in section 4.1.2 below.

42. We understand that the Authority has recently sought further information from EDBs to document how EDBs are setting connection charges or requiring the provision of vested assets, and how these policies are changing over time. This approach was also supported in some of the submissions. Axiom provides an example of the type of information that could be collected:

> "[W]hen Ofgem sought to determine whether there were issues with the UK's distribution connection charging arrangements, it explicitly called for empirical evidence. Respondents were asked to provide examples where the connection charging arrangements had caused problems, detailing what happened in each case (e.g., whether the connection proceeded) and the factors driving each outcome. Ofgem received information on 51 projects, which informed its problem statement and policy recommendations".[29]

43. While acknowledging that the Authority could do more to document evidence of a problem, we consider that the many of the specific demands for evidence set out in the expert reports go too far.

44. Some respondents assert that, to demonstrate the existence of an economic problem, the Authority must demonstrate the existence of connection requests which, although socially valuable (i.e., for which the value of the connection to the customer exceeds the full incremental cost of providing a distribution service) the connection does not go ahead. In other words, these respondents would require that the Authority prove the existence of desirable connections that did not happen. The problem here is that identifying potentially desirable connections that did not happen is likely to be impossible.

45. It is not sufficient to merely look at the outcome of *connection requests*. Even if it could be shown that the connection charges are set in such a way as to never deter a socially valuable connection request from proceeding, this is still not sufficient to determine that there is no economic harm from the presence of market power. This is discussed in more detail below in section 4.1.4. The reason is as follows: Potential connecting parties must make a sunk investment to explore economic opportunities which rely on access to the electricity distribution network (such as the cost of designing a nationwide EV charging network). Those investments must typically occur before approaching the distribution network to negotiate a connection charge. But, if the distribution network is able to price discriminate it could, in principle, set the connection charge to expropriate the full value of the investment by the connecting party. This would not deter

[29] Axiom, section 3.4, page 12.

connection ex post but would undermine the incentive on the connecting party to make the sunk investment in the first place.

46. In other words, the exercise of market power does not necessarily show up in the outcome of connection negotiations – rather, the exercise of market power is felt by chilling the incentive on connecting parties to make the investments which must occur *before* connection negotiations can take place. In principle this requires a demonstration of what business opportunities would have been exploited, what new products or services would have been developed, what investments would have occurred, if connection charges were effectively regulated. This is likely to be impossible.

47. For this reason, in regulatory and competition policy practice, it is not normally considered necessary to demonstrate the existence of activities which did not happen. Although some economists would insist on an estimation of the deadweight loss, in practice, a decision to impose regulation usually commences with a market power assessment (i.e., assessment of the relevant market, the degree of competition, and barriers to entry). Where there is found to be substantial market power there is typically a presumption that there is a need for some form of regulation. We do not consider that the Authority should be required to demonstrate the existence of services which potentially rely on access to the distribution network, and which are socially valuable, and which did not occur.

48. In any case, the courts in New Zealand have denounced over-emphasis on quantitative modelling as "false scientism". For example, in the High Court case *Godfrey Hirst NZ Ltd v Commerce Commission* (2011) 9 NZBLC 103,396 (HC), the judge discussed the need to quantify efficiencies:

> "Where possible these elements should be quantified; but the Commission and the courts cannot be compelled to perform a quantitative analysis of qualitative variables. … It is true that some data will be weighed or considered in deciding whether the law is violated and some will not. Yet all the suggestions about more systematic ways to inform that judgment are merely techniques, or hand tools. In short, this Court should not allow a kind of false scientism to overtake what is in the end a fundamental judgment which is required by the Act itself. … The Commission cannot be expected to render all relevant factors in quantitative terms. Nor should its qualitative judgment be reserved as a mere backstop."

49. We are keenly aware that demands for empirical evidence can easily amount to little more than an attempt to shift the burden of proof – especially to set the burden of proof at a level that cannot be easily satisfied. While we agree that the Authority could do more to substantiate the problem, we consider that some of the demands for empirical evidence in the expert reports risk placing an undue hurdle. The appropriate hurdle depends on the extent of the regulatory intervention. In our view – putting aside the reliance limits – the Authority's fast-track proposals impose relatively limited constraints on the discretion of EDBs. It follows, that the evidentiary burden for their adoption can remain relatively light.

4.1.2. Is an increase in customer contributions revenue evidence of a problem?

50. When it came to providing evidence of a problem the Authority relied heavily on the observation that, at least for some EDBs, the revenue from customer contributions has been increasing substantially in recent years. Several of the expert reports argued that this is not, in itself, sufficient evidence that the EDBs are exercising market power with respect to connection charges. For example, while acknowledging that the Authority has demonstrated a theoretical incentive to increase capital contributions above the forecast level, HoustonKemp write:

> "The Authority provides no evidence that this incentive has been acted upon by distributors. Such evidence could be gleaned from the extent to which outturn connections and connection expenditure exceeded the forecast values that underpinned its regulatory proposal. A general increase in connection charges through time is not sufficient evidence to conclude that, once a regulatory period commenced, distributors are

increasing connection charges above the level that was previously forecast so as to generate an incentive payoff".[30]

51. Axiom makes a very similar point:

> "[N]either the Authority nor CEPA have presented any examples of EDBs changing their charging approaches 'after the fact' and/or any estimates of the supposed financial benefits derived from doing so. That is not to say no such case studies exist – they simply have not been presented. Therefore, it has not been established that this is a problem in practice".[31]

52. We understand that the Authority has recognised that the reliance limits have some weaknesses and has decided to take more time to consider this option. We note that customer contributions as a share of growth capex could be increasing over time, even without any change in the incentive to connect, if for example:

- There is a shift in the provision of assets "in kind" to a requirement for upfront charges. Since "vested assets" are not (at present) included in customer contributions, even if the total cost of connection remains the same, a shift from a requirement to provide vested assets to a requirement to pay the same value in upfront charges would increase the customer contribution without changing the incentive to connect.[32]
- There is a rebalancing between upfront and ongoing charges. As discussed in more detail in section 4.2, when making a decision to connect, a connecting customer looks at the total stream of future charges (that is, any upfront charges or vested asset requirement and any on-going charges). If an EDB reduces the ongoing charges but raises the upfront charges in a manner which preserves the NPV of these charges, the total incentive to connect would remain the same, but the capital contribution would increase.
- New connections incur a higher cost to serve (relative to other growth capex) than historical connections. If the cost of connection assets is rising faster than other system growth capex, the reliance ratio may be increasing even though there is no increase in the exercise of market power (the revenue from connection relative to the cost remains the same). We have no reason to think that this is happening in practice – we raise it primarily as a theoretical possibility.[33]

4.1.3. Is diversity of approaches across EDBs a problem?

53. The Authority observes that there is considerable diversity of approaches to connections across EDBs, including differences in terminology, approach, and degree of reliance on capital contributions. In contrast, Axiom argues that diversity of approaches is not necessarily a problem:

> "There is no objective, principled standard for determining the 'efficient' or 'optimal' level of diversity across EDBs. As such, whether the existing differences genuinely constitute a problem is ultimately an empirical matter that requires quantitative assessment. For instance, Ofgem's review of connection projects in the UK

[30] HoustonKemp, "Review of the Electricity Authority's proposed distribution pricing Code amendment: A report for Vector", 20 December 2024, section 3.2, page 9.

[31] Axiom, section 2.2, page 7.

[32] This point is made by Incenta, para 23(b), page 11: "[T]he measured reliance of the EDBs on capital contributions only covers the assets the EDBs have installed themselves, and ignores any assets that are installed on behalf of customers that amount to in-kind (rather than cash) connection charge (these are referred to in New Zealand as "vested assets", and in Australia as "gifted assets"). Thus, the reliance statistic will understate the connection charges for the EDBs that make use of in-kind contributions, and any difference in the presence of in-kind contributions across EDBs will mean that the inconsistency of method across EDBs will be overstated".

[33] A similar point is made by Incenta, page 10-11: "[T]he strong real growth of capital input prices over the last decade means that an increase in connection charges would be expected over time, even before considering the potential that networks may be being extended into higher cost areas as well as the potential for distributed generation to be a larger share of the mix."

found that only a small proportion (4%) failed to proceed due to inconsistencies in approaches across EDB".[34]

54. We agree that variation in approaches to connection charges across EDBs is not definitive evidence of a problem. Different EDBs may choose to rely on a different balance between upfront and on-going charges. Some EDBs may choose to have high upfront charges and low ongoing charges. Others may choose to have low upfront and high ongoing charges. Since all customers must pay a combination of both upfront and ongoing charges, the balance between these charges need not have any economic significance and therefore is somewhat arbitrary.

55. Variation in connection charges across EDBs likely raises transactions cost for connecting parties who require connections across multiple EDBs but is not necessarily a sign that there is a problem with the exercise of market power.

56. This observation applies even if an EDB imposes no upfront connection charge at all. An EDB may not require the payment of connection charges but may, instead, require that the connecting customer itself provide all the connecting assets. In other words, the connection "charge" takes the form of the provision of "in kind" assets and services. In this context, the absence of a payment in cash to the EDB does not mean that the overall cost of connecting is inefficiently low.[35]

57. We agree that differences in approach to connection are unlikely to be a problem for most connecting parties (who only connect to one EDB). However, at the same time, there is scope to harmonize terminology and information disclosure at relatively low cost. This could facilitate comparisons and benchmarking across EDBs. Since the costs of the proposals are likely quite low, the obligation to demonstrate benefits is correspondingly, proportionally low.

4.1.4. Can economic harm arise even if there are no inefficient connection negotiations?

58. As noted above, Axiom argues that, even if we could show that some connections did not take place this is not evidence of economic harm. It could simply be that the value of the connection to the customer was less than the economic cost of the connection. In this case preventing such connections from occurring *improves* overall economic welfare. Axiom suggests that, in order to show economic harm, the Authority must show that some connections did not take place *and* those connections were efficient in the sense that the value of the connection to the customer exceeded the economic cost.[36]

59. As we noted above, this is likely to be very difficult in practice. We noted above that it is not normal, in regulatory practice, to require proof that there are transactions which are socially valuable, and which did not occur but which would have occurred but for the exercise of market power. This requirement could impose an unduly high hurdle to the taking of reasonable regulation action.

60. However, we consider that there is a deeper and more fundamental point to be made here. **Even if we could show that no socially-valuable connection requests were denied, this would still not demonstrate the absence of economic harm.**

[34] Axiom, section 6.1, page 22.

[35] Incenta points out that the two non-exempt EDBs that forecast no capital contributions in the next DPP both rely heavily on third-parties to provide connection assets, which are vested with the EDB on completion.

[36] Axiom, section 3.3, page 11.

61. The reason is that connecting parties may need to undertake a range of investments *before* ever requesting a connection. An EV charging company might, for example, invest in exploring a range of different locations for EV chargers across the country and advertise and build brand awareness (perhaps by developing and marketing an associated mobile app). For an EV charging network there is likely to be material value in achieving wide geographic coverage – that is, having charging stations across a wide area.

62. An EV charging company who has made such investments faces a hold-up problem by any one distributor. Let's suppose that the EV charging company determines that it would like to have a charging station in the geographic area of a particular distributor – and that without such a location its overall EV network would be substantially less valuable. When the EV network approaches that distributor for a connection, in the absence of regulatory controls, that distributor could in principle "hold out" for all or almost all of the additional value that it offers to the EV network in exchange for agreeing to connect that charging station. Put colloquially, the EV charging network could be "held to ransom" by the EDB. If the EDB is careful the charging network would still choose to connect, but it would be forced to give up a share of the gains from its investment.

63. Faced with this possibility, the EV network may think twice before investing resources in planning and marketing its network – since it knows that, once it has invested in establishing its network, certain key distributors can attempt to extract all the rent from the network.

64. Note, once again, that each distributor, if it is careful, will not prevent that EV charging network from connecting – that is, it will not deny any socially-valuable connection request. However, the price the distributor charges will extract the rent the EV charger expects to receive on its investments. The EV charging company will not undertake the investments to roll out the network in the first place.

65. This example shows that even if there are no inefficient connection decisions there can still arise an economic harm – in this case the serious economic harm of deterring a business opportunity which might rely on connection to the distribution network.

66. This thought experiment is not unique to EV charging networks. The same issue arises for any party which makes an investment in developing a business opportunity which relies on access to electricity distribution services before approaching the distributor for a connection. In each case the distributor could, in principle, hold-out for the full value of the business opportunity. Having made an investment, the connection decision would still be efficient, but the incentive to develop the business opportunity might be eliminated in the first place. The presence of market power may have a chilling effect on investment even when each individual (ex post) transaction is efficient.

4.1.5. Is there a need for a detailed welfare analysis?

67. In our previous report we noted that, under the current regulatory regime, if an EDB increased its upfront connection charges, this would eventually (at the next regulatory period) have to be reflected in the forecast customer contributions, which would reduce the capex in the next regulatory period, resulting in lower on-going charges over time.

68. Axiom argued that even if the higher connection charges deterred some customers from connecting, this should be offset against the welfare gains from lower on-going charges in the future. In other words, a balancing of the welfare effects is required. Axiom writes:

> "As CEPA acknowledges, higher upfront capital contributions lead to lower use-of-system charges. These lower ongoing prices contribute to a static efficiency improvement by increasing demand from existing customers (as most EDBs still incorporate volumetric charging). After all, the price elasticity of demand for electricity distribution network usage is not perfectly inelastic. …

Instead, CEPA has implicitly assumed that the welfare gain from lower use-of-system charges is zero. This is clearly not the case. While examining the size of that welfare effect is beyond the scope of this report, we can confidently say that it exists and has not been explored. This is a significant omission, because it means it has not been demonstrated, even at a conceptual level, that the observed increase in capital contributions has negatively impacted overall efficiency. In short, the welfare analysis is incomplete."[37]

69. This point was repeated by Vector:

"The Authority's welfare calculus does not sufficiently consider allocative efficiency. As acknowledged by CEPA, higher up-front capital contributions mean lower use-of-system charges. Those lower ongoing prices will have resulted in a static efficiency improvement in the form of higher usage by existing connected customers but appears to have been overlooked by the Authority".[38]

70. This point is technically correct. However, we suggest that there is good reason to believe that a more detailed welfare analysis would not change our conclusions.

71. As Axiom acknowledges the price elasticity of demand for electricity distribution network usage – while not perfectly inelastic – is likely to be relatively small. Let's consider the effect of the exercise of market power leading to a large increase in the connection charges to an individual customer. This large increase in the connection charges reduces the net capex rolled into the RAB, which reduces the on-going charges over many years into the future. The effect on the revenue allowance in any one year (since the change in capex is spread over many years) is small. Moreover, since the number of connecting customers is small relative to the total volume of existing customers, even a large increase in the connection charges to any one customer will have a small effect on the on-going charges in any one year. The welfare loss from changes in on-going charges is the deadweight loss. The effect on the deadweight loss from a change in the prices is proportional to the square of the change in the prices, so is very small indeed.

72. In comparison, the threat of a large increase in connection charges is likely to deter some connections – and, as we have argued above, is likely to deter investment in the development of opportunities which rely on a connection to the distribution network. As set out in the previous section, the welfare loss is not just the deadweight loss, but the entire surplus received by these customers from the consumption of electricity.

73. Ideally, detailed welfare analysis would be undertaken. We agree that the Authority has not positively proved that there is net welfare loss, but nor has Vector or Axiom proved that there isn't. Absent detailed welfare analysis, we consider that on balance the potential economic harm from leaving connection charges unregulated would likely outweigh the potential welfare benefits from slightly lower on-going charges

4.1.6. Conclusion

74. In summary, we agree that, as the proponent of a policy change there is a requirement on the Authority to establish the existence of a problem in the status quo.

75. We understand that the Authority relied on several different sources to justify a problem with the regulation of connection charges. We agree that it would be desirable for the Authority to collect further anecdotal or empirical evidence (perhaps in a similar exercise to that carried out by Ofgem) of cases where connections were denied, deferred or delayed due to the market power of EDBs. We understand that the Authority has recently done so.

[37] Axiom, section 3.2, page 10.

[38] Vector, "Submission on the Electricity Authority's distribution connection pricing: proposed code amendment", page 18.

76. However, the obligation to provide evidence of a problem should not be taken too far. We do not accept that, as a matter of good policy, it is necessary for the Authority to provide evidence of inefficient connection decisions – and even if it were possible to prove that there were no inefficient connection decisions this still would not be sufficient to determine that there is not an economic problem to be addressed.

4.2. CONNECTION PRICING: THE NEUTRAL POINT, BYPASS POINT AND BALANCE POINT

77. As noted above, under the "fast-track" reforms EDBs would be required to separate the connection charge into a component corresponding to the net incremental cost; and a component corresponding to the contribution to the shared network costs. This information must be provided to customers on request. Under the "full reform" proposals of the Authority, EDBs would be further required to adopt:

> "[A] formula-based approach that provides for the setting of connection charges based on net incremental costs … plus a contribution to [shared] network costs, with the contribution required to be within a permitted range. This provides cost-reflective pricing for connection applicants, while ensuring the benefits of connection growth are shared between newcomers and existing users".[39]

78. This proposal seems to have created some confusion, so we have been careful in this response to set out the arguments as precisely and clearly as possible.

4.2.1. Our assessment of the Authority's Pricing Principles

79. Even though the Authority did not propose *mandating* pricing relative to the Neutral Point or the Balance Point in the "fast track" reforms, nevertheless these pricing principles attracted a great deal of attention in the expert reports. Although there was some support for the principles, the expert reports claimed, variously, that these pricing concepts were novel, arbitrary, lacking in economic foundation, or not the correct pricing concepts. The reports also claimed that pricing on the basis of these principles would yield problems such as the risk of stranded assets or hindering contestability.

80. These concerns seem to reflect, in part, misunderstandings. This may be due to the Authority's presentation of the proposals, as we discuss below. Overall, we consider that the principles articulated by the Authority broadly represent a sound and reasonable approach to connection pricing. We consider that the criticisms raised in the expert reports variously reflect misunderstandings in the application of conventional regulatory pricing principles to the context of distribution connections, or in the terminology used by the Authority. We agree that some forms of pricing may give rise to a risk of stranded assets and may hinder contestability, but we understand the Authority is not, at this stage, seeking to either mandate or prevent these forms of pricing in its proposals. We therefore consider that these arguments are not relevant criticisms. These issues are discussed in more detail in the sections below.

81. We will relate these pricing concepts to the Authority's 2019 Distribution Pricing Principles which are set out here:

[39] Consultation Paper, para. 6.6, page 32.

2019 Distribution pricing principles

- Prices are to signal the economic costs of service provision, including by:
  - being subsidy free (equal to or greater than avoidable costs, and less than or equal to standalone costs);
  - reflecting the impacts of network use on economic costs;
  - reflecting differences in network service provided to (or by) consumers; and
  - encouraging efficient network alternatives.
- Where prices that signal economic costs would under-recover target revenues, the shortfall should be made up by prices that least distort network use.
- Prices should be responsive to the requirements and circumstances of end users by allowing negotiation to:
  - reflect the economic value of services; and
  - enable price/quality trade-offs.
- Development of prices should be transparent and have regard to transaction costs, consumer impacts and uptake incentives.

4.2.2. Net Incremental Cost, Neutral Point, Bypass Point

82. This section sets out the theoretical foundation for the concepts used by the Authority.

Derivation of the NIC principle

83. There is a widely accepted concept in regulatory economics that new customers to a regulated firm should normally provide additional or incremental revenue to the regulated firm that is at least as large as the incremental cost of serving those customers. We will refer to this principle as the "floor test".

84. This principle ensures that the revenue from any extensions of service (new services or new customers) cover the additional cost incurred. By ensuring that those additional services "pay their own way", the principle in effect ensures that other, existing customers or services are not forced to pay more for their own services as a consequence of the regulated firm extending other services to new customers. This allows the regulated firm to make a credible commitment to existing customers that their prices will be stable and cost-reflective, regardless of changes in the scale or scope of services provided to other customers.

85. The requirement that the incremental revenue for each service exceeds the incremental cost of that service is sometimes described as the requirement that the charges are "subsidy-free".[40]

86. This principle can be expressed using pseudo-maths as follows. The additional revenue from a new service (or a new customer) should satisfy the following condition:

Incremental revenue (of service) ≥ incremental cost (of service)

87. When applying this principle to the context of distribution connection services we must take into account that distribution "connection services" are not valuable to end-customers in their own right and are not consumed

[40] Frontier, page 13, observe that "the avoidance of cross-subsidy was the Australian Energy Regulator's (AER) justification for its incremental cost and incremental revenue test (the cost-revenue-test) when implementing its approach to connection charging."

on their own. Rather, distribution connection services are only valued for the "indirect" benefit they provide - providing access to the on-going services of a distribution network; that is, the ability to import and export electricity to the grid at the location of the customer.

88. In the case of distribution services, it is common to charge both one-off upfront charges and/or on-going charges for the use of the distribution network. When applying the principle above (that incremental revenue of a service should normally exceed the incremental cost) we must take into account *both* the upfront and on-going charges (as well as the upfront and on-going costs). Specifically, the economic principle of incremental-cost-as-a-price-floor must be extended slightly, to express the requirement that the incremental revenue from both upfront and on-going charges exceeds the sum of the upfront connection costs and the on-going costs of providing services. In other words:[41]

Upfront Incremental revenue + On-going Incremental revenue (of service) ≥ Upfront Incremental cost + On-going Incremental Cost (of service)

89. This can be re-written slightly (by moving the on-going incremental revenue to the right-hand side) to be expressed as a price floor on just the upfront charges:

Upfront Incremental revenue ≥ Upfront Incremental cost + On-going Incremental Cost - On-going Incremental revenue (of service)

90. Let's define the Net Incremental Cost (NIC) to be the right-hand side of the equation immediately above. In other words:

NIC = Upfront Incremental cost + On-going Incremental Cost - On-going Incremental revenue (of service)

91. Then we have the principle that the upfront charges for access to a distribution network should be no less than the net incremental cost:

Upfront Incremental revenue ≥ NIC

92. By requiring that new customers pay upfront revenue no less than the Net Incremental Cost, the regulatory regime ensures that existing customers are not forced to pay higher charges when the EDB extends its services to new customers.

93. To be clear, the Net Incremental Cost represents a *floor* under regulated prices – that is a level below which regulated prices are not normally allowed to go. It does not require that the EDB set connection charges at this level. If the NIC is negative (that is, if the on-going revenue exceeds the upfront costs plus the on-going costs) then the floor test does not *require* that the EDB make an upfront payment to the customer (although such a payment could be consistent with the floor test). Conversely, if the NIC is positive then the floor test would normally require that there be some upfront charge. The floor test is consistent with the practice for connection charges in Australia.[42]

Worked example

94. The following worked example shows how the NIC might be calculated in practice. This example assumes that the EDB is considering connecting a specific customer. The connection asset for this customer will last

[41] See HoustonKemp, page 17.

[42] Australian Energy Regulator, "Connection charge guidelines for electricity customers", April 2023: "Where there is a revenue shortfall from an individual customer, then the DNSP will levy a capital contribution. Alternatively, where the incremental revenue is in excess of the incremental cost, then the customer would not be required to make a capital contribution to the network. The AER is not proposing that any excess incremental revenue be returned to the customer. The AER considers this would still be consistent with the limit cross-subsidisation purpose of the guideline because it is unlikely these customers will be paying in excess of their stand alone cost."

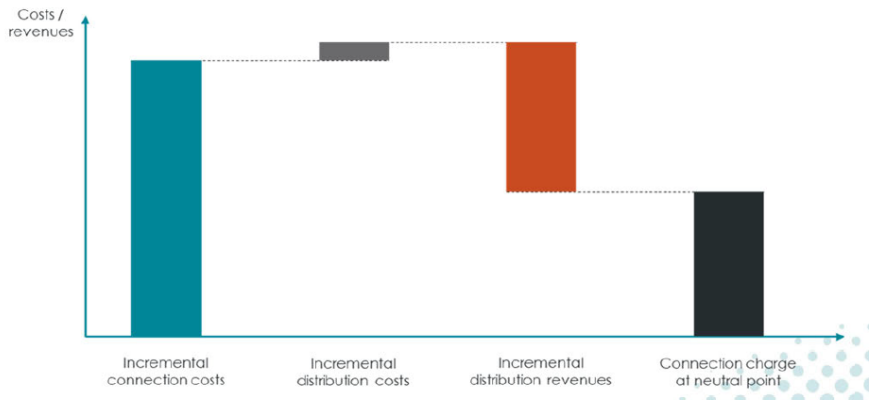
30 years and there is no risk of asset stranding. The discount rate (the cost of capital) is assumed to be 8 per cent. The EDB is assumed to incur additional up-front costs of $10,000 in connecting the customer, and to receive $900 per year in additional distribution charges from this customer. The EDB incurs an additional $300 per year to provide distribution service to the new customer. With these assumptions the Net Incremental Cost (NIC) for this customer is $3,425. The floor test requires that this customer make an upfront capital contribution of at least $3,425.

Table 1: Worked Example No. 1

Component		Value	Comment
Incremental cost of connection (i.e., cost of constructing connection assets)	(A)	$10,000	One-off
Revenue from on-going connection charges	(B)	$10,132	Present value of $900 per annum over 30 years, discount rate = 8%
On-going incremental costs of servicing the customer	(C)	$3,377	Present value of $300 per annum over 30 years, discount rate = 8%
Net Incremental Cost	(A)+(C)-(B)	$3,425	One-off

95. HoustonKemp illustrate this result in their figure 4.1 page 15, using the Authority's terminology of the "neutral point" instead of NIC:

Figure 4.1: Demonstration of calculation of the neutral point



96. The Net Incremental Cost concept is indifferent to the structure of distribution charges – that is, whether the total cost of the distribution business is recovered through upfront or on-going charges. While one EDB might choose to have relatively high on-going charges for the newly-connecting customer (as in the example above), another might choose to have relatively low on-going charges for the newly connecting customer, as the next table shows. The NIC will be different in each case, but in any case, still represents the minimum upfront charge for connection that is consistent with the EDB being able to connect the customer without having to raise charges to the other existing customers.

97. For example, let's now consider a second case in which an EDB has chosen on-going charges equal to $250 per annum, but is otherwise identical. As Table 2 shows, the NIC is now $10,563. This would require an upfront or connection charge of at least $10,563 – higher, even, than the direct incremental cost of connecting.

Table 2: Worked Example No. 2

Component		Value	Comment
Incremental cost of connection (i.e., cost of constructing connection assets)	(A)	$10,000	One-off
Revenue from on-going connection charges	(B)	$2,814	Present value of $250 per annum over 30 years, discount rate = 8%
On-going incremental costs of servicing the customer	(C)	$3,377	Present value of $300 per annum over 30 years, discount rate = 8%
Net Incremental Cost	(A)+(C)-(B)	$10,563	One-off

NIC and the Neutral Point

98. The Electricity Authority uses the term "Neutral Point" to refer to the Net Incremental Cost of connection. The Authority observes that it is undesirable to set connection charges below the Neutral Point (para 7.60, 7.63). This is equivalent to the statement that the upfront connection charges should be greater than or equal to the Net Incremental Cost as we explained above. The Authority observes that if upfront charges are set below the Neutral Point the newly connecting party is, in effect, subsidised to connect (figure 7.1, para 7.63).

99. Several of the expert reports acknowledged that NIC represents a valid floor for the upfront connection charges. For example, Incenta note:

> "[T]he efficient lower-bound for connection charges is achieved where the sum of the connection charge and the revenue from (expected) ongoing network charges equates to the incremental cost of connecting and serving the customer, which implies a connection charge that is set equal to the difference between the incremental cost of connecting and serving the customer, and the revenue from (expected) ongoing network charges".[43]

100. Similarly, Frontier observes that:

> "[A] connection price that signals the net incremental cost of connection – which is the Authority's neutral point -- can be expected to encourage the economically efficient volume of network connections".[44]

101. In contrast, Axiom argues that the Neutral Point is a "benchmark entirely of the Authority's own creation":

> "The 'neutral point' is not a recognised concept in authoritative economic literature on efficient regulatory pricing; to the best of knowledge, it is a benchmark entirely of the Authority's own creation. We are not aware of any basis in economic theory to suggest that setting upfront connection charges at this level will maximise efficiency".[45]

102. While the *terminology* "Neutral Point" may be a creation of the Authority, we disagree that the underlying of the Neutral Point is not well recognised in regulatory theory. Rather, as we have seen, the concept of the Neutral Point is directly based on one of the most fundamental concepts in regulatory theory – the concept that the revenues from a service should exceed the incremental cost of providing that service. In addition, as we pointed out in our previous report, the concept of the Net Incremental Cost is widely used as a floor on

[43] Incenta, para 16, page 7.

[44] Frontier, section 2.5.1, page 16.

[45] Axiom Letter, page 11.

distribution pricing in regulatory regimes around the world. The Neutral Point – as an extension of the concept of incremental cost – is a well-established concept in regulatory pricing theory.

103. HoustonKemp argue that since the on-going revenue exceeds the on-going cost of providing distribution services, the definition of the Neutral Point would allow a connection charge below the direct incremental cost of connection.

> "The Commerce Commission's approach to the regulation of distributors tends to allow revenues from distribution services that are substantially higher than their incremental costs. … It follows from these facts that the Authority's approach to combining revenues and costs from these services in its definition of the neutral point allows the connection charge to be materially below the incremental cost of providing the connection service".[46]

104. While the floor test requires that the *total* incremental revenue from connection exceeds the *total* incremental cost from connection, the floor test does not necessarily require that the upfront connection charges alone exceed the direct or upfront cost of connection. HoustonKemp is correct that the Authority's approach allows the connection charge to be materially below the incremental cost of providing the connection service.

105. But this is not relevant for the application of the floor test. If connecting customers had an incentive to obtain connection assets in their own right (i.e., could use connection assets directly without requiring on-going services) HoustonKemp's point would be a legitimate concern. But end-customers do not receive value or utility from connection assets directly. Rather, connection assets are acquired as part of a bundle that is required in order to receive distribution services. End-customers pay for connection assets and then *also* pay for on-going distribution services. It is only the price of the bundle that matters for economic connection decisions, not the price of the individual components.

106. This situation arises in many economic contexts. Many businesses routinely provide upfront assets at a discount to the actual cost in order to induce customers to sign up to an on-going service, recovering the costs of those connection assets through on-going charges. For example, telecommunication companies may provide broadband services to the home, charging little or no set-up or connection fees, but recovering the cost of the network or modem through on-going usage charges. Similar issues arise with, say, ink-jet printers or video-game consoles.

107. It is the relationship between the total stream of charges and the total costs which determines whether or not the floor test is satisfied, not the relationship between the upfront charges and the upfront costs. The fact that one component of the charges (the upfront charges) does not exceed one component of the cost (the upfront cost) does not violate the floor test (which is only concerned about total charges and the total costs).

Bypass Point and Upper Bound Pricing

108. In regulatory theory, it is commonly asserted that the revenue charged for a new service (or new customer or group of customers) should not exceed the *standalone cost* of providing that service (or that customer or group of customers). The standalone cost of a service is the cost that would be incurred to provide the desired service on its own (rather than in concert with the full range of other services provided by the regulated firm).

109. There are two reasons why standalone cost is a relevant upper bound on pricing. The first reason is directly related to the floor test. Mathematically, if the regulated firm is breaking even overall, then every service (or combination of services) is earning sufficient revenue to cover its incremental cost if and only if every service (or combination of services) is earning revenue below its standalone cost. This is a purely mathematical

[46] HoustonKemp, section 4.2, page 17.

relationship – and it implies that the incremental cost floor test and the standalone cost test are, in some sense, equivalent or parallel requirements.[47]

110. When the incremental revenue for a service falls between the incremental cost and the standalone cost for that service, the prices are said to be subsidy-free, as required in the Authority's Distribution Pricing Principles.

111. The second reason why standalone cost is a relevant upper bound on pricing is derived from efficiency considerations. In normal circumstances, due to economies of scale and scope, a regulated firm can almost always provide any given service cheaper (i.e., using fewer resources) when the service is provided alongside the vast range of other services provided by the regulated firm than when the service is provided on a standalone basis. Usually, therefore, it is considered undesirable to create incentives for customers to bypass the regulated service and to supply the required service themselves on a standalone basis. If the charges of the regulated firm exceed the standalone cost for a service, a customer (or a group of customers) would find it cheaper to provide the service itself rather than purchase from the regulated firm. That is, those customers would *bypass* the regulated firm. The same services would be provided at a higher total cost, which is inefficient.

112. Again, of course, when we apply this concept in the context of distribution connection charges, we must take into account that the provision of a new connection service may result in *both* an upfront and on-going stream of revenue and an upfront and on-going stream of costs. The principle that the revenue the regulated firm receives from a service should not exceed the standalone cost of that service becomes:

Upfront Incremental revenue + On-going Incremental revenue (of service) ≤ Upfront standalone cost + On-going standalone cost (of service)

113. As before, this can be re-written to represent an upper bound on just the upfront charges:

Upfront Incremental revenue ≤ Upfront standalone cost + On-going standalone cost - On-going Incremental revenue (of service)

114. Expressed in words, this says that the upfront charges for connection should not exceed the total cost that the customer would face to provide the same service on a standalone basis less the on-going revenue that the customer would save by providing the service itself.

115. The Authority uses the term Bypass Point (BP) to refer to the right-hand side of the equation immediately above. In other words, the Authority defines:

BP = Upfront standalone cost + On-going standalone cost - On-going Incremental revenue (of service)

116. It follows that the connection charges should not exceed the Bypass Point:

Upfront Incremental revenue ≤ BP

117. For many electricity distribution customers, the cost of bypassing the electricity grid entirely, to self-provide electricity, is prohibitively expensive. For these customers, the upper bound provides little practical constraint on the range of possible prices. However, there may be some customers (e.g., those located further from the "core" of the distribution business) for whom self-provision of electricity (e.g., through a local micro-grid) is only slightly more expensive than grid-supplied electricity (and for very remote customers a local micro-grid

[47] See Faulhaber, Gerald R. "Cross-subsidization: pricing in public enterprises." *The American Economic Review* 65.5 (1975): 966-977.

could be considerably cheaper than connecting the shared network). For these customers this upper bound may represent a real constraint.

118. We agree with the Authority that, for most customers, the standalone cost of self-provision of electricity is "typically very high"[48] and therefore not a relevant constraint.

119. Sapere quote Mayo and Willig as follows:

> "Properly calculated stand-alone costs are determined from a long-run, forward-looking perspective. This follows since they represent the costs that a new entrant into the relevant market would bear, with no preset rigidities and with the ability to choose the current best available technology and the most efficient inputs."[49]

120. We agree that the standalone cost concept is forward looking and unique to each customer or group of customers. Sapere argues that the standalone cost concept used by the Authority is incorrect for regulated pricing purposes:

> "The most urgent thing the Authority should do is accept that its definition of standalone cost in its proposal paper is incorrect for regulated pricing purposes".[50]

121. We disagree. We are not aware of any objections to the definition of standalone cost used by the Authority. We also acknowledge that for many customers, the cost of self-provision is, for most customers, prohibitive, it follows that the relevant standalone cost ceiling is very high and unlikely to be a relevant constraint on pricing.

122. It is important to emphasise, however, that there are many other – lower – prices which could also represent an upper bound on efficient pricing. This is because the upper bound on efficient pricing is the price at which the connecting customer would switch to some other (lower-value or higher-cost) alternative. For example, if we knew that the connecting customer would switch to an alternative or lower value service if it was forced to pay $X in revenue, then $X would represent a valid upper bound on the charges for that customer. This alternative might be failing to connect at all (which might occur if the total value of a connection is less than the standalone cost of provision). The alternative could also be some less-valuable alternative such as an inferior connection (e.g., smaller in capacity, less reliable). This point is made by Incenta:

> "[T]he efficient upper-bound for connection charges is achieved where the charge is at a level where customers choose not to connect (or not to change their connection), even though they would do so with a connection charge at the lower bound".[51]

123. The same point is made by HoustonKemp:

> "If a price is set above the opportunity cost then the customer will choose not to connect to the network and to pursue one of these alternative options instead. If this opportunity cost exceeds the incremental cost of the connection, then this outcome is allocatively inefficient because the customer values the ability to connect at more than incremental cost and could therefore contribute to the recovery of common costs. In effect, this approach defines the bypass point as the point at which the connecting party changes his/her

[48] Authority, para 7.62.

[49] Sapere, page 23.

[50] Sapere, page 22.

[51] Incenta, para 16., page 8.

behaviour to a lower-value alternative. If price discrimination is feasible this is the relevant upper bound for pricing".[52]

124. It will not always be possible to observe the price at which a connecting customer would switch to less-valued or higher-cost alternatives. Nevertheless, where this is possible to observe (and provided it exceeds the NIC) this represents a legitimate upper bound on pricing.

125. Overall, we can find no objection to the Authority's definition and use of Bypass Point to define the upper limit of subsidy free pricing, while recognising that there can be good reasons to choose a lower price as the upper bound.

4.2.3. Balance Point, efficiency, and non-discrimination

126. The previous section focused on the role of incremental cost and standalone cost as setting the bounds of "subsidy-free pricing". There is a second lens or prism through which we can view the setting of connection charges. This is the prism of "economic efficiency" – that is, whether the connection charges send the right signal for connection decisions.

Marginal cost as the basis of efficient pricing

127. A general principle of regulatory pricing is that prices are efficient when they signal to customers the marginal cost of their decisions. The marginal cost (usually) represents the social cost of consuming an extra unit. By setting the regulated price equal to marginal cost the regime ensures that customers make a decision which balances the private benefit from their decisions with the social cost. As a consequence, a fundamental principle in regulatory pricing theory is that regulated prices should – as far as possible – be based on marginal cost.

128. Marginal cost, as a basis for regulatory pricing, is well-established in regulatory pricing theory.[53] This is reflected in the report by Frontier who write:

> "[E]conomic efficiency is achieved when the marginal benefit obtained by consuming a good or service is equal to the marginal cost of production".[54]

129. In the context of distribution connection charges there are two relevant "margins" to consider. The first is the (binary) decision whether to connect at all. The second is the decision as to how much to consume once connected. The decision as to how much to consume once connected depends on how the on-going charges are structured. If those on-going charges are well-structured the variable component of the charge will be relatively close to marginal cost, so the customer (once connected) consumes electricity at an efficient rate.

130. We will focus here on the (binary) question of whether or not to connect. This decision is efficient if the upfront and on-going charges for distribution services reflect the additional cost of providing that service. In general in economic theory, incremental cost and marginal cost refer to difference concepts. But, in the case where the "increment" is a single unit – such as the additional cost of providing a single distribution connection – the incremental cost is the same as the marginal cost.

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[52] HoustonKemp, page 4.

[53] Alfred Kahn, in his famous textbook on the Economics of Regulation, writes: "The central policy prescription of microeconomics is the equation of price and marginal cost. If economic theory is to have any relevance to public utility pricing, that is the point at which the inquiry must begin."

[54] Fronter, section 2.2, page 10.

131. It follows that (at least under the assumption that the on-going charges are relatively well structured), if we set the upfront connection charges equal to the Net Incremental Cost, the customer, in making the connection decision, will compare his/her private valuation for connection with the marginal cost of providing that service. This leads to the efficient connection decision.

132. In summary, in the same way that pricing at marginal cost is considered to be a fundamental principle in regulatory pricing theory, we consider that the use of Net Incremental Cost as a basis for pricing the upfront cost of connections is consistent with regulatory pricing theory.[55]

133. This point is echoed in some of the submissions. For example, Frontier note:

> "Customers should connect only when the benefits of electricity use exceed the costs of connection and ongoing supply. Efficient pricing signals the incremental costs of connections. … Pricing above the neutral point would mean connecting parties would pay more than the incremental costs of their connection, which might distort network connection decisions away from the efficient level".[56]
>
> Also:
>
> "[A] connection price that signals the net incremental cost of connection – which is the Authority's neutral point – can be expected to encourage the economically efficient volume of network connections".[57]

134. However, these views on the efficiency of the NIC as the upfront connection charge was directly contested by Axiom Economics on the following grounds:

> "First, the conclusions appear to deviate from established economic principles of efficient pricing or, at a minimum, overstate what can reasonably be inferred from theory alone, because:
>
> - The 'neutral point' is not a recognised concept in authoritative economic literature on efficient regulatory pricing; to the best of knowledge, it is a benchmark entirely of the Authority's own creation. We are not aware of any basis in economic theory to suggest that setting upfront connection charges at this level will maximise efficiency (in the manner Frontier implies in the extract above).
> - If connection prices fall between incremental costs and standalone costs (the 'bypass point'), it is impossible to determine whether shifting them to another point (e.g., the 'neutral point') would improve overall welfare without thoroughly evaluating the impacts on both dynamic and static efficiency. To date, no such assessment has been conducted – by the Authority, CEPA or any other party."[58]

135. On the first point we disagree with Axiom Economics. We note, as emphasised above, that the Neutral Point, reflecting the incremental cost of a connection to the network (for the purpose of the floor test) and the marginal cost of a connection to the network (for the purposes of sending efficient price signals), represents an application of well-known and widely accepted practices in regulatory pricing theory.

136. On the second point, we note that, under not-reasonable assumptions, Axiom Economics is correct. Specifically, it may be that setting all distribution charges at incremental cost does not raise enough revenue

[55] The Authority express this point as follows: "In theory, pricing at the neutral point would be optimal if it minimised adverse effects on connection demand, and without supressing demand from existing users". Consultation Paper, para. 7.64.

[56] Frontier, section 1.2, page 5.

[57] Frontier, section 2.5.1, page 16.

[58] Axiom Letter, page 11.

to cover the total costs of the distribution network. In this context some distribution charges *must* be raised above incremental cost to ensure that the distribution network is able to break even overall.

137. However, we emphasise that the Authority is not proposing to mandate pricing at the Net Incremental Cost – that is, it is not proposing to require that connection charges are set at the Neutral Point. Instead, the Authority – at least in its longer-term reforms – is proposing to allow pricing up to the Balance Point. Let's now look at the Balance Point more closely.

The Balance Point

138. According to conventional regulatory pricing theory, the starting point of efficient pricing is short-run marginal cost. However, it is well understood that there are circumstances where pricing above short-run marginal cost may be required. For example, pricing above marginal cost may be required where setting prices equal to marginal cost does not recover sufficient revenue overall to cover the total costs of the distribution network and this cannot be mitigated with other tools, such as two-part pricing. In addition, including a margin above marginal cost may be valuable where prices cannot be varied in real-time to efficiently ration scarce network capacity and it is desirable to reflect the long-term cost of capital expansion in prices. In this latter case, it is common to attempt to reflect long-run capacity costs through the concept of long-run marginal cost. This is a "second-best" form of pricing – but appropriate where the "first-best" approach is infeasible.

139. In a similar way, there are circumstances where it may be necessary to set upfront connection charges above NIC. For example, it may be that the incremental cost of providing each individual network connection does not add up to the total cost of the network. In this case there is some common cost to be recovered. We agree with Frontier that pricing above the Neutral Point may deter some network connections. At the same time, pricing above the Neutral Point may be essential to allow the network to recover its common costs.

140. Those common costs must be recovered from the set of all customers somehow. One possible consideration that is frequently cited is to allocate more of these common costs to customers which are less price elastic. As set out earlier, the Authority's own Distribution Pricing Principles state that "Where prices that signal economic costs would under-recover target revenues, the shortfall should be made up by prices that least distort network use". This refers to the form of pricing known as Ramsey-Boiteux pricing.

141. We would like to emphasise that, no matter how the common costs are allocated (by Ramsey pricing or some other method) ex ante, once an allocation mechanism is determined there should be limited opportunity for the regulated business to vary prices on a case-by-case basis. The reason is that, as we have seen, customers may differ in how much investment they have made in reliance of the services of the regulated firm. If the customer finds that, once they have made a sunk investment which increases the value they place in regulated service, the regulated firm responded by increasing the price, the customer would have little or no incentive to make that investment in the first place.

142. For this reason, although regulated businesses are often given some discretion in how they structure their charges, there are usually strict limits on the ability to *change* those charges, and limits on the ability to engage in price discrimination. One of the most longstanding principles in regulatory theory is that regulated prices should be "just, reasonable, and *not unduly discriminatory*".[59]

143. In the context of distribution connection charges, a principle of non-discrimination can be valuable in limiting the ability of the EDB to price discriminate between customers. Specifically, it is common to require that like customers are treated alike. In this approach, customers are grouped ex ante into classes, with all customers

[59] This is a standard phrase used in public utility legislation in the US.

in a class (e.g., residential customers, small business customers, large industrial customers, and so on) required to pay a similar contribution to the common costs of the network. This approach prevents the regulated firm charging each customer up to its individual willingness to pay.

144. In the context of connection charging, this would require that all customers in a class pay a similar connection charge, which could be above the Neutral Point. The Authority refer to this charge as the Balance Point. The Balance Point for a customer in a given class is the Net Incremental Cost of distribution services plus a contribution to the common costs for that customer class.

145. We can define the balance point concept as follows

BalPt = Upfront incremental cost + On-going incremental cost + Contribution to Network Common Cost - On-going Incremental revenue (of service) = NIC + Contribution to Network Common Cost

146. Then the Authority's proposed requirement is that:

Upfront Incremental revenue = BalPt

147. To make this slightly more concrete, let's consider a specific example. Suppose that a new housing development services ten houses and a small business. Creating an electricity distribution network serving the development as a whole costs, say, $150,000, while the incremental cost of serving each house individually is only $10,000 and the incremental cost of the small business is $20,000 (this might be because there is a need to build infrastructure to the development that is shared across the houses). Let's assume for simplicity that the on-going distribution charges just cover the on-going distribution costs.

148. In this example, if the connection charges were set equal to the incremental cost of connection the total revenue collected would be (10 x $10,000 + 1 x $20,000 =) $120,000. There is a remaining common cost of $30,000 which needs to be allocated across the houses and the business. In this circumstance a possible allocation which treats like customers alike is to share that common cost across the ten houses equally, so that the connection charge is $10,000+$20,000/10 = $12,000 for the houses and $20,000+$10,000 = $30,000 for the small business.

149. The Authority refers to the additional charge of $2,000 for the houses and $10,000 for the business as the "network costs". The sum of the direct incremental costs and the network costs is termed the Balance Point – in this case $12,000 for the houses and $30,000 for the business.

150. The Balance Point is, of course, above the direct incremental cost (the Neutral Point) which, in this case, is $10,000. Like any charge which is above marginal cost, this could, in principle, deter a customer from connecting to the network. This would be an inefficient outcome. However, the common costs of the network must be recovered somehow and if the value of an electrical connection is large relative to its cost, the responsiveness of customers to the connection charge is likely to be low, so this possibility may not matter much.

151. The Authority writes that the Balance Point is where:

> "[T]he contribution a connection applicant will make to network costs over the life of their connection is commensurate with other users from the same consumer group".[60]

152. In principle there will (or could) be a different Balance Point for each different group or class of consumers (e.g., rural vs urban, residential vs commercial, large vs small and so on).

[60] Consultation Paper, para. 7.61.

153. By committing to charge customers in each class the same charge, the EDB makes a commitment to not engage in individualised or tailored price discrimination. Such price discrimination would allow an EDB to extract the full value of the connection to newly-connecting parties. As we have seen this would undermine the incentive to make investments to explore or develop economic opportunities which rely on access to the distribution network. We consider this a material economic harm.

154. In addition to the non-discrimination arguments in support of the Balance Point above, there is a second argument that is related to "position in queue" issues. As long as there are common costs to be recovered, they must be recovered from some of the connecting parties. If one customer is allowed to connect at incremental costs, it follows that at least some of the other connecting customers must pay higher charges. This could give rise to position-in-queue dynamics.

155. For example, suppose that, in the example above, five customers have connected and have each paid a connection charge of $13,000. With this connection charge the contribution to the common costs (of $15,000) have been fully covered. The next five connecting customers could, in principle, connect at the incremental cost of $10,000. However, recognising this, the first five connecting customers will potentially seek to delay their connections so that they can be in the second half, thereby paying a lower connection fee. This may lead to inefficient delay in connecting.

156. If we seek to avoid these position-in-queue issues, we must establish consistency in pricing customers over time (intertemporal equity). This can only be achieved by pricing similar customers similarly even when they connect at different points in time. This is what the Balance Point seeks to achieve.

157. The Balance Point concept was criticised in some of the submissions on several grounds:

- That the Balance Point is novel and an innovation[61];
- That the Balance Point is not linked to a concept of economic efficiency, but rather is based on a concept of equity[62]; and
- That the Balance Point is 'too high' as an upper limit for charges – being above incremental cost it may deter some efficient connections.[63]

158. We agree that the terminology of the "Balance Point" is, to our knowledge, original to this proposal. We also agree that the Balance Point is above incremental cost and therefore may deter some efficient connections. Frontier writes:

> "As indicated above, economic efficiency can be promoted by setting charges in a way that is least likely to distort efficient decision making; recognising that economic efficiency is concerned with the future rather than past sunk decisions. While the balance point is below stand-alone cost, and so there is no cross-subsidy involved, it is our view that a price above the neutral point up to the balance point, risks discouraging efficient connections proceeding. This is because the price would be above the costs directly caused by the connection, which are the incremental costs, and so contribute to sunk cost recovery. However, as previously noted, there is no efficiency benefit to be gained from signalling a sunk cost".[64]

159. But, in a world in which there are common network costs to be recovered it may not be possible to charge all connecting customers only the incremental cost (NIC) of connection. In other words, each customer must

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[61] HoustonKemp, section 4.1, page 14.

[62] Incenta, para 17, page 8. Axiom, section 4.3, page 23. HoustonKemp, section 4.3.2, page 24.

[63] Frontier, section 2.5.1, page 16.

[64] Frontier, section 2.5.1, page 16.

also be charged a contribution to the common network costs. As we have seen, that contribution to common costs should be chosen in such a way as to minimise any harm from pricing above the Neutral Point. If we must charge some customers above incremental cost in order to recover the full costs of the network, then the desire to prevent intertemporal price discrimination reasonably leads us to suggest that similar customers should be charged similarly.

160. In regard to economic efficiency, HoustonKemp write:

> "The balance point – contains no information about economic efficiency. Although the Authority's consideration of this 'balance point' references efficiency, the key principle motivating the role of the balance point in the Authority's framework for connection charges is not efficiency and appears to be equity. This central consideration is difficult to reconcile with the Authority's statutory objective, which refers to economic concepts of efficiency and competition".[65]

161. Similarly, Incenta writes:

> "Implicit in the Authority's analysis is that an equitable outcome between successive vintages of customers would be one where each customer contributes the incremental cost it causes and then makes a similar contribution to the common costs of the network. … [A]chieving outcomes that are broadly equitable between vintages of customers is typically seen as a key design principle of utility pricing – and connection prices in particular – and so the Authority should be given credit for the prominence it has provided to equity issues".[66]

162. We agree that it is possible to view the Balance Point through a lens of equity. However, we have emphasised the role that the Balance Point plays in providing an assurance to connecting customers that they will not experience price discrimination, which could potentially undermine any investments they have made, deterring their attempt to seek connection in the first place. This is an efficiency argument.

163. We note that the Authority mentioned efficiency when discussing the benefits of the Balance Point. We agree that there is an efficiency basis for the Balance Point concept – based primarily on allowing the EDB to recover its common costs while preventing price discrimination between customers.

164. Frontier seem to argue that any contribution to common network costs should be recovered through on-going distribution charges:

> "Based on our view that economic efficiency is promoted through customers paying for the incremental costs of their connection, it is our view that it is only the incremental revenue and incremental costs that should form part of the reconciliation and that there is no need or benefit in identifying 'network costs' that should be funded by standard ongoing network charges. From an economic efficiency perspective, we recommend that reconciliation reports focus solely on incremental costs and revenues. Recognising that these are relevant for an economically efficient signal for network connections. Identifying 'network costs' separately is unnecessary, as these should be funded through standard network charges, not connection-specific charges."

165. We disagree. While it is correct that setting connection charges equal to the NIC would promote economic efficiency in a narrow sense, this may prevent the distributor from recovering a contribution towards the common cost of providing the network. In our view it would be valuable to have the reconciliation reports separately identify both the incremental cost (the NIC) and the contribution to common costs. We understand that the Authority does not seek to mandate whether on-going charges should cover all of, part of, or more

[65] HoustonKemp, Executive Summary, page i.

[66] Incenta, para 18, page 8.

than the on-going distribution costs and the common network costs. That is a decision that is left to the distributor. We can see no reason to insist that network costs should be funded through standard network charges. In any case, if we are to ensure that similar customers are treated similarly with respect to the common costs then it remains necessary to identify the incremental costs and revenue of that customer as well as any contribution to the network common cost.

4.2.4. Regulation of Upfront vs Ongoing charges

166. Some of the submissions claim that the Authority's proposals to set connection charges between the Neutral Point and the Balance Point would require an EDB to set connection charges *below* the direct incremental cost of connection, which would then give rise to the need to recover the balance through the ongoing charges. For example, Axiom writes that "the Authority's calculation of the 'efficient' capital contribution is lower than the incremental cost of providing access, along with a share of common sunk costs".[67]

167. HoustonKemp similarly write:

> "The neutral point, which represents the lower bound of the Authority's preferred range of connection charges, reflects pricing below the incremental cost of connection services, which in turn can be expected to:
>
> - inefficiently transfer risks away from connection applicants by deferring the recovery of connection costs by up to thirty years and providing for outstanding costs to be recovered from other customers if the connecting party disconnects earlier than was assumed; and
> - deter competition for connection services by allowing connection charges to fall below levels that could be sustained in a competitive market, such that alternative service providers would be unable to match these charges."[68]

168. We believe that the claim that the Authority's proposals require setting connection charges below the direct incremental costs of connection reflects a misunderstanding. The misunderstanding may have arisen from the equation used in para 7.59 of the Consultation Paper. The Authority expressed this equation as follows:

$$CC = (IC - IR) + NC$$

Where:

- CC is the capital contribution
- IC is the total incremental cost of connection (the upfront cost of connection assets plus the on-going incremental cost of providing distribution services)
- IR is the on-going incremental revenue from distribution charges; and
- NC is the contribution to the common costs of the network.

169. It may be clearer to separately identify the upfront and on-going components of the cost and revenue. This yields the following formulation of the equation:

$$CC = UIR = UIC + (OIC - OIR) + NC$$

Here:

- UIR is the upfront incremental revenue (which is here equal to the capital contribution)
- OIR is the on-going incremental revenue (that is, the revenue from on-going distribution charges)
- UIC is the upfront cost of connection (that is, the cost of connection assets)
- OIC is the on-going cost of providing distribution services.

[67] Axiom, section 4.2, page 15.

[68] HoustonKemp, Executive Summary, page i.

170. Expressed in this way, we can see that the pricing proposal does not necessarily require that the connection charge CC is set below the direct incremental cost of connection UIC. If the on-going charges OIR exceed the on-going costs OIC, the connection charges may still exceed the direct incremental costs if there is a contribution to the common costs of the network NC.

171. We understand that the "full reform" pricing proposals that have been put forward to date do not specify or proscribe the balance between upfront and ongoing charges. An EDB which is currently charging connection charges which are substantially below the direct incremental cost ($CC = UIR < UIC$) would not (necessarily) be required to raise those charges; an EDB which is currently charging connection charges which are substantially above the direct incremental cost ($CC = UIR > UIC$) would not be required to lower the connection charges.

172. Several expert reports raised arguments that the Authority should *not* be indifferent in the balance between upfront and ongoing charges. These submissions argued that the Authority should actively favour a balance in which connection charges are set to cover all of the direct costs of connection ($CC = UIR \geq UIC$).

173. Specifically, the arguments raised were as follows:

- An argument based on the *stranding risk* – if the connection charges are below the incremental cost of connection the costs of connection must be recovered in on-going charges over time. If, for some reason, the connection assets cease to be useful before the end of their economic life there will be an unrecovered cost – that is, a risk of stranded assets. This risk of stranded assets must be allocated in the system (and will likely lead to higher charges for the remaining customers).
- An argument based on *contestability* – if the connection charges are below the incremental cost of connection, it is harder (and may be infeasible) to establish effective contestability (that is, competitive third party provision) of the connection assets.
- An argument based on *customisation of charges* – if the connection costs vary across customers and if the ongoing charges are not differentiated or customised to individual customers, then the connection charges must vary to reflect the varying cost of connection.

174. These arguments are discussed further below. Our view is that these arguments are not directly relevant to the policies proposed by the Authority at this stage (which, as we have noted, do not directly constrain the balance between upfront and ongoing charges). These arguments might become relevant in the future if the Authority sought to directly control the level of upfront charges. We have not carried out an analysis of such controls. At this stage we merely observe that there are also arguments in favour of lower upfront charges (e.g., based on differences in the cost of capital faced by the connecting party and by the EDB). These arguments are explored further in the box below.

Is there a case for a constraint on up-front charges alone?

Throughout this report we have emphasised that the concepts of the Neutral Point and the Balance Point do not directly constrain the upfront connection charges alone – rather, they act as a *joint constraint* on both the upfront connection charges and the on-going charges. In particular, we have emphasised that the concepts of the Neutral Point and the Balance Point do not necessarily require that the upfront connection charges be set at a level above or below the direct incremental cost of the connection assets. The concepts of the Neutral Point and the Balance Point are a constraint on the *sum* of the upfront and on-going charges. If the EDB has flexibility in how it sets the on-going charges for a given customer, it follows that the EDB has flexibility in how it chooses the upfront charges – provided the sum of the upfront and on-going charges satisfies the requirements of the Neutral Point and the Balance Point.

However we do not wish to leave the impression that, when pricing in compliance with the Neutral Point and Balance Point, an EDB will *always* necessarily have discretion over how to set the upfront connection charges. It

may well be the case that an EDB does not have flexibility in how it sets the on-going charges for a customer. As we noted in section 4.2.4 above, setting different on-going charges for a customer requires assigning that customer to a distinct tariff class, and maintaining the tariffs in that class at a higher or lower level relative to other tariff classes for some time into the future. It may be complex and inconvenient for an EDB (Frontier mentions "administrative difficulties") to maintain different tariffs for different cohorts or different generations of connecting customers. Instead, EDBs may prefer to have a very limited number of tariff classes and require that all new connecting customers be assigned to one of the existing tariff classes.

If the EDB is constrained, in some way, in how it sets the on-going charges, it follows that its flexibility to set the upfront charges – while maintaining compliance with the Neutral Point and the Balance Point – will also be constrained. If a connecting customer can only be assigned to a very limited number of existing tariff classes for the on-going charges, it follows that the upfront charges will also be constrained, while still maintaining compliance with the Neutral Point and the Balance Point.

Are there any other reasons why the regulator might prefer a particular level of upfront charges? That is, should a regulator prefer lower upfront charges (combined with higher on-going charges) over higher upfront charges (combined with lower on-going charges)? There are a couple of different reasons:

- **Differences in financing costs** (i.e., differences in the cost of capital). If the EDB can systematically borrow funds at a lower rate than connecting parties, it might be more efficient for the EDB to charge lower upfront charges (and to finance the connection costs through higher on-going charges) than for the connection assets to be paid for upfront by the connecting party.

- **Differences in risk exposure.** An individual connecting party may not be certain of needing an on-going connection for the life of the connecting assets. If the connecting party is required to pay upfront for the connection assets, then, in the event the business of the connecting party fails, the connecting party is highly unlikely to be able to recover the remaining cost of the connection asset. In contrast, the EDB may be able to use the connection asset to provide services to another connecting party and so will be able to recover the on-going value of the asset. In other words, a high upfront charge places greater risk on the connecting party than a low on-going charge, event when the present value of the charges is the same.

Finally, we make the observation that, under the current regulatory regime, the setting of the on-going charges is not entirely independent of the upfront charges. Since the upfront charges are subtracted from the RAB, in a steady-state equilibrium with constant charges, higher connection charges would be associated with a lower RAB, and lower on-going charges, while lower connection charges would be associated with a higher RAB, and higher on-going charges. In the status quo, in a steady-state the Neutral Point and Balance Point concepts are likely to be satisfied in the long-run. However, this is a special case.

NIC and stranding risk

175. In regard to the stranding risk Axiom Economics writes:

> "Deferring the recovery of a significant portion of upfront connection costs – potentially for up to thirty years – would lead to higher ongoing usage prices for existing customers. Those customers would also be left to shoulder the burden of any unrecovered costs if connecting parties disconnected earlier than expected. This would inefficiently – and arguably unfairly – shift risk from new connection applicants to existing customers."[69]

[69] Axiom Letter, page 12.

176. In a world of on-going growth in demand for electricity, the risk of a standard-sized connection close to the existing network being left unemployed for an extended period is low. Stranding risk is a larger potential problem for unusually-sized connections or connections in more remote locations.

177. It is correct that setting connection charges below the direct costs of connection plus the contribution to network costs would give rise to a deficit which must be recovered through on-going charges:[70]

$$CC = UIR = UIC + (OIC - OIR) + NC < UIC + NC \Leftrightarrow OIR > OIC$$

178. When upfront costs are recovered through on-going charges, if, the connection asset ceases to be utilised before the end of its technical life, and if redeployment of those assets is infeasible, then there arises a stranding risk. This cost would need to be recovered from charges to other customers. As Axiom notes: "it would be neither efficient nor equitable for 'stranding' costs to be smeared across customers who have not caused them to be incurred."[71]

179. It is correct that the balance between upfront and ongoing charges affects the allocation of the risk of stranded assets (the risk that the connection assets will cease to provide a revenue stream before the end of their economic life). Depending on the level of the upfront charges, this risk could be borne by the connecting party, or by the broader customer base, or any combination in between.

180. However, we emphasise again that the Authority's proposals to date *do not mandate* that the connection charges are below the direct or upfront incremental costs (plus a contribution to the common costs of the network). An EDB may choose to set the connection charges equal to the upfront incremental costs plus the contribution to the common costs of the network, in which case there is no deficit to be recovered and no risk of stranded assets.

181. Even if the Authority did, in the future, mandate a specific level of the upfront charges, there are other ways of ensuring that stranding risks are not socialised to the broader set of customers. For example, connecting parties might be required to provide bank guarantees guaranteeing the revenue stream from the connection asset for a certain number of years. Another approach is to charge termination fees for disconnecting parties. The stranding risk may also be mitigated through careful choice of the economic life of the connection asset.

182. These tools could be used where the connection asset is sufficiently unusual that re-deployment of the asset is not seen as likely. Houston Kemp notes that the AER permits prepayments or financial guarantees to be sought from the access seeker. HoustonKemp quotes the AER as follows:

> "Securities fees, whether by prepayment or financial guarantee, help to insure DNSPs [distribution network service providers] against the risk of failing to collect the total estimated incremental revenue associated with a connection offer. In the absence of a security scheme, if the DNSP does not collect the total estimated incremental revenue, then the shortfall would eventually be recovered through higher network tariffs to all other network users".[73]

NIC and competition for connection assets

183. Some submissions argued that the requirement to use the Neutral Point as a price floor would undermine competition in the market for connection services. For example, Axiom Economics writes:[74]

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[70] Or through other charges such as fees for disconnection. Axiom rightly points out that such charges are difficult to enforce.

[71] Axiom, section 4.2.2, page 17.

[73] HoustonKemp, section 6.4, page 33.

[74] Houston Kemp make the same point.

> "If upfront connection prices were set below incremental costs, only distributors – or contractors directly engaged by them – would be able to undertake such works. Independent or unaffiliated providers would be unable to match those artificially low charges."[75]

184. We agree that it is generally desirable to allow third parties (including the connecting customer) to have the option to provide the connection assets. This limits the ability of the EDB to over-charge for connection services, to over-provide the connection service (i.e., gold-plating), or to provide it inefficiently.

185. In the case where the EDB charges all of the upfront connection costs in the form of upfront charges it is clear that requiring contestability for the connection assets is relatively easy – the regulatory framework could simply require that the customer either (a) pay the upfront charge or (b) provide the connections assets (to a given specification and standard) in kind. This allows the customer the potential to seek third-party providers for the connection assets (potentially from a list of approved suppliers provided by the EDB).

186. What about the case where the upfront connection charges are *below* the upfront costs? If the upfront connection charges (by the EDB) are below the cost of the connection assets, the EDB recovers the shortfall through the on-going charges over time. In this case, allowing contestability in the provision of connection assets would require that the EDB makes a lump-sum payment to the third-party provider of connection assets in the amount equal to the difference between the present-value of the on-going revenue and the on-going costs. With such a lump-sum payment, the customer could, as before, "shop around" for the best provider of connection assets. We understand that some EDBs (which require connecting parties to provide the connection assets themselves) have a practice of making a lump sum contribution to connecting parties to assist them in the provision of connection assets.

187. In any case, as we have emphasised above, the Authority's proposals do not, at this stage, mandate the level of the upfront charge. If the level of the upfront charge was directly controlled in future, consideration could be given to the implications for contestability in the provision of connection assets.

Customisation of charges

188. There is another argument in favour of setting connection charges equal to the direct costs of connection. This argument is based on the observation that on-going charges are not usually differentiated according to the individual customer. If connection costs vary across customers and if on-going charges are not differentiated across customers, then it follows that any variation in the connection costs must be reflected in the connection charges. This argument is made by Frontier:

> "While, in theory, it would be possible to adjust ongoing charges to provide this signal to customers, this would introduce substantial administrative difficulties. This is because it would require every customer, or small group of customers, to have an individual tariff maintained specifically for them over the life of the connection".[76]

189. This argument does not imply that the connection charges must be set equal to the direct cost of connection, but it does suggest that variation in connection costs should be reflected in variation in the upfront connection charges, as opposed to ongoing charges.

190. Again, since the Authority is not proposing to mandate the level of the upfront charge, we do not consider this argument relevant at this stage. If, in the future, it is considered desirable to mandate the level of the

[75] Axiom Letter, page 12.

[76] Frontier, page 13.

upfront charge, consideration could be given to ensuring that there is sufficient scope for variation in the combination of the upfront and ongoing charges to reflect the variation in the connection costs.

4.3. Could the Problem be better solved by the Commerce Commission?

191. Several parties argued that the problems identified by the Authority would be better addressed by changes to the Incremental Rolling Incentive Scheme (IRIS) regime or the price-quality paths administered by the Commerce Commission. For example, Axiom writes:

> "The Authority's proposed solution is to fundamentally reform the connection pricing framework. This proposal would have enormous ramifications for the 29 EDBs, all of which would have to spend considerable time and effort modifying their pricing methodologies. … If the 'root cause' of the alleged problem is the incentives provided via the Part 4 price paths, one might expect the optimal solution to be found in addressing the issue via the Commission's input methodologies (IMs) or the reset methodology. …
>
> Simply put, it seems counterintuitive to address alleged issues with the incentive properties of the *revenue cap* through a complete overhaul of *pricing.* Ergo, even if the initial diagnosis is accurate (which is questionable), the prescribed 'cure' (connection price reform) and the party proposed to administer it (the Authority) do not appear to be optimal. While considering alternative solutions is beyond the scope of this report, we believe it is highly likely that the Commission would be the more appropriate entity to develop and implement such solutions".[77]

192. Similarly, HoustonKemp write:[78]

> "[T]he potential concerns raised by the Authority about distributors' incentives to fund capital expenditure through connection charges can most directly be resolved through modest amendments by the Commerce Commission that ensure net capital expenditure is unaffected by increases in connection charges, rather than through the Authority changing an entirely different element of the regulatory framework and thereby creating additional concerns."

193. There is no disagreement that the Authority has the power to regulate connection charges. The Authority's power to set pricing methodologies operates alongside regulation by the Commission under Part 4 of the Commerce Act, while allowing for differences in their respective statutory functions, purposes and objectives. Section 32 of the Electricity Industry Act 2010 provides that:

> "the Authority must not purport to regulate anything in the Code that the Commission is authorised or required to do or regulate under Part 4 of the Commerce Act 1986 except for: (a) quality or information requirements for … distributors, in relation to access to … distribution networks: (b) pricing methodologies for … distributors."

194. But should the regulation of connection charges be left to the Commerce Commission? In our view, changes to the regulatory framework for EDBs administered by the Commerce Commission would not easily mitigate the market power of EDBs with respect to connection charges. Specifically, it is not clear to us that the revenue from connection charges could be brought within the existing revenue cap applying to all the other charges of an EDB administered by the Commerce Commission[79], for the following reasons:

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[77] Axiom, section 2.3, page 8.

[78] Houston Kemp re-states this point in their response to submissions.

[79] To an extent, connection charges already affect the level of the revenue cap in the status quo. This is because forecast connection charges are subtracted off the RAB, so as increase in forecast connection charges reduces long-run revenue. But this relationship does not constrain connection charges ex post (once the revenue cap is set).

195. First, the existing revenue cap applies to services that are all delivered within a specific block of time (e.g., one year). Revenue from connection charges must be traded off with revenue from on-going charges over a long period of time. It is not clear that this could be achieved by simply including revenue from connection charges within the annual revenue cap. At least careful thought would need to be given to resolving the mis-match in time dimensions.

196. Second, revenue caps are most effective for services which have a low marginal cost. Revenue caps are acceptable for many distribution services where the marginal cost is low (or where it is considered desirable to not incentivise EDBs to encourage over-consumption of electricity). But this is not the case for connection services. Connection assets can be particularly costly. Where the marginal cost of the service is high an EDB operating under a revenue cap has an incentive to reduce the provision of that service (i.e., to refuse an expansion in the service and/or to seek to reduce provision of the service). If connection charges were brought within the revenue cap in a simplistic way EDBs would have an incentive to deny and/or delay connections.

197. These problems could, potentially be addressed by implementing a more sophisticated form of cap. For example, the revenue cap could be adjusted by the volume of connections. If it were possible to establish a mechanism which made the revenue cap depend on the forecast cost of connections in some way (this could be difficult) then in principle the EDB would retain the incentive to supply new connections *and*, at the same time, any increase in the charge per connection would require a reduction in other ongoing charges. This option is discussed by Incenta:

> "The two options for aligning the EDBs incentives [regarding connection charges] would be to have the capital expenditure allowances that are used in the IRIS adjusting with the level of connection activity, or to apply a revenue-driver (i.e., an adjustment to the revenue cap) that again relates to the level of connection activity. To this end we note that during the Commerce Commission's recent review of the Input Methodologies for the EDBs, several stakeholders proposed that the capital expenditure allowances used in the IRIS should adjust with the level of connection activity, and so address the incentive issue noted earlier. While the Commission adopted this suggestion as an option where a customised price path is applied, it did not adopt it for the DPP regime. However, the Commission's decision for not applying it in the latter case stemmed from the greater difficulty of devising an appropriate adjustment in the context of a DPP, and the Commission has committed to gather more information in relation to the relevant characteristics of customer connections that may allow it to reconsidering this matter in the future".[80]

198. As Incenta notes, a scheme of this kind was considered by the Commerce Commission for inclusion in the DPP. Recently the Input Methodologies were amended to allow schemes of this kind to be included in a Customised Price Path (CPP).[81]

199. In principle, this scheme could estimate unit rates for different connection types and then allow a revenue adjustment ex post based on the out-turn volume of connection for each connection type. However, problems would likely remain, since connection costs would likely vary even with categories of connection types. The EDB would retain an incentive to refuse connection for customers with an above-average

[80] Incenta, para 21, page 9.

[81] See the discussion about a new 'connections volume wash-up mechanism' in the Input Methodologies for CPPs in the Commerce Commission's final decision on the Input Methodologies Review ("Financing and incentivising efficient expenditure during the energy transition topic paper", paragraph 3.225 and following).

connection cost for that category. In addition, the cap, based on the average connection cost could still allow significant market power to be exercised on an individual customer.[82]

200. In any case, many of the issues that the Authority is trying to address do not fit easily or simply into the existing revenue cap regime administered by the Commerce Commission. This includes, say, "position in queue" issues ("first mover disadvantage" or "last straw"), policies to spread risks (such as a "pioneer" scheme) or to require the disclosure of information to assist connecting parties in their negotiations with EDBs. It is not obvious to us that the regulation of connection charges is best addressed by changes to the Input Methodologies.

[82] To see this, let's suppose that the EDB estimates that ten customers will connect in a given category, and the average cost of connection is, say, $10,000 per connection - but could vary from $5,000 to $15,000. Let's suppose that the revenue cap is augmented so that the EDB can receive an additional $10,000 for each connection it carries out. Then, ex post, the EDB will have an incentive to refuse connection to customers with connection costs above $10,000. Moreover, in the event that the EDB connects nine customers, with a total cost of, say, $55,000, if the EDB charges each of these customers at cost, the EDB will be allowed to charge up to $45,000 for connecting the tenth customer, which could be well above cost.

5. OTHER ISSUES

201. In its proposals, the Authority included a proposal for a "Pioneer scheme" which aims to reduce the extent of first-mover-disadvantage by requiring that, in the event of subsequent connections which share the same assets, the EDB will pay rebates to the first mover. This proposal received some support. For example, Frontier:

> "We agree with the Authority that a pioneer scheme can address first-mover disadvantages which may distort investment and impede development of the electricity network. A pioneer scheme ensures that the first connecting party is not left exposed to the full cost of its connection where subsequent connections are anticipated. It ensures that all customers connecting to a new area contribute equitably to the costs of extending the electricity network, which in turn encourages timely and efficient network connections. Additionally, the scheme prevents subsequent connections from free-riding on infrastructure funded by the initial connecting party. This ensures that all connecting parties face appropriate cost signals, including subsequent connecting parties, thereby promoting efficient decisions about the timing and location of connections".[83]

202. Several of the expert reports noted that the Pioneer scheme proposal may be costly to administer and may yield relatively limited benefits.[84] For example, Incenta note that a Pioneer scheme involves on-going monitoring and enforcement costs.

> "[P]ioneer schemes are likely to have a non-trivial cost to operate, as the *ad hoc* nature of the projects to which they apply means that administration is likely to involve largely manual processes. In addition, pioneer schemes change the nature of the connection transaction from a transaction that occurs at a single point in time to one that must be monitored, executed and enforced over an extended period".[85]

203. Incenta also note that, even where they are available in Australia, Pioneer schemes are not used all that often. Incenta argue that if the Authority chooses to retain the Pioneer scheme proposal it should (a) involve a minimum payment requirement; (b) include a simple methodology for calculating residual asset value; and (c) not extend too far into the future. Frontier also recommend allowing the EDB to deduct a reasonable administrative fee from the refund or rebate to cover the costs of administering the process.

204. We acknowledge these concerns and agree that a final decision on the implementation of Pioneer schemes will require a balancing of the potential benefits against the administrative costs.

205. In its report, Sapere argues that the Authority could have gone further in its proposals. For example:

- Sapere argues that EDB should be required to provide information – in a digitally searchable manner – which allows connecting parties to identify potential connection locations and to trade off hosting capacity and price. This proposal seems similar to the Network Opportunity Maps that are available in Australia.[86]
- Sapere also argue for greater consistency in processes and technical standards for connection and mandatory maximum response times to connection requests.

206. We have not formed a view on these proposals.

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[83] Frontier, section 5.4.3, page 30.

[84] See Frontier, page 31.

[85] Incenta, para 34, page 14.

[86] https://www.energynetworks.com.au/projects/network-opportunity-maps/

6. CONCLUSIONS

207. The Authority's proposals for improving the regulatory framework for distribution connection charges attracted a number of submissions, many of which commissioned independent economic analysis. Although some of that economic analysis was supportive of the approach of the Authority, much was rather critical. We have assessed the economic expert reports in detail. Putting aside the commentary on the reliance limits, our view is that, while the export reports highlighted some weaknesses in the Authority's Consultation Paper, overall the proposals of the Authority remain well supported.

208. In regard to evidence of a problem, we accept that the Authority could have done more to document - either quantitatively or qualitatively – the problems that are arising under the current regulatory framework. At the same time, however, we note that there is little dispute that EDBs have market power over connection charges, connection charges are widely regulated in other jurisdictions, and, setting aside the reliance limits, the Authority's fast-track proposals do not impose significant regulatory constraints on the discretion of EDBs. In this light we consider that detailed investigation of evidence of a problem is unnecessary.

209. In regard to the pricing concepts (the Neutral Point and Balance Point), the respondents made a range of criticisms. Although this terminology is somewhat novel, we consider that, correctly understood, these proposals are extensions or applications of conventional concepts in regulatory pricing theory. We consider that some of the criticisms reflect, in part, a misunderstanding of the proposals of the Authority. In particular, there appears to be a misunderstanding that the proposals do not mandate a particular structure between upfront and on-going charges. There could be reasons for preferring, say, low upfront charges (and higher on-going charges) but these do not form part of the regulatory proposals being put forward by the Authority.

210. We remain of the view that this work program (both the fast-track and full reform) offers the potential to materially improve the regulatory framework for distribution charges in New Zealand, thereby facilitating electrification of the NZ economy.

UK

Queens House

55-56 Lincoln's Inn Fields

London WC2A 3LJ

T. **+44 (0)20 7269 0210**

E. **info@cepa.co.uk**

www.cepa.co.uk

Australia

Level 20, Tower 2 Darling Park

201 Sussex Street

Sydney NSW 2000

T. **+61 2 9006 1308**

E. **info@cepa.net.au**

www.cepa.net.au

Cepa-ltd **@cepaltd**